South Derbyshire District Council

Version D01

Level 1
Strategic Flood Risk Assessment

February 2025

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Revision Schedule

Version	Date	Description	Prepared by	Reviewed by	Approved by
D01	Feb 2025	Draft for SDDC and EA Review	LB & EM	AH	SC
D02		*Draft Report*			
F01		*Final Report*			

Limitations of the report

This Strategic Flood Risk Assessment (SFRA) has been prepared for the purpose of assessing flood risk in accordance with relevant legislation and planning policy.

The information contained within this document is based on data available at the time of publication and is subject to change.

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Abbreviations

Abbreviation	Definition
AEP	Annual Exceedance Probability
BGS	British Geological Society
CFMP	Catchment Flood management Plan
CIL	Community Infrastructure Levy
DEFRA	Department for Environment, Food and Rural Affairs
DCC	Derbyshire County Council
DTM	Digital Terrain Model
EA	Environment Agency
EU	European Union
FRA	Flood Risk Assessment
FRMP	Flood Risk Management Plan
FRR	Flood Risk Regulations 2009
FWMA	Flood and Water Management Act 2010
LFRMS	Local Flood Risk Management Strategy
LLFA	Lead Local Flood Authority
LPA	Local Planning Authority
MAFP	Multi-Agency Flood Plan
MHCLG	Ministry of Housing, Communities & Local Government
NFCERM	National Flood and Coastal Erosion Risk Management
NPPF	National Planning Practice Framework
PFRA	Preliminary Flood Risk Assessment
PPG	Planning Practice Guidance
RMA	Risk Management Authorities
RoFSW	Risk of Flooding from Surface Water
SDD	South Derbyshire District
SDDC	South Derbyshire District Council
SFRA	Strategic Flood Risk Assessment
STW	Severn Trent Water
SuDS	Sustainable Drainage Systems
TCPA	Town and Country Planning Act 1990

UKCP	United Kingdom Climate Change Projections

Executive Summary

The purpose of this Level 1 Strategic Flood Risk Assessment (SFRA) is to fulfil the planning and flood risk requirements of the National Planning Policy Framework (NPPF). This SFRA supersedes the 2008 SFRA, enabling the South Derbyshire District Council (SDDC) to be compliant with the latest policy requirements and utilise the latest data to better assess flood risk.

The South Derbyshire District (SDD) is subject to fluvial flooding from the River Trent, River Derwent and the River Dove. The borough is also at risk of flooding from other sources, including surface water, sewers, groundwater and artificial sources.

The SFRA provides a strategic overview of all forms of flood risk throughout the SDD, now and in the future. This document, and the associated mapping delivered as part of the SFRA, is designed to help address local requirements, manage development requirements, and manage the risk of flooding. The local requirements addressed as part of this SFRA include climate change impacts, localised flooding issues, and specific policies and interpretations of the Flood Zones.

Future developments and climate change are some of the key factors that are increasing the risk of flooding across the UK and globally. The impact of development and projected future population growth may also present a greater overall risk to people and property due to the accumulative flood risk from all sources. The pressure of accommodating new development may lead to a larger number of sites being proposed within higher risk Flood Zones, placing them at greater risk of flooding.

To meet flood risk mitigation requirements whilst facilitating housing development needs at all scales, strategic policy is required targeting the impact of future growth and climate change on flood risk. It is recommended that SDD develop and implement policy that encourages opportunities for a strategic flood risk management approach. This would enable the borough and partnership organisations (including developers and water companies), to deliver and facilitate development. This SFRA has recommended nine strategic policies and 4 site-specific policies as a result of its flood risk assessment for the SDD.

1. Introduction

1.1 Objectives of the SFRA

This Level 1 Strategic Flood Risk Assessment (SFRA) replaces the previous South Derbyshire District Council (SDDC) produced in 2008 by Scott Wilson PLC.

The purpose of a Level 1 SFRA is to adhere to the planning and flood risk requirements established in the National Planning Policy Framework (NPPF). This revised Level 1 SFRA will include up-to-date data and provide a thorough strategic assessment of all flood risk types for the South Derbyshire District (SDD). This the SFRA will address local requirements in addition to proposing appropriate flood risk policies for adoption by SDDC.

This Level 1 SFRA will assist SDDC in improving their strategic approach for managing flood risk from all sources across the SDD. The approach adopted in this Level 1 SFRA aims to provide a suitable balance with challenges SDD faces in terms of the need for increased development.

This document forms the basis for SDD to undertake site selections on a sequential basis, applying the Sequential Test to inform the allocation of sites within the Local Plan. SDD's application of the Sequential Test are available within the Local Plan. Should the Sequential Test indicate that land outside flood risk areas cannot appropriately accommodate all necessary development; a further Level 2 SFRA will be undertaken to consider the detailed nature of flood risk within each Flood Zone and support the application of the Exception Test.

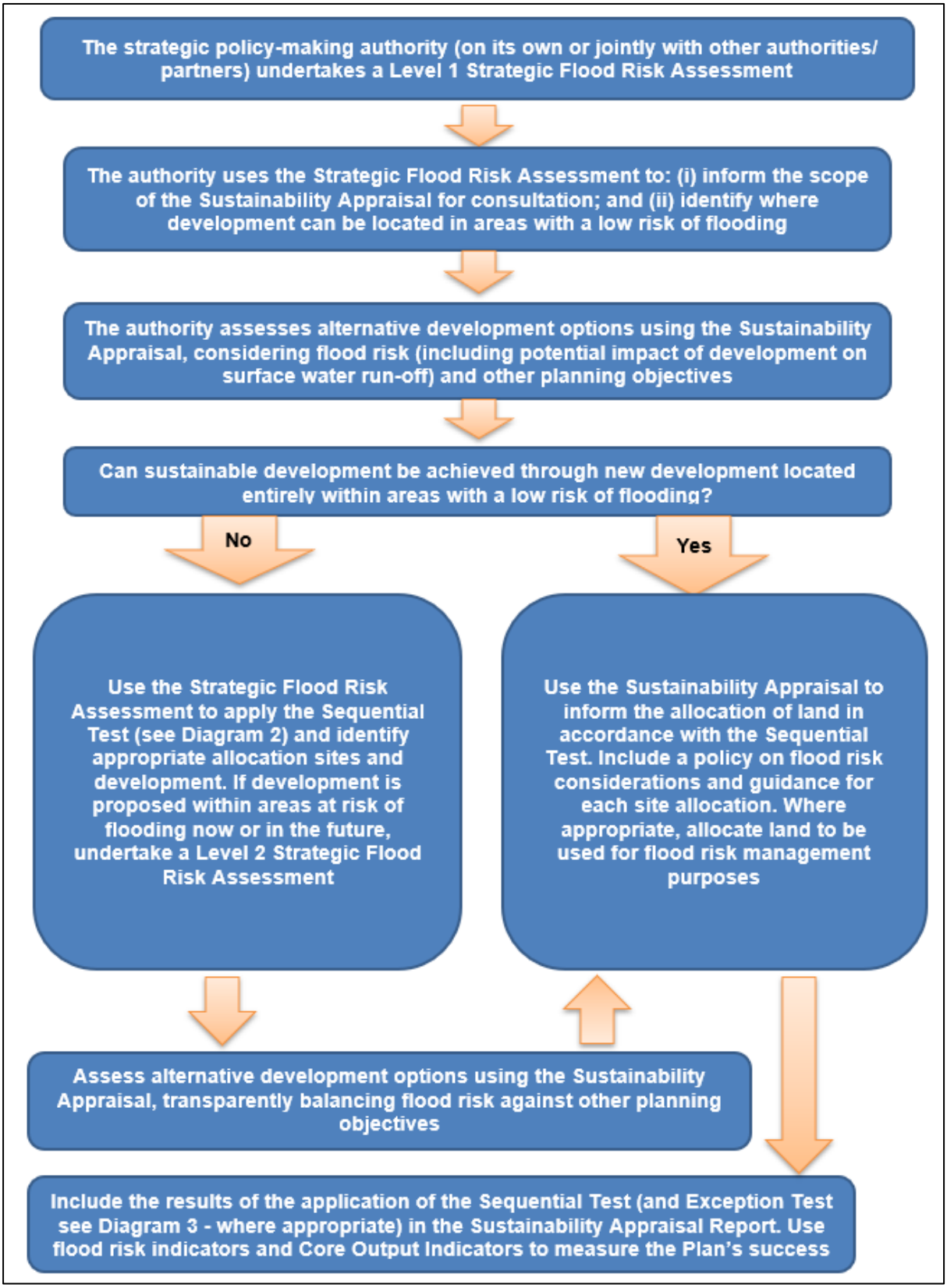

Figure 1.1 – Taking flood risk into account in the preparation of strategic policies, extract from Planning Practice Guidance

1.2 Study Area

The study area comprises the administrative area of SDDC and covers a total area of 338km^2. The main land use within the SDD is agriculture. This occupies 71% of district land use and reflects the districts predominantly rural nature. Approximately 38% of the district falls within the national forest, and much of that area is subsequently classed as Green Belt land (approximately 7.1% of the district). The district is characterised by extensive areas of countryside interspersed with a number of villages and hamlets. Melbourne is one of the larger villages along with Etwall, Linton, Hatton and Willington, with Swadlincote being the major urban area.

The spatial planning of any proposed development must be considered in regard to current and future risk of flooding from a number of sources, including fluvial, surface water, artificial sources and groundwater. It is therefore vitally important that flood risk is considered at a strategic scale to inform land allocations and future developments proposed by the emerging SDD Local Plan.

1.3 Document Structure - User Guidance

The SDDC Level 1 SFRA has been separated into the following Chapters:

- **Chapter 1: Introduction**
  Summary of the purpose of the SFRA, details of the study area and how to use the SFRA.
- **Chapter 2: Planning Policy Framework**
  Details of flood risk and associated policies on a national, regional and local scale that apply to the SDD.
- **Chapter 3: Data Sources and Mapping**
  Summary of data sources included maps that have been produced for the Level 1 SFRA.
- **Chapter 4: Applying Climate Change to Risk Assessment**
  Detail of how to plan for climate change adhering to the latest guidance.
- **Chapter 5: Sources and Assessment of Flood Risk**
  An examination of flood risk from all sources that impact SDD.
- **Chapter 6: Flood Risk Assessment Guidance**
  Information for those undertaking site-specific Flood Risk Assessments for development, including detail regarding the Sequential and Exception Tests.
- **Chapter 7: Policy Recommendations**
  Set of recommended site-specific and strategic policies based on risk assessment.
- **Chapter 8: Review and Next Steps**
  Summary of the proposed update schedule for the SFRA (technical content and mapping) and detail on Level 2 SFRA requirements.

1.4 A Living Document

Flood risk policy and data can often be updated or amended between full revisions made to an SFRA. It is therefore intended that this Level 1 SFRA for SDDC be a living document to accommodate for any changes to policies or the assessment of flood risk that may impact SDD. When any significant changes to legislation, policy or available flood risk information occurs, this SFRA will be reviewed in accordance with the information currently presented in this Level 1 SFRA. The information within this Level 1 SFRA should be reviewed on a regular basis to monitor these changes. Further information on the review and update process for this Level 1 SFRA is included within ***Chapter 8***.

2. Planning Policy Framework

2.1 Overview

There is a range of national, regional and local scale policies, guidance and strategies that should be used in the decision-making process when assessing flood risk and development.

2.2 National Policy

2.2.1 National Planning Policy Framework

The National Planning Policy Framework (NPPF) was first published in March 2012 by the Ministry of Housing, Communities & Local Government (MHCLG), with the latest update issued on 12th December 2024. The NPPF sets out the government's planning policies for England, and how these are expected to be applied with the aim of sustainable development.

The role of the Local Planning Authority (LPA) is outlined to prepare and make decisions on local plans, applications and proposed developments in line with the NPPF, which includes policies on minimising and managing risks imposed by flooding.

The NPPF states that strategic policies should be informed by an SFRA and should manage flood risk from all sources with consideration of advice from the Environment Agency (EA), Lead Local Flood Authority (LLFA), Internal Drainage Boards and other relevant flood risk management authorities. Chapter 14 of the NPPF sets out the aim of "Meeting the challenge of climate change, flooding and coastal change", within which paragraphs 170-182 detail Planning and flood risk.

Outlined within paragraphs 172-181 is the use of an SFRA as the basis for the sequential and exception test with the aim of steering new development to areas with the lowest risk of flooding from any source, with information regarding climate change in this context provided in paragraph 172.

The responsibility of an SFRA to consider cumulative impacts in local areas susceptible to flooding is outlined in paragraph 171 and recommendations on when and how sustainable drainage systems should be incorporated in developments are provided in paragraph 182.

Annex 3 of the NPPF details the Flood Risk Vulnerability Classification which assigns a range of vulnerabilities based upon a development use with varying requirements for different development types depending on the Flood Zone classification.

2.2.2 Planning Practice Guidance - Flood Risk and Coastal Change

The Planning Practice Guidance (PPG) is a living document, initially published in March 2014, that is periodically updated and operates in conjunction with the NPPF. The PPG provides additional information to support the application of the NPPF.

The 'Flood Risk and Coastal Change' section of the PPG was last updated in August 2022 to reflect changes in the NPPF and "advises how to take account of and address the risks associated with flooding and coastal change in the planning process".

This section of the PPG defines flood risk and details processes to avoid, control, mitigate and manage risk. It provides guidance for LPA's on taking flood risk into consideration with regards to local plans, identifying the risk management authorities (RMAs) to consult depending on the source of flooding and the process for planning applications. The PPG includes further detail on what should be included in an SFRA and how this should be taken into account through Local Plan updates.

The Flood Risk Vulnerability Classification of Annex 3 in the NPPF is referred to in the in the PPG within its Flood Zone and flood risks section, where Table 2 defines flood zone compatibility and exception test requirements.

2.2.3 Flood and Water Management Act (2010)

The Flood and Water Management Act (2010) (FWMA) was established to provide an improved and more sustainable method of managing flood risk at a local and national scale across England and Wales. This following recommendations from the Pitt Review of the 2007 floods.

The FWMA defines the duties and RMAs involved with managing different aspects of flood risk, these include: the EA, LLFAs, District Councils/ Unitary Authorities, Internal Drainage Boards, water & sewerage companies and highway authorities. A specific responsibility of the EA under the FWMA is to develop, maintain, apply and monitor a strategy for flood and coastal erosion risk management in England. The LLFA has an overarching responsibility of leading on flood risk at a local level, for South Derbyshire the LLFA is Derbyshire County Council (DCC).

2.2.4 Flood Risk Regulations (2009)

The Flood Risk Regulations (2009) (FRR) implements the European Union's (EU) Floods Directive for England and Wales. The FRR sets out additional duties of the EA and LLFA as RMAs such as producing

and updating Preliminary Flood Risk Assessments (PFRAs) mapping and reports, flood hazard and flood risk mapping and Flood Risk Management Plans (FRMPs).

DCC as the LLFA for South Derbyshire produced its most recent PFRA in May 2011. The report is noted to review "the risk of flooding from local sources, namely ordinary watercourses, surface water (overland run-off) and groundwater. It does not directly consider flooding from main rivers, such as the River Derwent". The PFRA received an addendum in December 2017 to review changes in flood risk for the area.

South Derbyshire falls within the Humber River Basin District. The EA published their FRMP for the Humber River Basin District in December 2022. The document covers a six-year period from 2021 to 2027.

2.2.5 National Flood and Coastal Erosion Risk Management Strategy

The current National Flood and Coastal Erosion Risk Management (NFCERM) Strategy was released in July 2020, with the latest revisions made in June 2022, and serves as an update to the previous NFCERM Strategy published in 2011. The NFCERM Strategy provides an overarching framework for RMAs involved with flood risk to tackle all sources of flooding and coastal change.

The NFCERM Strategy has a strong focus on the impact climate change will have on flood risk and coastal erosion and sees this as a significant challenge to heightened risk. The NFCERM underpins the Governments vision of "a nation ready for, and resilient to, flooding and coastal change – today, tomorrow and to the year 2100".

Alongside the NFCERM Strategy the EA has developed an Action Plan with measures RMAs should take in order to better manage the risks and consequences of flooding from rivers, the sea, groundwater, reservoirs, ordinary watercourses, surface water and sewers, and coastal erosion.

The next review of the NFCERM Strategy is anticipated for 2026 however the EA engages on an annual basis with RMAs to track shorter term measures and ensure actions remain on track to support the Strategy's vision and longer-term objectives. The latest update to the NFCERM in June 2022 includes the addition of the Flood and Coastal Erosion Risk Management Strategy Roadmap to 2026 which summaries practical actions that RMAs implementing the NFCERM should aim to complete by 2026.

2.3 Regional Policy

2.3.1 Humber River District Flood Risk Management Plan

The Humber River District Flood Risk Management Plan (FRMP) was released in 2022 as a collaborative plan between RMAs across the Humber catchment, which includes DCC, with the view to help the delivery of the NFCERM and the Governments 25 Year Environmental Plan. The key aims of the Humber River District FRMP are outlined as identifying measures to reduce the likelihood and consequences of flooding, wider exploration and improvement of flood resilience and creating long term plans and adaptations for climate change. A progress review of the first cycle of the FRMP is provided which involves the implementation of measures from the 2015 FRMP. The main body of the Humber River District FRMP (2022) outlines the objectives and measures of the second cycle at a district level, covering 51 districts.

2.3.2 River Trent Catchment Flood Management Plan

The River Trent Catchment Flood Management Plan (CFMP) was published by the EA in 2010 with the aim to help understand the present and future scale and extent of flooding, and to set policies to manage catchment flood risk with a sustainable approach. The plan is a living document which is intended for use by key stakeholders, including regional planning bodies and local authorities, to inform planning and decision making. Set out within the River Trent CFMP is an overview of the catchment's characteristics, current flood risk and climate change with a direction identified for the flood risk management of the catchments sub areas. SDD falls within "sub area 5: Derby, Burton and Nottingham" and "sub area 6: Mid Staffordshire and Lower Tame". In each section the key issues, policies and messages are identified and the proposed actions outlined.

2.4 Local Planning Policy

2.4.1 Local Plan

The SDDC Local Plan is the framework for managing the development and use of land at a local level, as required of a Local Authority by the NPPF. The plan comprises of Part 1 which was adopted in 2016 and Part 2 in 2017 that together replace the now suspended 1998 Local Plan. Part 1 is the strategic element of the SDDC Local Plan setting out long term visions, objectives and strategies for spatial development over the period 2011-2028. Pages 108-110 detail consideration for flood risk with information on water supply, drainage and sewerage infrastructure provided within pages 111-115. The SDDC Local Plan is currently being updated to reflect the current situation within SDD, this Level 1 SFRA will be part of supporting evidence to aid in the development of new Local Plan policies.

At the time of this SFRA being produced, SDDC are consulting on their Draft Local Plan Part 1 Review. The plan will outline how much, where and what type of larger development will take place across the area up to 2041. It will provide planning policies and site allocations to guide change and enhance new development proposals. The comments, along with technical evidence the Council is collecting, will help to prepare a Pre-Submission Local Plan Part 1 Review, which will be published for further consultation. At this stage the policies and plans carry only limited weight in decision making until it is adopted.

2.4.2 Swadlincote Town Centre Vision and Strategy

The Swadlincote Town Centre Vision and Strategy was published in 2012 to set out methods of raising the profile of the town and to identified opportunities for the development and enhancement of significant town centre sites. Any developments or designs at the planning application stage should include considerations of flood risk both at present and long term to account for climate change.

2.4.3 Local Flood Risk Management Strategy

As required in the FWMA DCC as an LLFA have produced a Local Flood Risk Management Strategy (LFRMS) which was initially published in 2013 with a major review provided in 2023. While Part 1 of the LFRMS is centred around providing communities with information and advice on flooding, Part 2 focuses on objectives and actions to manage the future risk of flooding. Set out within part 2 is the current understanding of flood risk in Derbyshire alongside the 5 key local objectives of which "Objective 3: Reduce the level of flood risk to the residents of Derbyshire" is highlighted to be the linking factor between these 5 aims.

2.4.4 Preliminary Flood Risk Assessment

As an LLFA, DCC are required under the FRR 2009 to prepare a Preliminary Flood Risk Assessment (PFRA) which considers local sources of flooding to identify areas at significant risk of flooding on a European level. The PFRA is used to develop a Local FRMS. The DCC PFRA concludes that whilst areas in Derbyshire are at risk of flooding, none are considered to be at Significant Risk of Flooding on the European level.

3. Mapping and Data

To inform the plan making process, flood risks and associated data has been assessed to support this Level 1 SFRA, with mapping produced to present flood risk across the study area. To allow suitable scales and view of data the coverage area has been collated into tiles which show localised areas, a tile coverage map has been produced as a reference guide.

A full list of maps is included below in ***Table 3.1***. Maps have been produced to show the risk of flooding from rivers, surface water, sewers and artificial sources. There is limited local level data to show groundwater flood risk, where geological maps have been produced to assist in supporting assumptions regarding potential geological impact to groundwater. Maps have also been produced to show historic flooding incidents and the distinction between Flood Zone 3a and 3b for planning.

Table 3.1 – Summary of Level 1 SFRA maps

Ref.	Title	Description	Coverage
01	Study Area	The whole SDDC administrative area.	District
02	Boundaries	Displays Green Belt land and Urban Settlements within a 10km buffer of the SDD.	District
03	LiDAR Derived Ground Levels	LiDAR topographical data to show ground levels across the SDD.	District
04	Tile Reference Layout	Location and references for map tiles which cover the study area.	District
05	Risk of Flooding from Rivers	Location of watercourses, Main Rivers and Flood Zones in addition to Flood Defences, Flood Storage Areas and areas with a reduction in risk.	Tiles
06	Flood Zones 3a and 3b	Areas within FZ3a and FZ3b as defined within this Level 1 SFRA.	Tiles
07	Risk of Flooding from Surface Water	Surface water flood extents for the annual chance of flooding in 1 in 30 year (3.3% AEP), 1 in 100 year (1% AEP) and 1 in 1000 year (0.1% AEP) flood events.	Tiles
08	Geological map	Bedrock and superficial geology.	District & Tiles
09	Risk of Flooding from Artificial Sources	Reservoir flood extents for a ‘wet day’ scenario.	Tiles
10	EA – Historic Flooding	Recorded flood outlines and historic flood map showing EA data on historic flooding.	Tiles

Ref.	Title	Description	Coverage
11	LLFA – Historic Flooding	Internally flooded properties from November 2019, February 2020 and October 2023 flood events.	District
12	STW – Historic Flooding	Number of sewer flooding incidents per postcode area within the SDD.	District
13	EA Flood Warning & Alert Areas	Extents of EA Flood Warning and Flood Alert Areas.	Tiles

The data included in the above maps comes from a variety of sources including open-source datasets from Ordnance Survey and the Environment Agency. A full list of the data, and its sources, used for this Level 1 SFRA has been included in ***Appendix A*** for information. Appropriate precautions have been taken regarding data of a sensitive nature provided by RMAs to support the assessment of flood risk in this Level 1 SFRA.

4. Applying Climate Change

4.1 Overview

It is important to consider climate change when planning for flood risk to ensure future plan making is well informed. In May 2016 the EA published its Climate Adaptation Reporting Second Round progress report, which is part of powers under the adaptation reporting power under the Climate Change Act (2008). The report discusses progress by the EA in adapting to the current and future predicted effects of climate change.

The report uses UK Climate Projections which provide probabilistic projections of UK and indicate the potential impacts of climate change. The 2016 EA report references the UK Climate Projections 2009 (UKCP09) however these have since been refreshed with a new set of climate projections for the UK – UKCP18. The UKCP18 projections broadly align with the previous UKCP09 projections, but it is recognised that there are some differences for rainfall and temperature which vary seasonally and in location between the two projections. Both projections that have been produced indicate that flooding may take place more frequently.

Legislation and guidance on planning values the projections and potential implications climate change may have on development in the future and sets out various considerations that should be made during the planning process. Paragraph 162 of the NPPF states "*Plans should take a proactive approach to mitigating and adapting to climate change, taking into account the long-term implications for flood risk, coastal change, water supply, biodiversity and landscapes, and the risk of overheating and drought from rising temperatures.*"

Local Plan policies should be supportive of actions to better prepare local infrastructure and communities for the impacts of climate change and encourage their resilience. It is crucial that risk assessments address the impacts of climate change, and that developers and planners consider the impacts of climate change on development throughout the decision-making process.

4.2 Climate Change Guidance

4.2.1 Updates

The EA regularly updates its information on Climate Change Allowances which should be applied in SFRAs and site-specific FRAs for planning developments. The most recent information (at time of writing) was first published in February 2016, with the latest updates having taken place in May 2022.

In July 2021 the EA updated their Climate Change Allowances to include the UKCP18 projections for peak river flow allowances. At this time, guidance was also updated on how to apply peak river flow allowances with the following options as follows:

"(a) the central allowance for all assessments except for essential infrastructure, where you use the higher central allowance,

(b) the upper end for 'credible maximum scenario' assessments, and

(c) the central allowance to calculate flood storage compensation, except for where essential infrastructure is affected, where you use the higher central allowance."

The EA has based the peak river flow allowances on management catchments instead of river basin districts. However, an additional update was made in July 2021 to clarify that *"in some locations the dominant source of flooding will be from a neighbouring management catchment. If so, use the allowances from the neighbouring management catchment to assess the risk for your development or site allocation."*

Further updates have also been made to peak rainfall allowances in May 2022 which now adopt UKCP local 2.2km projections and supporting research FUTURE-DRAINAGE. Again, these are provided per management catchment and not on a national scale. Peak rainfall allowances are provided for 2 epochs instead of 3: the 1% Annual Exceedance Probability (AEP) and 3.3% AEP events. Guidance on how to use these allowances has also changed whereby development with a lifetime up to 2100 should use the central allowance and development with a lifetime from 2100 to 2125 should use the upper end allowance.

Developers and planners should check the latest UKCP guidance to ensure the most recent information is applied within FRAs. At the time of writing the latest refresh of the UK Climate Projections: Headline Findings was published in August 2022, as V4.0, and was updated using the new UKCP probabilistic climate projections.

4.2.2 Applying Climate Change guidance

For planning applicants and developers, it is important that an awareness of how to apply the latest climate change guidance is held. The following list details the information that should be known to support this:

- The anticipated lifetime of the proposed development.

- For residential developments this is typically 100 years and between 75 and 60 years for commercial developments. This should be made clear with the site-specific FRA and justification should also be provided.

- Further guidance is provided within the PPG – Flood and Coastal Risk Change

- The vulnerability classification of the development.

  - Use Annex 3 of the NPPF to determine the flood risk vulnerability classification based on development type.

- The epoch period (or period of time) for peak rainfall intensity

  - 'Flood risk assessments: climate change allowances' shows the recommended allowances depending on the development's vulnerability classification and flood zone.

Table 4.1 – Flood zone vulnerability classifications

<table>
<tr><th></th><th colspan="3">Flood Zone</th></tr>
<tr><th>Vulnerability Classification</th><th>2</th><th>3a</th><th>3b</th></tr>
<tr><td>Essential Infrastructure</td><td colspan="2">higher central allowance</td><td>higher central allowance</td></tr>
<tr><td>Highly Vulnerable</td><td>central allowance</td><td>development should not be permitted</td><td rowspan="3">development should not be permitted</td></tr>
<tr><td>More Vulnerable</td><td colspan="2" rowspan="3">central allowance</td></tr>
<tr><td>Less Vulnerable</td></tr>
<tr><td>Water Compatible</td><td>central allowance</td></tr>
</table>

- Where this Level 1 SFRA shows an increased risk of flooding in the future, then the peak river flow allowances should be applied to developments.

  - This can be done by searching the postcode of the site or by selecting the catchment area the site falls within. Planning applicants must consider the flood risk vulnerability classification of their proposed development and the flood zone it falls within to apply an appropriate climate change allowance.

- The capability of the development to accommodate required mitigation measures to protect the proposed development from the effects of climate change.

4.3 Adapting to Climate Change

The Planning Practice Guidance (PPG) includes a section specifically on Climate Change and how this should be considered within the planning process. It advises on how appropriate mitigation and adaptation measures should be identified to address anticipated effects of climate change. The PPG explains that "addressing climate change is one of the core land use planning principles" from the NPPF which should be well thought out within the planning process and at the decision-making stage. Local Plans are expected to show how they will implement this principal to support sustainable development adhering to the NPPF.

The PPG explains that the following examples could be used in terms of adapting to climate change but that collaboration on a local scale will enable more effective responses to inform local approaches.

- *"Considering future climate risks when allocating development sites to ensure risks are understood over the development's lifetime*
- *Considering the impact of and promoting design responses to flood risk and coastal change for the lifetime of the development*
- *Considering availability of water and water infrastructure for the lifetime of the development and design responses to promote water efficiency and protect water quality*
- *Promoting adaptation approaches in design policies for developments and the public realm."*

5. Assessment of Flood Risk

5.1 Responsibilities

Under the FWMA stakeholders designated as RMAs are given responsibilities that should be upheld in terms of managing flood risk. Each RMA has a duty to co-operate and share information and act in a way that is consistent with NFCERM Strategy. Duties can involve preparing required flood risk documentation, supporting with development planning activities and offering consent for other flood risk related actions. ***Table 5.1*** summarises the responsibilities of RMAs in the context of this Level 1 SFRA.

Table 5.1 – Summary of RMA responsibilities in context of this Level 1 SFRA for SDDC

Department for Environment Flood and Rural Affairs
Department for Environment Flood and Rural Affairs (DEFRA) holds the responsibility for government level flood risk management, which includes managing associated flood risk and coastal erosion policy for England and providing funding for these flood risk and coastal erosion activities.
Environment Agency
The EA undertakes the role of implementing government policy on flood risk with the aim of reducing the risk of flooding from all sources. They are required to: • Have a strategic overview of all flood and coastal management matters as laid out within the FWMA. • Manage flood risk from main rivers, the sea and reservoirs under which they are obliged to carry out works on these assets, their drainage and associated defences. • Support the LPA by providing development advice for planning applications and act as a statutory consultee for certain application types. • Issue consents for works on or near main rivers, and works affecting watercourses, flood and sea defences and other structures protected by its byelaw. • Manage the flood warning system in England and issue and operates flood warnings and flood alerts.

Lead Local Flood Authority

DCC is the LLFA for the SDD area. The LLFA holds the responsibility for local flood risk management from surface water, ordinary watercourses and groundwater. The LLFA has the responsibility to

- Prepare, maintain and enforce strategies on local flood risk management, in addition to providing consultation in the development of a SFRA.
- Produce a PFRA which should include maps displaying flood hazards, risks and flood alleviation schemes.
- Designate structures which may impact on flood risk as part of maintaining their flood asset register.
- To make decisions for works on ordinary watercourses.
- Undertake sufficient investigation, when significant flooding has occurred in an event and provide suitable recommendations for implementation by RMAs.
- Support in the development and enforcement of policies and guidelines on flood risk.
- Review all major planning applications as a statutory consultee providing comment on surface water drainage proposals.

Local District / Borough Authorities

SDDC holds the responsibility for preparing local development plans and have the authority to determine planning applications. They manage local emergency flood planning and are part of the response and recovery to flood events in their area.

Water Authority

Severn Trent Water (STW) is the water authority serving the SDD. They hold responsibility for managing flooding from the public water and sewage systems including sewer flooding, burst pipes or water mains, floods caused by system failures. Severn Trent Water are to be consulted under the Water Industry Act 1991 on development applications which plan to connect into their network for either foul, surface water or combined out-takes and mains water in-takes.

Highway Authority

Local Highway authorities must maintain local roads to ensure adequate drainage is implemented and must ensure any roads or projects do not increase the risk of flooding. They are responsible for works on drains, roadside ditches, gullies and associated highway infrastructure (i.e. culverts, bridges etc). They should also work alongside the EA and LLFA (if a different authority) to perform these duties and manage highway flooding.

5.2 Flood Risk Introduction

As described by the PPG, "Flood risk" is a combination of the probability and the potential consequences of flooding. Areas at risk of flooding are those at risk of flooding from any source, now or in the future. Sources include rivers and the sea, direct rainfall on the ground surface, rising groundwater, overwhelmed sewers and drainage systems, reservoirs, canals and lakes and other artificial sources. Flood risk also accounts for the interactions between these different sources. This term is key to the application of the presumption in favour of sustainable development in paragraph 11 of the National Planning Policy Framework.

For areas at risk of river and sea flooding, this is principally land within Flood Zones 2 and 3 or where a Strategic Flood Risk Assessment shows it will be at risk of flooding in the future. It can also include an area within Flood Zone 1 which the Environment Agency has notified the local planning authority as having critical drainage problems.

Table 1 provides definitions of the Flood Zones, from low to high probability of river and sea flooding. A map showing river and sea flooding is available from the EA's Flood Map for Planning. The Environment Agency has also set out who is responsible for flood and coastal erosion risk management in its NFCERM strategy (Annex A). Government has also published a Flood and coastal erosion risk management policy statement.

5.3 Fluvial Flood Risk

5.3.1 Definition

Fluvial flooding, also referred to as river flooding, occurs when a catchment receives heavy or prolonged periods of rainfall which cause the river to exceed its channel capacity. This causes water to overflow onto the adjacent land, known as a floodplain. Developments on natural floodplains can be more susceptible to fluvial flooding, with urbanisation increasing the non-permeable surface of the floodplain which exacerbates the volume of water flowing into the river channel. Meanders and constrictions in the river channel can also increase fluvial flooding by causing flood water to back up which can impact developments located close to these areas.

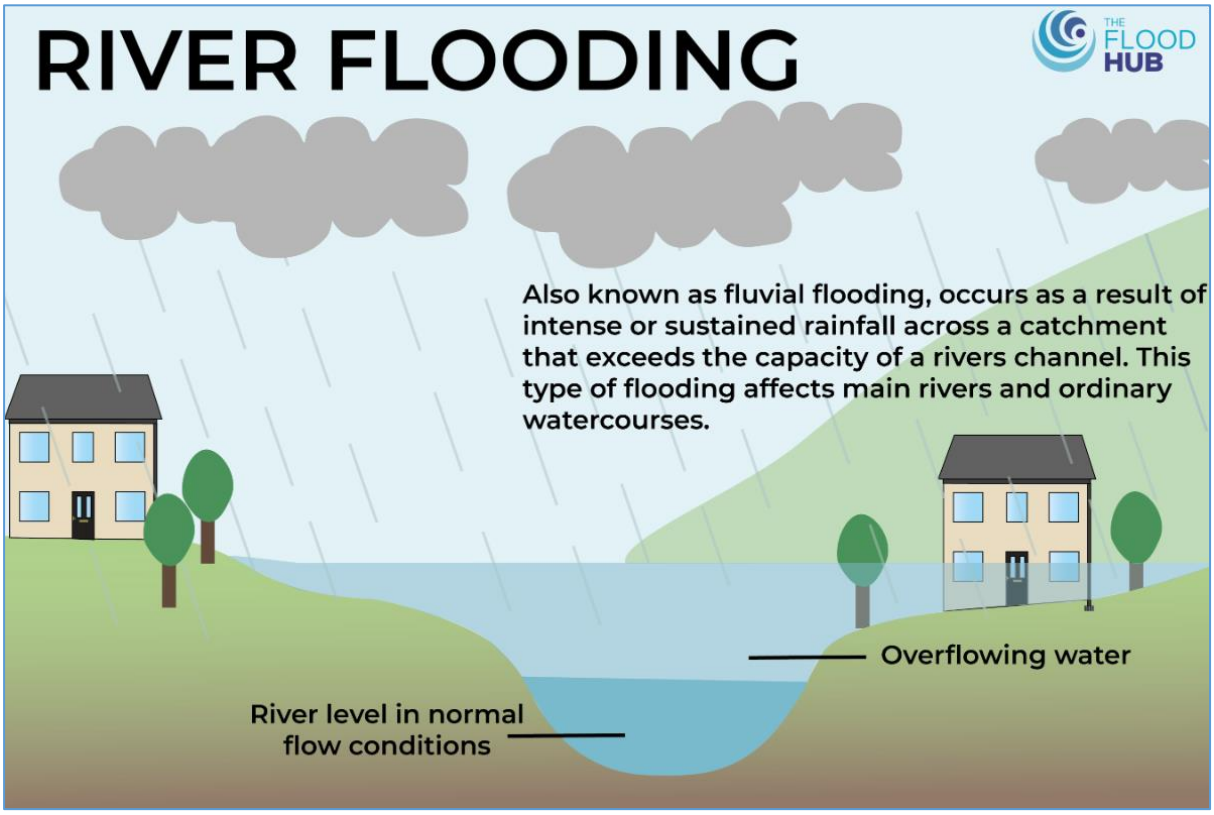

Figure 5.1 – Diagram of river flooding from The Flood Hub

5.3.2 Assessment

The risk of flooding from rivers is shown in ***Drawing 5. Risk of Flooding from Rivers***. These maps show the location of both Main Rivers and Ordinary Watercourses within the SDD. The maps also present EA Flood Zones 2 and 3, flood storage areas, spatial flood defences and areas with a reduction in the risk of flooding from rivers and/or the sea from defences. Flood Zones 2 and 3 are defined by the EA as follows:

- Flood Zone 3: “Areas of land at risk of flooding, when the presence of flood defences are ignored and covers land with a 1 in 100 (1%) or greater chance of flooding each year from Rivers; or with a 1 in 200 (0.5%) or greater chance of flooding each year from the Sea.”

- Flood Zone 2: “Areas of land at risk of flooding, when the presence of flood defences are ignored and covers land between Zone 3 and the extent of the flooding from rivers or the sea with a 1 in 1000 (0.1%) chance of flooding each year. This dataset also includes those areas defined in Flood Zone 3.”

The EA’s Flood Zones are based on the undefended flood scenario and do not account for the flood risk in an area that benefits from a reduction in risk due to flood defence assets. ***Chapter 5.10*** of this report provides further information on the local Flood Zone 3 approach and the LLFA definition of each.

The majority of the SDD is predominantly drained by the River Trent and its tributaries. ***Table 5.2***, below, lists all Main Rivers within the SDD administrative area.

Table 5.2 – List of Main Rivers with the SDD

Cuttle Brook	Hilton Brook	River Trent
Egginton Brook	Longford Brook	Sapperton Brook
Etwall Brook	Old Trent Water	Sutton Brook
Foston Brook	River Derwent	Twyford Brook
Hell Brook	River Dove	

Of these rivers, the rivers Trent, Derwent and Dove are largest and are characterised as follows:

The River Trent flows from the south-western edge of the SDD and up through its centre from west to east. This is the largest river within the SDD administrative area and therefore poses the greatest fluvial flood risk of all rivers within the study area. Most other rivers of the SDD are tributaries of the River Trent. These tributaries still pose fluvial flood risk to properties within their hydrological catchments. However, the rivers within the SDD are not tidally influenced.

The River Derwent is another major river that influences and poses fluvial flood risk to property and infrastructure within the SDD. The River Derwent flows along the north-eastern corner of the SDD administrative area in a south-easterly direction. The River Derwent then confluences the River Trent at the most easterly point of the SDD administrative area. Although another major river in the area, it is likely that due to its position along the edge of the administrative boundary that the River Derwent fluvial flood risk is more isolated for SDD residents in comparison to the risk posed by the River Trent.

The River Dove is also a tributary of the River Trent and is situated along the southern boundary of the north-western extension of the SDD administrative boundary. This river flows into the SDD from the west before its confluence with the River Trent at Newton Solney.

5.3.3 Impacts of Climate Change

All rivers and watercourses will be subject to changes due to climate change, with the largest effects expected within the River Trent catchment from increased rainfall events due to the cumulative amount of water it receives from other major rivers in the area, and the size of its hydrological catchment. With the effects of climate change these river stress events are likely to increase with the potential to increase effects of overtopping of riverbanks and formal fluvial defences.

The UKCP for peak river flow and peak rainfall intensity, it is anticipated that the effects of climate change will result in an increased number of people, properties and infrastructure located within areas at risk of fluvial flooding. The frequency and severity of fluvial flooding would increase, increasing the need for flood defence and mitigation measures for the River Trent, River Derwent and River Dove, in addition to the other Main Rivers within the SDD.

The EA's online guidance 'Flood risk assessments: climate change allowances' sets out the climate change allowances for peak river flows for specific management catchments and provides advice on applying climate change projections when preparing FRAs. The allowances for the management catchments of relevance to SDD identified in ***Table 5.3***. In some locations the dominant source of flooding will be from a neighbouring management catchment. If so, the allowances from the neighbouring management catchment should be used to assess the risk to the development or site allocation.

The range of allowances is based on percentiles. For each category, this is based on:

- central allowance is based on the 50th percentile
- higher central allowance is based on the 70th percentile
- upper end allowance is based on the 95th percentile

Table 5.3 – Climate Change allowances for Management Catchments within the SDD

Management Catchment Name	Category	2020s % Allowance	2050s % Allowance	2080s % Allowance
Lower Trent and Erewash	Upper	13	17	29
	Higher	18	23	39
	Central	29	38	62
Tame Anker and Mease	Upper	10	11	22
	Higher	15	17	30
	Central	24	30	51
Dove Management Catchment	Upper	13	18	31
	Higher	17	24	40
	Central	28	39	62

Management Catchment Name	Category	2020s % Allowance	2050s % Allowance	2080s % Allowance
Derwent Derbyshire	Upper	13	17	29
	Higher	18	23	39
	Central	29	38	63

The Flood Zone and vulnerability classification is used to determine the category level of allowance that should be used. SFRA's in this instance use the central and higher central allowances. For other assessments, the PPG identifies the following:

In flood zones 2 or 3a for:

- Essential infrastructure – use the higher central allowance
- Highly vulnerable – use central allowance (development should not be permitted in flood zone 3a)
- More vulnerable – use the central allowance
- Less vulnerable – use the central allowance
- Water compatible – use the central allowance

In flood zone 3b for:

- Essential infrastructure – use the higher central allowance
- Highly vulnerable – development should not be permitted
- More vulnerable – development should not be permitted
- Less vulnerable – development should not be permitted
- Water compatible – use the central allowance

The peak river flow allowances should be applied to developments and allocations where this SFRA shows an increased risk of flooding in the future. This includes locations that are currently in flood zone 1 but might be in flood zone 2 or 3 in the future.

In addition to using the vulnerability and flood zone classification, the lifetime of the development should be considered in applying the most appropriate climate change allowances.

5.4 Tidal Flood Risk

5.4.1 Definition

Tidal flooding occurs during astronomically high tides and can be exacerbated when combined with storm surge events. This can overtop coastal defences and encroach on developments situated along

the coastline. Erosion of coastal cliff lines and beaches can also occur as a result of tidal flooding which can threaten the foundations of developments in this area.

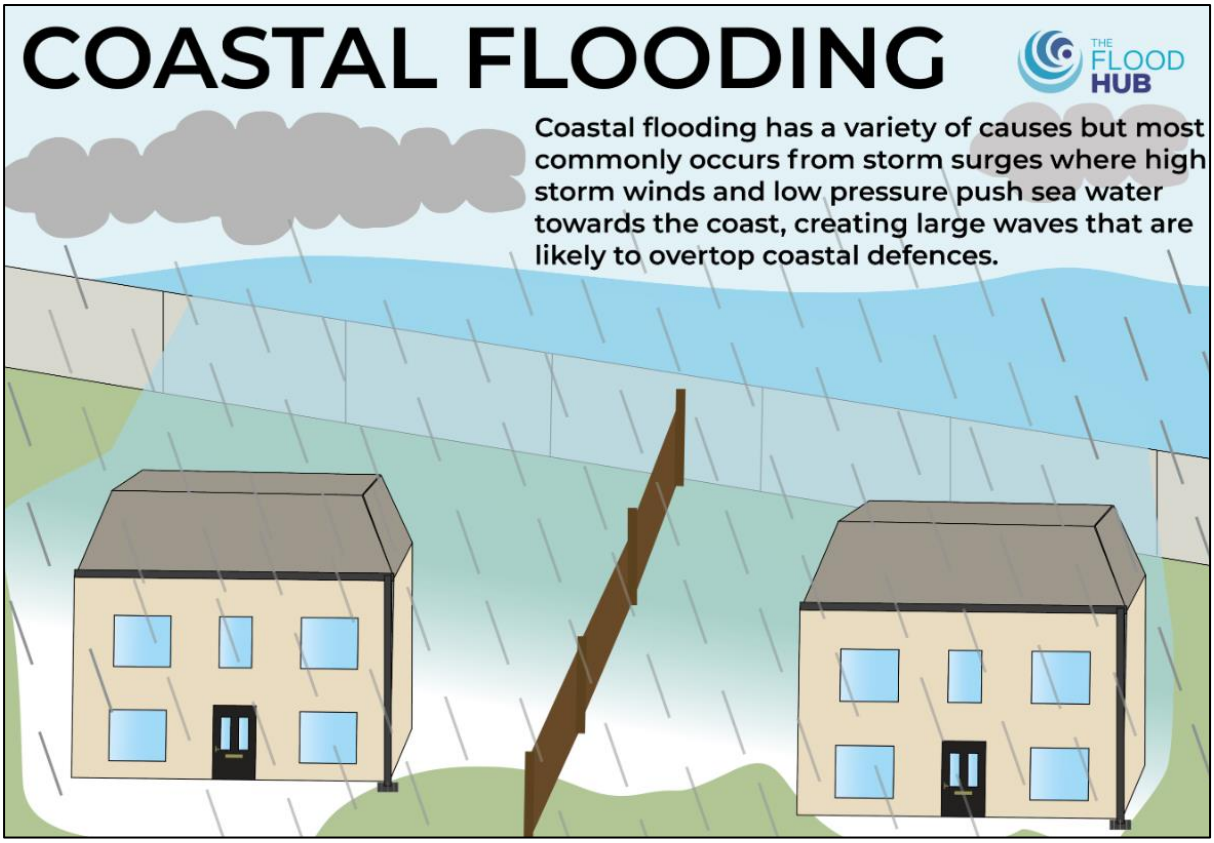

Figure 5.2 – Diagram of coastal flooding from The Flood Hub

5.4.2 Assessment

The SDD is not at risk from tidal flooding as the area is not impacted by any tidal watercourses and is located approximately 100km from the nearest coastline. This is expected to remain the same into the future as sea levels rises are realised due to climate change.

5.5 Surface Water Flood Risk

5.5.1 Definition

Surface water flooding, also known as pluvial flooding, occurs when water cannot infiltrate into the ground as it has become saturated, and in urban areas where the drainage capacity of surface water sewers / drains is exceeded by the volume of rainfall or overland flows. This results in water accumulating on the ground surface instead of within the drainage assets.

Flooding from ordinary watercourses is a flood risk which the LLFA is responsible for and under legislation is considered as part of surface water flood risk. Flooding of ordinary watercourses occurs through similar mechanisms to surface water flooding; these are watercourses which are not main rivers and can include drainage ditches. For the purposes of this Level 1 SFRA, the risk of flooding from ordinary watercourses is included within the 'surface water' terminology. This aligns with the approach taken by the EA for its Risk of Flooding from Surface Water (RoFSW) mapping.

Increases in urban developments can put pressure on existing drainage systems which can increase the volume and occurrences of surface water flooding across the new and existing developments. Urbanisation by means of converting permeable surface to impermeable can also exacerbate surface water flooding as impermeable surfaces restrict flood water from naturally infiltrating resulting in pooling at the surface.

Surface water in urban catchments is heavily reliant on positive drainage systems to take water away. The Highway Authority and STW both play a big part in maintaining and assessing these systems and will continue to play a big part in ensuring new developments can manage surface water runoff to not exacerbate surface flooding.

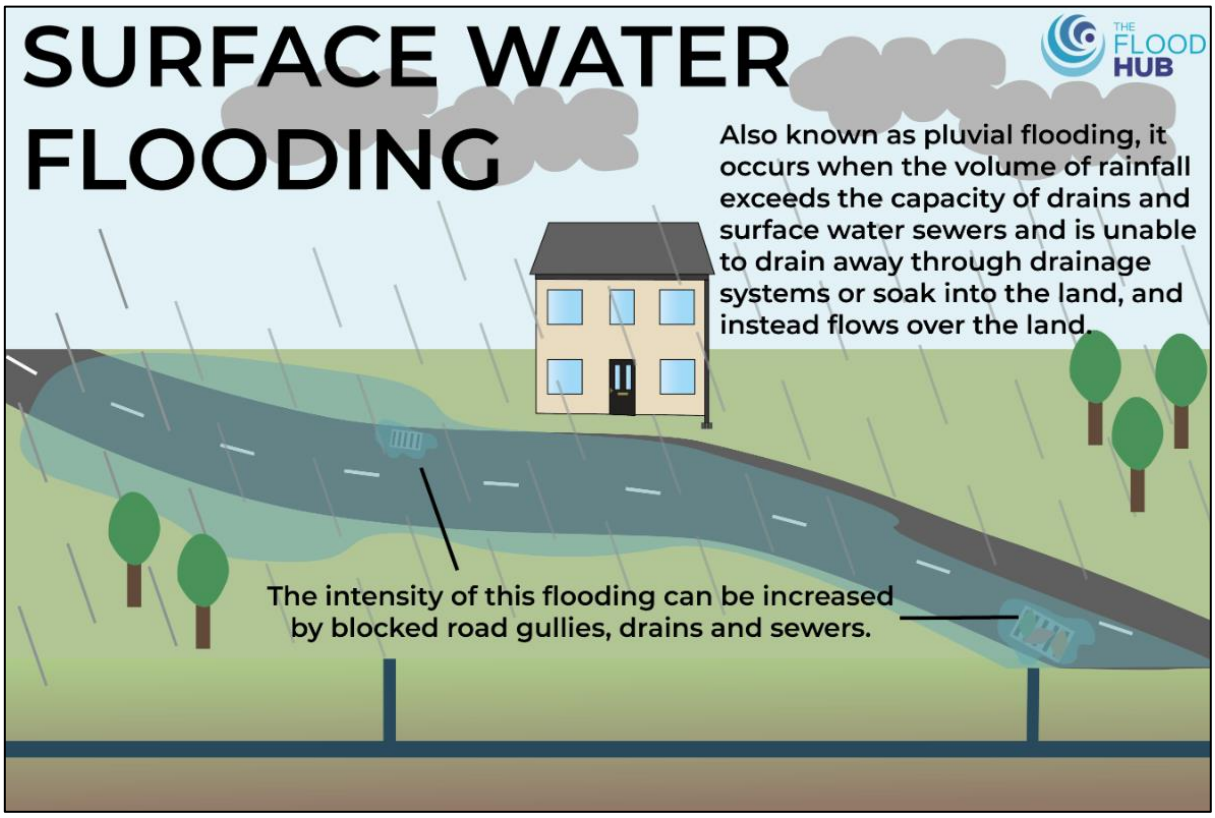

Figure 5.3 – Diagram of surface water flooding from The Flood Hub

5.5.2 Assessment

The extent of surface water flooding varies across the SDD. The study area is predominantly rural with small-scale urban areas across the region, the largest urban area being Swadlincote towards the south of the SDD. Undeveloped land helps mitigate against the impact of surface water runoff as it allows for greater interception and infiltration to take place reducing peak runoff, with rural catchments acting in a more natural way following the local geology and topography. Despite this, at times of prolonged heavy rainfall such as during storm events, ground can become saturated and its ability to manage surface water flooding is reduced. This also applies at times of prolonged dry periods where the grounds' ability to absorb moisture quickly is reduced.

SDD is not considered to be heavily urbanised or densely populated compared to other districts. However, the ground coverage like in all urban settlement areas is largely impermeable, increasing overland flows as less water can infiltrate to the ground. These flow paths will flow towards topographical low points and result in a higher peak runoff rate. This places people and buildings along these overland flow paths at risk of surface water flooding where the risks need to be managed, and future plan making will need to ensure that new developments do not increase flood risk elsewhere.

Drawing 5. Risk of Flooding from Rivers, shows the areas at risk of surface water flooding. The mapping consists of the flood extent of rainfall scenarios with a 3.3% (1 in 30 year), 1% (1 in 100 year) and 0.1% (1 in 1000 year) annual exceedance probability (AEP) / chance of occurring in any given year.

The RoFSW mapping tools allows access to surface water flood predictions across the country and can be used to inform development schemes to both review areas of existing risk, and to understand areas of land that withhold waters on a temporary basis, relieving flooding to some extent.

5.5.3 Impacts of Climate Change

From review of the UKCP for peak rainfall intensity, it is anticipated that the effects of climate change will result in an increased number of people, properties and infrastructure located within areas at risk from surface water flooding. The EA's Adapting to a Changing Climate report (2016) highlights that wetter winters and more intense rainfall will cause greater surface water runoff, resulting in increased localised flooding.

At present there are no EA specific surface water models that include climate change scenarios.

5.6 Groundwater Flood Risk

5.6.1 Definition

Rainfall over a long duration can cause the water table to rise above the grounds surface which is known as groundwater flooding. This can occur when large volumes of water infiltrates into the ground raising the level of the aquifer below and causing water to emerge through permeable rock and subsoils to the ground surface. Groundwater flooding is more likely to be experienced by properties with basements and by developments that are situated in low lying areas or in close proximity to aquifers / springs.

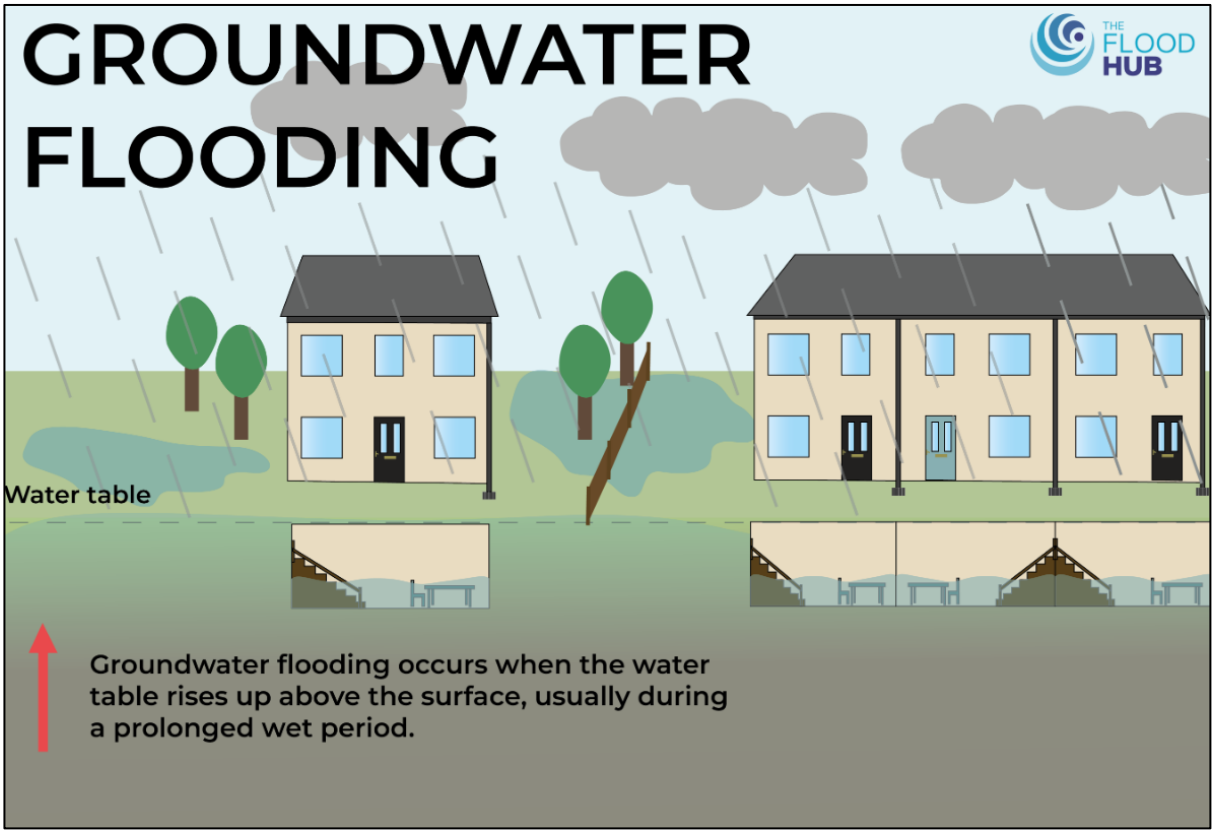

Figure 5.4 – Diagram of groundwater flooding from The Flood Hub

5.6.2 Assessment

The bedrock geology for the SDD is complex with approximately 12 different variations within the study area (inclusive of a 10km buffer). This is based of Hydrogeological data available from the British Geological Society (BGS) open-source data. The hydrogeological data, displayed in ***Drawing 8. Geological Map*** shows that a large part of the northern half of the SDD and an area in the south-west are of the Triassic Rocks (Undifferentiated) - Mudstone, Siltstone and Sandstone formation. Areas to the south-east of the study area show a more complex bedrock geology system. The bedrock geology for the whole study area typically contains sandstone.

The superficial geology as with convention are typically present within the SDD at points surrounding watercourses or water features. There are four types of superficial deposits identified within the SDD which are: (1) Alluvium; (2) Glacial Sand and Gravel; (3) River Terrace Deposits (Undifferentiated); and (4) Till. River Terrace Deposits (Undifferentiated) are comprised of sand and gravel which have a higher hydraulic conductivity than those comprised of clay and silt. The Alluvium is a geological unit comprised of clay, silt and sand which means water cannot move easily through this geology as it has a low hydraulic conductivity.

5.6.3 Impacts of Climate Change

Within this Level 1 SFRA there have been no investigations completed to identify how groundwater flood risk may be influenced by climate change. However, there are several potential ways in which climate change could impact groundwater flood risk. Rainfall intensity and duration variability could lead to a long-term decline in groundwater storage and an increase in groundwater drought periods and severity. The UKCP for peak rainfall intensity predicts rainfall intensity will increase during future rainfall events, which may result in an increased frequency and severity of groundwater flooding.

5.7 Sewer Flood Risk

5.7.1 Definition

Sewer flooding can occur when drainage system infrastructure either fails, becomes blocked, or is overwhelmed by the volume of rainfall. This causes water (foul or surface water) to surcharge from the system onto the ground surface or into nearby watercourses. Blockages to the sewage system, alongside sediment, are commonly caused when incorrect items are flushed down the toilet, or when fats, oils and grease from cooking are deposited down the sink. Floodwater contaminated with sewage is particularly hazardous to people and animals and can cause significant harm to properties and watercourses.

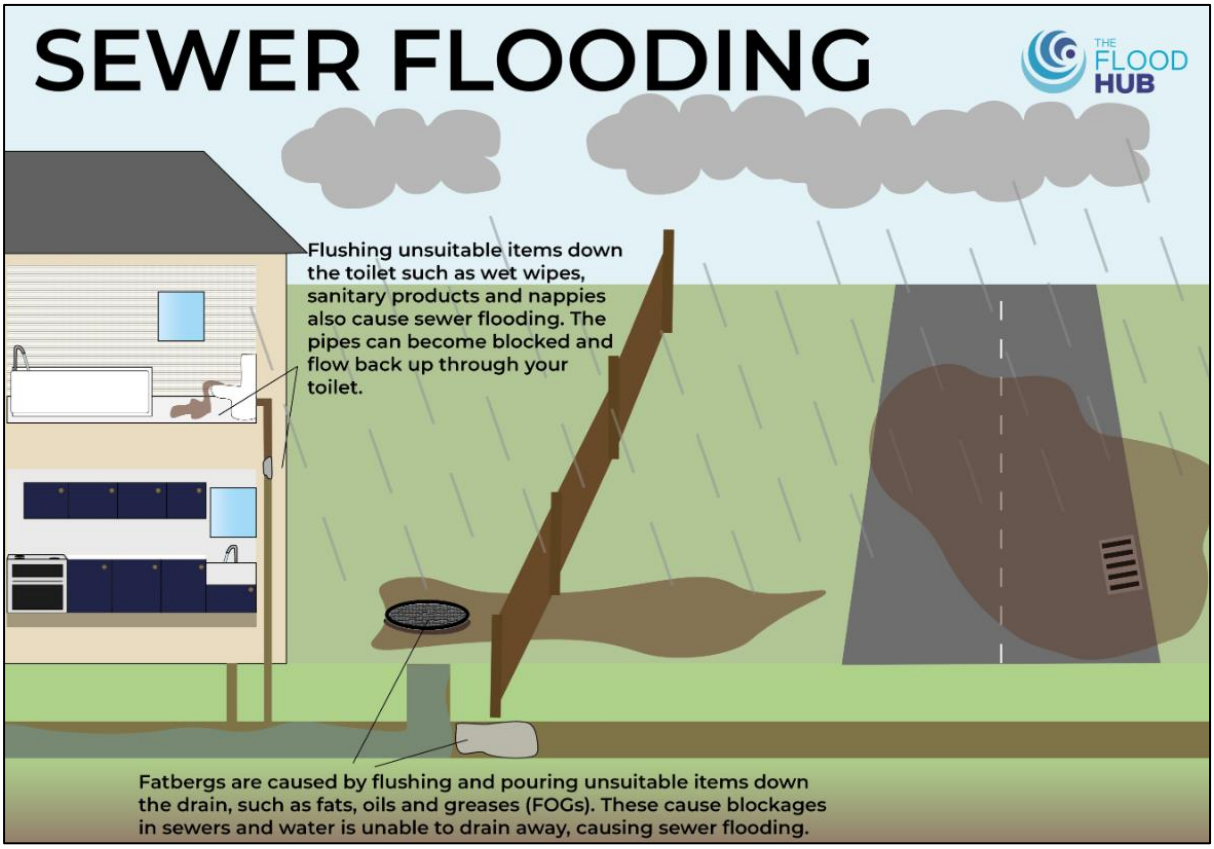

Figure 5.5 – Diagram of sewer flooding from The Flood Hub

5.7.2 Assessment

The public sewer system in the SDD is owned and operated by STW. Their networks consist of a mix of combined and separate systems. Modern sewer systems are designed to be separate systems, typically with surface water sewers accommodating up to a 3.3% AEP rainfall event. However, sections of the sewer system across the SDD vary in capacity due to age. Older sections tend to have a lower capacity and may not be designed to accommodate rainfall events as significant as a 3.3% AEP event.

STW have responsibilities for all 'public sewers' (the drainage network which serves more than one property, including associated manholes) under the Water Industry Act (1991). Typically gullies / drains and the interconnecting pipework which drain into sewers are the responsibility of the private landowner. For gullies, drains and pipework which drain the public highway, the Highways Authority is the responsible owner. Sewer flooding can be caused by a combination of factors and due to the interconnectedness of these assets it is important that all relevant parties are involved in subsequent investigations and, where necessary, work to resolve the cause of flooding collaboratively, from the source to the final outfall.

The existing sewer network needs to be accurately considered when planning for new development. DCC as the LLFA requires that applicants for major developments provide detailed drainage design plans and check if a flood risk assessment is needed as part of the planning application. It should be demonstrated by the applicant that capacity exists in the public sewerage and water supply network to serve their development. New developments built within the catchment area will create additional stresses on sewer capacity for the SDD which increases the risk of sewers becoming overwhelmed. Sewer flood risk is therefore something that is likely to increase throughout the borough in line development growth.

The opportunities afforded by new developments should be used to provide relief to the existing network where possible. For surface water, developments will manage water on-site for events up to and including their respective design life, with allowances for climate change. Designs should be borne from best practice and the most up-to-date guidance on SuDS, ensuring the long-term safe and functional operation on the drainage system.

For foul networks, infrastructure charges for any new connections can be used by sewerage company to provide improvements and off-set the impact of any new development. The phasing of improvement works needs to be carefully managed, with the sewerage provider working collaboratively with developers and plan makers to ensure the timely delivery, to overall ensure that flood risks from sewers are not increased.

Strategic planning by SDD will need to be collaboratively produced with input from STW where further reaching improvements can be considered.

5.7.3 Impacts of Climate Change

Changes to sewer flood risk are estimated to closely align with changes in surface water flood risk and are linked with the impact's climate change is likely to have on changing rainfall patterns and intensity.

Based on the UKCP for peak rainfall intensity, the UK can expect an increase in rainfall intensity during future rainfall events. This means that there would be an increase in the flow and volume of water flowing into the drainage system, increasing the chances of overload. Overload can lead to surface water surcharging, resulting in localised flooding above ground. It can also cause an increase in untreated wastewater overflows entering the environment through combined sewer overflows into rivers, causing widespread damage.

5.8 Artificial Sources of Flood Risk

5.8.1 Definition

Artificial sources include flooding from reservoirs, canals, and other artificial structures in the event of infrastructure failure. Flooding from artificial sources will likely have little to no warning and is often classed as having a low probability but a high impact across a potentially large area should an event occur. Many developments, even those not situated close to an artificial source, could be at risk from artificial flooding should a structural breach occur.

Reservoir flooding can result from improper maintenance, structural failure and slope instability of the dam embankment. Canal flooding is typically caused by improper use or vandalism of locks which leads to water levels overtopping the banks.

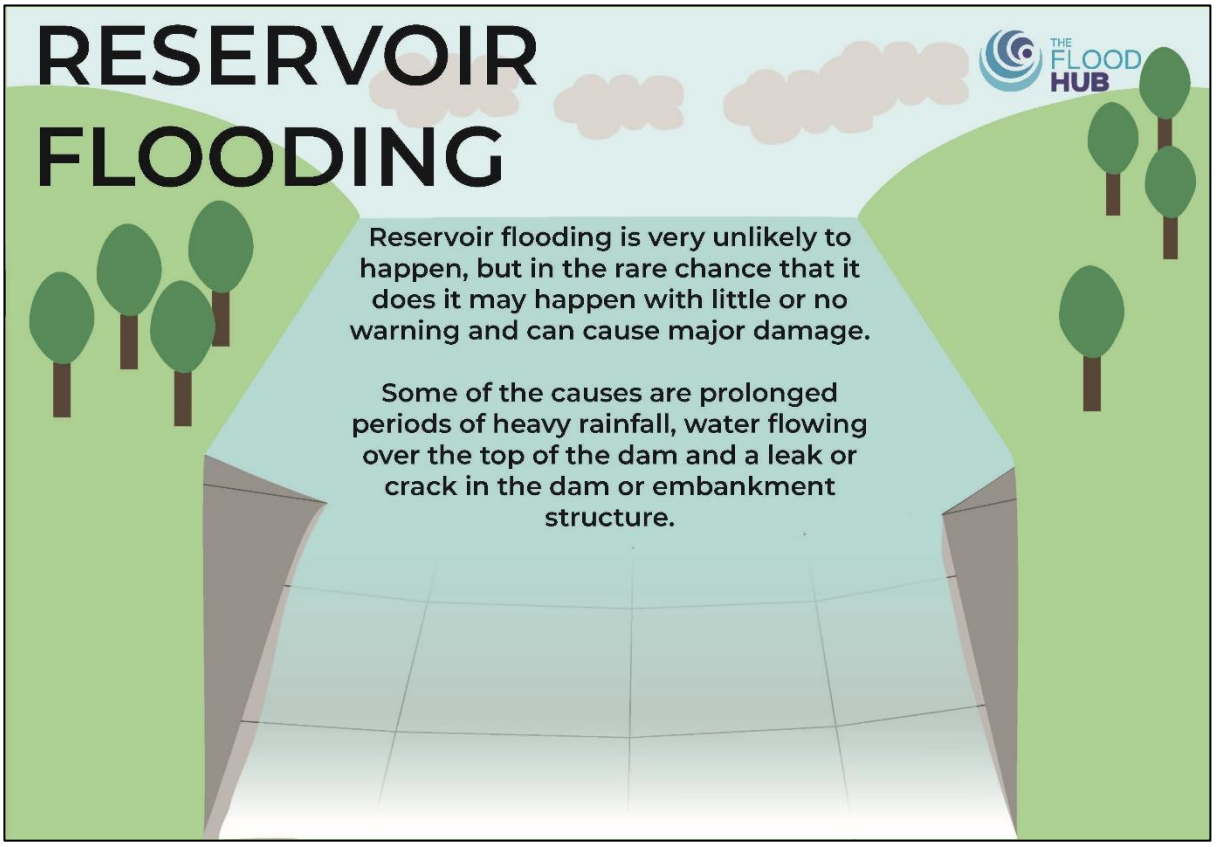

Figure 5.6 – Diagram of reservoir flooding from The Flood Hub

5.8.2 Assessment

Drawing 9. Risk of Flooding from Artificial Sources presents data showing the risk of flooding from reservoir failure on a 'wet day'. The coverage area shown indicates the potential area which could flood in the event that reservoirs were to "fail and release the water held on a 'wet day' when local rivers had

already overflowed their banks". The data from the EA is noted to "represent[s] a prediction of a credible worst case scenario, however it's unlikely that any actual flood would be this large. The data gives no indication of likelihood or probability of reservoir flooding."

It is recommended that this data be used in emergency planning, in addition to supporting the review of flooding from artificial sources in site-specific flood risk assessments.

Plan making should consider this source of flooding and evaluate the risk and likelihood from this source, although overall it is considered unlikely, it should be evaluated on a case-by-case basis.

5.8.3 Impacts of Climate Change

It is unknown what the exact impact climate change will have on artificial structures, such as reservoirs, in the future because of their complex nature and are likely to be varied. It is however, possible that fluctuations in volume and intensity of rainfall due to climate change may cause fluctuations in water levels with any impacts translated to increases in surface water with river and watercourse flows.

The safe management of these networks will continue to be a high priority in order to minimise the risk, with systems in place to manage the ever-increasing rainfall expected.

5.9 Residual Flood Risk

Flood defences are present along a significant amount of the rivers within the SDD, particularly where rivers flow through or in close proximity of urban areas. ***Drawing 5. Risk of Flooding from Rivers*** shows where flood defences are located across the SDD. These flood defences help to offer some protection for the SDD from fluvial sources, but residual flood risk remains. Residual flood risk can occur due to overtopping/ beach/ failure of flood defences, which could be the result of many factors for instance storm conditions, poor maintenance or vandalism.

Most Main River sections are defended although a large section of the River Trent through the centre of the SDD is not known to have formal flood defences in place. Land around this area is predominantly agricultural landscape.

Proposed developments within Flood Zone 2 or greater should include an assessment of residual risk within their site-specific FRA. Although the probability of residual flood risk is small the potential damage to infrastructure and potential risk to life is significant. ***Chapter 6*** of this Level 1 SFRA contains further information on development requirements.

To prepare for potential fluvial flooding the EA manages a Flood Warning Service which issues Flood Warnings and Alerts to specific areas when flooding is possible. ***Figure 5.7*** shows the different types of flood alerts and warnings that can be issued from this service. This allows the EA, residents and businesses to prepare for potential flooding and try to mitigate against any potential impacts from fluvial flooding. ***Drawing 13. EA Flood Warning & Alert Areas*** shows these areas visually for the study area.

Figure 5.7 – EA Flood Warning and Alerts, with advice from DEFRA Blog, 2020

5.10 Historic Flooding

In their role as the LLFA, DCC has duties to record and investigate flood incidents relating to local sources of flooding, namely flooding from surface water, groundwater and Ordinary Watercourses. Three historic flood maps have been produced as part of this Level 1 SFRA:

- ***Drawing 10. EA - Historic Flooding***
- ***Drawing 11. LLFA - Historic Flooding***
- ***Drawing 12. STW - Historic Flooding***

Each map shows flood incidents records or extents from different RMAs concerning different types of flooding. The EA flood records show extents of historic fluvial flooding; the LLFA flood records show properties that have internally flooded; and the STW flood records show the number of instances of sewer flooding per postcode. A summary of the LLFA and STW historic flood data is shown in ***Tables 5.4*** and ***5.5*** as follows.

Table 5.4 – No. of internally flooded properties per flood event from LLFA flood records

Flood Event	No. Internally Flood Properties
November 2019 (Storm Bernardo)	13
February 2020 (Storm Dennis)	357
October 2023 (Storm Babet)	39

*Table 5.5 – No. sewer flooding incidents per postcode from STW flood records**

Postcode	No. sewer flooding incidents
DE73	198
DE65	71
DE11	70
DE72	41
DE12	21
DE15	8
DE63	1
DE60	1

** Based on Information Exported from Severn Trent Water Hydraulic Sewer Flooding Risk Register on 11-Nov-24. Data includes flooding from both foul water sewers, surface water sewers and combined sewers.*

If there are any queries regarding the records, applicants are advised to contact DCC as the LLFA. For further FRA guidance, see ***Chapter 6***.

5.11 Flood Zones 3a and 3b

The entirety of Flood Zone 3 includes both Flood Zone 3a and Flood Zone 3b (also known as the functional flood plain). Some LPAs have chosen to include surface water when defining their boundary for Flood Zone 3b however at this time this Level 1 SFRA does not include surface water within its Flood Zone extents. Further information on Flood Zone 3b (fluvial), Flood Zone 3a (fluvial) is detailed below. ***Drawing 6. Flood Zones 3a and 3b*** displays the extents of Flood Zone 3a and Flood Zone 3b within the SDD.

5.11.1 Flood Zone 3b / Functional Floodplain

Table 1 of the Flood Risk and Coastal Change PPG defines the functional floodplain as "*land having a 3.3% or greater annual probability of flooding*" or *"land that is designed to flood"*. The PPG states that the extent of the functional floodplain, also known as Flood Zone 3b, should be defined by LPAs within their SFRAs. This allows for local circumstances to be considered and must be agreed between the EA and the LLFA. This Level 1 SFRA defines Flood Zone 3b (functional floodplain) as the following:

"*Land within EA modelled fluvial flood risk extents predicted for up to and including 1 in 30 year return period events, allowing for the impact of flood defences. It also includes land featured as part of the EA's Flood Storage Areas dataset*."

The Flood Zone 3b (functional floodplain) definition is adopted to ensure that future development is steered away from the most 'at risk' flooding extents from fluvial sources. The Flood Zone 3b definition within this SFRA does not include surface water flood risk.

5.11.2 Flood Zone 3a

Table 1 of the Flood Risk and Coastal Change PPG defines Flood Zone 3a as "Land having a 1% (1 in 100) or greater annual probability of river flooding; or Land having a 0.5% (1 in 200) or greater annual probability of sea".

In accordance with the PPG, this Level 1 SFRA defines Flood Zone 3a (fluvial) as the following:

"Land within EA modelled fluvial flood risk extents predicted for up to and including 1 in 100 year return period events."

At this time, it is not known if future updates to the EA's Flood Map for Planning will appreciate these extents separately. For plan making, refence should be made to these data sets to help steer development sequentially away from zones 3b and 3a, to lower risk areas where possible.

5.11.3 Permitted Development Rights

For development associated and dependent on permitted development rights, the approach is consistent with existing statutory requirements and means that there is no change to the permitted development rights and policy requirements listed within the Town and Country Planning (General Permitted Development) (England) Order 2015 (as amended) as these only relate to the EA's Flood Zones 1, 2 and 3. For this reason, site-specific FRAs are still required for developments requiring prior approval (in relation to change of use permitted development rights) if located within EA Flood Zones 2

or 3. The definition of Flood Zones 3a and 3b within this SFRA cannot amend the General Permitted Development policies.

As noted, future changes to the EA's Flood Map for Planning may appreciate the flood zone 3a and 3b extents separately, thereby being applicable to the permitted development policies.

6. Flood Risk Assessment Guidance

6.1 Overview

Planning applicants need to consider flood risk when preparing proposals for their development. To do this, applicants should supply a site-specific FRA and/or drainage strategy for the proposed development. It should be demonstrated how each type of flood risk identified to affect the scheme will be mitigated throughout the lifetime of the development, and that the proposals will not be at risk of flooding or increase flood risk anywhere else. It is permitted for a proportionate approach to be taken when undertaking a site-specific FRA which should be in line with the scale, nature and location of development in addition to the level of flood risk. Developments must also comply with NPPF policies and in particular with SDDC Draft Local Plan policy S1: Sustainable Growth Strategy and policy SD2: Flood Risk.

As most forms of development constitute an increase in the impermeable catchment, applicants must show how they will safely manage surface water runoff from the site. This will usually be through the use of Sustainable Drainage Systems (SuDS). The drainage destination hierarchy must be followed which prioritises measures that manage runoff as close to source as possible, as explained within the PPG: Flood Risk and Coastal Change and shown in ***Figure 6.1***. The application of SuDS should include focus towards the four pillars: amenity, biodiversity, water quality and water quantity, and should be proposed where possible.

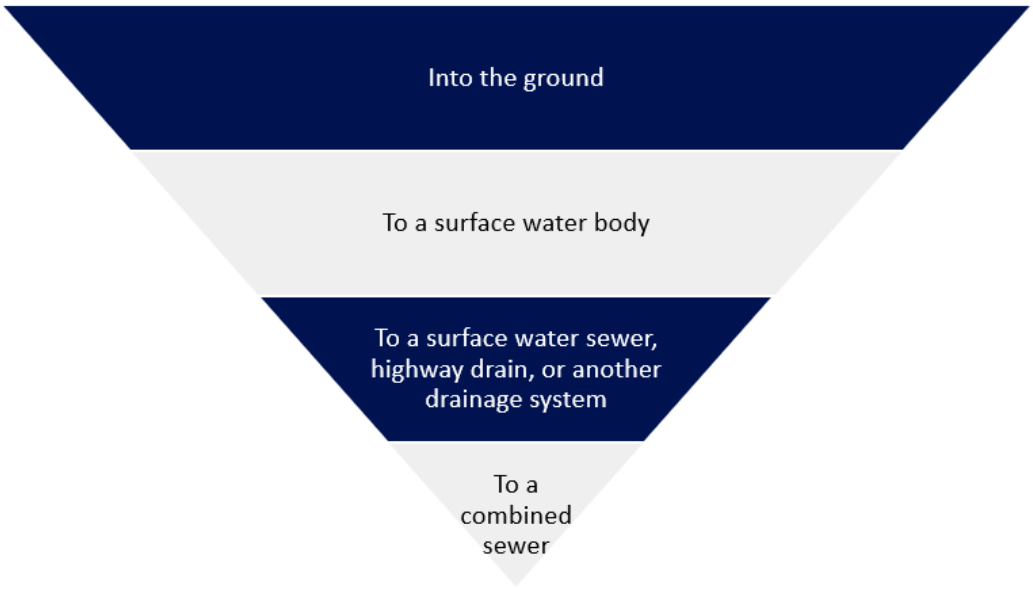

Figure 6.1 – Diagram of drainage hierarchy from PPG: Flood Risk and Coastal Change

Plan makers and developers should use the opportunity of new development to apply the four pillars appropriately, with the overall outcome of creating safe and sustainable places for people to live and work. Development plans should use a holistic approach in combing all policy requirements and guidance in creating quality places that are aesthetically pleasing and functional, with minimal flood risk.

6.2 Sequential and Exception Tests

6.2.1 What is the Sequential Test

A sequential, risk-based approach should be followed to steer new development into areas with the lowest risk of flooding. This is achieved by reviewing reasonably available sites, to confirm there are no other potential locations for the proposed development which are at a lower risk of flooding. Development should not be allocated or permitted if there are reasonably available sites appropriate for the proposed development in areas with a lower risk of flooding. The sequential approach should be used in areas known to be at risk now or in the future from any form of flooding.

6.2.2 When is the Sequential Test required

In England, flood risk is broadly classified into three Flood Zones. Flood Zone 1 (lowest risk), Flood Zone 2 (medium risk) and Flood Zone 3 (highest risk). If a proposed development is located within Flood Zone 2 or Flood Zone 3 and at risk of flooding, then as part of the planning application the applicant is required to apply the 'Sequential Test'.

A Sequential Test is not needed where:

- The site has prior allocation for development and was subjected to the test at the plan making stage (provided that there is no change to the proposed use and no significant changes to known flood risk at the site, now or in the future which would have affect the outcome of the test).
- The proposed development is located within Flood Zone 1. Unless there are flooding issues within the area of the proposed development, such as from surface water. This can be identified by using the data within ***Chapter 5*** of this SFRA or by contacting the LPA/ LLFA for further advice.
- The application is for a development type that is exempt from the test, as specified in footnote 62 of the NPPF i.e. householder development, small non-residential extensions (with a footprint of less than 250m^2) and changes of use; except for changes of use to a caravan, camping or chalet site, or to a mobile home or park home site.

6.2.3 How is the Sequential Test conducted

There are 3 steps in the process which should be followed as detailed in ***Table 6.1***.

Table 6.1 – Summary of the Sequential Test process

Step 1: Identify the Area
Firstly, the scale of the area to search for land needs to be determined and agreed with the LPA. This needs to be proportionate to the scale of the proposed development.
Step 2: Identify Potential Site Locations
Secondly, a list should be compiled of all suitable and available site locations within the study area. The list should include sites with planning permission in place for similar developments, allocations in the Local Plan as well as any 'windfall' sites, such as sites on the brownfield land register.
Step 3. Suitability of Identified Sites
Thirdly, once the potential site locations have been identified, each site will need to be assessed for: • Any potential constraints (e.g. heritage or ecology) • Capacity, estimated using local density policies • The flood risk of the site

The risk of flooding to the site will need to be compared against the other alternative site options identified using the above steps. Online resources to compare flood risk include:

- The EA Flood Map for Planning
- The EA's Long Term Flood Risk Information

Following the review, if no other suitable alternative sites are identified, then the Sequential Test is considered to be passed. All the information findings should then be submitted to the LPA with the planning application.

6.2.4 What if the Sequential Test fails

If it is not possible for the proposed development to be located in areas with a lower risk of flooding (taking into account wider sustainable development objectives), an Exception Test may have to be applied. The need for the Exception Test will depend on the potential vulnerability of the site and the nature of the proposed development.

The NPPF requires that, if following the application of the Sequential Test, it is not possible for development to be located in lower risk zones, the Exception Test must be applied where the proposed development is more vulnerable to flooding, in line with the Flood Risk Vulnerability Classification set out in Annex 3.

Paragraph 178 of the NPPF states *"the application of the exception test should be informed by a strategic or site-specific flood risk assessment, depending on whether it is being applied during plan production or at the application stage"*.

6.2.5 What is the Exception Test

The Exception Test provides a method of how the planning applicant will manage the flood risk at the proposed development. The Exception Test is required when vulnerable development or infrastructure is proposed in areas of medium and high flood risk (Flood Zones 2 and 3), and where the Sequential Test alone is not sufficient.

However, before an Exception Test is required, a Sequential Test must initially be conducted.

A successful Exception Test must demonstrate that the sustainability benefits of the development to the community outweigh the flood risk.

It must also be demonstrated that the development will be safe for its lifetime in the context of flood risk, taking into account the vulnerability of its users and that the development will not increase flood risk elsewhere.

How to demonstrate the development will be safe for its lifetime?

As part of the exception test, it must be demonstrated how the proposals will ensure the development itself can safely mitigate against flooding and ensure it will not increase the flood risk of others offsite. This can be done by the following:

- Assess and identify the characteristics of a possible flood event scenarios e.g. the source of flooding, potential depths, velocity of flowing water. (To assess these characteristics, a FRA is usually required).

- Review the structural stability/safety of the proposed development. (This is usually confirmed with an Architect with additional PFR measures installed/suggested around the development).

- Evaluate the safety of people within and adjacent to the building. (Are residents capable of deploying PFR measures such as flood barriers? Are they able to Evacuate? Are sleeping areas raised or located on ground level?) These are all considerations which can affect the design proposals.

- Measure the impact of the development on neighbouring properties. If there is a chance that the flood risk may be increased elsewhere due to a development, mitigation measures will need to be implemented to reduce this risk, such as Compensatory Storage or a surface water management strategy.

6.3 Planning Application and Development Requirements

Planning permission is required if the proposals meet the Section 55 of the Town and Country Planning Act (1990) (TCPA) definition of a 'development'. Under Section 57 of the TCPA all work contained under this statutory definition of 'development' is required to gain planning approval unless it meets permitted development criteria. The following are planning application definitions for development types:

- **Major Developments:** For residential developments, 10+ dwellings or site area over 0.5 hectares. For non-residential developments, total building floorspace exceeds 1,000m^2 or site area over 1 hectare.

- **Minor Developments:** For residential developments, 1-9 dwellings, site area under 0.5 hectares. For non-residential developments, total building floorspace is less than 1,000m^2, site area under 1 hectare.

- **Change of Use:** Developments classified as a 'Change of use' if - (i) the application does not concern a major development; and (ii(a)) no building or engineering work is involved; or (ii(b)) the building or engineering work would be permitted development were it not for the fact that the development involved a change of use (such as the removal of internal dividing walls in a dwelling house to provide more spacious accommodation for office use).

General planning application guidance is available via the PPG Site-specific FRA Checklist and the EA's Standing Advice. ***Table 6-2*** explains the requirements that must be addressed as part of development applications regarding flood risk and drainage strategy submission documents. The guidance is applicable for Major, Minor, Change of Use, and Changes Under Prior Approval Notifications developments. Development type-specific guidance has been included where applicable. The information presented in ***Table 6-2*** includes both legislative and best-practice requirements from

various sources. In some instances, the SFRA guidance and recommendations go beyond existing adopted policies at the time of writing (February 2025). This includes policy guidance on where Drainage Strategies are required, where specific information is needed to address a flood emergency, finished floor level requirements and flood plain compensation.

Table 6.2 – Planning requirements

Requirement Area	Flood Zone 3b	Flood Zone 3a	Flood Zone 2	Flood Zone 1
Land Uses and Development Restrictions (Information is from Flood Risk and Coastal Change PPG)	Table 2: Flood risk vulnerability and flood zone 'incompatibility' from the PPG shows that only 'Essential Infrastructure' and 'Water Compatible' developments may be granted planning permission for Flood Zone 3b (functional floodplain). As the functional floodplain, land in Flood Zone 3b will be protected by not permitting any form of development on other classifications of undeveloped sites, these can be determined using Annex 3 of the NPPF. Redevelopment of existing developed sites will only be supported if a net flood risk reduction is proposed and there is no intensification of the land use. Intensification of land use would include an increase in built footprint or an increase in the vulnerability classification of the development. Any restoration of the functional floodplain will be supported (see 'Flood Compensation Storage' section of this table). Proposals for the change of use or conversion should be in accordance with Table 2 from the PPG. If a proposed development is incompatible with the flood zone in which it is proposed, the Sequential and subsequent Exception Tests will not be considered.	Table 2: Flood risk vulnerability and flood zone 'incompatibility' from the PPG highlights that land use in Flood Zone 3a permits 'Essential Infrastructure', 'Water Compatible', 'Less Vulnerable' and 'More Vulnerable' land uses. 'Highly Vulnerable' developments will not be permitted as it is not a permitted development type in Flood Zone 3a. Self-contained residential basements and bedrooms at basement level will not be permitted without suitable mitigation measures and evidence by the applicant demonstrating the development will remain safe throughout its design life (see 'Basements' section of this table).	No land use restrictions. Self-contained residential basements and bedrooms at basement level will not be permitted without suitable mitigation measures and evidence by the applicant demonstrating the development will remain safe throughout its design life (see 'Basements' section of this table).	No land use restrictions.
Sequential and Exception Tests (Information is from the NPPF)	Criteria for when the Sequential and Exception Tests do not need to be applied to a site are detailed in ***Chapter 6.2.2*** of this SFRA. Where the Sequential and Exception Tests do need to be applied, they should be applied for all major developments and minor developments as below. For specific guidance on the application of these at the site-specific scale refer to ***Chapter 6.2*** of this SFRA.			
	Developments categorised as 'Essential Infrastructure' can only be considered following applications of the Sequential and Exception Tests.	The Sequential Test is required for all developments except for those categorised as 'Highly Vulnerable. This use is not permitted (see 'Land Uses and Development Restrictions' section of this table). Developments categorised as 'Essential Infrastructure' and 'More Vulnerable' can only be considered following application of the Exception Test.	The Sequential Test is required for all development types. Developments categorised as 'Highly Vulnerable' can only be considered following application of the Exception Test.	The Sequential Test only needs to be applied for development proposals in Flood Zone 1 if the information and mapping accompanying this SFRA indicates there may be existing flood issues from other sources or flood issues in the future, refer to ***Chapter 5***.
Site-specific FRA (Information is from the NPPF)	A site-specific FRA is required for all development proposals. Sites in Flood Zone 3b must also demonstrate that: • Infrastructure will remain safe and operational for users during flood periods. • That the development will not impede the flow of water. • There will be no net loss of floodplain storage (see the 'Flood Compensation Storage' section of this table). • Flood mitigation measures will be applied to reduce the overall flood risk of the site.	A site-specific FRA is required for all development proposals. It must be demonstrated that there will be no net loss of floodplain storage (see the 'Flood Compensation Storage' section of this table).	A site-specific FRA is required for all development proposals. It needs to demonstrate the reduction of flood risk at the site through the application of various mitigation techniques.	A site-specific FRA should accompany all proposals involving: • Sites of 1 hectare or more • Land which has been identified by the EA as having critical drainage problems. • Land which has been identified in this SFRA as being at increased flood risk in the future. • Land that may be subject to other sources of flooding, where its development would introduce a more vulnerable use. As taken from Footnote 63 of the NPPF.
	A site-specific FRA is required for all developments within the Swadlincote Town Centre area (see ***Chapter 6.5*** of this SFRA for further information).			

	A site-specific FRA should assess flood risk from all sources, including the potential impacts of climate change over the development's lifetime. The EA's most recent climate change allowances must be applied when assessing peak river flows and peak rainfall intensities.			
	Where a site-specific FRA is required, predicted flood depths should be analysed and appropriately mitigated. Mitigation may include (but not be limited to) flood resistance measures (where predicted flood depths are less than 0.3m) or flood resilience measures (where predicted flood depths are greater than 0.6m). Predicted flood depths between 0.3m and 0.6m should be analysed on a case-by-case basis to determine if resistance measures are sufficient. Design plans should show floor levels (relative to Ordnance Datum) and predicted flood depths.			
Drainage Strategy	A Drainage Strategy is required for all major developments. Minor developments and change of use applications that have a bearing on a site's existing drainage regime also need to provide a Drainage Strategy as part of the proposal. Further guidance on Drainage Strategies is provide in ***Chapter 6.3.2*** of this SFRA.			
	The Drainage Strategy requires information on the proposed SuDS and surface water runoff discharge destination. Each stage of the drainage hierarchy, shown in ***Figure 6.1*** of this SFRA, should be appropriately assessed with supporting information to demonstrate if measures could be implemented as high up the hierarchy as possible. The Drainage Strategy also requires supporting calculations on the greenfield and proposed development's peak discharge rates, and water storage volumes for different rainfall events with climate change allowances. These calculations need to ensure that proposed developments are designed to the Non-Statutory Technical Standards for Sustainable Drainage Systems. Maintenance and operation requirements must be designed into the proposals to ensure lifetime management of the SuDS features, in accordance with Written Ministerial Statement HCWS161. Permission to connect to the local sewer network and pipes, including written confirmation that capacity exists in the network, should be sought from STW. Evidence demonstrating that an agreement in principle for any proposed new sewer connections has been reached must be provided as part of the Drainage Strategy. Failure to do so could impact the detailed design and overall Drainage Strategy for the site. The requirement to confirm local sewer network connections is for major developments only.			
Basements (National Flood Risk Policy Requirement)	Basements should not be permitted in Flood Zone 3b.	Basement dwellings are categorised as 'Highly vulnerable' infrastructure by Annex 3 of the NPPF and should not be permitted in Flood Zone 3a under Table 2 of the PPG. Other new basement developments are restricted to 'Less Vulnerable' / 'Water Compatible' uses only. All basement rooms must have internal access and egress to a higher floor above the design flood level (1 in 100 year plus an appropriate allowance for climate change) which can be utilised as part of emergency evacuation procedures. All basements, including lightwells and vents that could allow water inundation, must have access thresholds raised 300mm above the 1 in 100 year plus an appropriate climate change allowance flood level. As part of any assessment, evidence needs to be submitted to confirm the local water table level.	Self-contained basement dwellings and bedrooms are not permitted in Flood Zone 2. The same rule applies to basement dwelling redevelopment works such as extensions and conversions. All basement rooms must have internal access and egress to a higher floor above the design flood level (1 in 100 year plus an appropriate allowance for climate change) which can be utilised as part of emergency evacuation procedures. All basements, including lightwells and vents that could allow water inundation, must have access thresholds raised 300mm above the 1 in 100 year plus an appropriate climate change allowance flood level. As part of any assessment, evidence needs to be submitted to confirm the local water table level	Where there is evidence of flood risk from surface water, groundwater and / or sewer flooding in the area, a site-specific FRA is required for new and existing basement dwelling proposals. Flood mitigation measures for these sites are required to demonstrate that the development will not be impacted by flooding or have any adverse impacts on flooding locally during a 1 in 100 year event. As part of any assessment, evidence needs to be submitted to confirm the local water table level.
Finished Floor Level (National Flood Risk Policy Requirement)	Finished floor levels required for developments are based upon their Vulnerability Classifications: • For 'More Vulnerable' and 'Highly Vulnerable' developments, or elements of a scheme with those classifications, on greenfield or brownfield sites and on 'Less Vulnerable' developments on greenfield sites, finished floor levels below the 1 in 100 year event with an allowance for climate change and 300mm freeboard level are not permitted. • For 'Less Vulnerable' brownfield sites, finished floor levels must follow a step-approach. Step 1 (below) must be followed unless sufficient evidence and justification is provided within an FRA that this is not reasonably practical. If Step 1 is proven to not be reasonably practical at that site, then Step 2 must be followed. This process repeats until Step 3, which is the bare minimum requirement (and only appropriate if sufficient evidence has been provided). The following steps are: 1. Ground floor finished floor levels must be above the 1 in 100 year with an allowance for climate change and 300mm freeboard level. 2. If Step 1 cannot be achieved, finished floor levels must be raised as high as possible. Passive resistance and resilience measures must be included up to the 1 in 100 year event with an allowance for climate change and 300mm freeboard level. 3. If Steps 1 and 2 cannot be achieved, finished floor levels must be raised as high as possible. Passive resistance measures must be included as high as possible. Resilience measures up to and including the 1 in 100 year event with an allowance for climate change and 300mm freeboard must be included. • For change of use developments that increase the vulnerability classification, ground floor finished floor levels must be above the 1 in 100 year event with an allowance for climate change and 300mm freeboard level. The EA's 2016 climate change allowances (including subsequent updates) must be used to incorporate the appropriate climate change allowances.			
Flood Compensation Storage (National Flood Risk Policy Requirement)	If permissible development decreases the volume of a fluvial or surface water floodplain, flood storage compensation should be addressed though the following step-approach. This is a requirement within Flood Zone 3b, Flood Zone 3a and the fluvial flood risk extent for the 1 in 100 year plus a suitable climate change allowance (which may cover some parts of Flood Zone 2). Step 1 (below) must be followed unless sufficient evidence is provided that this is not reasonably practical. If Step 1 is proven to not be reasonably practical at that site, then Step 2 must be followed. This process repeats until Step 4, which is the bare minimum requirement (and only appropriate if sufficient evidence has been provided). 1. The development must be located in areas of lowest risk on the site, mitigating the need for flood storage compensation.			N/A

	2. A sequential approach should be applied to the site, with as much of the development as possible located in the areas of lowest risk. Supplementary direct level-for-level and volume-for-volume flood storage compensation must be provided for parts of the development that are not in an area of low risk. 3. The development must provide direct level-for-level and volume-for-volume flood storage compensation for the entire proposed development. 4. As much as possible of the development must provide direct level-for-level and volume-for-volume flood storage compensation. The development can supplement floodplain compensation with voids (refer next row). The EA's most recent climate change allowances must also be incorporated to assess and calculate floodplain storage compensation. For further information on flood storage compensation, see ***Chapter 6.3.4***.		
Voids (National Flood Risk Policy Requirement)	As identified within the PPG, such techniques should not normally be relied upon for compensating for any loss of floodplain storage. However, the use of voids as a last resort method of compensation should be considered on a case-by-case basis. The loss of floodplain storage is less likely to be a concern in areas benefitting from appropriate flood risk management infrastructure or where the source of flood risk is solely tidal. Voids will only be considered if an applicant has followed the flood storage compensation stepped approach and provided sufficient justification within an FRA. If permissible development decreases the volume of a fluvial floodplain and flood compensation storage cannot be provided, introducing voids may be a suitable alternative. Voids are not considered floodplain compensation but flood mitigation and are to be used as a last resort for flood storage mitigation. Voids may be suitable where it is not possible to achieve all the direct compensation required or for small scale development where it can be difficult to achieve full compensation. Ideally, void openings should be a minimum of 1m long and open from existing ground levels to at least the 1 in 100 year fluvial event, plus climate change flood level. By setting finished floor levels at 300mm above the design flood level (1 in 100 year plus an allowance for climate change), there is usually enough space for the provision of voids below. The following voids mitigation specification must be adhered to if considering voids: 1. The openings to the void should extend from the existing ground level and the underside of the proposed void should be set to a minimum of the 1 in 100 year event with an appropriate allowance for climate change flood level. 2. There should be a minimum of 1m of open void length per 5m length of wall. Void openings should be provided along all external walls. 3. If security is an issue, 10mm diameter vertical bars set at 100mm centres can be incorporated into the void openings. The use of under-floor voids will typically require a legal agreement or planning condition and maintenance plan to ensure they remain open for the lifetime of the development. For small scale development different design criteria may be acceptable. Sole reliance on the use of under-floor voids to address the loss of floodplain storage capacity is not acceptable on undeveloped sites.	N/A	N/A
Impedance of Flood Flows (National Flood Risk Policy Requirement)	Any feature that may obstruct flood flows or surface water overland flow routes (e.g. embankments, walls, fencing, walls, raised land etc.) should minimise or remove the obstruction to ensure flood risk is not increased on or off site. This could be achieved by relocating these obstructions or providing openings to allow water to flow through structures (e.g. permeable fencing).		
Emergency Planning (Information is from the NPPFhttps://www.gov.uk/guidance/flood-risk-and-coastal-change)	All major developments will be expected to incorporate measures that effectively manage actual and residual flood risk.		
	As defined by Annex 3 of the NPPF defined 'Essential Infrastructure' and 'Water Compatible' use development needs to remain operational and safe in times of flood. Emergency Plans need to reflect this as these structures may assist in flooding evacuations.	As defined by Annex 3 of the NPPF defined 'Essential Infrastructure' use development needs to remain operational and safe in times of flood. Emergency Plans need to reflect this as these structures may assist in flooding evacuations.	No additional requirements to the above.	No additional requirements to the above.
Residual Risk (Information is from the Flood Risk and Coastal Change PPG)	As part of the second criteria of the Exception Test, there is a requirement to show that proposed developments are safe and that any residual risks can be reasonably overcome. Residual risk should be mitigated through flood resilient / resistant designs and emergency planning to make sure suitable measures are in place to offer protection. Further information about residual risk in the SDD is included in ***Chapter 5.9***, and further information on Property Level Resilience is included in ***Chapter 7.3***.		
Main River Buffer Zone (National Flood Risk Policy Requirement)	Developments should be set back from main rivers including culverts and existing flood defence infrastructure (8m for main rivers). Developments sites within specified distances of main rivers may require a flood risk activity permit in addition to planning permissions. For non-tidal main rivers, flood risk activity permits may be required if development sites are within 8m of a river, flood defence structure or culvert.		
Ordinary Watercourse (Information from DCC LLFA)	Development sites within 5m of ordinary watercourses require an approved ordinary watercourse consent in addition to planning permissions. Further information on ordinary watercourses land drainage consent is available from DCC's website.		
Groundwater Flooding	Groundwater flooding susceptibility should be determined by applicants for all major and minor development proposals. Where necessary, a screening study should either confirm that the potential impacts and level of risk posed by the proposed development is low (and therefore no further work is needed) or advises of the potential level of impact and the associated mitigation actions proposed.		

	The study and any other associated assessments should be prepared by a chartered professional or specialist. Examples of specialists that have the required skills and qualifications to carry out the assessment(s) that might be required include Geologist, Hydrogeologist or Geotechnical Specialist. Where the development includes a basement, the screening study must include the following as a minimum requirement: • Description of the proposed basement development. • Construction methods proposed. • Characteristics of the site, including geological information (bedrock, superficial deposits and aquifer confirmation) and topographical information. • Site borehole information with water levels. *If historical borehole data is used, the borehole location must be within 100m of the site and have been conducted within the last 20 years to best capture the current local conditions. However, singular borehole measurements may not provide information on what subterranean conditions might look like at a different time in the year. Groundwater flow and throughflow may be subjected to seasonal influences. Therefore, it will be necessary to monitor subterranean water levels over a period of time in areas that may be more susceptible to groundwater and throughflow.* • Characteristics of potential impacts (including the impact on soils, land use, water quality and hydrology with descriptions of the nature and scale of impacts, and the extent of the impacted area). • Details of mitigation measures (where appropriate).
Sewer Flooding	This is required for all major and minor development proposals. Where the development site intersects with an area defined as having one or more sewer flooding records, the applicant must consult with STW to confirm if the development site has historically flooded. Where historic flooding has occurred, the applicant must show how they will effectively manage this risk for the lifetime of the development. Where the site is not at risk, the applicant must demonstrate that STW has agreed in principle to any proposed new sewer connections. Sewer flooding records can be found in ***Drawing 12. STW – Historic Flooding***.
Artificial Sources Flooding – Reservoirs	This is required for all major and minor development proposals. Where the application site intersects an area defined to be at risk of flooding from reservoirs, the applicant must: • Identify which reservoirs are the sources of risk (available from the EA's Check Long Term Flood Risk). • Where the site is encircled by flood water, but not necessarily at risk itself, the implications of this must be addressed in the risk management measures proposed. • Propose appropriate and proportionate risk management measures. Reservoir flood extents can be found in ***Drawing 09. Risk of Flooding from Artificial Sources***.
Artificial Sources Flooding – Other	This is required for all major and minor development proposals. Other sources of artificial flood risk may include small lakes, ponds or canals. Where these exist within, or are immediately adjacent to, the development site, the applicant must identify them and propose risk management measures as appropriate.

6.3.1 Site-Specific Flood Risk Assessment (FRA)

Site-specific FRAs should be proportionate to the degree of flood risk, making the best use of available information. They should also be appropriate to the scale, nature and location of the development. For further information, see the 'Site-specific FRA' key requirement section in ***Table 6-2*** and the EA's guidance on FRAs for Planning Applications.

The site-specific FRA requires potential flood depths to be addressed as part of flood risk management and emergency planning measures where there is a probability of flooding from any flood risk source. Depending on the circumstances, certain mitigation measures will need to be employed to demonstrate that the potential impacts of flood depth will be adequately addressed. The most appropriate measure depends on a range of different factors including flood risk source, the potential impact of the flood risk, and the vulnerability classification of the development amongst others.

For further guidance on the preparation and development of a site-specific FRA, the PPG has a checklist to provide guidance through the process. Details on the requirements of emergency planning can be found in ***Table 6-2***.

6.3.2 Drainage Strategy

A Drainage Strategy can form part of a site-specific FRA or it can be its own entity. As FRAs are not required for all developments, producing a separate Drainage Strategy may be advisable. A Drainage Strategy can be in the form of a report and/or drawing that demonstrates how surface water could affect a site of interest and the surrounding areas post-development and should also provide information demonstrating how surface water runoff generated by the development site will be managed.

The Drainage Strategy should include the proposed SuDS features which are to be incorporated in the development (to improve the existing runoff conditions), along with details for their long-term management and maintenance. A Drainage Strategy is required for all major developments. This includes sites identified as being at risk of surface water flooding, and those that have a history of surface water flooding.

All minor developments and developments categorised as 'change of use' which modify existing surface water drainage will also require a Drainage Strategy. For example, if a minor development or development categorised as a 'change of use' proposes to amend the existing landscaping, a Drainage Strategy is required.

The Drainage Strategy should consider the appropriate climate change allowance, demonstrate how water is expected to act on a site, determine the site's infiltration potential, runoff rates, and flow

pathways, both before and after the proposed development is in place. Submitted information needs to also demonstrate that the proposed development will not increase flood risk to the surrounding sites. Safe conveyance of exceedance flows needs to be identified to ensure flood risk off-site is managed.

Further details on the SuDS requirements and SuDS implementation to address the impact of future growth are contained in ***Table 6-2*** and ***Chapter 6.3.3*** respectively.

6.3.3 Sustainable Drainage Systems

SuDS incorporate a range of measures and management techniques designed to manage surface water runoff. All new developments should incorporate SuDS in line with the Non-Statutory Technical Standards for Sustainable Drainage Systems. SuDS measures should aim to achieve greenfield runoff rates, providing management and attenuation features that ensure surface water runoff is managed as close to the source as possible.

- Greenfield runoff conditions must be achieved for any greenfield sites.
- Development on brownfield sites should aim to achieve greenfield runoff rates where practical.

Several policy and guidance documents provide information to assist with the implementation of SuDS, including CIRIA guidance documents the SuDS Manual and Guidance on the Construction of SuDS which all provide important information.

Applications need to outline the SuDS measures that the proposed development will include and demonstrate how they will connect with any piped drainage system, if infiltration is not possible. The submitted evidence needs to demonstrate that the drainage hierarchy (in line with Paragraph 56 of the PPG) has been followed. Surface water management features higher up the drainage hierarchy should preferably be incorporated:

1. rainwater use as a resource (e.g. rainwater harvesting, blue roofs for irrigation)
2. rainwater infiltration to ground at or close to source
3. rainwater attenuation in green infrastructure features for gradual release (e.g. green roofs, rain gardens)
4. rainwater discharge direct to a watercourse (unless not appropriate)
5. controlled rainwater discharge to a surface water sewer or drain
6. controlled rainwater discharge to a combined sewer

Where information is available, ***Drawing 08. Geological map*** may indicate where infiltration-based SuDS could potentially be suitable for use, where uncertainties exist and where they are unlikely to be suitable. Where infiltration SuDS are potentially suitable or uncertain, the applicant must provide site-specific infiltration testing or borehole data to justify use of non infiltration-based surface water management techniques within their Drainage Strategy. Early consultation with the LLFA is recommended to ascertain the site-specific testing requirements that will be required.

Not all developments that require a planning application have a bearing on a site's existing drainage regime or have the potential to impact flood risk locally. This may include certain minor developments that do not increase the built footprint of a site, do not introduce new building structures, and / or do not alter associated landscaping. However, this needs to be demonstrated by developments to demonstrate that the surface water discharge rate from the site is at the greenfield runoff rate. If this is not achievable, proposals need to demonstrate a betterment of the existing rate.

Some cases may not present an opportunity to improve on-site water management. However, efforts should be made to improve the site's drainage systems as the current regime may have wider flood risk implications for the area. For further information, contact the LLFA. Further details on SuDS are provided in ***Table 6-2***.

6.3.4 Flood Storage Compensation and Mitigation

Buildings and structures, or the raising of ground levels within the floodplain can reduce the ability to store floodwater in times of flood. This can result in an increase in the risk of flooding, as floodwater is forced elsewhere. Any part of the development that could result in the loss of floodplain storage (buildings, land raising etc.) should provide a direct replacement of volume. Compensatory volume must be provided at the same level as the lost storage for it to be 'level-for-level' and 'volume-for volume'. An equal volume of floodplain must be created to that taken up by the development. This equal volume must apply at all levels between the lowest point and the design flood level (1 in 100 year plus an allowance for climate change).

Level for level flood plain compensation is the preferred method of mitigation because voids, stilts or under croft parking tend to become blocked over time by debris or domestic effects leading to a gradual loss of the proposed mitigation. If it is not possible to provide level-for-level flood plain compensation, then other forms of mitigation may be considered if agreed with the LPA. An FRA must demonstrate that level-for-level compensation has been considered, explain why it was not possible to provide it and detail how any associated risks from the chosen form of mitigation can be minimised (See ***Table 6-2***).

If voids are proposed as an alternative form of mitigation these will need to be floodable, with the underside of the void above the 1 in 100 year (1% AEP) flood level with an appropriate allowance for climate change. The LPA must also be satisfied that they can enforce a condition to maintain the voids

as designed and that an adequate maintenance plan is in place to ensure the voids remain open for the lifetime of the development.

If the LPA are not satisfied that alternative mitigation measures are appropriate, then the applicant should revise their development proposals to ensure that there will be no increase in built footprint on this site.

6.4 Emergency Planning

Under the Civil Contingencies Act (2004) both the county and district / borough councils are designated as 'Category 1 Responders'. For the SDD this means that both DCC and SDDC are designated Category 1 Responders with duties to assess risks and respond in an emergency. Major flooding events is one of the emergencies considered and as such the responsibilities of SDDC are stated in the Civil Contingencies Act (2004) to be:

"*a) from time to time assess the risk of an emergency occurring;*

b) from time to time assess the risk of an emergency making it necessary or expedient for the person or body to perform any of his or its functions;

c) maintain plans for the purpose of ensuring, so far as is reasonably practicable, that if an emergency occurs the person or body is able to continue to perform his or its functions;

d) maintain plans for the purpose of ensuring that if an emergency occurs or is likely to occur the person or body is able to perform his or its functions so far as necessary or desirable for the purpose of:

i. preventing the emergency,

ii. reducing, controlling or mitigating its effects, or

iii. taking other action in connection with it"

DCC has two continency plans to help manage flood risk across Derbyshire, these include the Flood Contingency Plan, and the second type of plan relates to the potential for reservoir inundation. The Flood Contingency Plan relates to flooding from rivers and other watercourses (fluvial flooding), flash flooding associated with heavy rainfall, particularly in steep sided valley catchments, groundwater from elevated water tables and surface water (pluvial flooding). Flooding from reservoirs is considered as a low likelihood but the impacts could be very serious. Following advice from DEFRA, contingency plans are under preparation for some specific reservoirs in Derbyshire and a generic plan for all the others. Further information can be found on the Derbyshire Prepared website, which includes Derbyshire's Multi-Agency Flood Plan 2022 (MAFP).

Information found within ***Chapter 5*** of this Level 1 SFRA should be used by SDDC to help guide actions and inform response in an emergency to flooding.

6.5 Town Centres

Swadlincote is the only area in the SDD that is designated as a town centre. The Local Plan highlights the town centre as having high importance to the district as a large proportion of the district's growth will be located in Swadlincote. As a town centre, Swadlincote provides a range of higher order facilities and services that are largely accessible by public transport connections.

There is an Ordinary Watercourse located within Swadlincote and small associated area of land in the central west of the settlement designated as Flood Zone 3. The majority of Swadlincote is not indicated to be at risk from fluvial flooding. Throughout Swadlincote however, surface water flooding is indicated to be a hazard, particularly along main highstreets. This information can be found in ***Drawing 07. Risk of Flooding from Surface Water*** of this SFRA. Any development located within the Swadlincote town centre must provide an FRA based on the requirements set out in this SFRA.

7. Policy Recommendations

7.1 Overview

It is important to consider flood risk within local plan policy as it can be impacted by new or changes to developments and is also likely to have additional implications due to climate change. Many different factors are involved in terms of increasing flood risk for an area. Increased development typically leads to an increase in impermeable area and restricts the infiltration of rainfall creating increased surface water which may subsequently increase flood risk to properties.

There is great pressure on local authorities to meet housing targets, changes made to the NPPF in July 2024 mandate that under the new government method SDDC is required to build 606 new homes each year, an increase of 20% from the previous requirements. To meet this new target this may mean that a greater number of developments are proposed within areas that are at a greater risk of flooding and therefore future plan making needs to be well informed to fully understand the inherent flood risks. Three main factors: climate change, development targets, population growth are the main drivers which may increase the risk of flooding for an area. It is likely that this will impact all different types and combinations of flood risk. Good local policy must be in place to ensure that homes are protected for the future meeting mitigation requirements whilst also accommodating the need for new housing.

Both the NPPF and accompanying PPG support the sequential test whereby a risk-based approach to the location of development is applied. The purpose being to locate development away from areas which may be at risk of flooding presently or in the future due to climate change, towards areas of lower risk. Evidence presented in this SFRA reinforces the strategic and site-specific policy recommendations for the SDD. It is proposed that these policy recommendations are incorporated into SDDC's new Local Plan.

7.2 Impact of Future Growth on Flood Risk

The previous Local Plan (2016) sets out the housing targets needed for the SDD stating that "*South Derbyshire has the fastest growing population in Derbyshire and market needs suggest that around 12,618 additional homes are needed between 2011 and 2028".* Local Plan Policy S4: Housing Strategy sets out the provisions for how this target will be met as follows:

A. *"Part 1 – Strategic sites (greater than 99 dwellings) allocated to accommodate the majority of the housing target.*

B. *The Part 1 allocations are to be made according to the following strategy:*

   Urban Areas – Swadlincote, edge of Derby and the edge of Burton upon Trent

Key Service Villages – strategic sites in Aston on Trent, Etwall, Hatton, Hilton and Repton

C. *Local Plan Part 2 – 600 dwellings will be allocated across non-strategic sites (less than 100 dwellings).*

D. *The Council will maintain a five year rolling land supply of specific deliverable sites with additional buffers in accordance with the NPPF."*

SDD is part of the wider Derby Housing Market Area and the need for housing should be considered within this wider context. The City of Derby is noted within the previous Local Plan (2016) to be unable to accommodate its required additional dwellings within its boundary, therefore some housing provisions will need to be met in close proximity to Derby City with the SDD in order to meet this shortfall. At the time of writing (February 2025) SDDC are preparing an update to the Local Plan to refresh their vision for the areas future and provide guidance on development. The new Local Plan is being prepared with increased housing targets in mind.

The NPPF and PPG recognise the impact of increasing development on flood risk throughout the country with the overarching requirement that development needs to demonstrate that they will remain safe for their lifetime without increasing flood risk elsewhere.

With increasing development it is imperative that all new development can demonstrate that any increases in impermeable catchment will not increase flood risk elsewhere. The opportunity that large developments hold to help manage flood risk locally should not be underestimated and options should be considered to also reduce flood risk where possible and appropriate. Other local benefits should also be explored, with improvements for ecology, biodiversity and water quality through the implementation of appropriate SuDS features. To achieve these objectives, and those listed as part of the policies and guidance in ***Chapter 6.3.3***, it is vital to ensure that the impact of future growth on flood risk is mitigated as much as possible.

Funding should be used to take advantage of opportunities for the creation and advancement of strategic flood risk infrastructure plans that address the cumulative effect of future growth on flood risk. Planning responsibilities under Section 106 (S106) of the Town and Country Planning Act 1990 and the Community Infrastructure Levy (CIL) under Part 11 of the Planning Act 2008 are two examples of such funding contributions. Developers can enter into agreements with an LPA to make proposed development sites acceptable in terms of planning when they receive S106 funding. Similar to this, CIL funding agreements give LPAs the opportunity to contribute to the expenses of putting in place the infrastructure upgrades needed for the area's development.

7.3 Property Level Resilience Measures

Property flood resilience, defined in the PPG, combines flood resistance and flood recoverability measures to building design with the aim to reduce the damage caused by flooding and reduce the time it takes to recover from a flood. The CIRIA Property Flood Resilience Code of Practice covers the 6 stages of property flood resilience to provide advice at the planning, installation and post installation phase for all parties involved including residents, contractors and LPA's.

Ensuring the flood resilience of developments is a key part of the move towards effective planning for climate change, as required by the NPPF. This includes both new developments and the retrofitting of existing developments. Planning applications for developments require details of flood resilience strategies to be outlined within FRA's or Drainage Strategies.

Policy SD2 covering flood risk in the SDDC Local Plan states that "*Development in areas that are identified as being at risk of flooding will be expected to be resilient to flooding through design and layout"*.

Property flood resilience measures, particularly recoverability measures, are most efficiently installed in new developments or when a development is undergoing refurbishment as this causes the least disruption to a property. Flood recoverability measures range from waterproof flooring that can be mopped clean after a flood, to raising the height of electrical sockets and other assets in the property to minimise damage. Flood recoverability measures allow for flood water to enter the property as either a supporting measure to flood resistant options, or in the case that flood resistant options are unlikely suitable to prevent ingress of flood water into the property.

Property flood resistant measures focus on preventing flood water reaching internal areas of the property through a variety of strategies that can be passive or active measures to suit the preferences or requirements of the resident. Passive measures include flood doors, flood resistant airbricks, non-return valves on sewage and drainage assets and waterproofing to the property walls. Active measures, which require installation prior to a flood event, include flood barriers for apertures and gateways and toilet bungs or pan seals to prevent sewage surcharge from property toilets.

Flood resilience at a property level allows for the assessment of property construction and drainage, the identified risk of flooding to the individual development, and the requirements of the resident living there to be combined into a holistic approach to devising solutions that lower the impact of flooding and plan effectively for climate change.

7.4 Emergency Plans

Emergency plans are essential on a strategic and local scale in order to best prepare communities to manage flooding and the hazards involved which are only increasing with urban development and the

effects of climate change. The aim of emergency planning is to minimise to the greatest extent the potential impact flooding will have both during an event and after.

District wide emergency plans can set out a structure and responsibilities that can be followed in the event of an emergency by local authorities who coordinate the local resilience and emergency planning for their area. Development applications must demonstrate that emergency evacuation plans and procedures are in place in line with the wider strategic plan. Developments must also ensure that access for emergency services and response teams are not impeded in any way.

7.5 Managing Residual Risk

Residual risk consists of the remaining risks imposed on developments and communities once the results of mitigation, control and avoidance actions have been taken into account. It is important to identify residual risks and their potential magnitude to ensure the risks are being managed currently into the future. This is particularly key as the impacts of climate change could significantly alter residual risk compared to what is observed today meaning that ongoing monitoring, research and action is crucial to reducing these risks imposed on developments and communities.

Residual risk should be mitigated through emergency planning considerations of escape routes and safe access, alongside investigating if flood warnings would be adequate and reach the communities that could need it. Flood resilience measures should also be put in place with regards to mitigating against residual risk. All considerations should evolve as research progresses around climate change and its potential implications are understood, which will enable LLFA's to develop and progress the measures they implement to address residual risk.

7.6 Recommended Policies

A set of policy recommendations at both a strategic and site-specific level have been produced following the findings presented throughout this SFRA. These recommendations are intended for adoption as part of SDDC's Local Plan. The policies include recommendations to guide flood risk management for prospective development within the SDD. The policies aim to address the collective impacts of increased urbanisation on strategic flood risk management issues, whilst acknowledging climate change and the need for development to help SDDC achieve housing requirements.

7.6.1 Strategic Policies

1. SDDC should apply the sequential test to allocated sites within the SDD at an early stage in the Local Plan development process to help identify any lower flood risk areas that may be more suitable for development. This can be used to inform spatial planning and identify key growth

locations, increasing the possibility of facilitating development which is not exposed to flood risk whilst meeting development objectives.

2. SDDC should implement measures through their Local Plan to deal with the sequential test acceptability of windfall site development proposals at the strategic level (sites which become available for development unexpectedly). The measure could set out locations and quantities of windfall sites that would or would not be acceptable in sequential test terms (to provide input to the process defined in ***Chapter 6.2***). This would help create efficiencies.

3. SDDC should make space for water storage by identifying strategic locations that are required for current and future flood risk management. These identified areas of land should be safeguarded via Local Plans to facilitate links between flood risk management and other environmental priorities. SDDC should work with the LLFA and EA to identify such potential locations through flood alleviation schemes.

4. SDDC should consider implementation of additional surface water flood risk mitigation requirements for proposed developments where the development is located within the 1 in 30 year RoFSW mapped extents. These requirements could be similar to those adopted for Flood Zone 3b (Functional Floodplain) with modifications as follows:

    a. Development within the 1 in 30 year RoFSW mapped extent will be treated as if it were Flood Zone 3b (Functional Floodplain) as defined in PPG Table 1 (Paragraph 065).

    b. Development may be possible within the 1 in 30 year RoFSW mapped extents outside of existing infrastructure or solid building footprints.

    c. The development must not increase flood risk elsewhere and where possible reduce flood risk overall.

    d. Where beneficial to flood risk and/or other planning requirements, it may also be possible for development to occur within the functional floodplain through the relocation (but not increase of footprint size) of an existing building's footprint within a site.

5. SDDC should ensure that all permitted basement developments within an area of fluvial, surface water and groundwater flood risk should be fitted with resilience measures. This should be in line with the flood risk thresholds as detailed in ***Table 6.2***. Measures, for example, may include waterproofing of walls and floors.

6. SDDC should adopt a Catchment Based Approach to ensure recognition of catchment wide flood issues to justify the collection and use of S106 funding to investigate and develop flood alleviation schemes within the catchment the development falls within. The LLFA should

support in defining these areas for surface water flooding, and/or policy sub-areas defined by EA CFMP's (for fluvial / tidal flooding) should provide a technical basis for this approach.

7. SDDC should set up mechanisms to enable the use of CIL charges to be used for flood alleviation schemes across the borough to address the cumulative impact of development on flood risk.

8. SDDC should develop standing advice for the assessment of minor planning applications with surface water implications. This will aid the LPA in making informed and consistent decisions where the EA and / or LLFA has no statutory duty to provide comments as part of an application's consultation.

9. SDDC should adopt the policies within this SFRA into their Local Plan.

7.6.2 Site-Specific Policies

1. SDDC should ensure where possible that land within development sites are safeguarded for potential flood mitigation use through the active consideration of predicted flood mapping from all sources. This can be done as part of the planning process or as part of wider flood risk assessments such as a Level 2 SFRA.

2. SDDC should produce a clear drainage assessment form or proforma which should include a summary of all drainage and flood risk information required for submission of a development planning application. Developers should be required to submit this form with the accompanying FRA and Drainage Strategy where appropriate.

3. Development proposed in 'dry islands' (areas within Flood Zone 1 that are surrounded by areas at higher risk of flooding, i.e. areas falling within Flood Zone 2 and 3) should be designed for safe access and egress in a flood event. 'Dry islands' are considered as flood risk areas due to the potential loss of important local services during flood events and lack of safe access routes. They require safe access and egress routes to be developed for the lifetime of the property, factoring in the impacts of climate change.

4. SDDC should ensure that developments maximise the use of existing green and open spaces for water to flow during times of flood. This includes green spaces around main rivers and ordinary watercourses.

8. Review and Next Steps

8.1 Review and Updates

8.1.1 Technical Content

The SFRA's purpose is to assist various parties in taking account of flood risk to inform planning decisions regarding the location and design of a proposed development. The data and information applied within this level 1 SFRA is correct at the time of writing (February 2025) and it is the intention that the SFRA should be maintained to ensure that it provides an accurate representation of flood risk and policy requirements within the SDD using the best information to inform planning decisions moving forward. It is at SDDC's discretion of when interim updates are made to this Level 1 SFRA however there are some instances which may mandate a more thorough review and update of the report, as summarised below:

- Updates / revisions to the NPPF and Flood Risk and Coastal Change PPG.
- Significant amendments in any of the overarching legislation which may change the responsibilities of SDDC as the LPA or DCC as the LLFA.
- Significant updates to flood risk data used to prepare this Level 1 SFRA which may impact the outcome of the flood risk assessment.
- Following a major flooding event within the SDD.
- Following the outcome of any significant Section 19 Flood Investigations within the SDD conducted by DCC as the LLFA.
- When DCC as the LLFA determines there to be a significantly improved understanding of local flood risk knowledge.

Site-specific FRAs should be informed by the most up-to-date information. Developers should therefore consult other sources of information, such as those maintained by the EA, to ensure that their FRA contains the best available data beyond what has been provided within this Level 1 SFRA. Planners should also monitor changes in data and information to ensure that thorough checks are completed on planning applications to inform accurate planning decisions.

8.1.2 Mapping

This Level 1 SFRA has been prepared with PDF maps which can be downloaded and viewed by users of the SFRA.

Some of the data used within these maps is hosted and maintained by other stakeholders and RMAs so may be updated intermittently following the publication of this SFRA. ***Appendix A*** summarises all the data used within the maps for this SFRA, including data sources.

The layers used within this Level 1 SFRA are current at the time of writing (February 2025) and will require updating in the future.

It is recommended that SDDC should review options to include flood risk layers within its publicly available mapping system to provide a flexible platform ensuring the most up-to-date information is available.

8.2 Level 2 SFRA

A Level 2 SFRA is a more detailed analysis which illustrates the nature of the flood risks set out from the Level 1 SFRA. A Level 2 SFRA can cover the local authority area, several adjoining local authority areas, or focus on specific areas or sites where development is proposed. EA advice notes that should a Level 2 SFRA be undertaken it should be published online and include a different set of maps to the Level 1 SFRA, a supporting Level 2 SFRA report and a user guide.

The EA states that a Level 2 SFRA should:

- *"be detailed enough for you to identify which development allocation sites have the least risk of flooding*
- *contain the information needed to apply the exception test, if relevant*
- *enable you to decide if development can be made safe without increasing flood risk elsewhere."*

And that it should allow users to:

- *"apply the sequential test by identifying the severity and variation in risk within medium and high flood risk areas*
- *establish whether proposed allocations or windfall sites, on which your local plan will rely, are capable of being made safe throughout their lifetime without increasing flood risk elsewhere*
- *apply the exception test, where relevant."*

Prior to a Level 2 SFRA a Screening Assessment may be undertaken to explore the need and scope of a potential Level 2 SFRA. This assessment includes an analysis of proportion of the site within each of the defined Flood Zones, the potential impact of climate change, potential interactions with other sources

of flood risk, an initial appraisal on whether the Sequential Test and Exception Test are required, and a recommendation on if assessment through a Level 2 SFRA would be appropriate.

At the time of writing (February 2025) there are no plans by SDDC to undertake either a Level 2 SFRA Screening Assessment or a full Level 2 SFRA.

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Appendices

Appendix A – Data and Processing

Drawing ref.	Layers Displayed	Layer Processing	Layer Source	Accessed
01	SDDC Administrative Boundary	None *(This layer is displayed in all maps so therefore will not be repeated in this table)*	Provided by SDDC	Oct-24
	OS Basemap	None	OS VectorMap® District https://osdatahub.os.uk/downloads/open/VectorMapDistrict	28-Jan-25
02	10km SDDC Buffer	A buffer of 10km from the SDDC Administrative Boundary has been produced to create this layer. *(This layer is displayed in multiple maps so therefore will not be repeated in this table)*	New layer created for SFRA purposes	N/A
	Green Belt	Original data has been clipped to the 10km SDDC buffer.	Green belt https://www.planning.data.gov.uk/dataset/green-belt	04-Feb-25
	Urban Settlements		OS Open Built Up Areas https://osdatahub.os.uk/downloads/open/BuiltUpAreas	12-Feb-25
03	LiDAR (Meters Above Ordnance Datum)	Symbology has been set to show topographical data between levels of 10-190m AOD.	LIDAR Composite Digital Terrain Model (DTM) - 1m https://www.data.gov.uk/dataset/01b3ee39-da3f-47b6-83da-dc98e73a461f/lidar-composite-digital-terrain-model-dtm-1m	05-Feb-25
	Urban Settlements	*This layer is not visible, but place names have been shown as information. No processing has taken place.*	*OS Open Built Up Areas* https://osdatahub.os.uk/downloads/open/BuiltUpAreas	*12-Feb-25*
04	Tiles A-P	A 16 square grid has been created covering the SDDC Administrative Boundary area to enable	New layer created for SFRA purposes	N/A

Drawing ref.	Layers Displayed	Layer Processing	Layer Source	Accessed
		smaller tiled maps to be produced for Drawings 05, 06, 07,08, 09, 10, and 13.		
05	Main Rivers	Original data has been clipped to the 10km SDDC buffer.	Statutory Main River Map https://www.data.gov.uk/dataset/4ae8ba46-f9a4-47d0-8d93-0f93eb494540/statutory-main-river-map	16-Aug-24
	Ordinary Watercourses		OS Open Rivers https://osdatahub.os.uk/downloads/open/OpenRivers	28-Jan-25
	Spatial Flood Defences		AIMS Spatial Flood Defences (inc. standardised attributes) https://www.data.gov.uk/dataset/cc76738e-fc17-49f9-a216-977c61858dda/aims-spatial-flood-defences-inc-standardised-attributes	04-Feb-25
	Reduction in Risk of Flooding from Rivers & Sea		Reduction in Risk of Flooding from Rivers and Sea due to Defences https://www.data.gov.uk/dataset/dcdcf96b-3293-4987-8ca8-9b8827f5ccf8/reduction-in-risk-of-flooding-from-rivers-and-sea-due-to-defences	04-Feb-25
	Flood Storage Areas		Flood Map for Planning (Rivers and Sea) - Flood Storage Areas https://www.data.gov.uk/dataset/cae4e24c-0342-48aa-8a93-d727ce582b3c/flood-map-for-planning-rivers-and-sea-flood-storage-areas	04-Feb-25
	Flood Zone 3		Flood Map for Planning (Rivers and Sea) - Flood Zone 3 https://www.data.gov.uk/dataset/bed63fc1-dd26-4685-b143-2941088923b3/flood-map-for-planning-rivers-and-sea-flood-zone-3	17-Jan-25
	Flood Zone 2		Flood Map for Planning (Rivers and Sea) - Flood Zone 2 https://www.data.gov.uk/dataset/cf494c44-05cd-4060-a029-35937970c9c6/flood-map-for-planning-rivers-and-sea-flood-zone-2	17-Jan-25
06	Main Rivers		Statutory Main River Map	16-Aug-24

Drawing ref.	Layers Displayed	Layer Processing	Layer Source	Accessed
		Original data has been clipped to the 10km SDDC buffer.	https://www.data.gov.uk/dataset/4ae8ba46-f9a4-47d0-8d93-0f93eb494540/statutory-main-river-map	
	Flood Zone 3a (1 in 100 year)		Flood Map for Planning (Rivers and Sea) - Flood Zone 3 https://www.data.gov.uk/dataset/bed63fc1-dd26-4685-b143-2941088923b3/flood-map-for-planning-rivers-and-sea-flood-zone-3	17-Jan-25
	Flood Zone 3b (1 in 30 year)	Original data has been dissolved into a single polygon layer and then clipped to the 10km SDDC buffer. The RoFRS_4band high risk extent layer has been used to create FZ3b in this SFRA.	Risk of Flooding from Rivers and Sea https://www.data.gov.uk/dataset/943d2bbb-aa08-45d1-96cb-42556cd01d94/risk-of-flooding-from-rivers-and-sea2	13-Feb-25
07	1 in 30 year	Original data has been clipped to the 10km SDDC buffer.	Risk of Flooding from Surface Water Extent: 3.3 percent annual chance https://www.data.gov.uk/dataset/95ea1c96-f3dd-4f92-b41f-ef21603a2802/risk-of-flooding-from-surface-water-extent-3-3-percent-annual-chance	10-Feb-25
	1 in 100 year		Risk of Flooding from Surface Water Extent: 1 percent annual chance https://www.data.gov.uk/dataset/8b82987d-3616-4e46-8edb-2973e8b82ad7/risk-of-flooding-from-surface-water-extent-1-percent-annual-chance	10-Feb-25
	1 in 1000 year		Risk of Flooding from Surface Water Extent: 0.1 percent annual chance https://www.data.gov.uk/dataset/1f3d6e13-40f1-4d12-99de-77132bc19c47/risk-of-flooding-from-surface-water-extent-0-1-percent-annual-chance	10-Feb-25
08	Superficial Geology	Original data has been clipped to the 10km SDDC buffer.	Hydrogeology 625K digital hydrogeological map of the UK https://www.bgs.ac.uk/datasets/hydrogeology-625k/	29-Jan-25
	Bedrock Geology			29-Jan-25

Drawing ref.	Layers Displayed	Layer Processing	Layer Source	Accessed
09	Reservoir Locations	Original data has been clipped only include point data within the 10km SDDC buffer.	Inventory of reservoirs amounting to 90% of total UK storage https://www.data.gov.uk/dataset/aa1e16e8-eded-4a60-8d1d-0df920c319b6/inventory-of-reservoirs-amounting-to-90-of-total-uk-storage	05-Feb-25
	Reservoir Flood Extents – Wet Day	Original data has been dissolved into a single polygon layer and then clipped to the 10km SDDC buffer.	Reservoir Flood Extents - Wet Day (National) https://www.data.gov.uk/dataset/8a385f2f-c1ca-4037-b851-11662114b9e1/reservoir-flood-extents-wet-day-national	28-Jan-25
10	Recorded Flood Outlines	Original data has been dissolved into a single polygon layer and then clipped to the 10km SDDC buffer.	Recorded Flood Outlines https://www.data.gov.uk/dataset/16e32c53-35a6-4d54-a111-ca09031eaaaf/recorded-flood-outlines1	04-Feb-25
	Historic Flood Map	Original data has been dissolved into a single polygon layer and then clipped to the 10km SDDC buffer.	Historic Flood Map https://www.data.gov.uk/dataset/76292bec-7d8b-43e8-9c98-02734fd89c81/historic-flood-map1	04-Feb-25
11	Internal Property Flooding by Flood Event*	Internally flooded properties data from DCC was categorised into three storm events.	Provided by SDDC / DCC	22-Jan-25
12	Sewer Flooding Incidents by Postcode*	Data from STW's Hydraulic Sewer Flooding Risk Register has been provided. This data was then classified into high-level postcode districts to create totals for each postcode. Open-source postcode polygons were then used to display the total number of sewer flooding incidents. *	Provided by STW	11-Nov-24
13	EA Flood Warning Areas	Original data has been clipped to the 10km SDDC buffer.	Flood Warning Areas https://www.data.gov.uk/dataset/0d901c4a-6e1a-4f9a-9408-73e0c1f49dd3/flood-warning-areas3	04-Feb-25

Drawing ref.	Layers Displayed	Layer Processing	Layer Source	Accessed
	EA Flood Alert Areas		Flood Alert Areas https://www.data.gov.uk/dataset/7749e0a6-08fb-4ad8-8232-4e41da74a248/flood-alert-areas2	04-Feb-25