

# London Borough of Hackney SFRA Supplementary Information

2018

## Quality information

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## Revision History

Revision	Revision date	Details	Authorized	Name	Position
Draft	Nov 2018				

Prepared for: London Borough of Hackney

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# 1. Introduction

## Background

- 1.1 In 2009 London Borough (LB) of Hackney completed a Sequential Test<sup>1</sup> which identified that the majority of development proposals for the borough were located within Flood Zone 1 associated with areas of 'low probability' of flooding. The exception was the regeneration area of Hackney Wick located adjacent to the River Lee in the eastern part of the Borough.
- 1.2 In September 2010 AECOM (formerly Scott Wilson) completed a Level 2 Strategic Flood Risk Assessment<sup>2</sup> (SFRA) for the Borough. The assessment enabled the application of the PPS25 Exception Test to sites included in LB of Hackney's Local Development Documents presented at that time, in particular the Area Action Plan (AAP) for Hackney Wick.
- 1.3 More recently, in 2018, the Environment Agency has advised the LB of Hackney that additional information is required to 'focus on the existing areas of risk, considering the impacts of climate change, and whether this will result in a greater extend of flooding within the Borough'.
- 1.4 This technical note describes supplementary flood risk information which has become available since the production of the Level 2 SFRA in 2010 to provide LB of Hackney with the latest flood risk information to use as their evidence base though the planning process. This statement should not be read in isolation and should be considered supplementary information to be used in parallel with the Level 2 SFRA (2010) and the LB Hackney Surface Water Management Plan<sup>3</sup> (SWMP) developed as part of the Drain London Project in 2013.

## Flood Risk and Planning Policy

- 1.5 There is an established body of policy and guidance documents which are of particular importance when considering development and flood risk. These are identified in Table 1-1 along with links to the relevant documents where these are available.
- 1.6 The largest change to have occurred since 2010 was in March 2012 when the National Planning Policy Framework (NPPF) and Technical Guide replaced Planning Policy Statement 25 (PPS25). The NPPF has since been revised in July 2018. This policy document sets out the governments planning policies for England (including flood risk) and how these are expected to be applied. The policies are largely similar to PPS25, with the largest changes surrounding the application of climate change and the importance of considering all sources of flood risk.

**Table 1-1 Flood Risk Policy and Guidance Documents**

National Policy Documents		
National Planning Policy Framework (para. 99-104)	The NPPF was published by the UK's DCLG in March 2012, consolidating over two dozen previously issued documents called Planning Policy Statements (PPS) and Planning Policy Guidance Notes (PPG) for use in England. The NPPF has been revised on the 24th July 2018.	<a href="https://www.gov.uk/government/publications/national-planning-policy-framework--2">https://www.gov.uk/government/publications/national-planning-policy-framework--2</a>
Flood and Water Management Act (2010)	Provides for a more comprehensive management of flood risk and formalises risk management roles and responsibilities.	<a href="http://www.legislation.gov.uk/ukpga/2010/29/pdfs/ukpga_20100029_en.pdf">http://www.legislation.gov.uk/ukpga/2010/29/pdfs/ukpga_20100029_en.pdf</a>
Flood Risk Regulations (2009)	The Flood Risk Regulations transpose the EU Floods Directive into law in England. It aims to provide a consistent approach to flood risk across Europe.	<a href="http://www.legislation.gov.uk/uksi/2009/3042/pdfs/uksi_20093042_en.pdf">http://www.legislation.gov.uk/uksi/2009/3042/pdfs/uksi_20093042_en.pdf</a>
National Strategy for Flood and Coastal Erosion Risk	This strategy provides the framework for all flood and coastal risk management authorities, setting out long-	<a href="https://www.gov.uk/government/publications/national-flood-and-coastal-erosion-risk-">https://www.gov.uk/government/publications/national-flood-and-coastal-erosion-risk-</a>

<sup>1</sup> London Borough of Hackney Core Strategy Proposed Submission PPS25 Sequential Test, 2009 <https://www.hackney.gov.uk/cs-evidence-base>

<sup>2</sup> London Borough of Hackney Level 2 SFRA, 2010 <https://www.hackney.gov.uk/cs-evidence-base>

<sup>3</sup> London Borough of Hackney Surface Water Management Plan, 2013 <https://www.hackney.gov.uk/cs-evidence-base>

Management (Defra, Environment Agency, 2011)	term objectives for managing flood and coastal erosion risks.	<a href="#">management-strategy-for-england</a>
Adapting to Climate Change: Advice for Flood and Coastal Erosion Risk Management Authorities' (Environment Agency 2016)	This document outlines new climate change allowances for river flood flows and extreme rainfall for each of the river basin districts in England.	<a href="https://www.gov.uk/government/publications/adapting-to-climate-change-for-risk-management-authorities">https://www.gov.uk/government/publications/adapting-to-climate-change-for-risk-management-authorities</a>
<b>Regional Flood Risk Policy</b>		
Thames Estuary 2100 Plan	How the Environment Agency is planning to manage tidal flood risk in the Thames estuary until the year 2100. Specific policy from this document relating to each Borough is discussed in more detail within corresponding chapters.	<a href="https://www.gov.uk/government/publications/thames-estuary-2100-te2100">https://www.gov.uk/government/publications/thames-estuary-2100-te2100</a>
<b>Guidance Documents</b>		
Planning Policy Guidance – Flood Risk and Coastal Change	Describes the planning approach to development within areas at risk of flooding from all sources	<a href="http://planningguidance.planningportal.gov.uk/blog/guidance/flood-risk-and-coastal-change/">http://planningguidance.planningportal.gov.uk/blog/guidance/flood-risk-and-coastal-change/</a>
Environment Agency Standing Advice	Guidance on information to be included within robust site specific FRAs	<a href="https://www.gov.uk/guidance/flood-risk-assessment-standing-advice">https://www.gov.uk/guidance/flood-risk-assessment-standing-advice</a>
<b>Local Documents and Strategies</b>		
London Borough of Hackney Surface Water Management Plan (SWMP) 2013	A Surface Water Management Plan (SWMP) is a framework to understand the causes of surface water flooding and agree the most cost effective way of managing surface water flood risk	<a href="https://hackney.gov.uk/flooding-drainage">https://hackney.gov.uk/flooding-drainage</a>

## Climate Change Allowances

- 1.7 In accordance with NPPF, proposals for new developments must demonstrate how flood risk will be managed both now and over the lifetime of the development taking climate change into account. In previous SFRA's and site specific Flood Risk Assessments (FRAs) an allowance of 20% was added to the 1% AEP return period to account for the increase in flood risk due to climate change.
- 1.8 In February 2016 the Environment Agency published updated guidance on climate change allowances in an update to the document 'Adapting to Climate Change: Advice to Flood and Coastal Erosion Risk Management Authorities'<sup>4</sup>.
- 1.9 The guidance reflects and assessment completed by the Environment Agency between 2013 and 2015 using United Kingdom Climate Projections 2009 (UKCP09) data to produce more representative climate change allowances across England. The updated guidance includes predictions of anticipated change for:
- Peak flow by river basin district
  - Peak rainfall intensity
  - Sea level rise
  - Offshore wind speed and extreme height

### Climate Change and Strategic Planning

- 1.10 For the purposes of strategic planning and completion of the Sequential Test, LPAs are advised to use the '2070 to 2115' 100 year development lifetime outlined in Table 1-2, of relevant to residential development.

<sup>4</sup> Environment Agency, 2016, Adapting to Climate Change: Advice to Flood and Coastal Erosion Risk Management Authorities <https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances>

For More Vulnerable, residential development this correlates to a climate change range of impacts of between + 35% and + 70% with respect to the 1% AEP<sup>5</sup>.

**Table 1-2 Climate change allowances for the Thames River Basin<sup>6</sup>**

River basin district	Allowance category	Total potential change anticipated for '2020s' (2015 to 2039)	Total potential change anticipated for '2050s' (2040 to 2069)	Total potential change anticipated for '2080s' (2070 to 2115)
Thames	Upper end (90th)	25%	35%	70%
	Higher central (70th)	15%	25%	35%
	Central (50th)	10%	15%	25%

- 1.11 For the purpose of this supplementary information, available hydraulic modelling data for the River Lee<sup>7</sup> has been mapped for the 1% AEP flood event including 70% climate change allowance as described above. Please refer to Appendix A Figure 1 and 1A contained in this supplementary pack of information.

#### Climate Change and Site Specific Flood Risk Assessments

- 1.12 At an individual site level, when considering peak river allowances both the NPPF flood zone and flood risk vulnerability classification needs to be considered to confirm which range of climate change allowances should be assessed. This is detailed in Table 1-2.

**Table 1-3 NPPF Flood Zone and Vulnerability**

Flood Zone (Error! Reference source not found.)	Vulnerability (Error! Reference source not found.)	River Flow Allowances ( )
Flood Zone 2	Essential Infrastructure	Higher Central and Upper End
	Highly Vulnerable	Higher Central and Upper End
	More Vulnerable	Central and Higher Central
	Less Vulnerable	Central
	Water Compatible	None of the allowances
Flood Zone 3a	Essential Infrastructure	Upper End
	Highly Vulnerable	Development should not be permitted
	More Vulnerable	Higher Central and Upper End
	Less Vulnerable	Central and Higher Central
	Water Compatible	Central
Flood Zone 3b	Essential Infrastructure	Upper End
	Highly Vulnerable	Development should not be permitted
	More Vulnerable	Development should not be permitted
	Less Vulnerable	Development should not be permitted
	Water Compatible	Central

- 1.13 In order to determine which allowance category to use, the development lifetime should be considered. This should be judged based on the characteristics of development and applicants should be able to justify the chosen lifetime. Typically:

<sup>5</sup> For vulnerability classifications refer to Table 4-1 Hackney Level 2 SFRA or NPPF Table 2

<sup>6</sup> <https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances>

<sup>7</sup> Hydraulic modelling climate change outlines sourced from Environment Agency Hertfordshire North London (HNL) Package 1 modelling of the River Lee

- Residential developments should apply a minimum lifetime of 100 years, unless there is specific justification for considering a shorter period;
- Non-Residential developments should apply a 75 year lifetime.

1.14 Therefore, in this locality, if a residential (more vulnerable/100 year lifetime) development were proposed within Flood Zone 3a an allowance of between 35% and 70% should be applied typically to the 1% AEP to account for the potential impacts of climate change on peak river flows.

#### **Climate Change and Surface Water Flood Risk**

1.15 Although it is possible to make qualitative statements as to whether extreme rainfall is likely to increase or decrease over the UK in the future, there is still considerable uncertainty regarding the magnitude of these changes locally.

##### *Surface Water Climate Change at a Strategic Level*

1.16 The Environment Agency's Risk of Flooding from Surface Water (RoFSW) mapping is typically used to identify surface water flood risk. The RoFSW mapping does not include a specific scenario to determine the impact of climate change on the risk of surface water flooding. However, a range of three annual exceedance probability events have been undertaken, 3.3%, 1% and 0.1% AEP and therefore it is considered appropriate to use the 0.1% AEP event as a substitute dataset to provide a worst case scenario and an indication of the implications of climate change when considering site allocations at the strategic level. In addition, the SWMP for London Borough of Hackney included a climate change scenario which would provide a good reference point.

##### *Surface Water Climate Change at a Site Level*

1.17 When assessing climate change impacts for surface water runoff, consideration is given to the changes in peak rainfall intensity over the lifetime of the development. Where previously drainage design would include attenuation storage for the 1% AEP + 20% climate change allowance, this has increased to 1% AEP + 40% as outlined in Table 1-4 in accordance with the latest Environment Agency guidance (February 2016).

**Table 1-4 Changes to Peak Rainfall Intensity compared to a 1961-1990 baseline<sup>8</sup>**

Applies across all of England	Total potential change anticipated for '2020s' (2015 to 2039)	Total potential change anticipated for '2050s' (2040 to 2069)	Total potential change anticipated for '2080s' (2070 to 2115)
Upper estimate	10%	20%	40%
Central estimate	5%	10%	20%

<sup>8</sup> <https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances>

## 2. Available Flood Risk Datasets

### Fluvial Flood Risk

- 2.1 The NPPF still defines Flood Zones based on the probability of flooding, the same methodology as applied by PPS25 illustrated within Table 2-1 of the Level 2 SFRA. While the definition of fluvial flood risk remains the same, the data sets available to the Environment Agency and LB of Hackney have been revised.
- 2.2 In 2010 reference was made to the London Development Authority hydrodynamic modelling of the River Lee to provide further information on fluvial flood risk posed to Hackney, particularly in Hackney Wick. While this data had a comprehensive range of simulations, it did not account for climate change predictions which are now required as part of a SFRA.
- 2.3 Comparison between the 1 in 20 year LDA 2010 data and the 1 in 20 year River Lee shows very little variation, with Flood Zone 3b affecting a minimal area of Hackney Wick.
- 2.4 The latest modelling includes a 1% AEP (1 in 100 year) + 70% climate change model run which has been mapped as part of this pack of supplementary information. The hydraulic modelling data referred to in this supplementary information was completed as part of a separate Environment Agency scheme, called the Hertfordshire and North London (HNL) Package 1 modelling. While technically possible to extract from the hydraulic model, the latest hydraulic modelling outputs available for this report do not include flood depth, hazard or rate of onset mapping. Therefore, reference to the HNL Package 1 modelling should be used to inform flood extent information and the impact of climate change, while the 2010 data may be a good source of information relating to flood depths and hazards at the strategic site allocation stage.

### Surface Water Flood Risk

- 2.5 At the time of provision of the Level 2 SFRA in 2010, the Environment Agency had just published the national 'Areas Susceptible to Surface Water Flooding' mapping which was reproduced in Figure 08. This mapping was produced using a simplified method that excludes urban sewerage and drainage systems, excludes buildings and uses a single rainfall event to map surface water flood risk.
- 2.6 In 2013 the Environment Agency revised their national surface water flood risk mapping to identify those areas at risk of surface water flooding during three annual probability events:
  - > 1 in 30 year (3.3% AEP) – High Risk
  - Between 1 in 100 year (1% AEP) and 1 in 30 (3.3% AEP) - Medium Risk
  - < 1 in 1000 year (0.1% AEP) – Low Risk
- 2.7 This mapping, referred to as 'Risk of Flooding from Surface Water' (RoFSW), provides all relevant stakeholders with access to information on surface water flood which is consistent across England and Wales. The modelling helps to inform the Environment Agency when they take a strategic overview of surface water flood risk and should be used by the LB of Hackney in their capacity as Lead Local Flood Authority (LLFA) in their duties relating to the management of surface water flood risk.
- 2.8 The latest version of the mapping downloaded in 2018 to inform this supplementary information has been generated through a combination of new hydraulic modelling completed by the Environment Agency and a collation of modelled extents produced by some LLFAs.
- 2.9 The RoFSW modelling represents a significant improvement on previous mapping, namely the Flood Map for Surface Water (FMfSW) 2010, and the Areas Susceptible to Surface Water Flooding (ASfSWF) 2009, for example;
  - Increased model resolution to a 2m grid;
  - Representation of buildings and flow routes along roads and manual editing of the model for structural features such as flyovers;
  - Use of a range of storm scenarios; and,
  - Incorporation of appropriate local mapping, knowledge and flood incident records.
- 2.10 It should be noted that this national mapping still has the following limitations;

- Use of a sile drainage rate for urban areas;
  - It does not show the susceptibility of individual properties to surface water flooding;
  - The mapping has significant limitations for use in flat areas;
  - No explicit modelling of the interaction between the surface water network, the sewer system and watercourses is included; and,
  - In some areas modelling has not been validated due to a lack of surface water flood records.
- 2.11 The modelled extents from the RoFSW data have been used to inform this SFRA supplementary information and are presented in Appendix A Figure 2 and 2a. They do not show a great spatial variance to data presented in the 2010 Level 2 SFRA; more so, a greater confidence can be applied to the data which is presented at a higher resolution.
- 2.12 Reference should also be made to the LB of Hackney Surface Water Management Plan (SWMP) which was created in 2011. This report identifies areas where there is an increased flood risk from surface water and outlines potential options for mitigation and management of this form of flooding.

## Groundwater Flood Risk

- 2.13 The 2010 Level 2 SFRA does not include any mapping of flood risk posed by groundwater sources as at the time of writing there was limited mapping data available.
- 2.14 The latest Environment Agency groundwater flooding susceptibility data is referred to as 'Areas Susceptible to Groundwater Flooding' (AStGWF). This dataset indicates where groundwater may emerge due to geological and hydrogeological conditions. This information is shown as the proportion of each 1km grid squares where there is potential for groundwater emergence. The data does not show where flooding is likely to occur, but instead should be used at a strategic level to indicate areas for further investigation.
- 2.15 Groundwater flooding risks are often highly localised, and dependent upon geological interfaces between permeable and impermeable subsoils. It is therefore essential that an understanding of site specific ground conditions is achieved through site survey and/or review of detailed borehole data.
- 2.16 The AStGWF data should not be used on its own to make planning decisions at any scale, and, in particular, should not be used to inform planning decisions at the site scale.

## Other sources of flood risk

- 2.17 No additional information of flood defence improvements, risk of flooding from sewers or artificial sources has been included within this supplementary information over that contained within the 2010 Level 2 SFRA.

## 3. Sequential Test

- 3.1 The aims and application of the Sequential Test have not been revised since 2010 and reference should be made to the Level 2 SFRA. If additional sites have been identified through the local planning process, the Sequential Test will need to be updated to reflect any changes.

## 4. Exception Test

- 4.1 If the Sequential Test identifies that it isn't possible to locate all development in areas at low risk of flooding, e.g. Flood Zone 1, the Exception Test may be required. This process has been described in the Level 2 SFRA Section 4.2; however, the introduction of the NPPF has led to a change in the Exception Test as 'Part b) Redevelopment of previously developed land' is no longer included.
- 4.2 In order to pass the Exception Test, the NPPF Technical Guidance identifies two elements that need to be demonstrated/fulfilled to the satisfaction of the LPA:
- Part 1 - "It must be demonstrated that the development provides wider sustainability benefits to the community that outweigh flood risk, informed by the SFRA where one has been prepared; and,
  - Part 2 - A site specific Flood Risk Assessment must demonstrate that the development will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall."
- 4.3 Satisfying the Exception Test involves consideration of the reasons behind the selection of the site for development, from the sustainability appraisal, as well as consideration in planning and design, such that the site will remain safe and operational in the event of flooding. This may involve demonstrating:
- A sequential approach is taken to development site layout, such that within the site, the most vulnerable development is located in areas of lowest flood risk, unless there are overriding reasons to prefer a different location;
  - Provision of safe means of access and egress during a flood event;
  - Emergency evacuation procedures are developed, to be utilised following receipt of a flood warning;
  - Buildings are designed to be appropriately flood resilient and resistant, with essential services remaining functional in the event of flooding, and quick recovery following a flood;
  - Priority is given to the use of SuDS.
- 4.4 In order to determine Part 1) of the Exception Test, applicants should assess their scheme against the objectives set out in the LPA's Sustainability Appraisal.
- 4.5 In order to demonstrate satisfaction of Part 2) of the Exception Test, relevant measures, such as those presented within Section 5.6 of the 2010 Level 2 SFRA should be applied and demonstrated within a site specific FRA (as detailed in Section 5 of the Level 2 SFRA).

## 5. Summary

- 5.1 LB of Hackney has requested AECOM to review the 2010 Level 2 SFRA for their Borough. This process has shown that while there have been some notable updates to planning policy including the replacement of PPS25 with the NPPF, the approach to flood risk management largely remains the same.
- 5.2 Key points to note are:
- When preparing local plans, LB of Hackney must ensure that they use the updated fluvial flood risk mapping included within this SFRA to assess the impact of climate change across a range of allowances;
  - The risk flooding from 'other' sources must be considered fully in the planning process including reference to the updated surface water flood risk data sets included in this supplementary information;
  - Reference should be made to the LB of Hackney SWMP to identify areas where surface water flood risk could be increased, or where development may have greater potential to impact local surface water flood risk elsewhere;
  - The process of the application of the Exception Test has slightly altered since the 2010 Level SFRA was prepared (removal of the need for land to be previously developed).
- 5.3 Ideally, it would be sensible to have one report containing the Level 1 and Level 2 SFRA data so that there is one reference point for flood risk information. It is appreciated that at this time, that is not possible and is considered a 'nice to have' rather than a 'must have'.
- 5.4 If flood risk information from all sources is considered in parallel, the information required to provide a robust assessment of flood risk to inform development is possible.
- 5.5 A SFRA is always considered to be a 'living document' as additional data will become available. In the future it may be sensible to consider creating a more interactive SFRA available through the Council's website, where individual sections can be revised and updated as required. This is a similar format that the NPPF has adopted.

# Appendix A Document copies



