Kettering Strategic Flood Risk Assessment
Level 1
Main Report
Northamptonshire County Council
August 2019
# Revision Schedule

**Kettering Borough Level 1 Strategic Flood Risk Assessment 2019**

<table>
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<tr>
<th>Revision</th>
<th>Date</th>
<th>Details</th>
<th>Prepared by</th>
<th>Reviewed by</th>
<th>Approved by</th>
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<td>01</td>
<td>21/06/2019</td>
<td>1st Draft for client consultation</td>
<td>Phil Jones</td>
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<td>02</td>
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<td>Ruth Burnham</td>
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<td>Phil Jones</td>
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Executive Summary

A Stage 1 and Stage 2 Strategic Flood Risk Assessment (SFRA) were produced in 2005 by the Environment Agency (EA) covering Kettering and Wellingborough to ensure compliance with PPG25: Development and Flood Risk. A Level 1 and Level 2 SFRA update were produced in 2011 and 2010 respectively by Royal Haskoning, on behalf of Kettering Borough Council (KBC) and Borough Council of Wellingborough (BCW), to ensure compliance with PPS25: Development and Flood Risk, and in light of proposed development in Kettering Town Centre.

PPS25 has since been replaced by the National Planning Policy Framework (NPPF) and associated Planning Practice Guidance. There have also been a number of legislative and procedural changes, alongside updates to a number of flood and water data sets, modelling and mapping layers. These changes need to be reflected within the SFRA, to ensure that a sound flood and water management evidence base is available to support the plan-making process for development. In light of these changes, in May 2019 KBC commissioned Northamptonshire County Council (NCC) to prepare an updated Level 1 SFRA to satisfy the requirements of the NPPF.

The NPPF states that an SFRA is required to assess the risk to an area from flooding from all sources, now and in the future, taking account of the impacts of climate change, and to assess the impact that land use changes and development in the area will have on flood risk.

The NPPF requires Local Planning Authorities (LPAs) to review the variation in flood risk across their area, and to steer all development towards areas with the lowest probability of flooding from any source (now and in the future). Where there are no reasonably available sites and this cannot be achieved, the NPPF requires the LPA to demonstrate that there are sustainable mitigation solutions available that will ensure that the flood risk can be managed now and over the lifetime of the development should flooding occur.

Kettering Borough has undergone significant expansion historically and in recent years, with more growth still planned. This Level 1 SFRA update has considered all sources of flood risk based on information obtained through consultation with all Risk Management Authorities (RMAs) as specified within the NPPF. The assessment is compliant with the NPPF and will continue to inform all future land allocation and flood risk management needs within the Borough of Kettering.

A significant number of studies and strategies have previously reviewed the level of flood risk in the Borough, including the North Northamptonshire Flood Risk Management Study 2007, North Northamptonshire Flood Risk Management Study Update 2012, North Northamptonshire Detailed Water Cycle Strategy 2009, Kettering Green Infrastructure Delivery Plan 2018, Kettering Surface Water Management Plan 2019, KBC Stage 1 SFRA 2005, KBC Stage 2 SFRA 2005, KBC Level 1 SFRA 2011, KBC Level 2 SFRA 2010. This Level 1 SFRA updates this information and incorporates relevant data, recommendations and policies from these studies and strategies as appropriate, but no new modelling has been undertaken as part of this report.

The Borough covers an area of 23,350 hectares with an approximate population of 100,252 (ONS mid-2018 population projections). The Borough is expected to accommodate significant growth in the period to 2031, most of which will be focused in the town of Kettering. Smaller scale development will also take place at Burton Latimer, Desborough and Rothwell.

Housing and employment development will be accompanied by extensive development in Kettering Town Centre and by other infrastructure to support the growth. A significant proportion of the growth in Kettering Borough will take place through the East Kettering Sustainable Urban Extension,
which is planned to deliver 5,500 dwellings and associated development. In addition to this the Kettering Town Centre Area Action Plan makes provision for significant levels of retail, employment and residential development.

The Borough falls within both the River Nene catchment and the River Welland catchment. The main watercourses in the Borough are the River Ise (a tributary of the River Nene) and its tributary the Slade Brook. Two other tributaries of the River Nene, Harpers Brook and Alledge Brook, both rise in the Borough.

There has been a history of flooding in the Borough, with a total of 415 flooding incidents recorded since 1973 to the present day. These are from all sources of flood risk. Historically the primary source of flood incidents in Kettering has been fluvial, from the River Ise and Slade Brook, however more recently surface water, agricultural run-off and sewer flooding have been the main causes. The Borough has also been affected by several incidents of groundwater flooding.

Surface water flooding has been identified as a more recent concern and a key consideration for all new development. Major new developments have to address surface water drainage requirements set out in the National Standards and local guidance produced by NCC. This guidance ensures that careful design of the site layout and drainage system gives due consideration to the implementation of SuDS solutions and their ongoing maintenance where appropriate.

Groundwater flooding is also a key consideration to future growth and detailed guidance has been produced by NCC as the Lead Local Flood Authority (LLFA) and should be considered at all stages of the planning process.

There are a number of flood storage reservoirs located within the Borough, which may pose a residual flood risk to local communities if they were to breach. Also, the over-topping of flood defences could affect properties within the potential flow path or located behind defences. This risk should be incorporated within any assessment at all stages of the planning application process.

There is significant potential for cumulative impact of development on flood risk in Kettering Borough, particularly from unconstrained surface water drainage from minor developments. Considering the sites that have been identified for potential future development, the effects of cumulative impact are most likely to be seen in Kettering town centre, Burton Latimer, Broughton, Rothwell, Geddington and Desborough. Recommendations have been made for KBC to consider applying stricter requirements on surface water drainage proposals for sites located in areas draining into the Critical Drainage Catchments (CDCs) identified in the Kettering Surface Water Management Plan (SWMP).

Existing planning policy within the North Northamptonshire Joint Core Strategy is considered to be robust and fully up-to-date. Therefore no additional strategic policies are recommended as part of the development of the Part 2 Local Plan. Site-specific policies have however been recommended.

The site-specific assessment (Sequential Test) has identified one third of the sites as having an ‘Amber’ rating, as they are either at risk of surface water or groundwater flooding, have experienced flooding on the site or in close proximity of the site in the past, or have capacity issues within the existing drainage systems. These sites will require site-specific policies to be incorporated as part of the allocation process. Approximately half of the sites have been rated as ‘Green’ (low risk) and half as ‘amber’ (moderate risk which can be mitigated through application of suitable site-specific recommendations). Two sites have been rated as ‘red’ due to the high level of flood risk to the sites from various sources, and therefore will require further assessment prior to allocation.
Introduction

1.1 The North Northamptonshire Joint Core Strategy was adopted on 14 July 2016 and is the strategic part of the Local Plans for Corby, East Northamptonshire, Kettering and Wellingborough Councils. It was prepared by the North Northamptonshire Joint Committee, a plan making authority made up of elected representatives from the District, Borough and County Councils, and provides the basis for more detailed plans prepared by the District and Borough Councils and by Neighbourhood Planning Groups.

1.2 A Stage 1 and Stage 2 Strategic Flood Risk Assessment (SFRA) were produced in 2005 by the Environment Agency (EA) covering Kettering and Wellingborough to ensure compliance with PPG25: Development and Flood Risk. A Level 1 and Level 2 SFRA update were produced in 2011 and 2010 respectively by Royal Haskoning, on behalf of Kettering Borough Council (KBC) and Borough Council of Wellingborough (BCW), to ensure compliance with PPS25: Development and Flood Risk, and in light of proposed development in Kettering Town Centre.

1.3 This Level 1 SFRA updates this existing information and incorporates relevant data, recommendations and policies from these studies and strategies as appropriate. This Level 1 SFRA covers Kettering Borough only; an updated Level 1 SFRA for Wellingborough was produced by NCC in February 2017.

1.4 PPS25 has since been replaced by the National Planning Policy Framework (NPPF) and associated Planning Practice Guidance (PPG). There have also been a number of legislative and procedural changes, alongside updates to a number of flood and water data sets, modelling and mapping layers. These changes need to be reflected within the SFRA, to ensure that a sound flood and water management evidence base is available to support the plan-making process for development. In light of these changes, in May 2019 KBC commissioned Northamptonshire County Council (NCC) to prepare an updated Level 1 SFRA to satisfy the requirements of the NPPF.

1.5 One of the aims of the NPPF is to ensure that flood risk is taken into consideration at all stages in the plan-making process to avoid inappropriate development in areas at risk of flooding, and to direct development away from areas at highest flood risk (whether existing or future). Where new development is necessary in such areas, it aims to test this concept and make it safe without increasing flood risk elsewhere and, where possible, reduce flood risk overall. The NPPF also introduces the need to consider cumulative impacts of development in, or affecting, local areas susceptible to flooding.

1.6 The NPPF requires Local Planning Authorities (LPAs) to apply a risk-based sequential approach as part of the identification of land for development in areas at risk of flooding. The purpose of the sequential approach is to ensure that areas of low flood risk are developed in preference to areas of higher flood risk (now or in the future); and within this, ensuring that the developments that are most vulnerable to flood risk are located in the lowest flood risk areas. The application of the Sequential Test needs to be underpinned by an appropriate assessment of flood risk. The sequential approach process uses this information to avoid the highest flood risk areas (now or in the future) and where this is not possible, take opportunities to steer more vulnerable development to lower flood risk areas, or mitigate the risk of flooding.
Applying the Sequential Test for Plan Making Purposes

1.7 The Sequential Test ensures that a sequential approach is followed to steer new development to areas with the lowest risk of flooding and away from areas at highest risk of flooding, now or in the future. The detailed mapping, found within the accompanying Site Specific and Strategic Map Documents, provides the basis for applying the Test. The aim is to steer new development to Flood Zone 1 (areas with the lowest risk of flooding from rivers or sea). Where there are no reasonably available or sufficient sites located within Flood Zone 1, LPAs in their decision-making process should take into account the flood risk vulnerability of land uses and consider reasonably available sites located within Flood Zone 2 (areas with a medium risk of flooding from rivers or sea), applying the Exception Test, if required. Only where there are no reasonably available sites located within Flood Zone 1 or Flood Zone 2 should the suitability of sites located within Flood Zone 3 (areas with a high risk of flooding from rivers or sea) be considered, taking into account the flood risk vulnerability of land uses and applying the Exception Test, if required (see Image 1).

1.8 Robust application of the Sequential Test in the plan-making process will help to ensure that development can be safely and sustainably delivered and developers do not waste time and resources promoting proposals which are inappropriate on flood risk grounds.

1.9 All sources of flooding should be treated consistently with river flooding in terms of mapping probability and assessing vulnerability to ensure that the Sequential Test and approach are properly applied across all flood zones.

![Image 1: Extract from the Planning Practice Guidance](image1.png)
Applying the Exception Test for Plan Making Purposes

1.10 The Exception Test is a method to demonstrate and ensure that flood risk to people and property will be managed satisfactorily, while allowing necessary development to go ahead in situations where suitable sites at lower risk of flooding are not available.

1.11 Essentially, the two parts to the Test (see Image 1) require proposed development to show that it will provide wider sustainability benefits to the community that outweigh flood risk, and that it will be safe for its lifetime, without increasing flood risk elsewhere and where possible seek to reduce flood risk overall.

1.12 This process is summarised in Image 2. The Exception Test should only be applied as set out in National Planning Practice Guidance Flood Risk and Coastal Change (6th March 2014).

Image 2: Extract from the Planning Practice Guidance

Flood Risk Objectives

1.13 The general aim of the NPPF is to ensure that flood risk is taken into account at all stages in the planning process to avoid inappropriate development in areas at risk of flooding and to direct development away from areas at highest flood risk.

1.14 The NPPF states that Local Plans should take account of climate change over the longer term. Furthermore, when new development is brought forward in areas which are vulnerable, “care should be taken to ensure that risks can be managed through suitable adaptation measures, including through the planning of green infrastructure”.

1.15 The SFRA is a strategic assessment of flood risk which all LPAs are required to carry out in preparation of their Local Development Documents (LDDs). It aims to enable sound and reliable sustainability appraisals, land allocations and development control policies, to be informed by an understanding of the catchment-wide flooding issues affecting the area and the implications of climate change.
1.16 This updated SFRA will form a key part of the evidence base to help inform the Local Plan Part 2 preparation. A Level 1 SFRA is principally a desk-based study required to provide the LPAs with flood risk information to apply the Sequential Test. Where it is clear that a proposed development and infrastructure cannot be accommodated in accordance with the Sequential Test, taking account of the flood vulnerability of the intended use, then a more detailed Level 2 SFRA is required to facilitate the application of the Exception Test.

1.17 At the planning application stage, an appropriate site-specific flood risk assessment (FRA) will be required for all major development proposals, sites of 1 hectare or greater located within Flood Zone 1; land identified in a SFRA as being at increased flood risk in future; or land that may be subject to other sources of flooding, where it’s development would introduce a more vulnerable use. All proposals for new development located in Flood Zone 2 and Flood Zone 3 are required to have a site-specific FRA. This is required to demonstrate how flood risk from all sources of flooding within the development itself, and flood risk to others, will be managed taking climate change into account. Developers, and those promoting sites, should ensure that all site-specific FRAs use the information included within this assessment to inform their production.

1.18 The aims of the updated Level 1 SFRA are to:

- Provide a sound evidence base for site allocation purposes;
- Improve the understanding of flood risk within Kettering Borough;
- Provide information that reflects the changes to planning policy and guidance;
- Incorporate updated flood and water mapping;
- Include a climate change position statement;
- Provide an assessment of the flood risk (fluvial, pluvial, reservoir and groundwater) to inform the suitability of proposed development sites;
- Provide updated information on existing flood defences within the area;
- Provide sufficient information to enable the Sequential Test and approach (as defined in the NPPF) to be undertaken where required; and
- Include recommended policies and practices to ensure that development at risk of flooding can incorporate appropriate mitigation measures.

The Strategic Flood Risk Assessment Structure

1.19 The NPPF and associated guidance recommends that SFRAs are completed in two consecutive stages, which follow an iterative approach to provide LPAs with sufficient information to inform and update decisions regarding development sites. The two stages are:

- **Level 1 SFRA** - the objective of this document is to collate and review available information on flood risk for the study area. This enables a review of the preliminary site allocations, through the Sequential Test process, to determine if a Level 2 SFRA is required along with the scope.

- **Level 2 SFRA** - the principal objective of this document is to facilitate the application of the Exception Test. The Level 2 SFRA uses information from the Level 1 SFRA and potential additional work for sites allocated in areas at risk of flooding, which have been
identified following Level 1 Sequential Testing. Modelling of key watercourses may be required to define the functional floodplain as well as the extent of the floodplain, taking into account climate change, where there is no data. Clear guidance will be given on appropriate policies for the application of the Exception Test and the preparation of site-specific FRAs will be provided.

Study Area

1.20 The study area is defined as the Borough of Kettering, as shown on Map 1: Study Area and Watercourse Network, in the accompanying Strategic Map Document. The Borough of Kettering falls within North Northamptonshire along with Corby, Wellingborough and East Northamptonshire. The Borough comprises the main town of Kettering and three smaller market towns (Burton Latimer, Desborough and Rothwell), with the rest of the borough being mostly rural with 27 villages of varying scale and character.

1.21 The Borough covers an area of 23,350 hectares with an approximate population of 100,252 (ONS mid-2018 population projections). The Borough is expected to accommodate significant growth in the period to 2031, most of which will be focused in the town of Kettering. Smaller scale development will also take place at Burton Latimer, Desborough and Rothwell. Housing and employment development will be accompanied by extensive development in Kettering Town Centre and by other infrastructure to support the growth. A significant proportion of the growth in Kettering Borough will take place through the East Kettering Sustainable Urban Extension, which is planned to deliver 5,500 dwellings and associated development. In addition to this the Kettering Town Centre Area Action Plan makes provision for significant levels of retail, employment and residential development.
2 Methodology

Overview

2.1 As outlined in Section 1.18 the aim of the Level 1 SFRA is to collect, collate and review the information available relating to flooding in the study area. It also aims to review existing documents and guidance, making recommendations to ensure that the document follows current best practice and guidance.

Tasks

2.2 The following sets out the sequence of tasks undertaken in the preparation of the updated Level 1 SFRA:
- KBC organised an inception meeting with NCC on 21st May 2019;
- Identified the local stakeholders;
- Contacted the EA requesting data / information;
- Collated and reviewed the data;
- Undertook the Sequential Test for all proposed sites;
- Consulted the key local stakeholders on the SFRA; and
- Presented the available and relevant information on all flood sources.

2.3 All of the tasks set out above were completed between May 2019 and August 2019.

Stakeholders

2.4 The stakeholders relevant to Kettering Borough are as follows:
- KBC;
- NCC as LLFA;
- NNJPDU;
- EA; and
- AWS.

2.5 Where relevant, all flood and water management related information and data received from the stakeholders has been reviewed and incorporated into this document.

Data Collection and Review

2.6 In order to inform the production of this SFRA, all data related to flood risk and proposed development has been reviewed.

2.7 Data has been obtained from KBC, the EA, AWS, the Highways Authority and existing data held by the LLFA. This data includes:
- Growth aspirations for the area;
- Existing flood risk management plans, strategies and studies;
- Local development plans;
- Flood warning and alert areas;
- EA Flood Maps – fluvial and surface water;
- NCC Groundwater mapping;
- Flood related asset information from all stakeholders;
- Historical flooding information including the sewer flooding register from AWS; and
- Details relating to reservoirs within and adjacent to the study area;
2.8 Using the data collected from a variety of partners, a series of Geographic Information System (GIS) layers were collated to assist the findings of this report and any site allocation decisions. Using GIS, the data was analysed and interrogated to produce flood related statistics. Broadly, the layers can be classified into three main categories; planning policy, informative, and flood risk, as detailed in Table 1.

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<th>Topic</th>
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<td>Potential development sites</td>
<td>KBC</td>
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<td>Informative</td>
<td>Historic OS Maps</td>
<td>NCC</td>
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<td></td>
<td>Geology mapping</td>
<td>BGS</td>
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<td></td>
<td>Background mapping</td>
<td>OS</td>
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<td></td>
<td>Detailed River Network</td>
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<td>Terrain 5 topography</td>
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<td>Flood Risk</td>
<td>Flood Map for Planning</td>
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<td>Risk of Flooding from Surface Water</td>
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<td>Flood mapping for climate change assessment</td>
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<td>Flood Alert and Warning Areas</td>
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<td>Sewer Flooding Register</td>
<td>AWS</td>
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<td>Register</td>
<td>Historic flood hotspot data</td>
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<td>Asset Register (includes data from all partners)</td>
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<td>Risk of Flooding from Groundwater (Northamptonshire)</td>
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Table 1: List of GIS layers used

Data Gaps and Assumptions

2.9 Table 2 below sets out the details of the detailed hydraulic models for which the EA have been able to provide fluvial flood mapping outputs for the Borough.

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<th>Watercourse</th>
<th>Model type and version</th>
<th>Extent within Kettering Borough</th>
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<td>Alledge Brook</td>
<td>Alledge Brook Model, 1D ISIS model, August 2013</td>
<td>Full extent of main river designation of Alledge Brook within Borough (through Grafton Underwood, downstream to Borough boundary)</td>
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<tr>
<td>Harpers Brook</td>
<td>Harpers Brook Model, 1D ISIS model, August 2013</td>
<td>Full extent of main river designation of Harpers Brook within Borough (just upstream of A6003 crossing, downstream to Borough boundary)</td>
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<tr>
<td>River Jordan</td>
<td>River Jordan Model, 1D Mike11 model, July 2016</td>
<td>Full extent of main river designation of River Jordan within Borough (through Braybrooke, downstream to Borough boundary)</td>
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</table>
Watercourse | Model type and version | Extent within Kettering Borough
--- | --- | ---
River Ise and tributaries | River Ise Model, 1D ISIS model, August 2013 | Full extent of main river designation of River Ise through Borough (from Borough boundary upstream of Thorpe Underwood, to Borough boundary downstream of Burton Latimer); full extent of main river designation of Slade Brook (from just downstream of Orton, to confluence with River Ise in Kettering town)
River Welland | River Welland Model, 1D Mike11 model (upper reach) and 2D Mike21 model (lower fenland reach), September 2016 | Full extent of main river designation of River Welland along Borough’s northern boundary (from Borough boundary at A6 crossing, to Borough boundary downstream of Ashley)

Table 2: Model details

2.10 One of the requirements of the NPPF is that the functional floodplain, Flood Zone 3b, should be identified and mapped as part of an SFRA to highlight those areas where only water-compatible development and land use is recommended. Planning practice guidance states that the extent of the functional floodplain should be agreed in discussion with the LPA and EA to account for local circumstances, and that the extent of the 5% AEP floodplain is considered an appropriate initial definition. Therefore, it is locally agreed that for those watercourses in the Borough that have been subject to detailed modelling and mapping (see Table 2 above), the 5% AEP flood extent can be used (except for the Harpers Brook catchment where data is only available for the 4% AEP flood extent). Elsewhere, for watercourses without appropriate detailed hydraulic modelling, the best available information to define the functional floodplain is the full extent of Flood Zone 3 i.e. 1% AEP flood event. Map 8: Functional Floodplain, in the accompanying Strategic Map Document shows the locally agreed definition of the functional floodplain across Kettering Borough.

2.11 The NPPF also requires that SFRAs consider the impacts of climate change on flood risk in the study area, and specifically to support application of the sequential approach for new development. For the modelled watercourses set out in Table 2 above, only the 20% climate change allowance on river flows has been modelled, and therefore maps of floodplain extent accounting for updated climate change scenarios are not available. No climate change information is available for other unmodelled watercourses in the Borough.

2.12 As intimated from the above sections, the main gap in the available data relates to information on flood risk from smaller watercourses. Smaller non-main river watercourses are unlikely to have had strategic flood modelling undertaken in order to accurately assess the risk of flooding they pose. As set out above, this includes information on climate change impacts and delineation of their functional floodplain.
3 Relevant Flood Risk Management Plans, Strategies and Studies

3.1 The plans, studies and strategies that have been reviewed to inform the update of this assessment are set out below. The key points, policies and recommendations with specific reference to flood and water management have been extracted and should be used to inform the development of future planning policy and site-specific FRAs.

National Flood and Coastal Erosion Management Strategy for England

3.2 The National Flood and Coastal Erosion Management Strategy for England was published in September 2011 and provides guidance on “Understanding the risks, empowering communities and building resilience.”

3.3 The document builds upon existing approaches to flood and coastal erosion risk management and promotes the use of a wide range of measures to manage risk. The strategy promotes a framework to enable communities to have a greater role in local flood risk management decisions. The strategy encourages more effective flood risk management by enabling people, communities, business, infrastructure operators and the public sector to work together to:

- Ensure a clear understanding of the risks of flooding and coastal erosion, nationally and locally, so that investment in risk management can be prioritised more effectively;
- Set out clear and consistent plans for risk management so that communities and businesses can make informed decisions about the management of the remaining risk;
- Manage flood and coastal erosion risks in an appropriate way, taking account of the needs of communities and the natural environment;
- Ensure that emergency plans and responses to flood incidents are effective and that communities are able to respond effectively to flood forecasts, warnings and advice; and
- Help communities to recover more quickly and effectively after incidents.

3.4 This document is relevant because it promotes the concept of “the better understanding of flood risk through detailed assessment”. Therefore this SFRA contributes towards providing this improved awareness and understanding.

3.5 At the time of writing this SFRA, the update to the National Flood and Coastal Erosion Risk Management Strategy for England is currently in draft format and open for public consultation. The aim is that this new strategy will be published in 2020. Future updates to the SFRA should incorporate any relevant information from this new strategy.

Preliminary Flood Risk Assessments

3.6 A Preliminary Flood Risk Assessment (PFRA) is a requirement under the Flood Risk Regulations (2009), which implement the European Floods Directive (2007) into UK law. The PFRA is an assessment of flooding that has taken place in the past and flooding that could take place in the future.
3.7 It considers flooding from surface water runoff, groundwater and ordinary watercourses, and is updated on a six year basis.

3.8 PFRAs are used to identify areas that are at risk of significant flooding and the first were prepared by LLFAs in 2011. These areas are called Flood Risk Areas (FRAs). LLFAs are responsible for preparing preliminary assessment reports and reviewing indicative Flood Risk Areas (iFRAs) identified nationally through an assessment of surface water flood risk, or determining new FRAs based on local knowledge and understanding.

3.9 For the 2011 to 2017 planning cycle, NCC were required to identify FRAs for local sources using guidance produced by Defra. The areas represent ‘clusters’ where flood risk is an issue and where 30,000 people or more live. The Northamptonshire PFRA and associated FRA Map illustrated that there were none in Northamptonshire.

3.10 LLFAs are responsible for mapping local flood hazard and flood risk for each FRA and the EA is responsible for mapping flood hazard and flood risk for rivers, the sea and reservoirs, and for publishing the maps. These are reviewed and if required, updated and re-published every six years. These flood hazard and flood risk maps are used by the EA to prepare the Flood Risk Management Plans (FRMPs).

3.11 Following on from the previous six years, the EA published the updated PFRAs and FRAs in 2018 and these will be valid until 2023. The updated Northamptonshire PFRA has identified one FRA within Northampton Borough.

3.12 The PFRA review has also necessitated an assessment of flooding incidents since 2011 that have had ‘significant’ human health, economic, cultural or environmental consequences. For the purposes of the review, and in accordance with guidance issued by the EA, all incidents investigated under Section 19 (Local Authorities: Investigations) of the Flood and Water Management Act (FWMA) (the Act) have been assessed, a total of 51 incidents across the county with four of these located within Kettering Borough.

**Flood Risk Management Plans and River Basin Management Plans**

3.13 FRMPs build on Catchment Flood Management Plans (CFMPs) and highlight the hazards and risks of flooding from rivers, the sea, surface water, groundwater and reservoirs. They also set out how Risk Management Authorities (RMAs) work together with communities to manage flood risk. By law (EU Floods Directive 2007) the EA must produce FRMPs for each River Basin District. Map 1: Study Area and Watercourse Network, in the accompanying Strategic Map Document, shows the two major river catchments that cover the Borough of Kettering: the Nene Catchment and the Welland Catchment. It is for these that CFMPs have been prepared.

3.14 Each FRMP covers a specific River Basin District. There are 11 River Basin Districts in England and Wales, as defined in the legislation. A River Basin District is an area of land covering one or more river catchments. A river catchment is the area of land from which rainfall drains to a specific river.

**Anglian Flood Risk Management Plan**

3.15 Kettering Borough is wholly located within the Anglian River Basin District. The relevant FRMP is therefore the Anglian River Basin District Flood Risk Management Plan (Anglian FRMP).
3.16 There are a number of sub-areas within the Anglian FRMP. Kettering Borough is located within the Nene catchment and Welland catchment sub-areas, as shown within Image 3 and Image 4.

Image 3: Nene catchment - March 2016

Image 4: Welland catchment - March 2016
3.17 The FRMPs describe the river basin and the likely source and characteristics of flooding, as well as the key objectives for managing the flood risk. The FRMPs set out actions, known as ‘measures’, which demonstrate the ways in which RMAs focus efforts to reduce flood risk. The plans promote four key themes as follows:

- **Preventing risk** - Identifying and mitigating flood risk through the development of schemes and appropriate maintenance programmes;
- **Preparing for risk** - Working with communities to help them recognise their flood risk and ensure that they are adequately prepared for flooding;
- **Protecting from risk** - Actively reducing the likelihood of flooding affecting people and property, including maintaining watercourses that pose the most significant risk; and
- **Recovery and review** - Investigating instances of flooding to help communities recover from their impact and consider actions that may mitigate future risk.

3.18 FRMPs set out how RMAs (including LPAs) and communities will work together to reduce the potential adverse consequences of flooding. The EA worked in partnership with LLFAs and other RMAs to develop these plans at a catchment scale by pooling information from various existing plans such as CFMPs and Reservoir Plans. The FRMPs are high-level documents that should be referred to when developing spatial policies.

3.19 To meet the requirements of the Water Framework Directive (WFD), each River Basin District also has a River Basin Management Plan (RBMP), which looks at how to protect and improve water quality and ecology, and use water in a sustainable way. FRMPs and RBMPs work to a six-year planning cycle. The current cycle is from 2015 to 2021. Both flood risk management and river basin management form an important part of a collaborative and integrated approach to catchment planning for water.

**Northamptonshire Local Flood Risk Management Strategy and Action Plan**

3.20 The Act (Section 9) requires the LLFA, in this case NCC, to develop, maintain, apply and monitor a strategy for local flood risk management in its area. Local flood risk includes surface runoff, groundwater and ordinary watercourse flooding. The Northamptonshire LFRMS was first published in November 2013 and was then reviewed and updated every three years.

3.21 The LFRMS provides an overall picture of flood risk at a county scale and outlines how NCC, as the LLFA, will coordinate and manage flood risk along with its RMAs. The strategy sets out the policy direction for flood defence consenting, thresholds for formal flood investigations, formal partnership and management arrangements, details regarding the asset register, and a great deal of general advice and guidance relating to flood mitigation and resilience.

3.22 The updated LFRMS and associated documents were approved by the NCC Cabinet in November 2016 (with minor amendments approved in November 2017). The latest LFRMS is now reviewed and updated every five years and is available on the Flood Toolkit, together with the annual action plan, which incorporates the following partner actions, projects and flood alleviation schemes for Kettering as shown in Table 3 below. There are a large number of general actions covering Northamptonshire that have not been captured in the table below, but should be considered as part of any flood risk management work undertaken.
<table>
<thead>
<tr>
<th>Action / Project</th>
<th>Aim</th>
<th>Lead body</th>
<th>Broad phasing</th>
<th>Estimated total cost</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Welland and Nene Property Level Resilience (PLR)</strong></td>
<td>Survey and install PLR on properties in Pytchley in high flood risk areas and which have previously flooded</td>
<td>EA (NCC)</td>
<td>2017-2019</td>
<td>£250,000</td>
</tr>
<tr>
<td><strong>East Brook Culvert</strong></td>
<td>Determine current condition and future works required</td>
<td>NCC (KBC, EA, AWS)</td>
<td>2018-2019</td>
<td>£135,000 (£725,000 for potential future works)</td>
</tr>
<tr>
<td><strong>Kettering Rain Water Garden (SuDS) Schemes</strong></td>
<td>Review locations for rain water gardens in local communities</td>
<td>KBC</td>
<td>Ongoing</td>
<td>To be confirmed</td>
</tr>
<tr>
<td><strong>Flood Risk Improvement works at Barton Seagrave</strong></td>
<td>Flood alleviation scheme – develop and deliver scheme following Section 19 Investigation</td>
<td>NCC (KBC)</td>
<td>To be determined (post 2021)</td>
<td>£50,000</td>
</tr>
<tr>
<td><strong>Harpers Brook</strong></td>
<td>Partnership approach to catchment management</td>
<td>EA (River Nene Regional Park)</td>
<td>2017-2019</td>
<td>To be confirmed</td>
</tr>
<tr>
<td><strong>Kettering Borough Surface Water Management Plan (SWMP)</strong></td>
<td>Gain a better understanding of surface water flooding within Kettering Borough and identification of potential flood alleviation measures</td>
<td>KBC</td>
<td>2017-2019 (complete)</td>
<td>£45,000</td>
</tr>
<tr>
<td><strong>Flood Risk Improvement Works at Woodland Ave and Grosvenor Road, Barton Seagrave</strong></td>
<td>Flood alleviation scheme – highway drainage improvements</td>
<td>NCC (KBC, AWS, EA)</td>
<td>2014 (complete)</td>
<td>£2,815,000</td>
</tr>
</tbody>
</table>

Table 3: Projects identified in the LFRMS for Kettering

**Flood and Water Related Work**

**North Northamptonshire Detailed Water Cycle Strategy – 2009**

3.23 The North Northamptonshire detailed Water Cycle Strategy was commissioned and managed by the North Northants Development Company (NNDC) in partnership with the North Northamptonshire Joint Planning Unit (NNJPU), AWS and the EA. The purpose of the strategy was to identify the water services infrastructure requirements to support the levels of growth identified within the North Northamptonshire Joint Core Spatial Strategy and to also provide a framework for the ongoing detailed technical work and delivery programme needed to achieve these requirements.
3.24 The WCS comprises an interactive PDF accompanied by six technical sections. The Flood Risk Investigation Report is the most relevant to this study as it provides an overview of flood risk in the study area.

3.25 The 2009 report made a number of area-specific recommendations for strategic flood risk management within North Northamptonshire. For Kettering, two were included:

- **Strategic storage in the Slade Brook and River Ise catchment** areas to create capacity for new development and reduce flood risk to existing properties. It was recommended that new developments should contribute to this. This has been identified within KBC’s [Green Infrastructure Delivery Plan](#).

- **On-site storage (utilising SuDS) for developments within Alledge Brook** sub-catchment to avoid increasing flood risk downstream. Specifically for Kettering East – developers should investigate options for expanding on-site SuDS measures to create new flood storage facilities.


3.26 The North Northamptonshire Flood Risk Management Study (FRMS) was the first iteration of this document, commissioned by the Environment Agency and undertaken by Royal Haskoning. The key findings for the region are summarised below:

- Surface water management was found to be a key issue in all four Local Authority areas (Corby, Kettering, Wellingborough and East Northamptonshire);

- The study recommended that updates to the SFRA’s were needed to ensure full compliance with PPS25: Development and Flood Risk, to address the latest guidance on climate change, to assess all sources of flooding in more detail and to map the functional floodplain;

- At the time of the study, the Core Spatial Strategy for North Northamptonshire was emerging. The study found that the Councils had generally taken a sequential approach when identifying broad locations for the proposed Sustainable Urban Extensions; and

- A robust flood risk management strategy for North Northamptonshire was recommended, even if the proposed development sites were located in low risk areas, in order to address extra runoff and residual risk issues resulting from planned growth proposals and the existing flooding problems on receiving watercourses.

3.27 The study outlined key requirements to be addressed by a flood risk management strategy, to be delivered through policies, planning conditions, physical measures, residual risk management and guidance. The 2007 report recommended a strategy that:

- Implemented strategic flood risk management measures in advance or in parallel with the proposed developments in order to obtain financial contributions from prospective developers through Section 106 agreements including long term management.

- Sought opportunities using a partnership approach across North Northamptonshire to avoid managing flood risk within individual administrative areas.

- Provided a combination of source control and strategic SuDS measures within individual development sites where the opportunities for catchment-wide strategic measures are limited.
• Incorporated sufficient capacity in strategic flood management measures allowing for planned growth and future climate change.

• Avoided a piecemeal approach to managing runoff from small individual sites whilst providing strategic and local green corridors to incorporate SUDS for managing additional runoff from new developments.

• Restored floodplains as land becomes available for redevelopment, through set back options and creation of green space.

• Incorporated SuDS within strategic and local green corridors where possible.

• Identified locations of known surface water flooding problems from sewers and overland flow routes and explores possible solutions for them through new development proposals.

• Recognised the importance of accommodating imminent development currently planned in North Northamptonshire ahead of the final JCS.

**North Northamptonshire Flood Risk Management Study Update – March 2012**

3.28 This report updated the FRMS that Royal Haskoning produced in 2007 to inform the Joint Core Strategy evidence base, which was subsequently adopted.

3.29 The aim of the report was to update the North Northamptonshire FRMS to provide a sound basis for further developing local policy, along with related project priorities and delivery actions. The key objectives in delivering this were to:

• Identify key priorities for the future, arising from updated Level 1 SFRAs and all other relevant studies;

• Provide clear policy recommendations that can be taken forward at all levels of planning;

• Assess requirements arising from the proposed strategic land allocations;

• Estimate broad costs and potential funding mechanisms to support priority infrastructure projects; and

• Provide a sound evidence base to support infrastructure planning and the Section 106 legal agreements.

3.30 The main findings of the study included:

• Most of the areas identified for future development were at low risk from flooding.

• A strategic approach to managing flood risk should include the development of strategic flood storage on floodplains upstream of urban areas. Replacement of small storage schemes with larger strategic schemes is favoured.

• Several flood storage schemes were identified as priority schemes along with investigation of other potential strategic schemes.

• Surface Water Management Plans (SWMP) were recommended for Corby, Kettering and Wellingborough.

• Recommendations to identify watercourses in each urban area where channel improvements and routine maintenance programmes would be beneficial.

3.31 Key recommended actions for Kettering Borough included:
• Carry out a SWMP for Kettering (this has now been completed);
• Undertake an initial study to identify targeted maintenance and improvements to ordinary watercourses/channels within key areas of Kettering to ensure their drainage capacity is fully utilised;
• Implement a Flood Storage Reservoir Facility for Slade Brook (up-stream storage opportunities at Glendon being explored through the Kettering Borough Green Infrastructure Delivery Plan);
• Educate communities in Kettering on flood risk and encourage uptake of flood resilience measures (this is being delivered by the Northamptonshire Community Flood Resilience Pathfinder);
• Investigate management of runoff from new developments within the Kettering East SUE and explore options for strategic flood mitigation storage for Alledge Brook; and
• Investigate the potential for a Reservoir Catchment Storage Facility at Thorpe Malsor and Cransley.

Kettering Borough Council Strategic Flood Risk Assessments

3.32 Stage 1 and Stage 2 SFRA were produced in 2005 by the EA covering Kettering and Wellingborough to ensure compliance with PPG 25: Development and Flood Risk.

3.33 Following the initial SFRA, a Level 1 SFRA update was then produced in 2011 by Royal Haskoning, on behalf of Kettering Borough Council (KBC) and Borough Council of Wellingborough (BCW), to ensure compliance with PPS 25: Development and Flood Risk.

3.34 In light of the proposed development plans for Kettering Town Centre and in order to inform preparation of Local Development Documents, a Level 2 SFRA for Kettering Town Centre was prepared in April 2010, preceding the Level 1 SFRA. However where relevant findings from the Level 2 SFRA were acknowledged in the Level 1 SFRA.

3.35 The Level 2 SFRA update identifies Borough-wide flood risk and provides mapping to aid with the application of the Sequential Test. It also included site-specific FRAs for the two areas identified for proposed commercial use and the fifteen areas identified for proposed residential (some with commercial and open space) use. These proposed development sites were all in Kettering Town Centre adjacent to the Slade Brook and included:

- Car Park West of the station;
- Land west of the station;
- Land at Lidl store site, west of Trafalgar Road;
- Temporary car park, land west of Trafalgar Road;
- Land north and east of Trafalgar Road;
- B&Q and Comet site, Meadow Road / Jutland Way;
- National Grid site north, Jutland Way;
- National Grid site south, Jutland Way;
- Meadow Road/Cromwell Road backland;
- Commercial Road car park;
- Meadow Road Recreation Ground;
- ATS and Topps Tiles site, Northampton Road / Northfield Avenue;
- Bus Depot Site, Northampton Road;
- Hazelwood Lane;
• Northampton Road / Saunders Close backland;
• Honda garage and petrol station

3.36 Any suitable and relevant information has been used to inform this SFRA update.

**Kettering Green Infrastructure Delivery Plan – March 2018**

3.37 A Green Infrastructure Delivery Plan (GIDP) was produced for KBC by River Nene Regional Park, which builds on the strategic work of the North Northamptonshire Green Infrastructure Delivery Plan and Joint Core Strategy.

3.38 The Plan identifies a GI network for Kettering Borough that supports and enhances the sub-regional and local GI corridors, provides the evidence base supporting policies and proposals in the previous Site Specific Plan 2 Local Plan, and provides partners and stakeholders with a plan to guide and coordinate activities that support the development of GI in Kettering Borough.

3.39 One of the key aims of the Plan is to “contribute to flood water management through the identification of GI projects”.

3.40 The Plan also details 14 projects to enhance existing and create new GI for the area. A number of these have specific identified flood risk management benefits as set out in Table 4 below:

<table>
<thead>
<tr>
<th>Project</th>
<th>Description</th>
<th>Indicative Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Burton Latimer Park Improvements</td>
<td>Strengthen the connection between the green spaces within Burton Latimer and implement improvements to the Ise Brook including bank reshaping, weed control and planting, and ‘slow the flow’ measures to reduce flood risk</td>
<td>£68,665</td>
</tr>
<tr>
<td>Harvest Close Open Space, Burton Latimer</td>
<td>Improve drainage by clearing out the Brook to allow free water flow and creation of a two-stage channel to increase storage and conveyance.</td>
<td>£13,000</td>
</tr>
<tr>
<td>Ise Valley County Park, Desborough</td>
<td>Creation of a large-scale liner park with the River Ise at its centre. The creation of the park would offer an opportunity to enhance the function of the flood plain.</td>
<td>£201,000</td>
</tr>
<tr>
<td>Glendon Lake</td>
<td>Originally identified as a location for a flood storage reservoir in the Site Specific Plan 2 Local Plan. Creation of an on-line lake to intercept and retain rural flood and run off from Rothwell to reduce flood risk and provide enhanced protection to Slade Brook.</td>
<td>£410,000 + £11,000 per annum</td>
</tr>
<tr>
<td>Slade Brook Urban Corridor</td>
<td>Creation of town centre blue/green corridor along the Brook to provide enhanced flood risk management through ‘slow the flow’ measures.</td>
<td>£918,000</td>
</tr>
</tbody>
</table>

Table 4: Kettering Borough GI projects with flood risk management benefits

**Kettering Surface Water Management Plan – October 2018**

3.41 The Kettering Borough SWMP was commissioned by KBC and undertaken by AECOM. SWMPs identify areas vulnerable to flooding, known as ‘wet spots’. Once identified, these
areas are then prioritised for further investigation, and eventual mitigation options are assessed and implemented where economically viable.

3.42 The key stages of a SWMP are:
- **Stage 1 - Data Collection and Review**
  - Undertake a full catchment analysis and hydrological assessment to quantify the rainfall generated over a range of return periods;
- **Stage 2 - Intermediate and Detailed Assessment**
  - Through the use of hydraulic modelling, identify the sources and mechanisms of surface water flooding within the study area;
  - Assess the current risk of surface water flooding in the settlements/areas to assist in the identification of flood mitigation measures;
- **Stage 3 - Options Assessment undertaken for the identified wet spots**
  - Identify options available to reduce flood risk to the affected properties in the area;
  - Identify the environmental impacts of all options; and
- **Stage 4 - Action Plan and Reporting**
  - Creation of an action plan including an estimation of the cost implications to fund the preferred options, including year on year maintenance forecasts.

3.43 The Action Plan outlines actions required to implement the preferred options identified in Stage 3. It also identifies the responsible parties for implementing the actions and prioritises these alongside timescales for delivery.

3.44 These actions are divided into:
- **Flood risk management actions** to integrate outcomes, recommendations and new information from the SWMP into the practices of all Flood Risk Partner organisations;
- **Maintenance actions** to prompt a review of ‘business as usual’ maintenance and infrastructure improvement activities in the context of new information presented in the SWMP; and
- **Planning policy and decision making actions** to assist KBC (as the LPA), NCC (as the LLFA) and the Environment Agency and AWS (as consultees for planning applications and Local Plan development) to manage future developments in the context of local flood risk management.

3.45 The SWMP identified three prioritised Critical Drainage Catchments (CDCs), defined as “a discrete geographic area (usually a hydrological catchment) where multiple or interlinked sources of flood risk cause flooding during a severe rainfall event thereby affecting people, property or local infrastructure”. It should be noted that the CDCs as defined within the SWMP are not the same as the EAs Critical Drainage Areas (“an area within flood zone 1 which has critical drainage problems as notified by the Environment Agency”), and therefore the EA are not a statutory consultee within these CDCs. The conclusions and options for the three prioritised CDCs are set out in **Table 5** below.

<table>
<thead>
<tr>
<th>Priority area</th>
<th>Conclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Kettering Town (CDC 1)</strong></td>
<td>High surface water flood risk to properties and the highway following the path of Slade Brook and associated river valleys. The assessment identified the need for further investigation of the Slade Brook Flood Alleviation Scheme (as detailed in the North Northamptonshire FRMS 2012) to deliver multiple flood risk benefits to properties in the Slade Brook Corridor and downstream. This should be alongside retrofit of small scale SuDS schemes across the catchment and in new / re</td>
</tr>
</tbody>
</table>
### Table 5: Kettering SWMP 2018 – priority area conclusions and options

<table>
<thead>
<tr>
<th>Priority area</th>
<th>Conclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Desborough (CDC 2)</td>
<td>High surface water flood risk in the more rural areas of the catchment and predicted ponding to the north of the railway embankment to the east of the CDC. The SWMP identified the need for a combination of measures in line with Borough-wide options. Specifically seeking opportunities for delivering multiple benefits through including flood risk measures within new green infrastructure schemes or as part of those identified in the North Northamptonshire Green Infrastructure Delivery Plan.</td>
</tr>
<tr>
<td>East Brook (CDC 6)</td>
<td>High surface water flood risk to residential properties following the path of East Brook culvert to the north and centre of the catchment, and open watercourse to the south. The assessment identified the option for flood storage in Northern Recreation Ground (North Park Drive / Weekley Glebe Road recreation ground). There was a recommendation for further investigation of this flood storage scheme as well as a combination of measures in line with Borough-wide options; this included undertaking a CCTV survey of East Brook Culvert to identify its current condition (this is due to be undertaken in 2019).</td>
</tr>
</tbody>
</table>

3.46 The Kettering SWMP was published in 2018 and the information gained will be incorporated into the next annual update of the Northamptonshire LFRMS Action Plan.
4 Local Plans

4.1 The Local Plans that comprise the Statutory Development Plan for KBC have been reviewed to inform the update of this assessment. The key development sites have been provided by the LPA and have been assessed in terms of flood risk in more detail. The key points with specific reference to flood and water management have been extracted and should be used to inform the development of future planning policy and the undertaking of site-specific FRAs submitted as part of future planning applications. This SFRA will be used to inform the development of future planning policy and key decisions on site-specific allocations.

4.2 The requirement to produce a Local Plan was introduced as part of the Planning and Compulsory Purchase Act 2004. The Development Plan in North Northamptonshire (which covers Kettering Borough) consists of a number of documents, all of which have been reviewed as part of the update to this SFRA. These documents include the overarching updated North Northamptonshire JCS Local Plan (Part 1), which was adopted in July 2016 and sets out the long-term vision (for the plan period up to 2031) and objectives for the whole of the area covered by KBC. A number of site-specific or subject based Supplementary Planning Documents have also been reviewed.

North Northamptonshire Joint Core Strategy (Local Plan Part 1)

4.3 This JCS Local Plan forms Part 1 of the suite of Local Plans in North Northamptonshire and was updated and adopted in July 2016. It provides a long-term vision for the area with an overall framework in which more detailed plans will be set out. It contains a broad planning strategy which provides a strategic framework to guide the preparation of Part 2 Local Plans. These will provide more detailed planning policies and site allocations for each of the partner Borough and District Councils.

4.4 The Plan was prepared by the NNJPU on behalf of KBC, Corby Borough Council, Borough Council of Wellingborough and East Northamptonshire Council, working together with NCC.

4.5 The JCS sets out the long-term vision and objectives for the whole of North Northamptonshire area for the plan period from 2011 to 2031, including strategic policies for steering and shaping development. It identifies specific locations for new strategic housing and employment as well as changes to transport infrastructure and other supporting community facilities, alongside defining areas where development will be limited. It outlines the strategic picture for North Northamptonshire over the period to 2031, including the provision of a minimum of 35,000 homes and 31,100 jobs and the necessary supporting infrastructure. The JCS sets out policies to guide this development, including focusing on how the places in North Northamptonshire can be changed for the better.

4.6 The identified minimum housing needs for Kettering Borough totals 10,400 over the plan period, equivalent to 520 per year. This represents a 25% increase on 2011 housing stock.

4.7 An important part of the JCS is supporting North Northamptonshire’s resilience and self-reliance by ensuring: that its water environment is protected; that there is sufficient water and waste water infrastructure; and that the area is resilient to flood risk, particularly when the impact of future climate change is considered. The Plan promotes the concept of sustainable places that are naturally resilient to future climate change and in particular flood...
risk. This is demonstrated by the use of Policy 5 (as set out in Section 4.9 below), which helps to achieve this outcome.

4.8 Policy 20 (as set out in Section 4.12 below) also highlights the Nene and Ise Valleys as priorities for investment in green infrastructure and sets out how this can be achieved through managing development and investment. With regards aspects of flood risk management this specifies that development and investment should be managed to identify opportunities and proposals for floodplain and river re-naturalisation, de-culverting within urban areas and river habitat improvements.

**Policy 5 – Water Environment, Resources and Flood Risk Management**

4.9 Development should contribute towards reducing the risk of flooding and to the protection and improvement of the quality of the water environment. This will be achieved through the following criteria:

- Development should, wherever possible, be avoided in high and medium flood risk areas through the application of a sequential approach considering all forms of flooding for the identification of sites and also the layout of development within site boundaries;

- Development should meet a minimum 1% (1 in 100) annual probability standard of flood protection with allowances for climate change unless local studies indicate a higher annual probability, both in relation to development and the measures required to reduce the impact of any additional run off generated by that development, to demonstrate that there is no increased risk of flooding to existing and surrounding properties;

- Development should be designed from the outset to incorporate Sustainable Drainage Systems wherever practical, to reduce flood risk, improve water quality and promote environmental benefits;

- Where appropriate, development should, subject to viability and feasibility, contribute to flood risk management in North Northamptonshire;

- Following any identified mitigation, development that would lead to deterioration or may compromise the ability of a water body or underlying groundwater to meet good status standards in the Anglian RBMP (required by the WFD) is unlikely to be permitted;

- Development will only be permitted where it can be demonstrated that adequate and appropriate water supply and wastewater infrastructure is available (or will be prior to occupation).

4.10 The location of development can play a significant role in flood risk management. The use of the Sequential Test for all proposed sites will ensure that development is focused towards areas subject to a lower probability of flooding.

4.11 The JCS states that developers must manage flood risk on site for a 1% (1 in 100) annual probability flood with an allowance for climate change (see Appendix 4: Guidance on Climate Change Allowances for more information) without increasing risk to others. It also makes reference to the need for developers and those promoting sites to apply the sequential approach when locating development within the site boundary, where appropriate. New
development should be located in areas at the lowest probability of flooding so that the most vulnerable development is located in the lowest flood risk areas.

**Policy 20 – Nene and Ise Valleys**

4.12 The Nene and Ise Valleys will be priorities for investment in green infrastructure to strengthen biodiversity and landscape character, support a prosperous local economy, provide leisure and recreational opportunities and support the revitalisation of towns and the protection and enhancement of their surrounding countryside. Proposals should ensure the integrity of European designated sites such as the Upper Nene Valley Gravel Pits SPA are protected. This will be achieved by managing development and investment to:

- Improve visual and physical linkages between the rivers and waterways and adjacent settlements by creating and maximising vistas to the valley/water and ensuring development, public realm and access are orientated to the valley/water;
- Develop the tourism potential of Wellingborough, Thrapston and Oundle as gateways to the rivers and the wider valleys as focal points for the provision of waterside facilities;
- Prioritise the protection and enhancement of existing visitor attractions and facilities with appropriate infrastructure to ensure that these remain the focal points for visitors, in order to take the pressure off more sensitive locations;
- Support new green infrastructure and heritage based attractions of a type and scale that can be accommodated by existing or new infrastructure and which strike an appropriate balance between visitor numbers and biodiversity, landscape, local amenity and heritage interests;
- Provide a focus for improved navigation and enhanced waterways along the River Nene;
- Improve strategic recreation trails along the length of the Nene Valley and developing these in the Ise Valley;
- Identify opportunities and proposals for floodplain and river re-naturalisation, deculverting within urban areas and river habitat improvements.

**Kettering Part 2 Local Plan**

4.13 The Council is preparing the Site-Specific Part 2 Local Plan for Kettering, which will cover the plan period to 2031. It provides detailed planning policies to deliver the Part 1 North Northamptonshire JCS. The housing requirement for Kettering Borough is 10,400 dwellings by 2031.

4.14 The majority of development will be focused at Kettering, which is identified in the Joint Core Strategy as the principle growth town. Smaller scale development will also take place at Burton Latimer, Desborough and Rothwell.

4.15 A significant proportion of the growth in Kettering Borough will take place through the East Kettering Sustainable Urban Extension (SUE), due to deliver 5,500 dwellings and associated development (3,630 in the plan period and an additional 1,870 beyond 2031). The Kettering Town Centre Action Plan also includes significant levels of residential development, retail and employment.
4.16 The timetable for the delivery of the Site-Specific Part 2 Local Plan for Kettering is set out on the Council’s website. The pre-submission consultation is due to take place September – October 2019 followed by the submission to Secretary of State in January 2020 with final adoption planned for September 2020.

4.17 This SFRA should be used to inform site-specific policy considerations within the Part 2 Plan.

**North Northamptonshire Brownfield Land Assessment**

4.18 Through the Housing and Planning Act 2016, the Government introduced a requirement for LPAs to publish and maintain registers of brownfield land suitable for housing development. This was required to be in place by April 2017.

4.19 The NNJPU undertook this exercise on behalf of KBC. Each site reviewed was 0.25 hectares or above in size and considered suitable for future housing development. Site-specific data has been collated on each site following guidance set by the Department for Communities and Local Government (now Ministry of Housing, Communities and Local Government).

4.20 The NNJPU engaged the services of NCC, as the LLFA, to screen each of the sites in relation to flood and water management and this included applying the Sequential Test to each site. This information has been used to inform the update of this SFRA (see Section 6: Site-Specific Information for more details).

**Neighbourhood Planning**

4.21 Neighbourhood planning gives communities direct power to develop a shared vision for their neighbourhood, and help shape the development and growth of their local area. Communities are able to choose where they want new homes, shops and offices to be built, have their say on what those new buildings should look like and what infrastructure should be provided, and grant planning permission for the new buildings they want to see go ahead.

4.22 Neighbourhood planning provides a powerful set of tools for local people to ensure that they get the right types of development for their community, in order to align the aims and aspirations of the neighbourhood with the strategic needs and priorities of the wider local area.

4.23 The Localism Act of 2011 states that “an LPA should be proactive in providing information to communities about neighbourhood planning and fulfil its duties and take decisions as soon as possible, and within statutory time periods where these apply”. It also suggests that the LPA should set out a clear and transparent decision-making timetable and share this with those wishing to prepare a Neighbourhood Plan.

4.24 Through the development of Neighbourhood Plans, flood risk should be considered early on in the planning process and the LPA should promote this essential part of the process taking into account the NCC-produced guidance on ‘Neighbourhood Planning and Flood Risk’. Those wishing to develop Neighbourhood Plans in Kettering Borough should refer to this guidance for more information.

4.25 A number of Neighbourhood Plans have been designated or “made”, and can be accessed on the KBC website. These include:
- Broughton (designated 15th January 2014);
- Desborough (designated 16th October 2013);
- Grafton Underwood (designated 3rd June 2019);
• Great Cransley (designated 27th May 2015);
• Mawsley (designated 15th April 2015);
• Pytchley (designated 7th December 2015);
• Rothwell (designated 10th April 2013);
• South West Kettering (Headlands Community) (designated 14th October 2015); and
• Broughton (made 17th October 2018).
5 Understanding Flood Risk in Kettering Borough

Historic Flooding

5.1 The historic flooding record held by the LLFA (NCC) shows that there has been a total of 415 incidents of flooding reported in the Borough of Kettering since 1973, affecting over 120 properties internally. The majority of the reports of flooding are within Kettering, Desborough and Rothwell, although there are incidents within most of the towns and villages of the Borough (see Map 2: Recorded Flood Incidents, in the accompanying Strategic Map Document for more information).

5.2 Historically, the primary source of flood incidents in Kettering Borough have been the main watercourses of the River Ise and Slade Brook, attributed to the location of urban developments within close proximity to the watercourses. However surface water flooding from agricultural runoff has also been a significant contributory factor given the rural nature of the Borough. More recently, surface water runoff and sewer flooding in urban areas has been the main cause of flooding.

5.3 Records of particularly historic flooding generally lack the detail required to accurately report the source and/or extent of the flooding. The following information has been extracted from the River Nene and River Welland Catchment Flood Management Plans:

- **March 1947**: A combination of heavy rain on a frozen catchment caused high surface runoff rates followed by a rapid snowmelt, which resulted in widespread flooding across the River Nene catchment. This large scale flood caused flooding to properties. Extent of impact upstream in Kettering is unknown.
- **June and July 1958**: Fluvial flooding from the River Ise. Extent not reported.
- **July 1968**: Fluvial flooding of the river valley in the Upper Welland.
- **1973**: Surface water flooding along the River Ise affecting Geddington.
- **1980**: Surface water flooding along the River Ise affecting Geddington.
- **June 1981**: Widespread flooding to property and roads, caused by heavy rainfall on a saturated catchment. Flooding was most severe in the smaller catchments due to the intense nature of the storm.
- **1981**: Fluvial and surface water flooding from River Ise and Slade Brook affecting Geddington.
- **1992**: Fluvial flooding along the River Ise, affecting Geddington.
- **April 1998**: Large areas along the River Nene and River Ise were flooded due to heavy rainfall and channel capacities being exceeded. Sites along the River Ise downstream from Rushton (at A6003) through Kettering to Wellingborough were affected. Approximately 2800 properties were affected, although approximately 90% of these were in Northampton.
- **November 2000**: Minor fluvial flooding from River Ise affected properties in Geddington. Localised flooding from River Jordan.
- **August 2004**: Sewer flooding in Kettering due to surface water runoff, flooded five properties.
June 2007: Intense rainfall (over 65mm in three hours at one gauge) fell on the predominantly urbanised Slade Brook catchment leading to rapid surface runoff. In Slade Brook, river levels rose by over two metres in one hour. The intensity of the rainfall meant that drainage systems were completely overwhelmed, flooding 29 properties in Kettering along the Slade Brook. High flows from Slade Brook also caused levels to rise on the River Ise flooding an industrial building and roads in the Pytchley Lodge industrial estate. Other parts of Kettering were also affected. There were no defence failures that occurred during this flood.

5.4 Since the creation of the LLFA role in 2010, NCC has undertaken to collect as much information as possible relating to historic flood incidents within the county. The data collected is not considered to be exhaustive, and data relating to flood incidents occurring prior to 2010 is limited, however the record is considered comprehensive. It includes data from all Risk Management Authorities including Anglian Water (flooding from water supply and sewerage systems, collated on the Sewer Flooding Register), Environment Agency, highways authorities and local authorities.

5.5 In the period 2010 to 2019, records of flood incidents are characterised as predominantly surface water flooding, both in urbanised areas due to blockage or exceedance of artificial drainage, and in rural areas due to agricultural runoff and condition of natural drainage. Flooding tends to be localised small channel overflow in conjunction with surcharging of drainage following short, intense storms rather than those of a longer duration. In the period 2010 to 2019, 74 properties have been reported as being flooded internally. The two most notable incidents in this period were in November 2012 and March 2016, as summarised below:

- **November 2012**: A total of 20-30mm of rain fell across Northamptonshire on 21st November 2012 with some parts getting as much as 40mm, causing widespread surface water and fluvial flooding. An additional approximately 20mm of rain fell on the night of 24th November, which resulted in further flooding as a result of heavy rainfall, sewer incapacity, channel exceedance and agricultural runoff. 23 properties were flooded internally across the Borough.

- **March 2016**: Over 30mm of rain fell over approximately 10 hours on the morning of 9th March 2016, approximately 75% of the average monthly rainfall total. This heavy rainfall fell on a saturated catchment and land drainage systems were unable to convey rainwater effectively. 10 properties were flooded internally in the Borough.

5.6 Incidents of flooding from sewers are captured on Anglian Water’s Sewer Flooding Register. There are a total of 172 reported flood incidents on the Sewer Flooding Register within the study area. These incidents are clustered within the main settlements of the Borough (Kettering town, Rothwell, Desborough, Burton Latimer) as well as incidents in Broughton, Cranford, Geddington, Rushton and Willbarston.

5.7 Groundwater flooding occurs when water levels in the ground rise above the surface or into structures such as basements. There are five reports of flooding from rising ground water levels or springs emerging, two of which have affected properties internally. However, the effects of groundwater flooding are often indistinguishable from the effects of fluvial flooding or agricultural runoff, and are not always correctly attributed as ground water flooding. As a result, the recording of groundwater flooding tends to be less consistent or reliable.
5.8 The table below is indicative of reported flood incidents from all sources that are geographically defined, and so does not include the small number of broader reported incidents of flooding spanning a number of wards, including 29 properties in Kettering in 2007 and other more widespread historic incidents.

<table>
<thead>
<tr>
<th>Ward</th>
<th>No. of incidents</th>
<th>No. of properties affected internally</th>
</tr>
</thead>
<tbody>
<tr>
<td>All Saints</td>
<td>19</td>
<td>5</td>
</tr>
<tr>
<td>Avondale Grange</td>
<td>9</td>
<td>2</td>
</tr>
<tr>
<td>Barton</td>
<td>18</td>
<td>2</td>
</tr>
<tr>
<td>Brambleside</td>
<td>16</td>
<td>1</td>
</tr>
<tr>
<td>Burton Latimer</td>
<td>35</td>
<td>2</td>
</tr>
<tr>
<td>Desborough Loatland</td>
<td>17</td>
<td>10</td>
</tr>
<tr>
<td>Desborough St Giles</td>
<td>9</td>
<td>1</td>
</tr>
<tr>
<td>Ise Lodge</td>
<td>17</td>
<td>7</td>
</tr>
<tr>
<td>Northfield</td>
<td>14</td>
<td>0</td>
</tr>
<tr>
<td>Pipers Hill</td>
<td>26</td>
<td>4</td>
</tr>
<tr>
<td>Queen Eleanor and Buccleuch</td>
<td>50</td>
<td>18</td>
</tr>
<tr>
<td>Rothwell</td>
<td>41</td>
<td>9</td>
</tr>
<tr>
<td>Slade</td>
<td>46</td>
<td>11</td>
</tr>
<tr>
<td>St Michaels and Wicksteed</td>
<td>17</td>
<td>3</td>
</tr>
<tr>
<td>St Peters</td>
<td>18</td>
<td>0</td>
</tr>
<tr>
<td>Welland Ward</td>
<td>49</td>
<td>10</td>
</tr>
<tr>
<td>William Knibb</td>
<td>14</td>
<td>7</td>
</tr>
</tbody>
</table>

Table 6: Flooding incidents affecting properties in Kettering Borough

5.9 Where incidents are located within 400m of a proposed development site, consideration of the potential effects of capacity resulting in surcharging have been assessed as part of the Sequential Testing process, and should also be considered as part of any site-specific FRA.

Topography, Natural Landform and Geology

5.10 The Borough of Kettering falls within both the River Nene catchment (78% of the Borough) and the River Welland catchment (22% of the Borough). The main watercourses in the Borough are the River Ise (a tributary of the River Nene) and its tributary the Slade Brook. Two other tributaries of the River Nene, Harpers Brook and Alledge Brook, both rise in the Borough. The River Welland forms the northern boundary of the Borough, and its tributary River Jordan emerges in the west of the Borough. Watercourses are shown on Map 1: Study Area and Watercourse Network in the accompanying Strategic Map Document.

5.11 The River Ise emerges west of the Borough, in the north of Daventry District, and crosses the centre of the Borough in a west to east direction through Desborough and Rushton, before turning south at Geddington and flowing through Kettering town, Barton Seagrave and Burton Latimer. When it leaves the Borough, the River Ise drains over half the Borough and a catchment totalling approximately 17,000 hectares. Within Kettering, the Ise flows through Wicksteed Park Lake, a privately-owned lake.

5.12 Slade Brook is the main tributary of the River Ise. It flows from the Borough’s western boundary, through Rothwell. It flows through the centre of Kettering town before joining the River Ise. Its catchment of around 2,500 hectares falls entirely within the Borough, and
includes the Thorpe Malsor and Cransley private reservoirs, and KBC-owned Slade Brook Balancing reservoir.

5.13 East Brook is a small tributary of the Slade Brook, the extent of which is relatively unknown as it is largely culverted through Kettering town.

5.14 The headwaters of the Harpers Brook rise just north of Desborough, and the watercourse flows east through Little Oakely and then out of the Borough to Brigstock.

5.15 Alledge Brook rises in Grafton Underwood to the east of the Borough, then flows south to Cranford before flowing east out of the Borough to the River Nene.

5.16 The River Welland forms the northern boundary and flows through predominantly rural areas. Its tributary River Jordan emerges just west of Desborough before flowing west through Braybrooke then out of the Borough.

5.17 The Borough has a history of flooding from a range of sources. The most notable events occurred in June 1981, April 1998, 2007 and 2012, with greatest impacts to the urban waterside areas of Kettering town.

5.18 The topography of the Borough varies between 50mAOD and 150mAOD as can be seen on Map 3: Topography, in the accompanying Strategic Map Document. The Borough’s south-western boundary forms a high ridge of 125-150mAOD, between the River Ise catchment and the adjacent Northampton tributaries of the Nene. There is also a similar height ridge line across the central part of the Borough just north of Desborough, forming the watershed between the Welland and Nene catchments. The northern extent of the Borough along the River Welland is at a low point of 55-60mAOD, and low points along the River Ise to the south of Kettering town are also at 55-60mAOD.

5.19 The bedrock geology in the Borough is complex, as can be seen on Map 4a: Bedrock Geology, in the accompanying Strategic Map Document. The River Ise catchment is characterised by valleys of Whitby Mudstone and high grounds of Northampton Sands. The Welland catchment valleys consist of Blue Lias and Charmouth Mudstone and Dyrham Formation. There are significant outcrops of Blisworth Limestone in the south-eastern part of the Borough and Lowe Lincolnshire Limestone in the centre of the Borough. Approximately a third of the Borough also has significant superficial deposits of Till on the highest ground and to the east of the Borough, as can be seen on Map 4b: Superficial Geology, in the accompanying Strategic Map Document.

**Surface Water Flood Risk**

5.20 Also known as pluvial flooding, surface water flooding occurs when rainfall generates runoff which flows over the surface of the ground and ponds in low lying areas. It is usually associated with high intensity rainfall events and can be exacerbated when the ground is saturated or when the drainage network has insufficient capacity to cope with the additional flow.

5.21 Flooding occurs as a result of the rainfall that does not soak into the land or enter a drainage system or watercourse, but remains on the surface. Runoff does not necessarily cause a problem if it flows straight into drains or watercourses, or on to land where it can quickly soak away. However, in some cases runoff flows onto the road network creating a hazard, particularly in winter conditions, or into homes or onto their land where it can cause damage.
5.22 Surface water flooding can also originate from farmland, often termed agricultural runoff. This is a particular risk where soil has been compacted or vegetation removed, either seasonally by ploughing or temporarily as topsoil is stripped to allow for development, as rainwater is no longer able to quickly soak into the ground. Instead the rainwater flows over the land, carrying soil with it to create a “muddy flood”. The farmland itself can be damaged because the floodwater can carry away topsoil and even crops.

5.23 The updated Flood Map for Surface Water, produced by the EA, has been used to inform the findings of this report and in particular the site-specific assessment found in Section 6 of this document. This mapping layer assesses flooding scenarios as a result of rainfall with the following chance of occurring in any given year (annual exceedance probability (AEP) of flooding is shown in brackets): 1 in 30 (3.3% AEP); 1 in 100 (1% AEP); and 1 in 1000 (0.1% AEP).

5.24 For each flooding scenario the data shows the extent, depth, velocity (including flow direction at maximum velocity), and hazard (as a function of depth and velocity).

5.25 It includes information about the source of the data (i.e. whether it was from nationally or locally produced modelling) and the confidence in the data outputs.

5.26 Map 5: Risk of Flooding from Surface Water, in the accompanying Strategic Map Document, shows the Borough of Kettering is at significant risk of flooding from surface water, with all of the main settlements shown to be at risk. The town of Kettering is shown to be at particularly high risk. A significant proportion of the rural land in the Borough is also at risk of surface water flooding, along the routes of small watercourses, in local valleys and following topographic depressions. Notable areas with clusters of properties at risk of surface water flooding are:

- Kettering Town – properties along the route of the East Brook culvert (vicinity of Bath Road, Lobelia Road, Laurel Road, Avondale Road, Linden Avenue, Waverley Road, Woodcroft Road, Boddington Road), Kathleen Drive, along the Slade Brook corridor, Langley Way, and Pytchley Lodge industrial estate;
- Burton Latimer - properties off Finedon Road and Wheatfield Drive;
- Desborough – properties off Harrington Road, Millholm Road, and Rushton Road (Sycamore Drive, Watermill Close, Eastbrook Hill);
- Rothwell – properties off Horsefair Lane, Evison and Meadow Road, Columbus Crescent, and Slade Valley Avenue;
- Geddington – properties off Wood Street;
- Grafton Underwood – properties on High Street;
- Mawsley – properties off Cransley Rise and Saxon Close;
- Braybrooke - properties along Newland Street; and
- Broughton - properties off Church Street and High Street.
5.27 In total, there are 1488 properties at risk of surface water flooding in the study area. Of these, 166 properties are at risk from the 1% AEP storm and 71 from the 3.3%AEP storm\(^1\).

5.28 The data has also been used to inform the site-specific assessments and the associated maps show that there are numerous potential development sites at risk from surface water flooding, particularly those close to the watercourses and with undulating topography. Where areas of surface water flood risk fall within a proposed development site, these should be considered as part of any site-specific FRA.

**Drainage and Sewerage Flood Risk**

5.29 Overflowing surface water drains (both public and private systems) can lead to flooding, either due to under capacity of drainage or failure of a drainage system, such as blocked pipes, mechanical breakdown or operational errors. Gravity drained systems can also back up due to an inability to flow into the river due to high water levels occurring in the receiving watercourse.

5.30 Existing combined sewer systems (where surface water and foul water use the same network) generally have more limited capacity than separate surface water and foul water systems. They often do not have the capacity to convey all flows during a significant event, with excess flows being discharged into adjacent watercourses via combined sewer overflows. Furthermore, during high flow events, excess flood water can flow out of the combined sewer system at manholes, and flood roads and properties in the vicinity.

5.31 There is no strategic or publicly available mapping to show the risk of flooding directly from drains and sewers, although the capacity of existing drainage systems is considered to some degree in the EA’s Risk of Flooding from Surface Water map (see paragraph 5.23 above). Water companies have a duty to maintain a register of sewer flood incidents from public sewers (as set out in section 5.6) which can help give a picture of areas at risk from sewer flooding.

5.32 New development has the potential to increase pressure on existing drainage and sewerage systems, where there is no ability to drain to ground or nearby watercourses. Water companies are unable to request that developers, wishing to connect to the existing public sewerage network, resolve historic issues within the network. However, water companies are able to undertake investment through their business plans to address historic flooding as well as promoting behavioural change to avoid a reoccurrence of blockages within the sewerage network.

5.33 Given the rural historic nature of the Borough, the majority of the smaller rural communities (such as Ashley, Wilbarston & Stoke Albany, Braybrooke, Rushton, Lodddington, Cranford and Pytchley) and some of the historic cores of larger urban areas such as Desborough and Burton Latimer, are served by surface water drainage systems which are not adopted by any public body, and therefore remain in riparian ownership. There is a lack of knowledge or understanding of these antiquated systems, and therefore limited maintenance undertaken, resulting in a higher risk of flooding from the surface water drainage network in these communities.

\(^1\) These figures have been calculated using address points data, and therefore may be an underestimation as properties only partially within the flood risk area may not have been included in the calculation.
5.34 It is clear from the number of instances of sewer network flooding in the study area, combined with the increased pressure for development and the impacts of climate change, that localised flood risk from public and private drainage systems will need to be managed effectively to deliver an overall reduction in flood risk. Where known sewer network capacity issues have been identified, as part of the site-specific assessments, these have been highlighted. Detailed consideration and assessment will be required for certain sites as part of the planning application process, and this has been outlined within Table 8.

**Fluvial Flood Risk**

5.35 Fluvial flooding occurs when a watercourse cannot accommodate the volume of water that is flowing into it. Rivers are categorised into main rivers and ordinary watercourses. Main rivers are usually large watercourses, but also include smaller watercourses of strategic drainage importance. These are coordinated, in flood risk terms, by the EA. Smaller watercourses, ditches and streams are classified as ordinary watercourses. Ordinary watercourses in Northamptonshire are those not defined as main rivers and are coordinated in flood risk terms by NCC. All Borough and District Councils have permissive powers under the Land Drainage Act (1991 as amended) to undertake works on these watercourses.

5.36 The fluvial flooding risk to Kettering Borough is identified on Map 6: Risk of Flooding from Rivers and Seas, in the accompanying Strategic Map Document. The Risk of Flooding from Rivers and Seas shows the chance of flooding from rivers and the sea, presented in categories taking account of flood defences and the condition they are in. The data is based on cells of 50m, each of which is allocated one of four flood risk categories: High risk (greater than 3.3% chance of flooding each year), Medium risk (between 1% and 3.3% chance of flooding each year), Low risk (between 0.1 and 1% chance of flooding each year) and Very Low risk (less than 0.1% chance of flooding each year).

5.37 The Flood Map for Planning also shows the risk of fluvial flooding, but is designed to delineate the risk into Flood Zones for land use planning purposes, and ignores the presence of flood defences. The dataset is designed to support flood risk assessments in line with Planning Practice Guidance. Flood Zone 3 shows areas at greater than 1% chance of flooding each year when the presence of flood defences are ignored, and Flood Zone 2 shows areas at 1% to 0.1% chance of flooding each year when the presence of flood defences are ignored. The flood zones for Kettering Borough can be seen on Map 7: Fluvial Flood Zones, in the accompanying Strategic Map Document.

5.38 These two maps together show that the risk of flooding from watercourses in the Borough is mainly limited to natural rural floodplains or physically constrained adjacent to urban areas. Notable areas at risk of fluvial flooding are:
- a large number of commercial properties in Pytchley Lodge industrial estate, which is at risk of flooding from Slade Brook;
- a block of flats off Mariners Way at risk from Slade Brook;
- small tributary of the River Ise south of Burton Latimer affects some properties off Higham Road, Finedon Road and Wheatfield Drive;
- a number of residential properties are at risk of flooding from the River Ise in Geddinton along Bridge Street and Queen Street;
- some properties are at risk of flooding from Alledge Brook in Grafton Underwood.
5.39 Within the Borough there are 318 properties identified as being located in Flood Zone 2 (1% AEP) and 80 properties located in Flood Zone 3 (0.1% AEP).2

5.40 There are no formal raised flood defence structures present within the Borough, other than high ground and Flood Storage Reservoirs, and therefore there are no areas defined as benefitting from flood defences.

5.41 It is a requirement within the NPPF that LPAs identify, in their SFRAs, areas of functional floodplain. The functional floodplain is a very important planning tool in ensuring that space is made for flood waters when flooding occurs. Development should be directed away from these areas. This functional floodplain is generally defined as areas with an annual probability of flooding of 1 in 20 (5%) or 1 in 25 (4%) or greater in any year. It also highlights areas that are designed to flood (such as flood storage reservoirs) in an extreme flood (0.1% annual probability).

5.42 For several watercourses within the study area, the EA hold detailed modelled flood outlines for the 1 in 20 year (5% annual probability) and 1 in 25 year (4% annual probability) flood events. Where this is the case, this data has been used to define the functional floodplain. Where this information is not available, the EA Flood Map for Planning (Rivers and Sea), Flood Zone 3, is considered as a suitable proxy. This provides the best estimate for the areas of land at risk of flooding, when the presence of flood defences are not considered. This zone also covers land with a 1 in 100 (1%) or greater chance of flooding each year from rivers.

5.43 Map 8: Functional Floodplain, in the accompanying Strategic Map Document, identifies that the areas of the Borough that are found within this extent are primarily rural, or within designated open space along river frontages in the main settlements. 73 properties are located within the Functional Floodplain3.

5.44 Detailed consideration should be given to fluvial flood risk as part of the preparation of any site-specific FRA and should include the updated climate change allowances. See Appendix 3 ‘Guidance on the preparation of FRAs’ and Appendix 4 ‘Guidance on Climate Change Allowances’ for more information. This information should also be used to inform future planning policy considerations.

Groundwater Flood Risk

5.45 This type of flooding occurs when the water table rises and water levels in the ground rise above the surface of the land. Flooding tends to occur after long periods of sustained heavy rainfall and can last for weeks or even months. The areas at most risk are often low-lying areas where the water table is more likely to be at a shallow depth and flooding can be experienced through water rising up from the underlying aquifer, or from water flowing from springs. Flooding from groundwater is most common in areas where the underlying bedrock is chalk, but it can also happen in locations with sand and gravel, such as in the Northamptonshire river valleys. There is also a risk of groundwater flooding along lines of changes in geology that result in potential spring emergence.

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2 These figures have been calculated using address points data, and therefore may be an underestimation as properties only partially within the flood risk area may not have been included in the calculation.
3 This figure has been calculated using address points data, and therefore may be an underestimation as properties only partially within the flood risk area may not have been included in the calculation.
5.46 Groundwater flooding mostly affects below surface infrastructure and buildings (for example, tunnels, basements and car parks) before it affects above-ground. The main causes of groundwater flooding include:

- Rise of typically high groundwater levels to extreme levels in response to prolonged intense rainfall;
- Rising groundwater levels in response to reduced groundwater abstraction in an urban area (termed groundwater rebound) or a mining area (termed mine water rebound);
- Subsidence of the ground surface below the current groundwater level;
- Rise of groundwater levels due to leaking sewers, drains and water supply mains;
- Faulty borehole headworks or casings, causing upward leakage of groundwater driven by high pressure underground; and
- Increases in groundwater levels and changed flow paths due to artificial obstructions or pathways, and loss of natural storage and drainage paths.

5.47 The only freely available Groundwater Flood Risk maps are the “Areas Susceptible to Groundwater Flooding” provided by the EA, which are quite outdated and would not be detailed enough for assessing site-specific risk. However as part of a wider Groundwater Flood Risk Study for Northamptonshire, NCC has produced a detailed Groundwater Flood Risk map for the county which provides a more robust assessment of groundwater flooding. The study identified areas at risk from bedrock aquifers, permeable superficial deposits (e.g. sands and gravels within river beds), and spring flow, and classifies them into bands of very high, high, moderate, low or very low risk. Full details of the study and associated planning guidance can be found in the detailed Northamptonshire Groundwater Flood Risk Study (2016).

5.48 The extent and level of risk posed by groundwater flooding across Kettering Borough can be seen on Map 9: Groundwater Flood Risk, in the accompanying Strategic Map Document. The map shows there are areas at significant risk of groundwater flooding. The areas at greatest risk are:

- Very high risk of bedrock flooding in Pipewell;
- Very high risk of spring flows east of Desborough;
- Very high risk of spring flows at North Park Recreation Ground and properties to the north;
- Very high risk of spring flows in the north-east of Burton Latimer;
- Very high risk of bedrock and spring flows in Cranford St John and Cranford St Andrew;
- High risk of spring flows at Telford Way industrial estate;

5.49 A total of 769 properties in the study area are located in areas at very high risk of groundwater flooding, and 962 properties at high risk.

5.50 Further investigation should be carried out as part of the preparation of a site-specific FRA, for any site deemed to be at risk of groundwater flooding. The FRA should incorporate a site-based assessment of the potential risk of groundwater flooding to the site, confirming from borehole data whether groundwater is a source of flood risk for the site, and setting out any mitigation measures proposed.

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4 These figures have been calculated using address points data, and therefore may be an underestimation as properties only partially within the flood risk area may not have been included in the calculation.
Reservoir Flood Risk

5.51 Reservoir flooding may occur as a result of the facility being overtopped and / or as a result of a breach developing in the dam wall. The latter can happen suddenly resulting in rapidly flowing, deep water that can cause a significant threat to life and major property damage.

5.52 The EA is responsible for enforcing the Reservoirs Act 1975 (as amended by the Act 2010), which is the safety legislation for reservoirs in the United Kingdom. However, the responsibility for safety lies with reservoir owners. There are different requirements for reservoirs that hold 25,000m³ or more of water above ground level (known as large raised reservoirs), and for reservoirs that hold less than 25,000m³ of water above ground level. Reservoirs must be registered with the EA if it holds or could hold 25,000m³ or more of water above ground level.

5.53 The EA is also responsible for establishing and maintaining a register of reservoirs, and making this information available to the public. The following table sets out the reservoirs on this register that either fall within the study area or where significant failure / breach would have an effect upon watercourses within the study area. The EA’s Long Term Flood Risk Map shows the maximum flood extent of these reservoirs.

<table>
<thead>
<tr>
<th>Reservoir</th>
<th>Location</th>
<th>Capacity (m³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thorpe Malsor Reservoir</td>
<td>Thorpe Malsor, near Kettering</td>
<td>591,000</td>
</tr>
<tr>
<td>Cransley Reservoir</td>
<td>Cransley, near Kettering</td>
<td>727,000</td>
</tr>
<tr>
<td>Slade Brook Balancing Reservoir</td>
<td>Kettering</td>
<td>111,000</td>
</tr>
<tr>
<td>Wicksteed Park Lake</td>
<td>Kettering</td>
<td>127,000</td>
</tr>
</tbody>
</table>

Table 7: Reservoirs in close proximity to and within the Study Area

5.54 Map 10: Flood Storage and Water Supply Reservoirs, in the accompanying Strategic Map Document, shows the location of these reservoirs within the study area.

5.55 Reservoirs overtopping or breaching could result in extensive flooding, with potentially severe consequences on properties and infrastructure. If development is proposed in an area encompassing a flood storage area or reservoir, or within the extent of flood risk of reservoirs, as shown in the EA’s Long Term Flood Risk Map, then it is recommended that a site-specific FRA be produced and that this FRA should consider flood risk from a breach of the reservoir.

5.56 Emergency planners have prepared specific plans for high priority reservoirs. The NCC Emergency Planning Team has used these maps to develop emergency flood plans in partnership with the Local Resilience Forum (LRF). Developers and those promoting sites may need to refer to this information to support their site-specific FRAs and therefore more information can be obtained by contacting the NCC Emergency Planning Team.

5.57 Where there is a risk of flooding to proposed development sites as a consequence of reservoir breach, failure or overtopping, this has been captured within the site-specific review. An appropriate analysis should be undertaken as part of any site specific FRA for any development site that falls within a breach location.

Residual Flood Risk

5.58 Flood defence infrastructure data has been provided in the study area to control floodwater and to reduce fluvial flood risk. Flood defence infrastructure comes in a variety of forms.
(flood walls, flood embankments, flood relief channels and flood storage reservoirs), and it is important to stress that this infrastructure does not altogether alleviate the risk of flooding.

5.59 Residual flood risk will remain if there is a system malfunction and/or if the magnitude of the flood event exceeds the flood management design standard of the infrastructure. Regular maintenance of the flood defence assets, as well emergency preparedness, will help keep this residual risk as low as possible. A key element of emergency preparedness is the maintenance of a flood warning service.

5.60 The NPPF defines residual risks as those remaining after applying the sequential approach to the location of development and taking mitigating actions. Examples of residual flood risk include:

- The failure of flood management infrastructure, such as a breach of a raised flood defence, blockage of a surface water conveyance system, overtopping of an upstream storage area, or failure of a pumped drainage system;
- Failure of a reservoir; or
- A severe flood event that exceeds a flood management design standard, such as a flood that overtops a raised flood defence, or an intense rainfall event which the drainage system cannot cope with.

5.61 Development areas located behind flood defences are at particular risk from rapid onset of fast-flowing and deep water flooding, with little or no warning if defences are overtopped or breached. Therefore, where development is located in areas behind formal or informal defences, this should be considered as part of the preparation of any site-specific FRA.
6 Site-Specific Information

6.1 Map 11: Potential Development Sites, in the accompanying Strategic Map Document, identifies all of the sites that have been reviewed in terms of flood risk within Kettering Borough, as set out in Table 8.

6.2 This site-specific review has included an assessment of the fluvial, surface water, sewer, ground water and reservoir breach flood risk. To illustrate the various sources of flood risk, maps have been produced for each site in the accompanying Site Specific Map Document. Where a site has experienced flooding in the past, or flooding has been experienced in close proximity (i.e. within 400m), this has been highlighted. Where a site has a watercourse located adjacent or flowing through it, the need for a Land Drainage Consent (for Ordinary Watercourses) or Environmental Permit (for Main Rivers) has also been highlighted.

6.3 Site-specific development considerations have been provided for each site and additional advice provided where considered appropriate. The data displayed in Table 8 includes a Red, Amber, and Green (RAG) Assessment, which has been used to communicate the following:

- **Limited flood risk to site, acceptable for allocation in flood risk management terms**
- **Site deliverable in flood risk management terms, providing the site-specific considerations e.g. sequential approach are incorporated into the policy requirement for the site**
- **Additional work required before allocation**

6.4 Where potential development sites are at risk from flooding, ideally they should be relocated to Flood Zone 1, if possible, in line with the Sequential Test. However, in the absence of other suitable locations, the development sites may be located in Flood Zone 2 and Flood Zone 3 (in order of preference respectively). Where the sequential approach to the site layout can be taken this has also been recommended. Development sites that are either wholly or largely situated in Flood Zone 2 or Flood Zone 3 will require further assessment or justification through the Exception Test.

6.5 It should be noted and acknowledged that sites which are located within Flood Zone 2 and Flood Zone 3, often have an area also located within Flood Zone 1. Therefore a sequential approach to the site layout can be adopted, providing the scale and density of the proposed development is known, with a view to locating more vulnerable land uses in Flood Zone 1 and less vulnerable uses in the higher risk Flood Zones. Site boundaries can also be redefined to avoid areas of high flood risk if required.

6.6 Half of the sites have been assessed as ‘green’ (16 of 29 sites), however there are a number of ‘amber’ sites (10 of 29), because they are either at risk of surface water or groundwater flooding, have experienced flooding on the site or in close proximity of the site in the past, or have capacity issues within the existing drainage systems. These sites will require site-specific policies to be incorporated as part of the allocation process, to ensure that the risk of flooding is adequately assessed and mitigated prior to development.

6.7 Two sites have been classed as ‘red’, requiring additional work before allocation:

- KE/184a McAlpine’s Yard, Pytchley Lodge Road, Kettering – as it is partly within Flood Zone 2, has been affected by flooding incidents in the past, and is entirely at risk of reservoir breach flooding; and
RA/170 South of New Stone House, Duck End, Cranford – as it has a high level of surface water flood risk.

At the time of writing, neither of the ‘red’ sites have had planning applications submitted.

Further Site-Specific Requirements

For all sites assessed, site-specific recommendations for planning requirements have been made in Table 8, some of which will be covered by existing strategic policy and some of which will be required to be implemented as site-specific policy if they are to be allocated for development.

Those sites with a low to moderate risk of flooding (‘amber’ sites) can be put forward for allocation in the LPP2 as long as adequate policies are in place to ensure a sequential approach to site layout is taken to ensure that more vulnerable development is located in areas at low risk of flooding. Recommended policy wording for these sites is:

- A sequential approach to site layout must be applied, taking into consideration the impacts of climate change on flood risk, to ensure that development is appropriate. No ‘highly vulnerable’ development can be located within Flood Zone 2 or areas at high risk of surface water flooding.

For ‘red’ site KE/184a McAlpine’s Yard, Pytchley Lodge Road, Kettering, it is recommended that a Level 2 SFRA is undertaken in order to more accurately assess the risks of flooding to the site, to ensure that the exception test can be passed and development of the site made safe without increasing flood risk elsewhere. This should include further analysis of the risk to the site from reservoir breach.

For ‘red’ site RA/170 South of New Stone House, Duck End, Cranford, it is recommended that a Level 2 SFRA is undertaken in order to more accurately assess the risk of surface water flooding to the site. Alternatively, the site could be allocated within the Part 2 Local Plan, with associated policy put in place to ensure that adequate assessment is undertaken of the flood risk and that a sequential approach to site layout is taken to ensure that more vulnerable development is located in areas at low risk of flooding. Recommended policy wording for this site would be:

- Detailed site-specific modelling is required in order to accurately assess the risk of surface water flooding to the site. This must include the impacts of climate change using latest guidance on allowances.

- A sequential approach to site layout must be applied to ensure that development is appropriate. No ‘highly vulnerable’ development can be located within Flood Zone 2 or areas at high risk of surface water flooding.
<table>
<thead>
<tr>
<th>SITE</th>
<th>Sources of flood risk</th>
<th>Overall Risk (RAG)</th>
<th>Sequential Test passed?</th>
<th>Site-specific development requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>BL/038 Land adjacent Major Employment</td>
<td>Negligible risk.</td>
<td>Negligible risk.</td>
<td>No records of flooding within 100m of site, 4x AWS sewer incidents within 400m of site. Record of flooding to one property on Finedon Road 02/01/2014, source unknown.</td>
<td>Yes</td>
</tr>
<tr>
<td>BL/039 Land to the rear of 23 Road, Burton Latimer, Residential.</td>
<td>Negligible risk.</td>
<td>Negligible risk.</td>
<td>One AWS sewer incident 75m from site boundary. Record of surface water flooding due to blocked gully on Nene Road, 28/10/2013. Record of surface water flooding on Polwell Lane junction with Station Road, 30/01/2014. Record of surface water flooding due to blocked drain on Polwell Lane, 24/08/2014.</td>
<td>Yes</td>
</tr>
<tr>
<td>BL/044 Land to west of Kettering Road, Burton Latimer, Residential.</td>
<td>Western area of site at high risk of surface water flooding (pooling); otherwise negligible risk.</td>
<td>Negligible risk, but band of high risk of spring emergence 75m east of site.</td>
<td>No records of flooding within 150m of site. 5x AWS sewer incidents within 400m of site.</td>
<td>Yes</td>
</tr>
<tr>
<td>BL/057 Bosworth Nurseries and Garden Centre, Finedon Road, Burton Latimer, Residential.</td>
<td>Areas of low to medium risk on south-west boundary of site, associated with main river Ise and 20m from south-east corner of site, associated with main river Latimer Brook. Two ordinary watercourses/land drains originating 30m from south-west corner of site, and another flowing 75m north-west of site, all draining to River Ise.</td>
<td>South-west area of site at very low to moderate risk of flooding from permeable superficial deposits.</td>
<td>Site is just outside the maximum flood extent for the Thorpe Malsor, Cransley Waters, Slade Brook Balancing Reservoir, and Wicksteed Park reservoirs. Site of flood to Finedon Road immediately adjacent site, 13/10/2013. Record of surface water/ordinary watercourse flooding to Finedon Road at crossing with Latimer Brook 50m from site, 25/11/2012. Record of flooding from River Ise within 60m of site boundary. Record of two incidents of main river flooding to commercial property 300m south of site, 21 &amp; 25/11/2012. One AWS foul sewer incident 250m north of site.</td>
<td>Yes</td>
</tr>
<tr>
<td>D/1 Land at Magnetic Park, employment B2/B8</td>
<td>Area of high risk of ponding in western corner of site. Very low risk flow path along south-eastern part of site.</td>
<td>Negligible risk.</td>
<td>Record of flooding 300m south of site - blockage to ordinary watercourse headwall causing flooding of highway and adjacent land, 08/01/2015 and 09/03/2016.</td>
<td>Yes</td>
</tr>
<tr>
<td>SITE</td>
<td>Fluvial and watercourses within 100m</td>
<td>Surface Water</td>
<td>Ground Water</td>
<td>Reservoir</td>
</tr>
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</tr>
<tr>
<td>DE/210 Land to the south of Desborough, Desborough, Residential.</td>
<td>Almost entirely Flood Zone 1 but Flood Zone 2 and 3 immediately adjacent southern boundary of site, associated with the River Ise 0-100m from site. Unnamed ordinary watercourse flowing south along western boundary of site. Unnamed ordinary watercourse/land drain originating within central part of site and draining south to River Ise.</td>
<td>High risk; six surface water flow paths crossing the site (north to south) presenting areas (approx 30% of the site) of low to high risk; highest risk area near western extent of site.</td>
<td>Band of high risk of spring flow across central part of site. Southern boundary at moderate risk of permeable superficial deposits.</td>
<td>Negligible risk from large raised reservoirs.</td>
</tr>
<tr>
<td>DE/212 Land off Buxton Drive and Eyeam Close, Desborough, Residential.</td>
<td>Entirely Flood Zone 1. Unnamed ordinary watercourse originates at north-east corner of site, flowing east.</td>
<td>Mostly negligible risk, areas of low risk at south-eastern end of site. Moderate risk associated with ordinary watercourse to east of site.</td>
<td>Band of very low risk of spring flow across central part of site. High risk of spring flow 175m south of site.</td>
<td>Negligible risk from large raised reservoirs.</td>
</tr>
<tr>
<td>KE/001 Scott Road Garages, Kettering, Residential.</td>
<td>Entirely Flood Zone 1. Area of low to high risk along western part of site, associated with flow path from Kipling Road to Scott Road.</td>
<td>Whole site at very high risk of spring flow.</td>
<td>Negligible risk from large raised reservoirs.</td>
<td>No records of flooding within 250m of site. 3x AWS sewer incident records 250-300m from site.</td>
</tr>
<tr>
<td>KE/002 Land adjacent A14 opposite crematorium, Kettering, Residential.</td>
<td>Entirely Flood Zone 1. Negligible risk.</td>
<td>Negligible risk, but high risk of spring flow immediately adjacent to southern corner of site.</td>
<td>Negligible risk from large raised reservoirs.</td>
<td>No records of flooding within 400m of site.</td>
</tr>
</tbody>
</table>

**Kettering Borough Council Level 1 SFRA Update (August 2019)**

- **Yes** indicates approval.
- **No** indicates rejection.
- **Unknown** indicates uncertainty or lack of data.

**Sources of flood risk**

- **Ground Water**
- **Surface Water**
- **Reservoirs**

**Recorded history of risk**

- Flood incident records within 250m of site.
- Flood incident records within 150m of site.
- Flood incident records within 100m of site.
- Flood incident records within 50m of site.
- Flood incident records within 10m of site.
- Flood incident records within 5m of site.
- Flood incident records within 1m of site.

**Sequential Test passed?**

- Yes: Approval
- No: Rejection
- Unknown: Uncertainty or lack of data
<table>
<thead>
<tr>
<th>SITE</th>
<th>Fluvial and watercourses within 100m</th>
<th>Sources of flood risk</th>
<th>Overall Risk (RAG)</th>
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</tr>
</thead>
<tbody>
<tr>
<td><strong>KE/003</strong> Former Kettering Town Football Club, Rockingham Road, Kettering, Residential.</td>
<td>Entirely Flood Zone 1. Approx 30% of the site at low to high risk of surface water ponding. Moderate risk flow path along Britannia Road and low risk flow path along Beatrice Road, either side of site. Western quarter of site at very low risk of spring flow, remainder of site negligible risk. 175m from area of moderate risk from permeable superficial deposits along Slade Brook.</td>
<td>Negligible risk from large raised reservoirs. No records of flooding within 200m of site. 3x AWS sewer incident records within 300m of site. Records of flooding to Kettering Town Centre from surface water and watercourses in June 1981, 2007 and April 1998, extent unknown.</td>
<td><strong>Yes</strong></td>
<td>- Major development, therefore Surface Water Drainage Assessment must be provided to demonstrate that SuDS are being used and to ensure that the development is safe and does not increase flood risk to any adjacent land. - Surface water flood risk to the site will need to be mitigated against through site layout and SuDS design. - Site &gt;1ha therefore a site-specific FRA will be required.</td>
<td></td>
</tr>
<tr>
<td><strong>KE/007</strong> Kettering Fire Station, Headlands, Kettering, Residential.</td>
<td>Entirely Flood Zone 1. Negligible risk to site. Low to moderate risk flow path adjacent to the western boundary of the site. South-west third of site at very low risk of spring flow.</td>
<td>Negligible risk from large raised reservoirs. No records of flooding within 300m of the site. Record of surface water flooding of highway at The Oval, 28/10/2018. Record of surface water flooding from railway embankment at The Fairway, 04/11/2015. Records of flooding to Kettering Town Centre from surface water and watercourses in June 1981, 2007 and April 1998, extent unknown.</td>
<td><strong>Yes</strong></td>
<td>- Major development, therefore Surface Water Drainage Assessment must be provided to demonstrate that SuDS are being used and to ensure that the development is safe and does not increase flood risk to any adjacent land.</td>
<td></td>
</tr>
<tr>
<td><strong>KE/011</strong> Land west of Kettering, Kettering, Residential.</td>
<td>Entirely Flood Zone 1 but southern corner of site immediately adjacent to Flood Zone 3 associated with main river Slade Brook. Thorpe Malsor Arm. Mostly negligible risk, but one flow path of low to high risk across centre of site, flowing from Buttermere Close to A14, with ponding adjacent A14 embankment on western boundary of the site. Approx. 15% of central and western part of site at high risk of spring flow, and further 35% at very low risk. Southern corner of the site is just within the predicted maximum extent for both the Cransley Waters and Thorpe Malsor reservoirs. Negligible risk.</td>
<td>Record of surface water flooding to Gipsy Lane on site boundary, 09/06/2010.</td>
<td><strong>Yes</strong></td>
<td>- Major development, therefore Surface Water Drainage Assessment must be provided to demonstrate that SuDS are being used and to ensure that the development is safe and does not increase flood risk to any adjacent land.</td>
<td></td>
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</tbody>
</table>
| KE/153 | Factory adjacent to 52 Lawson Street, Kettering, Residential. | | | • Flooding has been experienced on the site or within close proximity, therefore a detailed site-specific FRA will be required to investigate this history of risk ensure that the development is safe and does not increase flood risk to any adjacent land.  
• Major development, therefore Surface Water Drainage Assessment must be provided to demonstrate that SuDS are being used and to ensure that the development is safe and does not increase flood risk to any adjacent land.  
• An assessment should consider impacts of development on East Brook Culvert which is understood to be located near or within the site. |
| KE/154 | Land to the rear of Cranford Road, Kettering, Residential. | | | • Flooding has been experienced on the site or within close proximity, therefore a detailed site-specific FRA will be required to investigate this history of risk ensure that the development is safe and does not increase flood risk to any adjacent land (site specific FRA also required as site is >1ha).  
• Major development, therefore Surface Water Drainage Assessment must be provided to demonstrate that SuDS are being used and to ensure that the development is safe and does not increase flood risk to any adjacent land. |
<table>
<thead>
<tr>
<th>SITE</th>
<th>Description</th>
<th>Sources of flood risk</th>
<th>Overall Risk (RAG)</th>
<th>Sequential Test passed?</th>
<th>Site-specific development requirements</th>
</tr>
</thead>
</table>
| KE/184A | McAlpine’s Yard, Pytchley Lodge Road, Kettering. Mixed use – B1c/B2 and residential. | **Surface Water** | High risk - greater than half the site is at risk of flooding although the risk is mainly low, with isolated areas of pooling at moderate to high risk. | | • Site is at high risk of flooding from reservoir breach. A Level 2 SFRA will be required to accurately assess the risk of flooding from nearby reservoirs, particularly Slade Brook Balancing Reservoir. This assessment should include:  
  • Evaluation of the potential damage to buildings or loss of life in the event of dam failure;  
  • Discussions with the reservoir undertaker to avoid an intensification of development within areas at risk from reservoir failure, and to ensure that reservoir undertakers can assess the cost implications of any reservoir safety improvements required due to changes in land use downstream of their assets; and  
  • Assessment to inform preparation of an emergency plan.  
  • Site is partly in Flood Zone 2 and with a history of flooding, therefore sequential approach to site layout will be required, taking into consideration the impacts of climate change to ensure that development is appropriate. Limit development within Flood Zone 2 to ‘less vulnerable’ development classes, with all residential uses restricted to Flood Zone 1 areas.  
  • Flooding has been experienced on the site or within close proximity, therefore a detailed site-specific FRA will be required to investigate this history of risk ensure that the development is safe and does not increase flood risk to any adjacent land (site specific FRA also required as site is >1ha).  
  • Major development, therefore Surface Water Drainage Assessment must be provided to demonstrate that SuDS are being used and to ensure that the development is safe and does not increase flood risk to any adjacent land.  
  • Surface water flood risk within and flow paths across the site will need to be protected and/or mitigated against through site layout and SuDS design.  
  • An Environmental permit will be required for works near Slade Brook and consent will be required for works near ordinary watercourses. |
| KE/200 | Land at Wicksteed Park, housing | **Surface Water** | Low to moderate risk at western side of, otherwise negligible risk. High risk on Sussex Road immediately west of site. | | • Flooding has been experienced on the site or within close proximity, therefore a detailed site-specific FRA will be required to investigate this history of risk ensure that the development is safe and does not increase flood risk to any adjacent land (FRA also required as site is >1ha).  
  • Major development, therefore Surface Water Drainage Assessment must be provided to demonstrate that SuDS are being used and to ensure that the development is safe and does not increase flood risk to any adjacent land.  
  • Flooding has been experienced on the site or within close proximity, therefore a detailed site-specific FRA will be required to investigate this history of risk ensure that the development is safe and does not increase flood risk to any adjacent land (FRA also required as site is >1ha).  
  • Major development, therefore Surface Water Drainage Assessment must be provided to demonstrate that SuDS are being used and to ensure that the development is safe and does not increase flood risk to any adjacent land. |

**Fluvial and watercourses within 100m**
- Southern third of site is within Flood Zone 2, remainder of site Flood Zone 1. Eastern and southern boundaries of site are adjacent to Flood Zone 3 associated with main river Slade Brook and an ordinary watercourse tributary, which are located within 10m of the site boundaries. Flood Zone 3 is just within the southern site boundary, and at this location is considered the Functional Floodplain.
- Western and southern edge of site at moderate risk from permeable superficial deposits.

**Reservoir**
- Site is entirely at risk from Cransley Waters, Thorpe Malsor and Slade Brook Balancing Reservoirs. Given proximity of the site to Slade Brook Balancing Reservoir, warning time is likely to be minimal.

**Recorded history of risk (within 400m)**
- Record of flooding to southern third of site, as well as multiple units on Orton Way, from surface water and from Slade Brook, 19/06/2007. Record of standing water on A14 south of site, 28/10/2013. 2x AWS sewer incident records 300-400m north-east of site. Records of flooding to Kettering Town Centre from surface water and watercourses in June 1981, 2007 and April 1998, extent unknown.

**Site-specific development requirements**
- Site is partly in Flood Zone 2 and with a history of flooding, therefore sequential approach to site layout will be required, taking into consideration the impacts of climate change to ensure that development is appropriate. Limit development within Flood Zone 2 to ‘less vulnerable’ development classes, with all residential uses restricted to Flood Zone 1 areas.  
  • Flooding has been experienced on the site or within close proximity, therefore a detailed site-specific FRA will be required to investigate this history of risk ensure that the development is safe and does not increase flood risk to any adjacent land (site specific FRA also required as site is >1ha).  
  • Major development, therefore Surface Water Drainage Assessment must be provided to demonstrate that SuDS are being used and to ensure that the development is safe and does not increase flood risk to any adjacent land.  
  • Surface water flood risk within and flow paths across the site will need to be protected and/or mitigated against through site layout and SuDS design.  
  • An Environmental permit will be required for works near Slade Brook and consent will be required for works near ordinary watercourses.
Site: Geddington

**Ref.** RA/6

**Location**
Land south of A14 Junction 4, employment B2/B8

**SITE**
South-eastern quarter of site is within Flood Zone 2, and a very small amount of Flood Zone 3 and 3b on southern boundary; remainder of site is Flood Zone 1. Southern boundary of site is adjacent to FZ3 associated with main river Slade Brook, which is located within 10m of the site boundary.

**Fluvial and watercourses within 100m**
A third of the site (western and southern) is at low to high risk of flooding. High risk to the south of the site associated with the Slade Brook.

**Surface Water**
Negligible risk.

**Ground Water**
Negligible risk from large raised reservoirs.

**Reservoir**
Records of flooding to A14 underpass and emergency services access, 50-200m east of site, source unknown. January 2014. Records of Kettering Road 150m north of site flooding from surface water runoff, 28/10/2013 and 16/03/2016. Record of flooding to property on Meadow Road, source unknown, 28/10/2013. 1x AWS sewer incident record 350m from site.

**Overall Risk (RAG)**
Yes

**Sequential Test passed?**
Yes

**Sources of flood risk**

<table>
<thead>
<tr>
<th>Fluvial and watercourses within 100m</th>
<th>Surface Water</th>
<th>Ground Water</th>
<th>Reservoir</th>
<th>Recorded history of risk (within 400m)</th>
<th>Overall Risk (RAG)</th>
<th>Sequential Test passed?</th>
<th>Site-specific development requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>A third of the site (western and southern) is at low to high risk of flooding. High risk to the south of the site associated with the Slade Brook.</td>
<td>Negligible risk.</td>
<td>Negligible risk from large raised reservoirs.</td>
<td>Records of flooding to A14 underpass and emergency services access, 50-200m east of site, source unknown. January 2014. Records of Kettering Road 150m north of site flooding from surface water runoff, 28/10/2013 and 16/03/2016. Record of flooding to property on Meadow Road, source unknown, 28/10/2013. 1x AWS sewer incident record 350m from site.</td>
<td>Yes</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**SITE**

| RA/10 | Geddington South West, employment B1c |

**SITE**
Entirely Flood Zone 1.

**Fluvial and watercourses within 100m**
Northern quarter of site is at very high risk of bedrock aquifer flooding. Remainder of site is at very low risk of spring emergence.

**Surface Water**
Negligible risk.

**Ground Water**
Negligible risk from large raised reservoirs.

**Reservoir**

**Overall Risk (RAG)**
Yes

**Sequential Test passed?**
Yes

**Sources of flood risk**

| RA/107 | Geddington South West, Grafton Road, Geddington Residential. |

**SITE**
Entirely Flood Zone 1.

**Fluvial and watercourses within 100m**
Moderate risk flow path along northern extent of site, otherwise negligible risk.

**Surface Water**
Negligible risk from large raised reservoirs.

**Ground Water**
Negligible risk from large raised reservoirs.

**Reservoir**

**Overall Risk (RAG)**
Yes

**Sequential Test passed?**
Yes

**Sources of flood risk**

| RA/109 | Geddington South East, Geddington Residential. |

**SITE**
Entirely Flood Zone 1. Nearest Flood Zone 75m east of site associated with the main river River Ise.

**Fluvial and watercourses within 100m**
Half of the site at high risk and a third at very low risk from spring flow.

**Surface Water**
Negligible risk. Moderate risk on Kettering Road and adjacent gardens.

**Ground Water**
Negligible risk from large raised reservoirs.

**Reservoir**

**Overall Risk (RAG)**
Yes

**Sequential Test passed?**
Yes

**Sources of flood risk**

- Site is partly in Flood Zone 2 and at high risk of surface water flooding, therefore sequential approach to site layout will be required, taking into consideration the impacts of climate change to ensure that development is appropriate. It is proposed to allocate Flood Zone 2 area as open space / ‘less vulnerable’ development classes only, with no development in Flood Zone 3a/3b, and all residential uses restricted to Flood Zone 1 areas.
- Surface water flood risk within the site will need to be protected and/or mitigated against through site layout and SuDS design.
- Major development, therefore Surface Water Drainage Assessment must be provided to demonstrate that SuDS are being used and to ensure that the development is safe and does not increase flood risk to any adjacent land.
- An Environmental permit will be required for works near Slade Brook.

- Unclear whether likely to be a minor or major development, however Surface Water Drainage Assessment should be provided to demonstrate that SuDS are being used and to ensure that the development is safe and does not increase flood risk to any adjacent land.
- Groundwater flood risk will need to be assessed as part of a site-specific FRA and mitigated against through site design (FRA also required as site is >1ha).

- Flooding has been experienced on the site or within close proximity, therefore a detailed site-specific FRA will be required to investigate this history of risk ensure that the development is safe and does not increase flood risk to any adjacent land.
- Major development, therefore Surface Water Drainage Assessment must be provided to demonstrate that SuDS are being used and to ensure that the development is safe and does not increase flood risk to any adjacent land.
- Major development, therefore Surface Water Drainage Assessment must be provided to demonstrate that SuDS are being used and to ensure that the development is safe and does not increase flood risk to any adjacent land.
- Groundwater flood risk will need to be assessed as part of a site-specific FRA and mitigated against through site design (site specific FRA also required as site is >1ha).
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</thead>
<tbody>
<tr>
<td>RA/110 Old Nursery Asie, Grafton Road, Geddington. Residential.</td>
<td>Western edge of site in Flood Zone 2, remaining Flood Zone 1. Flood Zone 3 associated with the main River Ise 15m west of site. River Ise 25m from western corner of site. Negligible risk. Southern half of site at moderate risk from spring flow, and northern half at very low risk. Negligible risk from large raised reservoirs. Record of main river flooding from River Ise affecting the western edge of the site, April 1998. Record of flooding to Grafton Road south of site, 21/11/2012. Records of main river and surface water flooding of Bridge Street and Queen Street, April 1998, 20/11/2012, 25/11/2012, 20/12/2012, and 09/03/2016. Records of Geddington affected by flooding from River Ise in 1973, 1980 and 1981, extent unknown. 2x AWS sewer incident records 200-300m from site.</td>
<td>Yes</td>
<td>Site is partly in Flood Zone 2 and with a history of flooding, therefore sequential approach to site layout will be required, taking into consideration the impacts of climate change to ensure that development is appropriate. It is proposed to allocate Flood Zone 2 area as open space / ‘less vulnerable’ development classes only, with all residential uses restricted to Flood Zone 1 areas. Flooding has been experienced on the site or within close proximity, therefore a detailed site-specific FRA will be required to investigate this history of risk ensure that the development is safe and does not increase flood risk to any adjacent land. Major development, therefore Surface Water Drainage Assessment must be provided to demonstrate that SuDS are being used and to ensure that the development is safe and does not increase flood risk to any adjacent land.</td>
<td></td>
</tr>
<tr>
<td>RA/117 Two fields on the outskirts of Pytchley, Pytchley, Residential.</td>
<td>Entirely Flood Zone 1. Negligible risk. Negligible risk. Negligible risk from large raised reservoirs. Record of 5 properties on High Street flooding from agricultural runoff, and incapacity of historic culverts under village, June 2007. Record of surface water flooding to Isham Road adjacent to the site from agricultural runoff, 19/02/2013.</td>
<td>Yes</td>
<td>Likely to be a minor development however Surface Water Drainage Assessment should be provided to demonstrate that SuDS are being used and to ensure that the development is safe and does not increase flood risk to any adjacent land.</td>
<td></td>
</tr>
<tr>
<td>RA/120 Stoke Farm, Stoke Albany. Residential.</td>
<td>Entirely Flood Zone 1. Negligible risk. High risk flow path along Ashley Road adjacent to north-eastern boundary of site. Negligible risk. Band of very high risk from spring flow 200m east of site. Negligible risk from large raised reservoirs. No records of flooding within 400m of site.</td>
<td>Yes</td>
<td>Major development, therefore Surface Water Drainage Assessment must be provided to demonstrate that SuDS are being used and to ensure that the development is safe and does not increase flood risk to any adjacent land.</td>
<td></td>
</tr>
<tr>
<td>RA/128 Top Orchard, Braybrooke. Residential.</td>
<td>Entirely Flood Zone 1. Negligible risk. Negligible risk. Negligible risk from large raised reservoirs. Records of ordinary watercourse and main river flooding of Newland Street and Desborough Road and gardens and property, 21/11/2012, 09/03/2016, December 2017. Record of flooding on the River Jordan at Braybrook, April 1998.</td>
<td>Yes</td>
<td>Likely to be a minor development however Surface Water Drainage Assessment should be provided to demonstrate that SuDS are being used and to ensure that the development is safe and does not increase flood risk to any adjacent land.</td>
<td></td>
</tr>
<tr>
<td>RA/136 Home Farm, Weston by Welland. Residential.</td>
<td>Entirely Flood Zone 1. Ordinary watercourse tributary of River Welland 60m south of site. Negligible risk. High risk flow path and pooling along Valley Road immediately south of site attributed to ordinary watercourse crossing. Negligible risk. Negligible risk from large raised reservoirs. Records of surface water flooding immediately east of site, affecting a property, attributed to private drainage infrastructure, July 2013 and December 2014. Record of surface water flooding to Mickelborough Close, 20/12/2012.</td>
<td>Yes</td>
<td>Flooding has been experienced on the site or within close proximity, therefore a detailed site-specific FRA will be required to investigate this history of risk ensure that the development is safe and does not increase flood risk to any adjacent land. Major development, therefore Surface Water Drainage Assessment must be provided to demonstrate that SuDS are being used and to ensure that the development is safe and does not increase flood risk to any adjacent land.</td>
<td></td>
</tr>
<tr>
<td>RA/146 Land north of Loddington Road, Great Cransley. Residential.</td>
<td>Entirely Flood Zone 1. Negligible risk. Negligible risk. Negligible risk from large raised reservoirs. No records of flooding within 400m of site.</td>
<td>Yes</td>
<td>Major development, therefore Surface Water Drainage Assessment must be provided to demonstrate that SuDS are being used and to ensure that the development is safe and does not increase flood risk to any adjacent land.</td>
<td></td>
</tr>
</tbody>
</table>
### Table: Sources of flood risk

<table>
<thead>
<tr>
<th>Ref.</th>
<th>Name/Location</th>
<th>Fluvial and watercourses within 100m</th>
<th>Surface Water</th>
<th>Ground Water</th>
<th>Reservoir</th>
<th>Recorded history of risk (within 400m)</th>
<th>Overall Risk (RAG)</th>
<th>Sequential Test passed?</th>
<th>Site-specific development requirements</th>
</tr>
</thead>
</table>
| RA/170 | South of New Grove House, Duck End, Cranford. Residential. | Entirely Flood Zone 1, but Flood Zone immediately south of site associated with main river Alledge Brook. Ordinary watercourse tributary of Alledge Brook located along Duck End road 10m west of site. | High risk - southern half of site at high risk, and significant flow path along Duck End road extends into western half of site. | Entire site at very high risk from spring flow. | Negligible risk from large raised reservoirs. | 1x AWS sewer incident record 300m south west of site. | Red | Yes | • A site-specific FRA will be required to refine understanding of surface water flood risk to the site. It is recommended that this is undertaken as part of a Level 2 SFRA prior to allocation for development.  
• Sequential approach to site layout must be taken, despite this limiting the developable area to half the site, which may affect viability of the site for development. Surface water flow paths across the site will need to be protected and/or mitigated against through site layout and SuDS design.  
• Likely to be a minor development however Surface Water Drainage Assessment should be provided to demonstrate that SuDS are being used and to ensure that the development is safe and does not increase flood risk to any adjacent land.  
• Groundwater flood risk will need to be assessed as part of a site-specific FRA and mitigated against through site design.  
• Likely to be a minor development however Surface Water Drainage Assessment should be provided to demonstrate that SuDS are being used and to ensure that the development is safe and does not increase flood risk to any adjacent land. |
| RA/173 | Land east of the corner of Duck End and Thrapston Road, Cranford. Residential. | Entirely Flood Zone 1. | Northern corner of site at very low risk from spring flow. Very high risk bands 125m north and east of site from spring flow. | Negligible risk from large raised reservoirs. | 1x AWS sewer incident record 300m west of site. | Green | Yes | • Major development, therefore Surface Water Drainage Assessment must be provided to demonstrate that SuDS are being used and to ensure that the development is safe and does not increase flood risk to any adjacent land. |
| RA/174 | Land to the west of Mawsley, Mawsley. Residential. | Entirely Flood Zone 1. | High risk - significant flow path across centre of site plus other areas at low risk of ponding. | South-eastern half of site at high risk and remainder of site at very low risk from spring flow. | Negligible risk from large raised reservoirs. | Record of surface water flooding to Cransley Rise immediately east of site, 25/11/2012. | Green | Yes | • Flooding has been experienced on the site or within close proximity, therefore a detailed site-specific FRA will be required to investigate this history of risk ensure that the development is safe and does not increase flood risk to any adjacent land.  
• A site-specific FRA will be required to refine understanding of surface water flood risk to the site, which is likely to require hydraulic modelling. Sequential approach to site layout would limit the developable area of the site. Surface water flow paths across the site will need to be protected and/or mitigated against through site layout and SuDS design, and supported by the refined understanding of surface water risk.  
• The surface water flood risk immediately downstream of the site is significant, therefore there are opportunities for this site to deliver betterment to the local community by providing additional flood attenuation within the site.  
• Groundwater flood risk will need to be assessed as part of a site-specific FRA and mitigated against through site design (site specific FRA also required as site is >1ha).  
• Major development, therefore Surface Water Drainage Assessment must be provided to demonstrate that SuDS are being used and to ensure that the development is safe and does not increase flood risk to any adjacent land. |
<table>
<thead>
<tr>
<th>SITE</th>
<th>Name/ Location</th>
<th>Fluvial and watercourses within 100m</th>
<th>Surface Water</th>
<th>Ground Water</th>
<th>Reservoir</th>
<th>Recorded history of risk (within 400m)</th>
<th>Overall Risk (RAG)</th>
<th>Sequential Test passed?</th>
<th>Site-specific development requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>RA/ 221</td>
<td>Land south of Harborough Road, Stoke Albany, Residential.</td>
<td>Entirely Flood Zone 1.</td>
<td>Negligible risk. High risk flow path along Ashley Road adjacent to south-corner boundary of site.</td>
<td>Eastern extent and northern boundary at very low risk from spring flow.</td>
<td>Negligible risk from large raised reservoirs.</td>
<td>No records of flooding within 400m of site.</td>
<td>Yes</td>
<td></td>
<td>• Major development, therefore Surface Water Drainage Assessment must be provided to demonstrate that SuDS are being used and to ensure that the development is safe and does not increase flood risk to any adjacent land.&lt;br&gt;• Site &gt;1ha therefore a site-specific FRA will be required.</td>
</tr>
<tr>
<td>RO/ 088a</td>
<td>Rothwell North/Land to the west of Rothwell, Rothwell. Residential.</td>
<td>Entirely Flood Zone 1.</td>
<td>Negligible risk. High risk adjacent to properties immediately south of site.</td>
<td>Negligible risk.</td>
<td>Negligible risk from large raised reservoirs.</td>
<td>No records of flooding within 400m of site.</td>
<td>Yes</td>
<td></td>
<td>• Major development, therefore Surface Water Drainage Assessment must be provided to demonstrate that SuDS are being used and to ensure that the development is safe and does not increase flood risk to any adjacent land.&lt;br&gt;• Site &gt;1ha therefore a site-specific FRA will be required.</td>
</tr>
</tbody>
</table>

Table 8: Sequential Testing of key development sites within Kettering Borough
7 Flood Risk Management in Kettering Borough

Existing Flood Defences and Assets

7.1 Flood defences and assets within Northamptonshire have been identified within the Section 21 (the Act 2010) Asset Register. This register has been created by NCC as the LLFA and is a legal duty. This register is available to view on the NCC Flood Toolkit.

7.2 The asset register contains information about assets that could have an effect on flood risk in the county, including raised defences such as embankments and flood walls, as well as flood storage reservoirs and flood relief channels. Additionally the EA holds data along the defined main rivers.

7.3 The key defences within and affecting the study area are tabulated below.

<table>
<thead>
<tr>
<th>River</th>
<th>Location</th>
<th>Defence Type</th>
<th>Standard of Protection</th>
<th>Date Constructed</th>
<th>Responsibility</th>
</tr>
</thead>
<tbody>
<tr>
<td>Slade Brook</td>
<td>Kettering Leisure Village</td>
<td>Flood Storage Reservoir</td>
<td>2%</td>
<td></td>
<td>KBC</td>
</tr>
<tr>
<td>River Ise</td>
<td>Geddington</td>
<td>Flood Relief Channel</td>
<td>1%</td>
<td>2000</td>
<td>EA</td>
</tr>
<tr>
<td>River Ise</td>
<td>Clipston</td>
<td>Flood Storage Reservoir</td>
<td></td>
<td></td>
<td>EA</td>
</tr>
<tr>
<td>River Jordan</td>
<td>Braybrook</td>
<td>Flood Storage Reservoir</td>
<td>2%</td>
<td></td>
<td>EA</td>
</tr>
</tbody>
</table>

Table 9: Key flood defences within the study area

Flood Warning and Hydrometric Stations

7.4 The EA measures river levels, river flows and rainfall across England at strategic locations. The hydrometric data, combined with flood forecasting models, are used to inform the EA’s Flood Warning System. The details for those located within Kettering Borough are provided in Table 10 below. Real-time information is available for these stations, which can be viewed through the hyperlinks provided. This data can be used to inform site-specific FRAs and associated flood model data.

<table>
<thead>
<tr>
<th>Location</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>River Ise at Barford Bridge</td>
<td>Station name: Barford Bridge</td>
</tr>
<tr>
<td></td>
<td>Station ID: 6109</td>
</tr>
<tr>
<td></td>
<td>River name: River Ise</td>
</tr>
<tr>
<td></td>
<td>Typical range: 0.02m to 1.54m</td>
</tr>
<tr>
<td></td>
<td>Highest level on record: 1.86m on 10 April 1998</td>
</tr>
<tr>
<td></td>
<td>Site datum: 76.85mAOD</td>
</tr>
<tr>
<td></td>
<td>Website: <a href="https://flood-warning-information.service.gov.uk/station/6109">https://flood-warning-information.service.gov.uk/station/6109</a></td>
</tr>
</tbody>
</table>

| River Welland at Ashley    | Station name: Ashley                                                  |
|----------------------------|                                                                      |
|                            | Station ID: 6025                                                      |
|                            | River name: River Welland                                             |
|                            | Typical range: 0.03m to 2.08m                                         |
|                            | Highest level on record: 2.87m on 06 November 2000                   |
|                            | Site datum: 55.70mAOD                                                 |
The timely issue, receipt and response to warnings of floods are essential elements in the management of the residual risk of flooding. Where development is located in flood risk areas this provides an essential early warning service. The EA is responsible for monitoring flood events and for issuing warnings to people, properties and businesses at risk of flooding.

Flood forecasting requires real time data and forecast model data to provide accurate and timely flood warnings to the public. The EA’s procedures for distributing warnings are activated by triggers for individual river level and flow sites. Once a rain gauge and/or a river level gauge reaches pre-determined levels, catchment conditions are assessed using a combination of soil moisture deficit data, rainfall information from radar, and real-time rainfall and river responses. When conditions suggest that a flood is expected, a flood warning is issued and the EA’s flood warning service is activated. This is known as the Floodline Warnings Direct (FWD).

Four codes are used, which are:
- **Flood Alert**: when flooding of low-lying land and roads is possible;
- **Flood Warning**: when flooding of homes, businesses and main roads is expected;
- **Severe Flood Warning**: when severe flooding is expected. Under such conditions, there will be significant risk to life and property; and
- **Warning no longer in force**: when flood alerts or flood warnings are no longer in place.

Upon reaching an action trigger there is a built-in two-hour lead time before the onset of flooding. This lead time allows people to take remedial action in the face of an oncoming flood, such as lifting carpets, moving furniture and evacuating buildings.

Three EA designated flood warning areas intersect the Borough of Kettering: the River Ise in Geddington, the Slade Brook in the Venture Park area of Kettering, and the River Jordan in Braybrooke and Little Bowden. These can be seen on Map 12: Flood Warning and Alert Areas, in the accompanying Strategic Map Document. The River Welland and Tribuaries in Welham flood warning area and the River Welland in Market Harborough flood warning area intersect with the Borough’s northern and western boundaries but have no interaction with settlements within the Borough.

All new development being promoted within these areas should be by exception and should detail within their FRA a robust strategy for ensuring new residents sign up to the FWD service.
7.11 Local Authorities are encouraged to work with the EA to ensure that as many homeowners as possible are signed up to FWD and that any new properties are made aware of this service.

Emergency Planning and New Development

7.12 Where efforts to avoid and reduce flood risk have been exhausted at the planning application stage, flood risk can be further managed by mitigating the damages caused by flooding on homes, businesses and infrastructures. This can be achieved by promoting flood resilience and flood resistance measures as set out below.

7.13 During flood events, the EA and Local Authorities are required (under the Civil Contingencies Act 2004) to liaise closely, and the Councils will implement a range of contingency plans to detail how local services are to work together to respond to any incident or disaster. These plans include but are not limited to a Civil Emergency Manual, Flood Plan, and Emergency Communication plan.

7.14 Evacuation plans should be designed and put in place for new development areas identified as being at risk of flooding and should take into account that the occupiers are likely to lack local knowledge. The mobility of occupants also needs to be considered.

7.15 Developers and those promoting sites should refer to the guidance produced by NCC regarding New Development and Emergency Flood Plans, which can be found on the NCC Flood Toolkit, when producing their site-specific FRAs.

Flood Resilience

7.16 The concept of flood resilience refers to the ability of a building to recover following inundation from flood water. Flood resilient buildings are designed to reduce the consequences of flooding and facilitate recovery from the effects of flooding sooner than conventional buildings.

7.17 Flood resilience may be achieved through the use of water-resistant materials for floors, walls and fixtures, and by ensuring electrical controls, cables and appliances are placed at a higher than normal level. More information is available, including interactive diagrams, on the Flood Prevention pages of the NCC Flood Toolkit.

7.18 Where possible, the finished floor levels (lowest floor level) should be raised above the predicted flood level to prevent the ingress of flood water. For fluvial flooding this should generally be 300mm above the 1% (1 in 100) probability flood, including an allowance for climate change (see Appendix 4 for more information).

7.19 For single storey residential development (bungalows and ground floor flats), finished floor levels should be set 300mm above the 0.1% (1 in 1000) annual probability flood event, including an allowance for climate change (see Appendix 4 for more information).

7.20 Consideration must be given to providing access for those with restricted mobility. In considering appropriate resilience measures, it will be necessary to plan for specific circumstances and have a clear understanding of the mechanisms that lead to flooding and the nature of the flood risk. This information will need to be included within any FRA supporting the planning application where a risk of flooding has been demonstrated (see Appendix 3: Guidance on Preparation of FRAs, for more information).
**Flood Resistance**

7.21 The concept of flood resistance refers to the ability of a building to keep floodwater from entering it, even if surrounded by it. Flood resistant construction prevents the entry of water or minimises the amount of water that may enter a building where there is flooding outside and therefore relies on the operational deployment of flood defences at the property scale. This can be achieved by raising finished floor levels for instance, and often these measures rely on the availability of a reliable flood forecasting and warning system, and well established mobilisation and closure processes.

7.22 This form of construction should be used with caution and accompanied by resilience measures, as flood exclusion may rely on the effective deployment of elements such as barriers to doorways. Temporary and demountable defences are not normally appropriate for new developments.

7.23 Resilient construction is favoured because it can be achieved more consistently and is less likely to encourage occupiers to remain in buildings surrounded by rapidly rising water levels, thereby making access for emergency services difficult and possibly hazardous.

7.24 Essential infrastructure which has to be located in flood risk areas should be designed to remain operational when floods occur. More information is available on flood resistance and can be found on the NCC [Flood Toolkit](#).

**Reducing Flood Risk through Site Layout and Design**

7.25 Flood risk should be considered at an early stage in designing the layout and development of a site in order to provide an opportunity to reduce flood risk within the development.

7.26 The NPPF states that a sequential, risk-based approach should be applied to try to locate more vulnerable land-use to higher ground, while more flood-compatible development (e.g. vehicular parking, recreational space) can be located in higher risk areas. However, vehicular parking in floodplains should be based on the nature of flooding, flood depths and hazard, including evacuation procedures and flood warnings.

7.27 Waterside areas, or areas along known flow routes, can act as green infrastructure, being used for recreation, amenity and environmental purposes, allowing the preservation of flow routes and flood storage, and at the same time providing valuable social and environmental benefits to contribute towards other sustainability objectives. Landscaping should ensure safe access to higher ground from these areas, and avoid the creation of isolated islands as water levels rise.

**Modification of Ground Levels**

7.28 Modifying ground levels to raise the land above the required flood level is an effective way of reducing flood risk to a particular site in circumstances where the risk is entirely from tidal flooding or the land does not act as conveyance for flood waters. However, care must be taken at locations where raising ground levels could adversely affect existing communities and properties.

7.29 In most areas of fluvial flood risk, raising land above the floodplain would reduce conveyance or flood storage in flood cells and could adversely impact flood risk downstream or on neighbouring land.
7.30 Compensatory flood storage should be provided, and would normally be on a level for level, volume for volume basis, on land that does not currently flood but is adjacent to the floodplain (in order for it to fill and drain). It should be in the vicinity of the site and within the red line of the planning application boundary (unless the site is strategically allocated).

7.31 Raising ground levels can also deflect flood flows, so appropriate assessment should be performed to demonstrate that there are no adverse effects on third party land.

7.32 Raising levels can also create areas where surface water might pond during significant rainfall events. Any proposals to raise ground levels should be tested to ensure that it would not cause increased ponding or build-up of surface runoff on third party land.

**Buffer Strips**

7.33 As a minimum, developers should set back development eight metres from the landward toe of a main river (fluvial defences or top of bank where defences do not exist) and nine metres for ordinary watercourses. This provides a buffer strip to ‘make space for water’, allow additional capacity to accommodate climate change, ensure access to defences is secured for maintenance purposes and provide added resistance to the site. Where works are required within eight metres of main river an Environmental Permit for flood risk activities may be required. Where works are required within nine metres of an ordinary watercourse Flood Defence Consent will be required.

**Houses in Multiple Occupation**

7.34 Houses in multiple occupation can put residents at greater risk in areas of high flood risk, as they often have bedrooms on the ground floor or have basements that are converted into living accommodation. Basements, by their very nature, are susceptible to flooding particularly in areas that are located in flood risk areas or have a residual flood risk from being located behind flood defences.

7.35 Proposals in areas of flood risk may not be appropriate where previously unoccupied ground floor rooms are proposed to be converted to living accommodation. Therefore, all planning applications for the conversion of dwellings into homes of multiple occupation, must be accompanied by a site-specific FRA demonstrating that the accommodation (and indeed the whole development) is safe from the risk of flooding from all sources, and includes safe refuge. It is recommended that full consideration is given to whether or not planning permission should be granted for proposals for houses in multiple occupation, if it cannot be demonstrated that there would not be an increase in the number of people at risk from flooding.

**Developer Contributions**

7.36 In some cases, and following the application of the Sequential Test, it may be necessary for the developer to make a contribution to the improvement of flood defence provision that would benefit both the proposed new development and the existing local community. This would be subject to a S106 legal agreement.

7.37 For new development in locations without existing defences, or where the development is the only beneficiary, the full costs of appropriate risk management measures for the life of the assets proposed must be funded by the developer.

7.38 Funding from developers should be explored prior to the granting of planning permission and in partnership with the LPA and the EA and/or LLFA.
The appropriate route for the consideration of strategic measures to address flood risk issues is the Northamptonshire LFRMS. The LFRMS and associated documents can be found on the NCC Flood Toolkit and describes the priorities with respect to local flood risk management. The action plan includes the measures to be taken, their timescale for completion and how they will be funded. Developers should be able to demonstrate that strategic provisions are in accordance with the LFRMS, and can be afforded and maintained for their lifetime.
8 Cumulative Impact of Development

Understanding Cumulative Impact

8.1 Under the revised 2018 NPPF, strategic policies and their supporting SFRAs, are required to ‘consider cumulative impacts in, or affecting, local areas susceptible to flooding’ (para. 156).

8.2 Development of greenfield sites results in an increase in impermeable area. Without mitigation this can cause an associated increase in surface water runoff rates and volumes, and a consequent potential increase in downstream flood risk due to overloading of sewers, watercourses, culverts and other drainage infrastructure. Over time, development (both planned for and urban creep) has increased the coverage of impermeable surfaces, particularly in the urban settlements of the Borough. This has increased flow into the sewer network, which is known to be at capacity in many places.

8.3 Managing surface water discharges from new development is therefore crucial in managing and reducing flood risk. The planning system has a key role to play in settings standards for sustainable drainage from new developments and ensuring that developments are designed to take account of the risk from surface water flooding.

8.4 It has previously been assumed that if each individual development does not increase the risk of flooding, the cumulative impact will also be minimal. However, if there is a lot of development occurring within one catchment, particularly where there is flood risk to existing properties or where there are few opportunities for mitigation, the cumulative impact may be to change the flood response of the catchment.

8.5 For example, in Kettering Borough, inappropriately designed development in Desborough and Rothwell could impact on flood risk to properties in Kettering town; and uncontrolled development in Kettering town could impact on flood risk to properties downstream in Wellingborough.

8.6 However it should also be noted that redevelopment of brownfield sites has the potential to provide benefit and reduce flood risk by storing water onsite that would previously have been freely discharged. Therefore strong development control policies to reduce surface water runoff could have benefits to flood risk as a result of brownfield redevelopment.

Cumulative Impact of Development in Kettering Borough

8.7 The majority of Kettering Borough is at the top of the hydrologic catchments, and therefore the impacts of development control policy within the Borough could have an impact on flood risk in the neighbouring (downstream) authorities of Wellingborough, East Northamptonshire, Corby, Market Harborough and Leicestershire. However approximately 3,500 ha of upper reaches of the River Ise catchment are upstream of Kettering Borough in Daventry district, so management of development in Daventry district could have an impact on flood risk in Kettering Borough.

8.8 A detailed assessment of cumulative impacts of the developments being considered for allocation as part of Kettering’s Local Plan Part 2 is beyond the scope of this Level 1 SFRA. However a basic review of the extent potential development in the Borough has been undertaken to determine the potential scale of the issue.
8.9 Taking into account all sites that have come forward through Strategic Housing Land Availability Assessments (SHLAAs), Brownfield Land Registers and Employment Allocations, and more strategic development areas, there is an area of approximately 1,900ha that could be brought forward for development in Kettering Borough (although it is understood that some of this has now already been built out). Compared to an existing (2011) built-up area of approximately 2,500ha, this potential increase in development represents in the region of a 75% increase in urban areas within the Borough.

8.10 These development areas are dispersed across the Borough, however the Slade Brook catchment contains the greatest proportion of areas (mainly around Kettering town) and therefore has the greatest potential to be affected by proposed development. The Ise catchment also has a large number of potential development areas, and there are a number of areas identified in the upper reaches of the Harpers Brook. Almost no areas are identified in the north part of the Borough (i.e. the Welland catchment).

8.11 There is a strong policy base in Northamptonshire for provision of sustainable drainage on major developments, through NCCs role as a statutory consultee and the production of the Local Standards (see Section 10 below). These ensure that major developments meet strict requirements for surface water drainage and where possible (particularly for brownfield sites) provide betterment.

8.12 However there is a high risk of cumulative impacts from uncontrolled discharge on minor developments and permitted development, which are currently not assessed for their surface water drainage impacts.

**SWMP Critical Drainage Catchments**

8.13 The Kettering SWMP assessed the risk of flooding across the Borough (based on the EAs Risk of Flooding from Surface Water) and the identified areas at more significant risk. These were delineated into Critical Drainage Catchments (CDCs), defined within the SWMP as “a discrete geographic area (usually a hydrological catchment) where multiple or interlinked sources of flood risk cause flooding during a severe rainfall event thereby affecting people, property or local infrastructure.”

8.14 It should be noted that the CDCs as defined within the SWMP are not the same as the EAs Critical Drainage Areas (“an area within flood zone 1 which has critical drainage problems as notified by the Environment Agency”), and therefore the EA will not be a statutory consultee for applications within the SWMP’s CDCs.

8.15 In total, 10 CDCs were identified across the Borough and for each CDC an assessment was undertaken of the flooding sources and mechanisms, historical flooding records, the number of properties potentially at risk from surface water flooding and any significant new development (which offers the opportunity to incorporate improved surface water management).

8.16 A ranking and prioritisation process was applied to the identified CDCs, including, but not limited to, information on number and vulnerability of properties / receptors at ‘Moderate’ and ‘High’ Risk of surface water flooding, recorded historic impacts, potential for future development impacts / opportunities and potential positive environmental impacts.
8.17 It is considered that this assessment provides a suitable indication of those critical catchments that would be most affected by cumulative impact of development as discussed above. The Critical Drainage Catchments identified in the SWMP are, in priority order:

<table>
<thead>
<tr>
<th>Catchment Name</th>
<th>SWMP CDC reference</th>
<th>Flood Sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kettering Town</td>
<td>CDC 1</td>
<td>Surface water, sewer and fluvial</td>
</tr>
<tr>
<td>Desborough South</td>
<td>CDC 2</td>
<td>Surface water, ordinary watercourses / land drainage, sewer and fluvial</td>
</tr>
<tr>
<td>East Brook</td>
<td>CDC 6</td>
<td>Surface water, ordinary watercourses / land drainage and sewer</td>
</tr>
<tr>
<td>Rothwell South</td>
<td>CDC 3</td>
<td>Surface water, ordinary watercourses / land drainage and fluvial</td>
</tr>
<tr>
<td>Burton Latimer East)</td>
<td>CDC 7</td>
<td>Surface water, ordinary watercourses / land drainage, sewer and fluvial</td>
</tr>
<tr>
<td>Broughton</td>
<td>CDC 4</td>
<td>Surface water and ordinary watercourses / land drainage</td>
</tr>
<tr>
<td>Geddington</td>
<td>CDC 9</td>
<td>Surface water and fluvial</td>
</tr>
<tr>
<td>Ise Lodge Estate</td>
<td>CDC 5</td>
<td>Surface water, ordinary watercourses / land drainage and fluvial</td>
</tr>
<tr>
<td>Grafton Underwood</td>
<td>CDC 10</td>
<td>Surface water, ordinary watercourses / land drainage, and fluvial</td>
</tr>
<tr>
<td>Braybrooke</td>
<td>CDC 8</td>
<td>Surface water, ordinary watercourses / land drainage, and fluvial</td>
</tr>
</tbody>
</table>

Table 2: SWMP Critical Drainage Catchments

8.18 The CDCs and the catchments which drain to them are shown in Map 13: Critical Drainage Catchments in the accompanying Strategic Map Document. Developments in these areas have the potential to have a cumulative impact on flood risk in the CDCs (positive or negative).

8.19 A simple comparison of the CDCs with catchments having greatest volume of likely future development (as summarised in paragraph 8.9 above), indicates that the effects of cumulative impact are most likely to be seen in Kettering town centre, Burton Latimer, Broughton, Rothwell, Geddington and Desborough.

**Recommendations for Cumulative Impact**

8.20 The following recommendations for KBC are made for the catchments where cumulative development is likely to have the greatest impact on flood risk:

1. A Level 2 SFRA could consider further how the cumulative effects of potential peak rates and volumes of water from development sites would impact on peak flows, duration of flooding and timing of flood peaks on receiving watercourses. Such study could be used to justify greater restrictions/enforce through Local Planning Policy development site runoff rates and volumes specific to each catchment that are over and above those required by the Local SuDS Standards. They could also identify where there are opportunities with allocated sites to provide off-site betterment e.g. online/ offline
flood storage and where land should be safeguarded within proposed site allocations to fulfil this purpose.

2. KBC should consider requiring developers in areas draining to the SWMP CDCs to provide additional surface water management within their sites in order to minimise the risk of cumulative impact of development. Where infiltration of surface water runoff is not feasible within the site, this should include a requirement for long term storage, and an assessment of the impact of additional volumes of runoff on the receiving watercourse/sewer system.

3. KBC should consider requiring developers in areas draining to the SWMP CDCs to contribute to community flood management schemes outside of their red line boundary to provide wider benefit to the catchment and help offset the cumulative impact of development.
9 Sustainable Drainage Systems

Statutory Consultee Role

9.1 As of April 2015, all major planning applications have to demonstrate the use of sustainable drainage as part of their development. NCC, as LLFA, is now a statutory consultee on these planning applications.

Sustainable Drainage Systems

9.2 Sustainable Drainage Systems (SuDS) mimic natural drainage in a built environment. Instead of surface water being piped underground, water remains at the surface, where it is cleaned and stored, reducing flood risk and improving the quality of the water before it either soaks into the ground or discharges to a watercourse. This allows for greater biodiversity, habitat creation and visual amenity.

9.3 NCC encourages all new development and redevelopment that requires planning permission to use SuDS in order to reduce flood risk, improve water quality and present options for biodiversity and public amenity gains. This is consistent with existing national guidance and local planning policy.

General SuDS Advice for Developers in Northamptonshire

9.4 The demands of each individual development will lead to a wide variety of solutions. Understanding NCC’s priorities in terms of SuDS will help ensure the solutions are appropriate to the defined requirements.

9.5 It is important that developers establish the geological and hydrological conditions of their site at an early stage through ground investigations, before coming to any conclusions about the suitability of any particular SuDS system.

9.6 SuDS incorporate cost-effective techniques that are applicable to a wide range of schemes, from small developments to major residential, leisure, commercial or industrial operations with large areas of hard standing and roof.

9.7 They can also be successfully retro-fitted into existing developments.

Local Standards and Guidance for Surface Water Drainage in Northamptonshire

9.8 NCC updated this document in September 2017, which is intended to assist developers in the design of all surface water drainage systems, and to support LPAs in considering drainage proposals for new development in Northamptonshire. The guide sets out the standards that NCC applies in assessing all surface water drainage proposals. The Local Standards and Guidance for Surface Water Drainage in Northamptonshire provides more information including local SuDS standards for the relevant water and sewerage companies, specifically AWS for Kettering Borough.

Adoption of Drainage Systems and Water Company Guidance

9.9 Water UK has recently published Sewers for Adoption (version 8 at the time of this report), which sets out the standards for which sustainable drainage systems must be designed to for water authorities to adopt them.
9.10 Anglian Water Services also have guidance and policies, which sets out their position regarding the management of surface water drainage and adoption of drainage systems.

**Flood Data and Information Requests**

9.11 NCC can provide the following information to inform and supplement any flood risk/drainage assessment, regardless of the size or nature of the development:

- A review of surface water drainage constraints from national mapping;
- A review of site-specific flood risk issues;
- A summary of any historic flood incidents that have occurred on the site or within the related locality;
- A review of flood related assets that are within the related locality;
- A statement of any flood related issues you should consider further;
- Advice on the type and nature of surface water drainage that could be designed into the relevant development; and
- Information about flood risk consenting that may be required for your proposed development.

9.12 For more information about these data requests, contact the NCC Surface Water Drainage Team.

**Technical Flood Advice Services**

9.13 NCC also provides technical advice on the surface water drainage design and other local sources of flood risk, for any proposed development in the County. The use of formal pre-application discussions is advocated to ensure SuDS and their management can be incorporated into developments in a well-planned manner from the early stages of design formation, which will then streamline the planning determination process.

9.14 For more information about the technical flood advice service, contact the NCC Surface Water Drainage Team.

9.15 In addition, AWS offer a Pre-Application Service which can be used to identify feasible drainage solutions for development sites prior to the submission of planning applications.
10 Responsibility for Risk Management Authorities

Overview

10.1 Numerous organisations, agencies, authorities and individuals have roles and responsibilities relating to flood risk management. This section sets out what these roles and responsibilities are for each of the different organisations, agencies and authorities.

10.2 Part 1, Section 6 (13) of the Act 2010 defines the following as flood risk management authorities:

- The EA;
- An LLFA;
- A District or Borough Council for an area for which there is no unitary authority;
- An Internal Drainage Board;
- A Water Company; and
- A Highway Authority.

10.3 Under Section 13(4) of the Act 2010, an RMA can arrange for a flood risk management function to be exercised on its behalf by another RMA. A flood risk management function is defined in the Land Drainage Act 1991 as including anything done to maintain, operate, improve, alter or remove existing works; and to construct or repair new works, to maintain or restore natural processes, to monitor, investigate or survey a location or natural process, or to increase or reduce the level of water.

The Environment Agency

10.4 The EA is responsible for the management of flood risk from the sea, main rivers and reservoirs. It has a strategic overview role for all forms of flooding in addition to responsibilities for the prevention, mitigation and remedying of flood damage for main rivers and coastal areas.

10.5 Main rivers are watercourses shown on the statutory main river map held by the EA and Defra. The EA has permissive powers to carry out works of maintenance, improvement and flood defence on main rivers. This can include any structure or appliance for controlling or regulating the flow of water into or out of the channel. The overall responsibility for maintenance of main rivers, however, lies with the riparian owner.

10.6 The EA is the lead organisation responsible for all flood and erosion risk management around the coastline of England, including tidal flood risk. The EA leads the country in developing a coastal management plan that works at a local, regional and national level, with partner organisations, including local authorities, putting agreed plans into practical action. The EA supports this by administering Grant-in-Aid funding and overseeing the work carried out.

10.7 The EA enforces the Reservoirs Act 1975, which is the safety legislation for reservoirs in the United Kingdom. Although the responsibility for safety lies with the owners, the EA is responsible as Enforcement Authority of reservoirs in England and Wales that are greater than 25,000m³. The EA is also responsible for establishing and maintaining a register of reservoirs, and making this information available to the public. As Enforcement Authority the EA must ensure flood plans are produced for specified reservoirs.
10.8 The EA is responsible for controlling works which affect main rivers and flood defences through permitting works under the Environmental Permitting Regulations.

10.9 The EA is also responsible for providing advice to planning authorities, providing fluvial and coastal flood warnings, monitoring flood and coastal erosion risks and supporting emergency responders when flooding occurs.

10.10 In support of its objectives, the EA is involved in land use planning, including advising on strategic planning guidance, development plans and planning applications. Its primary role, subject to any changes in light of the Planning Green Paper, is to advise on those aspects of draft plans, planning applications, environmental statements and hazardous substances consent applications, which relate to its operational functions and particular expertise, using information it already has. The EA also has a role in providing advice at the early stages in the planning process: both to help shape development briefs and draft plans before they go out to consultation; and to advise prospective applicants on the potential implications of their proposals before an application is made to the LPA. If the EA considers there to be gaps in the evidence base underpinning a planning authority’s draft plan or appraisal of an application from the wider sustainability point of view, it should draw the authority’s attention to this. Where the EA provides advice it should do so in a timely, consistent, justifiable and understandable way.

10.11 The EA is a statutory consultee on a number of types of development, for the purposes of responding on planning application consultations from LPAs and pre-planning application enquiries from developers. In addition they provide consultation responses on some types of development on which they are not a statutory consultee.

10.12 When planning proposals are brought forward for major new road, rail or airport developments, the EA will require that:

- Drainage is via SuDS, designed and maintained to current good practice standards, including the provision of suitable treatment or pollution prevention measures. The point of discharge of such systems should normally be outside Source Protection Zone (SPZ) 1 and ideally outside SPZ2; and
- Where there is an existing or unavoidable need to discharge in SPZ1, the EA requires a detailed risk assessment to demonstrate that pollution of groundwater will not occur.

10.13 The Government’s expectation is that SuDS will be provided in new developments wherever this is appropriate.

10.14 Where infiltration SuDS are to be used for surface run-off from roads, car parking and public or amenity areas, they should:

- Be suitably designed;
- Meet the Government’s non-statutory technical standards for SuDS - these standards should be used in conjunction with the NPPF and PPG; and
- Use a SuDS management treatment train - that is, use drainage components in series to achieve a robust surface water management system that does not pose an unacceptable risk of pollution to groundwater.
10.15 Where infiltration SuDS are proposed for anything other than clean roof drainage in an SPZ1, a hydrogeological risk assessment should be undertaken, to ensure that the system does not pose an unacceptable risk to the source of supply.

10.16 Discharges of surface water run-off to ground at sites affected by land contamination, or from sites used for the storage of potential pollutants, are likely to require an Environmental Permit.

10.17 This applies especially to sites where storage, handling or use of hazardous substances occurs (for example, garage forecourts, coach and lorry parks/turning areas and metal recycling/vehicle dismantling facilities). These sites will need to be subject to risk assessment with acceptable effluent treatment provided.

10.18 In its strategic overview of all sources of flood risk role, the EA provides:

- Advice to Government on flood and coastal erosion risk, supporting future national responses, policy and strategy;
- Supervision of flood and coastal erosion risk management;
- Allocation of flood and coastal erosion risk management capital funding; and
- Support to LLFAs by providing data and guidance on assessing, planning and carrying out flood risk management for flooding from ordinary watercourses, surface runoff and groundwater.

**Lead Local Flood Authority**

10.19 NCC is a LLFA and as such is responsible for the coordination and management of flood risk from surface water runoff, ordinary watercourses and groundwater.

10.20 **Table 1** sets out all of the functions that the County Council can exercise under the Act 2010 and the Flood Risk Regulations (2009).
<table>
<thead>
<tr>
<th>Function</th>
<th>Legislation</th>
<th>Explanation</th>
</tr>
</thead>
</table>
| Local Flood Risk Management Strategy          | Flood & Water Management Act (2010)            | Develop, maintain, apply and monitor a strategy for local flood risk management of the area for surface water runoff, groundwater and ordinary watercourses. The strategy must specify:  
  - The RMAs in the authority’s area;  
  - The flood and coastal erosion risk management functions that may be exercised by those authorities in relation to the area;  
  - The objectives for managing local flood risk;  
  - The measures proposed to achieve those objectives;  
  - How and when the measures are expected to be implemented;  
  - The costs and benefits of those measures, and how they are to be paid for;  
  - The assessment of local flood risk for the purpose of the strategy;  
  - How and when the strategy is to be reviewed; and  
  - How the strategy contributes to the achievement of wider environmental objectives. |
<p>| Co-operation and joint working arrangements   | Flood &amp; Water Management Act (2010)            | Authorities must co-operate with each other in exercising functions. Authorities can also delegate functions to each other by local agreement.       |
| Power to request information                  | Flood &amp; Water Management Act (2010)            | LLFAs and the EA may request information from an individual in relation to the authority’s risk management functions. The information must be provided in the form/manner and period specified within the request. Enforcement action may be taken if the individual neglects to comply with the request. A financial penalty may also be imposed. |
| Creation and maintenance of an asset register | Flood &amp; Water Management Act (2010)            | This section requires LLFAs to establish and maintain a register of structures, or features, which may significantly affect flood risk in their administrative area and also provide a record of information about such structures and features, including ownership and state of repair. The register must be available for public inspection at all reasonable times. This requirement does not apply to the record which may contain personal or other confidential data. The method by which inspection of the register is provided is not specified in the legislation. |</p>
<table>
<thead>
<tr>
<th>Function</th>
<th>Legislation</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Investigation of flooding incidents</td>
<td>Flood &amp; Water Management Act (2010)</td>
<td>The purpose of this provision is to require the LLFA to investigate flooding incidents where appropriate, so as to try and ascertain where responsibility for managing the flood risk lies and what is being done about it. The LLFA must publish the results of any investigation and notify any relevant flood risk management authority of those results.</td>
</tr>
<tr>
<td>Designation of features</td>
<td>Flood &amp; Water Management Act (2010)</td>
<td>This Schedule to the Act provides additional legal powers for certain authorities in England and Wales to formally designate assets or features which affect flood risk. It increases the regulatory control of the significant number of assets or features that form flood risk management systems, but which are not maintained or operated by those formally responsible for managing the risk. Once a feature is designated, the owner must seek consent from the designating authority to alter, remove, or replace it. A series of conditions have to be met prior to designation.</td>
</tr>
<tr>
<td>Land Drainage Act 1991 consenting and enforcement powers</td>
<td>Flood &amp; Water Management Act (2010)</td>
<td>With the provisions in the Flood and Water Management Act 2010, powers relating to consenting and enforcement on ordinary watercourses moved from the EA to LLFAs outside areas under the jurisdiction of an IDB where relevant.</td>
</tr>
</tbody>
</table>
| Surface Water Drainage – Statutory Consultee Role to the planning application process. | Article 2(1) of the Town and Country Planning Development Management Procedure (England) Order 2015 | On the 24th March 2015, the Government laid a statutory instrument making the County Council, as LLFA, a statutory consultee to the planning application process for major development that has surface water drainage implications. Major development is defined as development involving any one or more of the following;  
  a) The winning and working of minerals or the use of land for mineral-working deposits;  
  b) Waste development;  
  c) The provision of dwellinghouses where -  
     i. the number of dwellinghouses to be provided is 10 or more; or  
     ii. the development is to be carried out on a site having an area of 0.5 hectares or more and it is not known whether the development falls within subparagraph (c)(i);  
  d) The provision of a building or buildings where the floor space to be created by the development is 1,000 square metres or more; or  
  e) Development carried out on a site having an area of 1 hectare or more. |
**Function** | **Legislation** | **Explanation**
--- | --- | ---
PFRA Report | Flood Risk Regulations (2009) | An LLFA must prepare a PFRA for their area. A PFRA is a report about past floods and the possible harmful consequences of future floods. The report must be based on relevant existing information.
Identify areas of significant flood risk | Flood Risk Regulations (2009) | Ministerial guidance has been published about the criteria for assessing whether a risk of flooding is significant. The EA has used the Flood Map for Surface Water and the Defra guidance to produce iFRAs. It is important to note that no iFRAs have been identified in Northamptonshire.

**Table 11: LLFA responsibilities**

**Water and Sewerage Companies**

10.21 Water and sewerage companies are responsible for managing the risks of flooding from public sewer systems. A public sewer is a conduit, normally a pipe that is vested in a water and sewerage company, or predecessor, that drains two or more properties and conveys foul, surface water or combined sewerage from one point to another point and discharges via a positive outfall.

10.22 The water and sewerage company that operates within Kettering Borough is AWS.

10.23 In October 2011, under the ‘Private Sewer Transfer’, water and sewerage companies adopted piped systems on private land that serve more than one property and connect to a public sewer. Sewerage undertakers have a general duty under Section 94 of the Water Industry Act 1991, to provide, improve and extend sewers for the drainage of buildings and associated paved areas.

**Borough and District Councils**

10.24 The information set out below highlights the full range of mechanisms available to KBC in the exercise of their flood risk management functions.

10.25 Responsibilities under the **Act 2010** include:

- **Section 6**: District and Borough Councils are classed as RMAs.

- **Section 11**: In exercising its flood and coastal erosion risk management functions, a District or Borough Council must act in a manner which is consistent with the national strategy and associated guidance, and also act in a manner which is consistent with local strategies and associated guidance. In exercising any other function in a manner which may affect a flood risk or coastal erosion risk, a District or Borough Council must have regard to the national and local strategies and guidance.

- **Section 13**: A District or Borough Council must co-operate with other RMAs in the exercise of their flood and coastal erosion risk management functions. A District or Borough Council may share information with another RMA for the purpose of discharging its duty in the exercise of their flood and coastal erosion risk management functions. In addition, a District or Borough Council may arrange for a flood risk management function to be exercised on its behalf by another RMA or a navigation authority.
• **Section 27:** In exercising a flood or coastal erosion risk management function, District and Borough Councils must aim to make a contribution towards the achievement of sustainable development.

• **Section 39:** A District or Borough Council may carry out work (as specified by Section 3 (3) (a) to (e) of the Act) that will or may cause flooding, increase water below the ground, or coastal erosion.

• **Schedule 1:** District and Borough Councils are classed as designating authorities under Schedule 1 of the Act. This allows the Councils, where the conditions outlined in Schedule 1 are satisfied, to designate a structure, or a natural or man-made feature of the environment, where the authority thinks that the existence or location of the structure or feature affects flood risk. The effect of designation is that a person may not alter, remove or replace a designated structure or feature without the consent of the responsible authority.

10.26 Responsibilities under the [Land Drainage Act 1991](https://www.legislation.gov.uk/ukpga/1991/38) (as amended by the Act) include:

• **Section 14A:** A District or Borough Council may carry out flood risk management work where the authority considers the work desirable, having regard to the local flood risk management strategy for its area, and that the purpose of the work is to manage flood risk in the authority's area from an ordinary watercourse.

• **Section 66:** A District or Borough Council may make byelaws to secure the efficient working of a drainage system in the authority's district or area, to regulate the effects on the environment, to secure the effectiveness of flood risk management work within the meaning of section 14A and/or to secure the effectiveness of works done in reliance on Section 39 of the Act 2010.

10.27 Responsibilities under the [Public Health Act 1936](https://www.legislation.gov.uk/ukpga/1936/25) include:

• **Section 260:** A District or Borough Council may undertake works to manage statutory nuisances in connection with watercourses, ditches, ponds, etc. as outlined by Section 259 of the Public Health Act 1936. This includes the clearance of any obstruction or impediment to the proper flow of water. Other provisions within the Public Health Act 1936 outline further provisions related to watercourses, culverting and land drainage.

10.28 Responsibilities under the [Environmental Protection Act 1990](https://www.legislation.gov.uk/ukpga/1990/25) include:

• **Section 79:** Section 79 (Statutory nuisances and inspections therefore) outlines that the following would constitute a statutory nuisance; that any water covering land or land covered with water which is in such a state as to be prejudicial to health or a nuisance.

10.29 Responsibilities under the [Localism Act 2011](https://www.legislation.gov.uk/ukpga/2011/25) include:

• **Section 9FH and 9JB:** A District or Borough Council (as an RMA) must comply with a request made by an LLFA’s overview and scrutiny committee, in the course of its arrangements to review and scrutinise the exercise by RMAs of flood risk management functions, which may affect the local authority’s area. District and Borough Councils must have regard to reports and recommendations of an overview and scrutiny committee in the course of the arrangement outlined above.
10.30 Under planning legislation, Borough and District Councils operate their development planning and control functions, having due regard to the NPPF and associated technical guidance.

Highway Authority

10.31 Northamptonshire Highways is the Highway Authority responsible for the provision and management of highway drainage under the Highways Act (1980). This excludes motorways and trunk roads that are the responsibility of Highways England.

10.32 Northamptonshire Highways has various duties and powers in relation to flooding and drainage on the highway. The Highway Authority is not responsible for flooding or drainage on private land – this is the responsibility of the owner or occupier of the land. Where flooding on a highway is caused by another person (e.g. an adjoining landowner), the Highway Authority can take action against the person responsible.

10.33 Highway drainage systems are for the primary purpose of accepting surface water runoff from the highway and are the responsibility of the Highway Authority unless they have been specifically adopted by the sewerage undertaker.

Highway England

10.34 Highways England is responsible for the strategic road network. In Kettering this includes the A14.

10.35 Where a motorway or trunk road is identified as being at risk from flooding, contingency plans are prepared to warn road users and, where necessary, divert them away from the problem. Where possible, weather data from the Met Office is analysed and if intense rainfall events are forecast in sensitive flood areas, suitable warnings are posted using the variable message signs.

Riparian Owners

10.36 Under common law, a riparian owner is someone who has a watercourse within or adjacent to any boundary of their property. Where a watercourse is sited between two or more property boundaries each owner may be equally responsible up to the centre line of the watercourse.

10.37 Although not defined as a flood risk management authority under the Act, riparian owners retain their own duties and responsibilities for watercourses on or adjacent to their land, as set out in the Land Drainage Act 1991. This includes the responsibility for the maintenance of any river, stream, ditch, drain, cut, dyke, sluice, culvert, sewer (excluding public sewers) or any other passage through which water flows.

10.38 The NCC Flood Toolkit provides a vast amount of guidance to help clarify the rights and responsibilities of riparian owners.

Parish Councils

10.39 Parish Councils have the powers to undertake maintenance works on ponds, ditches and other open drainage in order to prevent the feature from becoming a risk to health. Parish Councils can also play an important role in managing flood risk at the community level by preparing community flood plans, raising additional funding for local flood resilience and
flood defence measures, and gathering information on flooding by reporting any flood incidents in their area. For further details on the roles of Parish Councils please see Flood Guide 19 on the Flood Toolkit.

Other Bodies

10.40 There are many other bodies that play an important role in flood risk management: for example, Natural England, The Met Office, the Flood Forecasting Centre; and charities such as the National Flood Forum, Red Cross and Salvation Army, and the National Farmers Union.
11 Conclusions and Recommendations

Conclusions

11.1 Kettering Borough has undergone significant expansion historically and in recent years, with more growth still planned. This Level 1 SFRA update has considered all sources of flood risk based on information gained through consultation with all RMAs as specified within the NPPF. The assessment is compliant with the NPPF and will continue to inform all future land allocation and flood risk management needs within the Borough of Kettering.

11.2 A vast amount of data and a significant number of studies and strategies have previously reviewed the level of flood risk in the Borough. This SFRA updates this information. There has been a history of flooding in the Borough with a total of 415 incidents recorded since 1973 to the present day. These are from all sources of flooding.

11.3 In terms of the number of properties at risk, ground water flood risk poses the greatest risk in the Borough, followed by surface water flood risk, then fluvial flood risk.

11.4 Surface water flooding has been identified as a more recent concern and a key consideration for all new development. Major new developments now have to address surface water drainage requirements set out in the National Standards, and local guidance produced by NCC. This guidance will ensure that careful design of the site lay-out and drainage system is factored into new development, giving due consideration to the implementation of SuDS solutions and their ongoing maintenance where appropriate.

11.5 Groundwater flooding is also a key consideration to future growth and detailed guidance has been produced by NCC as the LLFA and should be considered at all stages of the planning process.

11.6 There are a number of reservoirs located within the Borough, which may pose a residual flood risk to local communities if they were to breach. Also, the over-topping of flood defences could affect properties within the potential flow path or located behind defences. This risk should be incorporated within any assessment at all stages of the planning application process.

11.7 Existing planning policy within the North Northamptonshire JCS is considered to be robust and fully up-to-date. Therefore no additional strategic policies in relation to flood risk are recommended as part of the development of the Part 2 Local Plan. Site-specific policies have however been recommended, and should be adopted if KBC brings forward additional non-strategic land allocations in the Part 2 Local Plan or if planning applications come forward for the assessed sites.

11.8 The site-specific assessment has identified the majority of sites as having a ‘green’ rating, as they are at low risk of flooding. There are however a number of sites with an ‘amber’ rating, as they are either at risk of surface water, fluvial and/or groundwater flooding, have experienced flooding on the site or in close proximity of the site in the past, or have capacity issues within the existing drainage systems. Site-specific recommendations have been made for all sites, some of which will be covered by existing strategic policy and some of which will be required to be implemented as site-specific policy if the sites are to be allocated for development.
Two sites have been given a ‘red’ rating (KE/184a McAlpine’s Yard, Pytchley Lodge Road, Kettering and RA/170 South of New Stone House, Duck End, Cranford) due to the level of floor risk to the sites from a range of sources. For these sites it is recommended that further work is undertaken prior to allocation, to better understand the level of risk to the sites, such as through a Level 2 SFRA.

**Recommendations**

**Robust Evidence Base**

11.10 This SFRA is compliant with the NPPF and therefore if this framework is significantly altered, along with any associated guidance, the SFRA will need to once again be reviewed and updated to reflect these changes. A robust SFRA can be achieved by ensuring the following actions take place:

- During future iterations the key stakeholders should be contacted to ensure that the most up-to-date records are included in the SFRA;
- Information on all sources of flooding should continue to be collected, where possible;
- When more detailed or updated hydraulic modelling becomes available, these should be included in the SFRA;
- When more detailed assessment is carried out by developers and land owners, information should be captured and submitted to KBC as part of the development control process;
- Datasets that are updated regularly should be identified, saved and recorded;
- Continued partnership working between all RMAs should be promoted to maximise opportunities for holistic flood risk management and natural resilience;
- Early consultation between developers and KBC, the EA, and the LLFA should be encouraged for any proposed development; and
- Emergency planning is imperative to minimise the risk to life posed by flooding within the area. It is recommended that the Borough Council has regard to the guidance set out in *Flood Guide 23: New Development and Emergency Flood Plans*, and advise the LRF of the risks raised in light of this SFRA, ensuring that the planning for future emergency response can be reviewed accordingly.

**Development Principles**

11.11 In accordance with the NPPF, a specific policy on flood risk should be included within the Local Plan Part 2 document to ensure that the advice provided for each site, outlined within the Sequential Test table, is incorporated if necessary to support land allocation.

11.12 KBC should adopt a sequential approach to land allocation and no inappropriate development in Flood Zone 2 or 3, or areas at high risk of flooding from any source should be promoted.

11.13 The information provided within this report should be used to inform the scope of information required to support a planning application e.g. FRA (see the Developer Checklist in *Appendix 5*). This information should also be used to inform planning application decisions taken by KBC.
11.14 Three recommendations relating to the cumulative impacts of development have been provided, for further assessment of cumulative effects on watercourses across the Borough, requiring developers of sites draining to CDCs to provide additional storage and/or assessment of runoff impacts, and consideration of requiring contributions to community flood management schemes.

Technical Matters

11.15 Flood Risk Assessments should assess the risk of flooding to the development from all sources and should identify options to mitigate the flood risk to the development, site users and surrounding area. The detailed guidance provided in Appendix 3, relating to site specific Flood Risk Assessments, should be followed.

11.16 Sites adjacent (typically within 9m) to a stretch of watercourse without flooding information (i.e. broad-scale flood zone maps) should be examined as part of a site-specific FRA. This may require modelling to define the functional floodplain and impact of climate change.

11.17 Post-development surface water flows and volumes should be restricted based on the standards set out in the Local Standards and Guidance for Surface Water Drainage in Northamptonshire. These standards should apply to all development, although the LLFA can only comment on major development. The standards include the following:

- No flooding for a 1 in 100 year (plus climate change) event (as per Policy 5 of the North Northamptonshire JCS) - achieved by a combination of measures;
- Run-off from new developments restricted to greenfield run-off rates (or a minimum 40% betterment over brownfield rates);
- SuDS features required for all major developments;
- No net increase in flood risk to upstream or downstream communities; and
- As Flood Estimation Handbook (FEH) rainfall data is more up to date, calculations should use FEH data for surface water drainage design, except where the critical storm duration is less than 60 minutes, as it is recognised that FEH data is less robust than Flood Studies Report for short duration storms.

Flood Risk Mitigation, Resistance and Resilience

11.18 Piecemeal flood mitigation measures should be avoided by implementing strategic flood risk management infrastructure projects through partnership schemes. Furthermore, as the North Northamptonshire JCS Infrastructure Delivery Plan identifies, large developments taking place across North Northamptonshire offer opportunities to encourage comprehensive water management schemes, that can help to reduce the risk of flooding across wide catchment areas. Small-scale flood mitigation should consider natural flood management measures wherever appropriate.

11.19 Where a watercourse runs through a development site, incorporation of river naturalisation and environmental enhancement should be considered where feasible, providing these do not increase flood risk. Opportunities should be sought for retrofitting Green Infrastructure and SuDS in urban areas, particularly in high risk catchments.
11.20 Resistance and resilience measures should be introduced into new developments within areas at risk of fluvial or surface water flooding. Reference to existing guidance, such as Flood Guide 23 on the NCC Flood Toolkit, within LPA’s Local Plan Part 2 policies should be considered.

Land Drainage Consent, Environmental Permits and Riparian Matters

11.21 No development should be located within 8 metres of a main river without Environmental Permit, or within 9m of an ordinary watercourse without Land Drainage Consent, to ensure adequate access for maintenance is preserved and that a riparian corridor is maintained.

11.22 Culverting of watercourses is only acceptable where it can be demonstrated that there is an overriding need, i.e. to gain access to a site. This is due to the loss of riparian habitat, increased risk of blockage, and difficulty of maintenance. Culverting of watercourses should be designed to minimise risk of blockage and must secure the correct consents and permits.

Developer Contributions

11.23 There should be continued identification of the locations that are known to have surface water flooding problems from sewers and overland flow routes, and explore possible solutions for them through new development proposals.

11.24 There should be consideration of strategic flood risk management measures in advance, or in parallel with, proposed development with the intent of obtaining appropriate financial contributions from the prospective developers through a Section 106 Agreement, including for long-term management.
# Appendix 1: Glossary of Terms

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aquifer</td>
<td>A source of groundwater comprising water-bearing rock, sand or gravel, capable of yielding significant quantities of water.</td>
</tr>
<tr>
<td>Breach</td>
<td>Flooding caused by the constructional failure of a flood defence or other structure that is acting as a flood defence.</td>
</tr>
<tr>
<td>Catchment Flood Management Plans</td>
<td>Catchment Flood Management Plans (CFMPs) have been produced by the EA and are high-level planning tools that set out objectives for flood risk management for each river catchment and estuary. CFMPs consider inland risk from rivers, surface water, groundwater and tidal flooding but do not consider sewer flooding. The CFMPs that cover Kettering Borough are: River Nene Catchment Flood Management Plan (December 2009) and the River Welland Catchment Flood Management Plan (December 2009). Flood Risk Management Plans build upon Catchment Flood Management Plans.</td>
</tr>
<tr>
<td>Climate Change</td>
<td>A long-term change in the statistical distribution of weather patterns over periods of time that range from decades to millions of years. It may be a change in the average weather conditions or a change in the distribution of weather events with respect to an average, for example, greater or fewer extreme weather events. Climate change may be limited to a specific region, or may occur across the whole planet.</td>
</tr>
<tr>
<td>Culvert</td>
<td>A closed conduit or pipe used for the conveyance of water under a road, railway, canal, property, or other impediment.</td>
</tr>
<tr>
<td>Defence</td>
<td>A structure that alters the natural flow of water or flood water for the purposes of flood defence, thereby reducing the risk of flooding. A defence may be ‘formal’ (a structure built and maintained specifically for flood defence purposes) or ‘informal’ (a structure that provides a flood defence function but has not been built and/or maintained for this purpose).</td>
</tr>
<tr>
<td>Environment Agency</td>
<td>An Executive non-departmental Public Body responsible to the Secretary of State for Environment, Food and Rural Affairs and an Assembly Sponsored Public Body responsible to the National Assembly for Wales. The Environment Agency’s principal aims are to protect and improve the environment, and to promote sustainable development. They play a central role in delivering the environmental priorities of central government and the Welsh Assembly Government through our functions and roles.</td>
</tr>
<tr>
<td>Environmental Permit for Flood Risk Activities</td>
<td>A permit required under the Environmental Permitting (England and Wales) Regulations 2010 from the Environment Agency for any proposed works or structures, in, under, over or within eight metres of the top of the bank of any watercourse, designated a ‘main river’. This was formerly called a Flood Defence Consent. Some activities are also now excluded or exempt. A permit is separate to, and in addition to, any planning permission granted. Further details and guidance are available on the GOV.UK website: <a href="https://www.gov.uk/guidance/flood-risk-activities-environmental-permits">https://www.gov.uk/guidance/flood-risk-activities-environmental-permits</a></td>
</tr>
<tr>
<td><strong>Flood</strong></td>
<td>A flood is an overflow of an expanse of water that submerges land. Both the Flood and Water Management Act (2010) and the Flood Risk Regulations (2009) state that it does not matter whether a flood is caused by: heavy rainfall; a river overflowing its banks or being breached; a dam overflowing or being breached; tidal waters; groundwater; or anything else including a combination of factors. However, both state that a ‘flood’ does not include: a flood caused from any part of a sewerage system, unless wholly or partly caused by an increase in the volume of rainwater (including snow and other precipitation) entering or otherwise affecting the system; or a flood caused by a burst water main.</td>
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</tbody>
</table>
| **Land Drainage Consent** | A Consent required if a landowner wants to:  
- Do work on, over, under or near an ordinary watercourse (within nine metres of the landward toe of the bank); or  
- Make changes to any structure that helps control water. |
<p>| <strong>Flood Map for Planning (rivers and sea)</strong> | A multi-layered map produced by the Environment Agency, which provides information on flooding from rivers and the sea for England and Wales, in the form of Flood Zones. The Flood Map also has information on flood defences and the areas benefiting from those flood defences. This map is intended for use as a planning tool. The Environment Agency has also published maps of the Risk of Flooding from Rivers and Seas, which includes the impact of any flood defences in the area. |
| <strong>Flood Map for Surface Water</strong> | The Flood Map for Surface Water represents the mechanisms that cause surface water flooding. |
| <strong>Flood and Water Management Act (2010)</strong> | The Act brings together the recommendations of the Pitt report and previous policies, to improve the management of water resources and create a more comprehensive and risk based regime for managing the risk of flooding from all sources. The Act reinforces the need to take an integrated approach to the management of flooding and places a number of roles and responsibilities on local authorities, such as the County Council, under the role of Lead Local Flood Authority. |
| <strong>Flood Resilience</strong> | Actions taken which allow the ingress of flood water through a property but enable swift recovery after the flood event. Flood resilience measures may include (amongst others) flood-resistant construction materials, raised electricity sockets and water-resistant flooring. |
| <strong>Flood Resistance</strong> | Actions taken to prevent the ingress of flood water to a property. Flood Resistance measures may include flood barriers placed over doorways. |
| <strong>Flood Risk</strong> | Flood risk is a combination of two components: the chance (or probability) of a particular flood event occurring and the impact (or consequence) that the event would cause if it took place. |
| <strong>Flood Risk Map</strong> | A map showing: the number of people living in the area who are likely to be affected in the event of flooding; the type of economic activity likely to be affected in the event of flooding; any industrial activities in the area that may increase the risk of pollution in the event of flooding; any relevant protected areas that may be affected in the event of flooding; any areas of water subject to specified measures or protection for the purpose of maintaining the water quality that may be affected in the event of flooding; and any other effect on human health, economic activity or the environment (including cultural heritage). The Environment Agency has produced a suite of maps which can be found on <a href="https://www.gov.uk/">https://www.gov.uk/</a>. These maps are also available in the NCC Flood Toolkit. |
| <strong>Flood Risk Management Plans</strong> | Flood Risk Management Plans (FRMPs) highlight the hazards and risks of flooding from rivers, the sea, surface water, groundwater and reservoirs, and set out how RMAs work together with communities to manage flood risk. By law the EA must produce FRMPs for each River Basin District. The FRMP with relevance to Kettering Borough is the <a href="https://www.gov.uk/">Anglian River Basin District Flood Risk Management Plan</a>. |
| <strong>The Flood Risk Regulations</strong> | The Flood Risk Regulations were enacted in December 2009 to implement the requirements of the EU Floods Directive, which aims to provide a consistent approach to managing flood risk across Europe. The regulations outline the roles and responsibilities of the various authorities consistent with the Act and provide for the delivery of the outputs required by the Directive. The Directive requires Member States to develop and update a series of tools for managing all sources of flood risk. |
| <strong>Flood storage</strong> | A temporary area that stores excess runoff or river flow, which are often ponds or reservoirs. |
| <strong>Flood Zones</strong> | Nationally consistent delineation of ‘high’ and ‘medium’ flood risk, published on a quarterly basis by the EA and based on the definitions within NPPF. |
| <strong>Flood Zone 1 Low Probability</strong> | Defined as an area only at risk of flooding from flood events with an Annual Exceedence Probability (AEP) of less than 0.1% (1 in 1000). The probability of flooding occurring in this area in any one year is less than 0.1%. |
| <strong>Flood Zone 2 Medium Probability</strong> | Defined as an area at risk of flooding from flood events with an AEP of between 1% (1 in 100) and 0.1% (1 in 1000). The probability of flooding occurring in this area in any one year is between 1% and 0.1%. |
| <strong>Flood Zone 3a High Probability</strong> | Defined as an area at risk of flooding from flood events with an AEP of greater than 1% (1 in 100). The probability of flooding occurring in this area in any one year is greater than 1%. |
| <strong>Flood Zone 3b Functional Floodplain</strong> | Defined as land where water has to flow or be stored in times of flood. Usually defined as areas at risk of flooding from flood events with an AEP of greater than 5% (1 in 20) design event. The probability of flooding occurring in this area in any one year is greater than 5%. |</p>
<table>
<thead>
<tr>
<th><strong>Fluvial</strong></th>
<th>The processes associated with rivers and streams and the deposits and landforms created by them.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Functional Floodplain</strong></td>
<td>This zone comprises land where water has to flow or be stored in times of flood. LPAs are required to identify in their SFRAs, areas of functional floodplain and its boundaries accordingly.</td>
</tr>
<tr>
<td><strong>Geographical Information Systems</strong></td>
<td>GIS is any system which stores geographical data, such as elevations, location of buildings and extent of flood outlines.</td>
</tr>
<tr>
<td><strong>Groundwater</strong></td>
<td>Water located beneath the ground surface, either in soil pore spaces or fractures in rock.</td>
</tr>
<tr>
<td><strong>Internal Drainage Board</strong></td>
<td>Independent body with responsibility for ordinary watercourses within a specified district or borough.</td>
</tr>
<tr>
<td><strong>Inundation</strong></td>
<td>To cover with floodwater.</td>
</tr>
<tr>
<td><strong>Local Planning Authority</strong></td>
<td>The body that is responsible for controlling planning and development through the planning system.</td>
</tr>
<tr>
<td><strong>Main River</strong></td>
<td>All watercourses shown on the statutory main river maps held by the Environment Agency. This can include any structure for controlling or regulating the flow of water into or out of the channel. The Environment Agency has permissive power to carry out works of maintenance and improvement on these rivers.</td>
</tr>
<tr>
<td><strong>Mitigation Measure</strong></td>
<td>An element of development design which may be used to manage flood risk or avoid an increase in flood risk elsewhere.</td>
</tr>
<tr>
<td><strong>National Flood and Coastal Erosion Risk Management Strategy</strong></td>
<td>The Environment Agency’s National Strategy was published in May 2011 and provides an overview of how flood risk and the risk of coastal erosion will be managed across England. The aims and objectives of the National Strategy have been translated onto a local scale through this Local Strategy for the County Council.</td>
</tr>
<tr>
<td><strong>National Planning Policy Framework</strong></td>
<td>Sets out the Government’s planning policies for England and how these are expected to be applied. It sets out the Government’s requirements for the planning system only to the extent that it is relevant, proportionate and necessary to do so. It provides a framework within which local people and their accountable councils can produce their own distinctive local and neighbourhood plans, which reflect the needs and priorities of their communities.</td>
</tr>
<tr>
<td><strong>National Planning Practice Guidance</strong></td>
<td>A planning practice guidance web-based resource. Links between the National Planning Policy Framework and relevant planning practice guidance.</td>
</tr>
<tr>
<td><strong>Ordinary Watercourse</strong></td>
<td>Any section of watercourse not designated as a main river.</td>
</tr>
<tr>
<td><strong>Pitt Review</strong></td>
<td>Sir Michael Pitt carried out an independent review of the 2007 floods and made a number of recommendations for future flood risk management. In particular, he recommended that local authorities should play a more significant role in tackling local problems of flooding and coordinating all relevant agencies. Many of the recommendations of The Pitt Review have been enacted through the Act.</td>
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</tr>
<tr>
<td><strong>Pluvial</strong></td>
<td>Direct runoff as a result of rainfall and the processes associated with it.</td>
</tr>
<tr>
<td><strong>Precipitation</strong></td>
<td>Describes rain, sleet, hail, snow and other forms of water falling from the sky.</td>
</tr>
<tr>
<td><strong>Preliminary Flood Risk Assessment</strong></td>
<td>The PFRA is a process involving an assessment of past floods and the possible harmful consequences of future floods, leading to the identification of areas of significant risk. All LLFAs must prepare a PFRA report in relation to flooding in the LLFA’s area. The floods to be included are those which had significant harmful consequences for human health, economic activity or the environment (including cultural heritage), or which would have significant harmful consequences for those matters if they were to occur now.</td>
</tr>
<tr>
<td><strong>Reservoir</strong></td>
<td>Artificial lake used to store water. Reservoirs may be created in river valleys by the construction of a dam, or may be built by excavation in the ground or by conventional construction techniques, such as brickwork or cast concrete. Reservoirs greater than 25,000m³ are governed by the Reservoirs Act.</td>
</tr>
<tr>
<td><strong>Residual Risk</strong></td>
<td>The risk which remains after all risk avoidance, reduction and mitigation measures have been implemented.</td>
</tr>
<tr>
<td><strong>Return Period</strong></td>
<td>The probability of a flood of a given magnitude occurring within any one year e.g. a 1% (1 in 100) AEP flood event has a 1% probability of occurring once in any one year.</td>
</tr>
<tr>
<td><strong>Riparian Owner</strong></td>
<td>All landowners whose property is adjoining to a body of water have the right to make reasonable use of it and the responsibility to suitably maintain it.</td>
</tr>
<tr>
<td><strong>Risk</strong></td>
<td>The probability or likelihood of an event occurring.</td>
</tr>
</tbody>
</table>
| **Risk Management Authority** | Flood Risk Management Authorities have a range of roles and responsibilities relating to flood risk management. These authorities include:  
  - The Environment Agency;  
  - An LLFA;  
  - A District or Borough Council for an area for which there is no unitary authority;  
  - An Internal Drainage Board;  
  - A water company; and  
  - A highway authority.                                                                                           |
| **River Basin Management Plans** | River Basin Management Plans (RBMPs) have been produced by the Environment Agency for the eleven River Basin Districts in England and Wales and are the central tool setting out the objectives and actions required to achieve the objectives of the Water Framework Directive. RBMPs describe the main issues for each river basin district and state the environmental objectives for the basin, explain the objectives selected to achieve good ecological status and summarise the actions needed to deliver those objectives. A River Basin District is: a river basin, or several river basins, and the river basin’s adjacent coastal waters. |
| **Sequential Test** | Informed by an SFRA, a planning authority applies the Sequential Test to demonstrate that there are no reasonably available sites in areas with less risk of flooding that would be appropriate to the type of development or land use proposed. |
| **Sewer** | A sewer is a pipe which carries and removes either rainwater (surface) or foul water (or a combination of both) from more than one property. A sewer can also be categorised as being a private or public sewer and can carry surface or foul water.  
  - A Private Sewer is solely the responsibility of the occupiers/owners of the properties that it serves.  
  - A Public Sewer is a sewer that has been adopted and maintained by a Sewerage Undertaker. |
| **Sewer Flooding** | The consequence of sewer systems exceeding their capacity during a rainfall event. Sewer flooding can also occur due to structural or operational issues. |
| **Strategic Flood Risk Assessment** | An SFRA is used as a tool by a planning authority to assess flood risk for spatial planning, producing development briefs, setting constraints, informing sustainability appraisals and identifying locations of emergency planning measures and requirements for FRAs. The purpose of an SFRA is to assess and map all forms of flood risk from groundwater, surface water, impounded water bodies, sewer and river sources, taking into account future climate change predictions, to allow planning authorities to use this as an evidence base to locate future development primarily in low flood risk areas. The outputs from an SFRA also assist in the production of sustainable policies for the long-term management of flood risk. |
| **Sustainable Drainage Systems** | SuDS are drainage systems which are designed to reduce the impact of urbanisation on the hydrology of a river system. |
| **Surface Run-off** | Rainwater (including snow and other precipitation) which is on the surface of the ground (whether or not it is moving), and has not entered a watercourse, drainage system or public sewer. Areas that suffer a depth of greater than 0.1m are considered to be at risk of surface water flooding. Flooding that is greater than 0.3m deep is classed as being at risk of deep surface water flooding. |
| **Surface Water Management Plans** | SWMPs are produced by local authorities and are described as a framework through which key local partners with a responsibility for surface water and drainage in their area work together to understand the causes of surface water flooding and agree the most cost effective way of managing that risk. The purpose is to make sustainable surface water management decisions that are evidence based, risk based, future proofed and inclusive of stakeholder views. A SWMP should establish a long-term action plan to manage surface water in an area and should influence future capital investment, drainage maintenance, public engagement and understanding, land-use planning, emergency planning and future developments. |
| **1% annual probability flood event** | Event that on average will occur once every 100 years. Expressed as an event which has a 1% probability of occurring in any one year. |
| **0.5% annual probability flood event** | Event that on average will occur once every 200 years. Expressed as an event which has a 0.5% probability of occurring in any one year. |
| **0.1% annual probability flood event** | Event that on average will occur once every 1000 years. Expressed as an event, which has a 0.1% probability of occurring in any one year. |
## Appendix 2: Abbreviations

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Meaning / Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>AEP</td>
<td>Annual Exceedance Probability</td>
</tr>
<tr>
<td>AWS</td>
<td>Anglian Water Services</td>
</tr>
<tr>
<td>BCW</td>
<td>Borough Council of Wellingborough</td>
</tr>
<tr>
<td>BGS</td>
<td>British Geological Survey</td>
</tr>
<tr>
<td>CDC</td>
<td>Critical Drainage Catchment</td>
</tr>
<tr>
<td>CFMP</td>
<td>Catchment Flood Management Plan</td>
</tr>
<tr>
<td>CRT</td>
<td>Canal and Rivers Trust</td>
</tr>
<tr>
<td>Defra</td>
<td>The Department for Food and Rural Affairs</td>
</tr>
<tr>
<td>DPD</td>
<td>Development Plan Document</td>
</tr>
<tr>
<td>EA</td>
<td>Environment Agency</td>
</tr>
<tr>
<td>ENDC</td>
<td>East Northamptonshire District Council</td>
</tr>
<tr>
<td>FCERM</td>
<td>Flood and Coastal Erosion Risk Management</td>
</tr>
<tr>
<td>FEH</td>
<td>Flood Estimation Handbook</td>
</tr>
<tr>
<td>FRMP</td>
<td>Flood Risk Management Plan</td>
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<tr>
<td>FMfSW</td>
<td>Flood Map for Surface Water</td>
</tr>
<tr>
<td>FRA</td>
<td>Flood Risk Assessment and/or Flood Risk Area</td>
</tr>
<tr>
<td>FSR</td>
<td>Flood Storage Reservoir</td>
</tr>
<tr>
<td>FWMA</td>
<td>Flood and Water Management Act 2010</td>
</tr>
<tr>
<td>GIS</td>
<td>Geographical Information System</td>
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<tr>
<td>IDB</td>
<td>Internal Drainage Board</td>
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<tr>
<td>JCS</td>
<td>Joint Core Strategy</td>
</tr>
<tr>
<td>KBC</td>
<td>Kettering Borough Council</td>
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<tr>
<td>LDD</td>
<td>Local Development Document</td>
</tr>
<tr>
<td>LFRMS</td>
<td>Local Flood Risk Management Strategy</td>
</tr>
<tr>
<td>LiDAR</td>
<td>Light Detection and Ranging</td>
</tr>
<tr>
<td>LLFA</td>
<td>Lead Local Flood Authority</td>
</tr>
<tr>
<td>LPA</td>
<td>Local Planning Authority</td>
</tr>
<tr>
<td>LDF</td>
<td>Local Development Framework</td>
</tr>
<tr>
<td>LRF</td>
<td>Local Resilience Forum</td>
</tr>
<tr>
<td>NCC</td>
<td>Northamptonshire County Council</td>
</tr>
<tr>
<td>NNJPDU</td>
<td>North Northamptonshire Joint Planning Development Unit</td>
</tr>
<tr>
<td>NPPF</td>
<td>National Planning Policy Framework</td>
</tr>
<tr>
<td>PFRA</td>
<td>Preliminary Flood Risk Assessment</td>
</tr>
<tr>
<td>PPG</td>
<td>Planning Policy Guidance</td>
</tr>
<tr>
<td>PPS25</td>
<td>Planning Policy Statement 25</td>
</tr>
<tr>
<td>RBMP</td>
<td>River Basin Management Plan</td>
</tr>
<tr>
<td>RMA</td>
<td>Risk Management Authority</td>
</tr>
<tr>
<td>SFRA</td>
<td>Strategic Flood Risk Assessment</td>
</tr>
<tr>
<td>SoP</td>
<td>Standard of Protection</td>
</tr>
<tr>
<td>SPD</td>
<td>Supplementary Planning Document</td>
</tr>
<tr>
<td>SuDS</td>
<td>Sustainable Drainage Systems</td>
</tr>
<tr>
<td>SWMP</td>
<td>Surface Water Management Plan</td>
</tr>
<tr>
<td>WFD</td>
<td>Water Framework Directive</td>
</tr>
<tr>
<td>WCS</td>
<td>Water Cycle Study or Strategy</td>
</tr>
</tbody>
</table>
Appendix 3: Guidance on the Preparation of Flood Risk Assessments

Guidance for LPAs can be found on the National Government webpages in the guide on reviewing flood risk assessments.

Developers will usually need to pay a flood risk specialist to carry out the FRA. Planning applications can be refused by LPAs if a FRA is not satisfactory.

FRAs are required for most developments within one of the flood zones. This includes developments:

- In Flood Zone 2 or 3 including minor development and change of use;
- More than 1 ha in Flood Zone 1; or
- Less than 1 ha in Flood Zone 1, including a change of use in development type to a more vulnerable class (e.g. from commercial to residential), where they could be affected by sources of flooding other than rivers and the sea (e.g. surface water drains and reservoirs).

Standing Advice

Developers should follow the EA’s standing advice if they are carrying out a FRA of a development classed as:

- A minor extension (household extensions or non-domestic extensions less than 250 square metres) in Flood Zone 2 or 3;
- ‘More vulnerable’ in Flood Zone 2 (except for landfill or waste facility sites, caravan or camping sites);
- ‘Less vulnerable’ in Flood Zone 2 (except for agriculture and forestry, waste treatment, mineral processing, and water and sewage treatment); or
- ‘Water compatible’ in Flood Zone 2.

Developers also need to follow standing advice for developments involving a change of use into one of these vulnerable categories or into the water compatible category.

Information to Support a Flood Risk Assessment

The following products or packages of information available from the EA may help to complete a flood risk assessment:

- **Product 1**: Flood Map, including flood zones, defences and storage areas and areas benefiting from flood defences;
- **Product 3**: Basic Flood Risk Assessment Map, including flood zones, defences and storage areas, areas benefiting from defences, statutory main river designations and some key modelled flood levels;
- **Product 4**: Detailed Flood Risk Assessment Map, including flood zones, defences and storage areas, areas benefiting from defences, statutory main river designations, historic flood event
outlines and more detailed information from our computer river models (including model extent, information on one or more specific points, flood levels, flood flows);

- **Product 5**: Reports, including flood modelling and hydrology reports, and modelling guidelines;
- **Product 6**: Model Output Data, including Product 5;
- **Product 7**: Calibrated and Verified Model Input Data; and
- **Product 8**: Flood Defence Breach Hazard Map including, maximum flood depth, maximum flood velocity and maximum flood hazard.

Contact the EA to obtain this data and to find out if there is a charge for the product, as well as the contact details of the local team that will deal with your request.

The following information is available from NCC as the LLFA:

- **Local Standards and Guidance for Surface Water Drainage in Northamptonshire**, which should be incorporated into every FRA;
- Historic flood events/hotspot data;
- Asset Data;
- Groundwater flooding; and
- Flood Map for Surface Water.

More information about the charge for this data, and the contact details of the team that will deal with your request, is available on the Flood Toolkit.

**Requirements for Flood Risk Assessments**

The aim of a FRA is to demonstrate that the development is protected to the 1 in 100-year (1% AEP) event and is safe during the design flood event, including an allowance for climate change.

Where appropriate, the following aspects of flood risk should be addressed in all planning applications in flood risk areas:

- The area liable to flooding;
- The probability of flooding occurring now and over time;
- The extent and standard of existing flood defences and their effectiveness over time;
- The likely depth of flooding;
- The rates of flow likely to be involved;
- The likelihood of impacts to other areas, properties and habitats;
- The effects of climate change – based on the updated allowances (see Appendix 4 for more information); and
- The nature and currently expected lifetime of the development proposed and the extent to which it is designed to deal with flood risk.

Development proposals requiring FRAs should:
• Apply the sequential approach;

• Apply the Sequential Test and, when necessary, Exception Test;

• Not increase flood risk, either upstream or downstream, of the site, taking into account the impacts of climate change;

• Not increase surface water volumes or peak flow rates, which would result in increased flood risk to the receiving catchments;

• Use opportunities provided by new development to, where practical, reduce flood risk within the site and elsewhere;

• Ensure that where development is necessary in areas of flood risk (after application of Sequential and Exception Tests), it is made safe from flooding for the lifetime of the development, taking into account the impact of climate change; and

• All sources of flood risk, including fluvial, surface water, groundwater, reservoir and drainage need to be considered.

FRAs should follow government guidance on development and flood risk, complying with the approach recommended by the NPPF (and its associated guidance) and guidance provided by the EA.

The NPPF advocates a risk-based approach to flood risk management in terms of appraising, managing and reducing the consequences of flooding both to and from a development site.

In circumstances where FRAs are prepared for windfall sites then they should include evidence that demonstrates the proposals are in accordance with the policies described in the Local Plan.

**Finished Floor Levels**

Where possible, the finished floor levels (lowest floor level) should be raised above the predicted flood level to prevent the ingress of flood water. For fluvial flooding this should generally be 300mm above the 1% (1 in 100) probability flood level, including an allowance for climate change (see Appendix 4 for more information).

For single storey residential developments (bungalows and ground floor flats), finished floor levels should be set 300mm above the 0.1% (1 in 1000) annual probability flood event, including an allowance for climate change (see Appendix 4 for more information).

**Modifying Ground Levels**

In most areas of fluvial flood risk, developments which propose to raise land levels above the floodplain risk reducing conveyance or flood storage, which could adversely impact flood risk upstream, downstream or on neighbouring land.

In such cases, details of compensatory flood storage should be provided as part of a FRA. It is expected that this will be on a level for level, volume for volume basis to ensure that there is no loss in flood storage capacity, and on land that does not currently flood but is adjacent to the floodplain (in order for it to fill and drain). It should be in the vicinity of the site and within the red line of the planning application boundary (unless the site is strategically allocated).

Raising ground levels can also deflect flood flows, so appropriate assessment should be performed to demonstrate that there are no adverse effects on third party land.
Raising levels can also create areas where surface water might pond during significant rainfall events. Any proposals to raise ground levels should be tested to ensure that it would not cause increased ponding or build-up of surface runoff on third party land.
Appendix 4: Guidance on Climate Change Allowances

Climate Change Allowances

The NPPF sets out how the planning system should help minimise vulnerability and provide resilience to the impacts of climate change. The NPPF and supporting PPG on Flood Risk and Coastal Change explain when and how FRAs should be used. This includes demonstrating how flood risk will be managed now and over the development’s lifetime, taking climate change into account. LPAs refer to this when preparing local plans and considering planning applications.

Making an allowance for climate change in your FRA will help to minimise vulnerability and provide resilience to flooding and coastal change in the future. The climate change allowances are predictions of anticipated change for:

- Peak river flow by River Basin District;
- Peak rainfall intensity;
- Sea level rise; and
- Offshore wind speed and extreme wave height.

Climate Change Allowances Update

On 19th February 2016, the EA published new guidance on the climate change allowances that should be used in the assessment of flood risk. This guidance can be found on the GOV.UK website.

For assessment of rainfall intensity allowances, Table 2 of the guidance provides two allowances based on central and upper end predictions of climate change impacts.

Climate Change Allowances for Rainfall

Under the new guidance, for development with a design life to 2060-2115, NCC expects that all developers should design the surface water attenuation on site to accommodate the +20% climate change allowance, and undertake a sensitivity analysis to understand the flooding implications of the +40% climate change allowance.

If the implications are significant, i.e. the site could flood existing development (by allowing additional flow of runoff from the site) or put people at risk (as a result of increased hazard levels within or off the site), then a view may be taken to provide more attenuation within the drainage design up towards the +40% allowance, or to provide additional mitigation, for example a higher freeboard to ensure no risk to third parties/onsite users for the +40% allowance. This will tie into existing principles for designing for exceedance. NCC may also request that the +40% allowance is accounted for on development sites which could have a direct impact on sites of known flood risk, where no other mitigation is proposed.

This climate change guidance needs to be considered in the FRA/drainage design for all developments submitted for planning permission on and after 19th February 2016, even if the technical work was completed in advance of this date.

Climate Change Allowances for Fluvial Flooding

To ensure that the appropriate climate change allowances are considered within a site-specific FRA for fluvial flood risk matters, it is recommended that developers consult directly with the EA.
## Appendix 5: Developer Checklist

This list, although not exhaustive, will give developers a useful reference to ensure relevant advice is incorporated into site design.

<table>
<thead>
<tr>
<th>Checklist Items</th>
<th>Completed Y/N?</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Development site and location</strong> – describe the site you are proposing to develop.</td>
<td></td>
</tr>
<tr>
<td>Where is the development site located?</td>
<td></td>
</tr>
<tr>
<td>What is the current use of the site? (e.g. undeveloped land, housing, shops, offices)</td>
<td></td>
</tr>
<tr>
<td>Which Flood Zone (for river or sea flooding) is the site within? (I.e. Flood Zone 1, Flood Zone 2, Flood Zone 3). As a first step, you should check the Flood Map for Planning (Rivers and Sea). It is also a good idea to check the Strategic Flood Risk Assessment for the area available from the local planning authority.</td>
<td></td>
</tr>
<tr>
<td><strong>Development proposals</strong> - provide a general summary of the development proposals.</td>
<td></td>
</tr>
<tr>
<td>What is the development proposal(s) for this site? Will this involve a change of use of the site and, if so, what will that change be?</td>
<td></td>
</tr>
<tr>
<td>In terms of vulnerability to flooding, what is the vulnerability classification of the proposed development? See Table 2 of this guidance for an explanation of the vulnerability classifications.</td>
<td></td>
</tr>
<tr>
<td>What is the expected or estimated lifetime of the proposed development likely to be? (E.g. less than 20 years, 20-50 years, 50-100 years?). See Paragraph 026 of this guidance for further advice on how to assess the lifetime of developments for flood risk and coastal change purposes. It may also be advisable to seek advice from the local planning authority.</td>
<td></td>
</tr>
<tr>
<td><strong>Sequential Test</strong> - describe how you have applied the sequential test.</td>
<td></td>
</tr>
<tr>
<td>What other locations with a lower risk of flooding have you considered for the proposed development?</td>
<td></td>
</tr>
<tr>
<td>If you have not considered any other locations, what are the reasons for this?</td>
<td></td>
</tr>
<tr>
<td>Explain why you consider the development cannot reasonably be located within an area with the lowest probability of flooding (Flood Zone 1). If your chosen site is within Flood Zone 3, explain why you consider the development cannot reasonably be located in Flood Zone 2.</td>
<td></td>
</tr>
<tr>
<td>As well as flood risk from rivers or the sea, have you taken account of the risk from any other sources of flooding in selecting the location for the development?</td>
<td></td>
</tr>
<tr>
<td><strong>Site-specific flood risk.</strong></td>
<td></td>
</tr>
<tr>
<td>What is/are the main source(s) of flood risk to the site? (E.g. fluvial, surface water, groundwater, reservoir). See the NCC Flood Toolkit mapping and the Strategic Flood Risk Assessment for any relevant and available information.</td>
<td></td>
</tr>
<tr>
<td>What is the probability of the site flooding, taking account of the maps?</td>
<td></td>
</tr>
<tr>
<td>What is the expected depth and level for the design flood?</td>
<td></td>
</tr>
<tr>
<td>Are properties expected to flood internally in the design flood, and to what depth?</td>
<td></td>
</tr>
<tr>
<td>Are there any opportunities offered by the development to reduce the causes and impacts of flooding? See Paragraph 050 of this guidance for further advice.</td>
<td></td>
</tr>
<tr>
<td><strong>Climate Change</strong> - how is flood risk at the site likely to be affected by climate change?</td>
<td></td>
</tr>
<tr>
<td>How will the development be made safe from the impacts of climate change, for its lifetime? Further information can be found in Paragraph’s 054 and 059 (including on the use of flood resilience and resistance measures) of this guidance. Further advice on how to take account of the impacts of climate change in flood risk assessments is available from the Environment Agency.</td>
<td></td>
</tr>
</tbody>
</table>
**Surface Water** - describe the existing and proposed surface water management arrangements at the site?

<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Is the proposal defined as <strong>major development</strong>? If so then a surface water drainage assessment will be required to accompany the planning application.</td>
<td><strong>Is the proposal defined as major development? If so then a surface water drainage assessment will be required to accompany the planning application.</strong></td>
</tr>
<tr>
<td>Is the development compliant with the National “Sustainable drainage systems: non-statutory technical standards”?</td>
<td><strong>Is the development compliant with the National “Sustainable drainage systems: non-statutory technical standards”?</strong></td>
</tr>
<tr>
<td>Is the proposal compliant with the “Local Standards and Guidance for Surface Water Drainage in Northamptonshire”?</td>
<td><strong>Is the proposal compliant with the “Local Standards and Guidance for Surface Water Drainage in Northamptonshire”?</strong></td>
</tr>
<tr>
<td>Provide evidence that the surface water run-off rate will be restricted to 2 l/s/ha, or demonstrate that the existing greenfield run off rate will be maintained or reduced.</td>
<td><strong>Provide evidence that the surface water run-off rate will be restricted to 2 l/s/ha, or demonstrate that the existing greenfield run off rate will be maintained or reduced.</strong></td>
</tr>
</tbody>
</table>

**Occupants and users of the development** - provide a summary of the numbers of future occupants and users of the new development; the likely future pattern of occupancy and use; and proposed measures for protecting more vulnerable people from flooding.

<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
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</thead>
<tbody>
<tr>
<td>Will the development proposals increase the overall number of occupants and/or people using the building or land, compared with the current use? If this is the case, by approximately how many will the number(s) increase?</td>
<td><strong>Will the development proposals increase the overall number of occupants and/or people using the building or land, compared with the current use? If this is the case, by approximately how many will the number(s) increase?</strong></td>
</tr>
<tr>
<td>Will the proposals change the nature or times of occupation or use, such that it may affect the degree of flood risk to these people? If this is the case, describe the extent of the change.</td>
<td><strong>Will the proposals change the nature or times of occupation or use, such that it may affect the degree of flood risk to these people? If this is the case, describe the extent of the change.</strong></td>
</tr>
<tr>
<td>Where appropriate, are you able to demonstrate how the occupants and users that may be more vulnerable to the impact of flooding (e.g. residents who will sleep in the building; people with health or mobility issues etc.) will be located primarily in the parts of the building and site that are at lowest risk of flooding? If not, are there any overriding reasons why this approach is not being followed?</td>
<td><strong>Where appropriate, are you able to demonstrate how the occupants and users that may be more vulnerable to the impact of flooding (e.g. residents who will sleep in the building; people with health or mobility issues etc.) will be located primarily in the parts of the building and site that are at lowest risk of flooding? If not, are there any overriding reasons why this approach is not being followed?</strong></td>
</tr>
</tbody>
</table>

**Exception test** - provide the evidence to support certain development proposals in Flood Zones 2 or 3 where the sequential test cannot be passed. Use Paragraph 035 of the NPPF guidance for further information.

<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
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</thead>
<tbody>
<tr>
<td>Would the proposed development provide wider sustainability benefits to the community? If so, could these benefits be considered to outweigh the flood risk to and from the proposed development? See Paragraph 037 of this guidance for further information.</td>
<td><strong>Would the proposed development provide wider sustainability benefits to the community? If so, could these benefits be considered to outweigh the flood risk to and from the proposed development? See Paragraph 037 of this guidance for further information.</strong></td>
</tr>
<tr>
<td>How can it be demonstrated that the proposed development will remain safe over its lifetime without increasing flood risk elsewhere? See Paragraph 038 of this guidance for further information. Also see Flood Guide 23: New Development and Emergency Flood Plans, on the NCC Flood Toolkit.</td>
<td><strong>How can it be demonstrated that the proposed development will remain safe over its lifetime without increasing flood risk elsewhere? See Paragraph 038 of this guidance for further information. Also see Flood Guide 23: New Development and Emergency Flood Plans, on the NCC Flood Toolkit.</strong></td>
</tr>
<tr>
<td>Will it be possible to for the development to reduce flood risk overall (e.g. through the provision of improved drainage)? See Paragraph 050 for further advice.</td>
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</tr>
</tbody>
</table>

**Residual risk** - describe any residual risks that remain after the flood risk management and mitigation measures are implemented, and to explain how these risks can be managed to keep the users of the development safe over its lifetime. See Paragraph 042 of this guidance for more information.

<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>What flood related risks will remain after the flood risk management and mitigation measures have been implemented?</td>
<td><strong>What flood related risks will remain after the flood risk management and mitigation measures have been implemented?</strong></td>
</tr>
<tr>
<td>How, and by whom, will these risks be managed over the lifetime of the development? (E.g. putting in place flood warning and evacuation plans). Also see Flood Guide 23: New Development and Emergency Flood Plans on the NCC Flood Toolkit.</td>
<td><strong>How, and by whom, will these risks be managed over the lifetime of the development? (E.g. putting in place flood warning and evacuation plans). Also see Flood Guide 23: New Development and Emergency Flood Plans on the NCC Flood Toolkit.</strong></td>
</tr>
</tbody>
</table>

**Land Drainage Consent and Flood Risk Permits.**

<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
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</thead>
<tbody>
<tr>
<td>You must apply for Land Drainage Consent if you want to: Do work on, over, under or near an ordinary watercourse (within 9 metres of the landward toe of the bank); or</td>
<td><strong>You must apply for Land Drainage Consent if you want to: Do work on, over, under or near an ordinary watercourse (within 9 metres of the landward toe of the bank); or</strong></td>
</tr>
</tbody>
</table>
Make changes to any structure that helps control water.

For works on main rivers (within 8 metres of the landward toe of the bank) in Northamptonshire you need to apply for an [Environmental Permit](#) from the Environment Agency.

### Water Quality.

- The number of outfalls from the site should be minimised. Any new or replacement outfall designs should adhere to [Statutory Guidance Form SD27](#).
- Provide details of measures to minimise pollution to watercourses during construction.
- Provide details of pollution prevention measures for the life of the development, such as oil and silt interceptors. Consider whether permeable pavement areas are protected from siltation.

### Water Consumption.

- Confirm that the development can meet a water consumption target as set out in the [North Northamptonshire JCS](#) of 110 litres/person/day (105 litres within the home and 5 litres external use) and enclose supporting details (e.g. proposals for measures such as rainwater harvesting, low/dual flush toilets and water saving tap and shower fittings).
- Has a practical strategy been included for the supply of water for firefighting?
- Confirm whether grey water recycling is to be utilised and provide details.
- Provide details of any proposed measures to increase public awareness and community participation.

### Water Supply and Sewage Treatment.

- Provide evidence to confirm that water supply capacity is available, and that demand can be met.
- Provide evidence to confirm that sewerage and wastewater treatment capacity is available, and that demand can be met in accordance with the Water Cycle Strategy (see [Section 4.4.3](#) for more information).

**Flood risk assessment credentials** - provide details of the author and date of the flood risk assessment.

- Who has undertaken the flood risk assessment?
- When was the flood risk assessment completed?