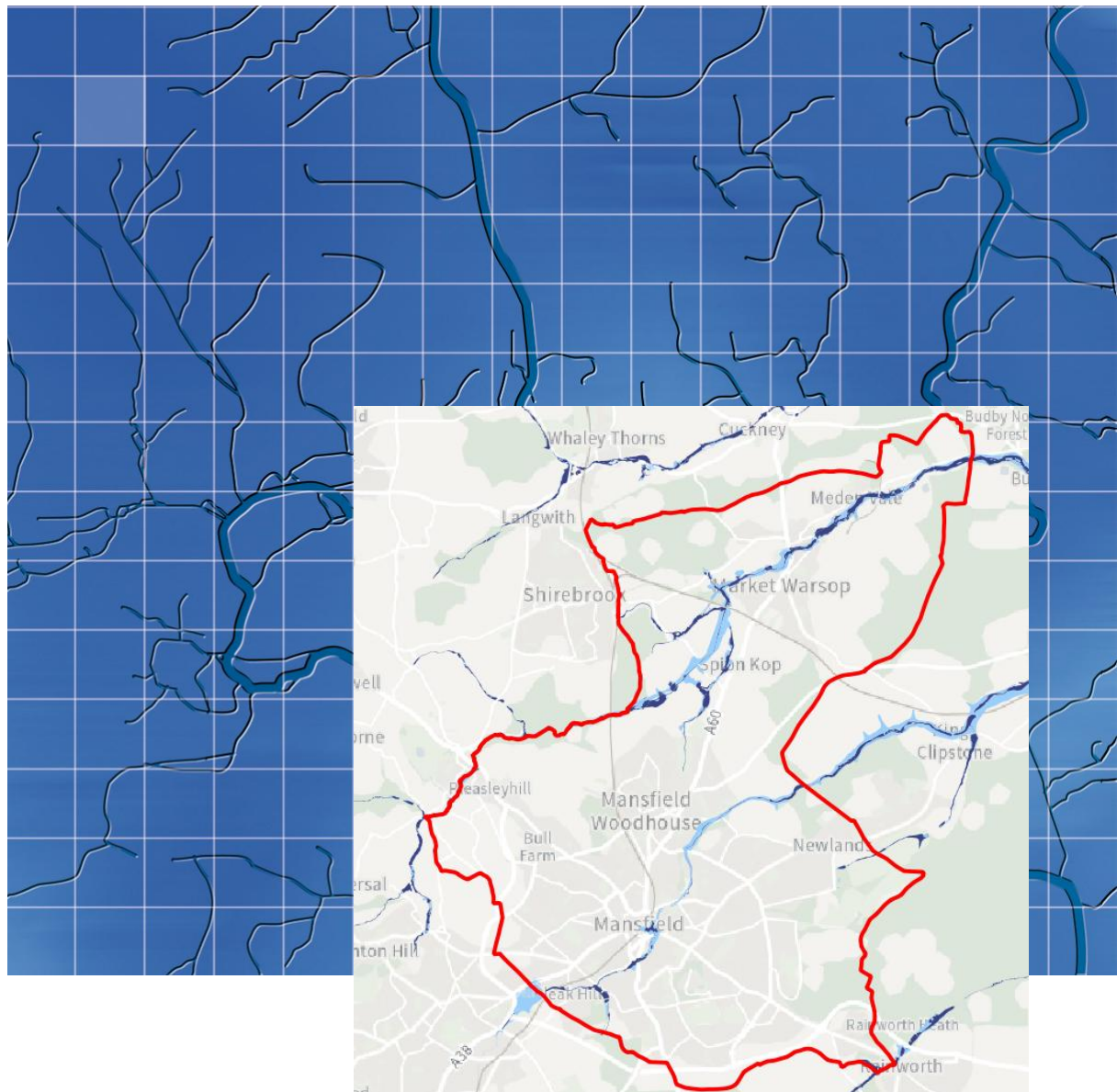


Mansfield District Council

February 2026

Mansfield District

Level 1 Strategic Flood Risk Assessment



Mansfield District Council

Mansfield District – Level 1 Strategic Flood Risk Assessment

Document issue details

WHS10220

Version	Issue date	Issue status	Prepared By	Approved By
1.0	28/11/2025	Draft	Jasmine Lucas (Graduate Consultant)	Paul Blackman (Director)
2.0	14/01/2026	Final	Jasmine Lucas (Graduate Consultant)	Brett Park (Principal Consultant)
3.0	21/01/2026	Final	Jasmine Lucas (Graduate Consultant)	Brett Park (Principal Consultant)
3.2	20/02/2026	Draft	Jasmine Lucas (Graduate Consultant)	Brett Park (Principal Consultant)
4.0	27/02/2026	Final	Jasmine Lucas (Graduate Consultant)	Brett Park (Principal Consultant)

For and on behalf of Wallingford HydroSolutions Ltd.

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1 Introduction

1.1 Scope of Assessment

- 1.1.1.1 Wallingford HydroSolutions (WHS) has been commissioned by Mansfield District Council (MDC) to undertake a Level 1 Strategic Flood Risk Assessment (SFRA) to identify the extent of flood risk and to inform policies and site selection processes for MDC's Local Plan Review 2023 - 2043.
- 1.1.1.2 The study will identify key flood risk constraints within the development plan area to enable MDC to assess the suitability of future development and inform land use policy with regards to flood risk.

1.2 SFRA Objectives

- 1.2.1.1 SFRAs are overarching technical studies that are used to guide development and inform the selection of sites in relation to flood risk.
- 1.2.1.2 A major part of this study will be to assess flood risk from all sources which will first involve the collation of available model data, historical information on flooding and details on flood risk management infrastructure. Flood risk will be assessed for the baseline and the future scenario, which will consider the latest climate change guidance.
- 1.2.1.3 In this context, we will i) identify and map flood risk from all sources, ii) assess existing and future flood management infrastructure, and iii) outline measures to reduce the causes and impacts of flooding.
- 1.2.1.4 This information will enable MDC to make informed decisions on allocating sites for development in the local plan and identify sites where a further level 2 SFRA assessment is required.
- 1.2.1.5 Figure 1 shows the main and ordinary watercourses within and around the MDC administrative boundary.

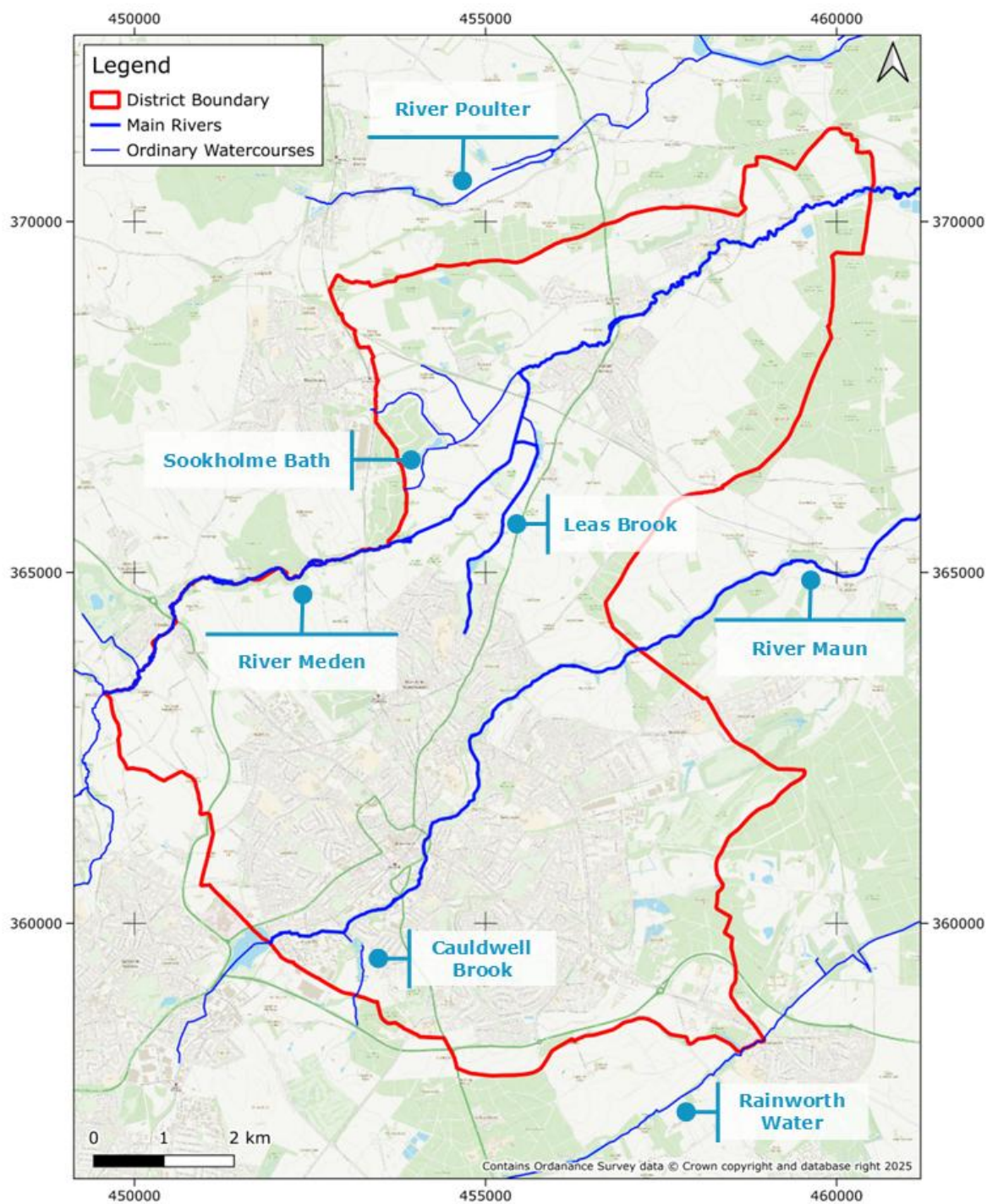


Figure 1- Overview of Study Area

1.3 Overview of National Planning Policy

1.3.1 National Planning Policy Framework (NPPF)

- 1.3.1.1 The National Planning Policy Framework (NPPF)¹ sets out the Government’s planning policies for England and how these should be applied. It provides a framework within which locally prepared plans for housing and other development can be produced. The latest NPPF was revised in December 2024 and replaces the previous NPPF published in December 2023. However, updates to the Flood Risk and Coastal change guidance were last made in September 2025².
- 1.3.1.2 In terms of flood risk, NPPF states that a sequential risk-based approach (the sequential test) should be taken for development to ensure that it is directed away from areas at highest risk. Where development is necessary in such areas, an exception test should be applied ensuring development is i) made safe for its lifetime without increasing flood risk elsewhere, and ii) provides wider sustainability benefits to the community (see section 3.2 for more details).
- 1.3.1.3 To inform strategic development policies in the context of flood risk, NPPF specifies the requirement for an SFRA that considers flood risk from all sources, the potential impacts of climate change and the effects of development on flood risk. The SFRA should take account of flood risk management policies and provides the basis for application of the sequential test.

1.3.2 NPPF Flood Zones

- 1.3.2.1 Flood risk is a function of the probability of a flood occurrence and the direct consequences to the community or a receptor. The NPPF categorises areas within the fluvial floodplain into zones of low, medium and high probability, as shown in Table 1.

Table 1- Flood Zones

Flood Zone	Definition
Flood Zone 1 (Low Probability)	Land having a less than 0.1% annual probability of river or sea flooding.
Flood Zone 2 (Medium Probability)	Land having between a 1% and 0.1% annual probability of river flooding; or land having between a 0.5% and 0.1% annual probability of sea flooding.
Flood Zone 3a (High Probability)	Land having a 1% or greater annual probability of river flooding; or Land having a 0.5% or greater annual probability of sea flooding.

¹ Ministry of Housing, Communities & Local Government (2024) *National Planning Policy Framework*, <https://www.gov.uk/government/publications/national-planning-policy-framework--2>

² Ministry of Housing, Communities & Local Government (2025) *Flood risk and coastal change*, <https://www.gov.uk/guidance/flood-risk-and-coastal-change>

Flood Zone	Definition
Flood Zone 3b (Functional Floodplain)	This zone comprises land where water from rivers or the sea is required to flow or be stored in times of flood. The identification of functional floodplain should take account of local circumstances and not be defined solely on rigid probability parameters. Functional floodplain will normally comprise: • land having a 3.3% or greater annual probability of flooding, with any existing flood risk management infrastructure operating effectively; or • land that is designed to flood (such as a flood attenuation scheme), even if it would only flood in more extreme events (such as 0.1% annual probability of flooding).

1.3.3 Planning Practice Guidance- Flood Risk and coastal change

1.3.3.1 The Planning Practice Guidance (PPG)³ supports the NPPF. The PPG on flood risk and coastal change was last updated in September 2025² and advises how to take account of and address the risks associated with flooding and coastal change in the planning process. It supports and aligns with the principles espoused by the NPPF but sets out more specific guidance for developers and planners. The main areas covered by the PPG include:

- Taking flood risk into account in preparing plans
- Site-specific flood risk assessments
- The sequential approach & exception test
- The role of the Environment Agency (EA) and Lead Local Flood Authorities (LLFA)
- Addressing residual flood risk
- The flood risk issues raised by minor developments & changes of use
- Permitted development rights and flood risk
- Proximity to watercourses and the need for a flood risk activity permit
- Sustainable drainage systems (SuDS)
- Flood resistance and flood resilience
- Planning and development in areas of coastal change
- Flood Zone and flood risk tables

1.3.3.2 In terms of taking flood risk into account in preparing plans, the document outlines how local planning authorities (LPAs) should use SFRAs to:

- Inform the sustainability appraisal of the Local Plan, so that flood risk is fully taken into account when considering allocation options and in the preparation of plan policies;
- Apply the sequential test and, where necessary, the exception test when determining land use allocations;

³ Ministry of Housing, Communities & Local Government (2024) *Planning Practice Guidance*, <https://www.gov.uk/government/collections/planning-practice-guidance#full-publication-update-history>

- Inform the allocation of land to safeguard it for flood risk management infrastructure;
- Inform policies for change of use and reducing the causes and impacts of flooding;
- Identify the requirements for site-specific flood risk assessments in particular locations, including those at risk from sources other than river and sea flooding;
- Determine the acceptability of flood risk in relation to emergency planning capability;
- Help demonstrate how the adaptation to climate change could be met.

1.3.4 Climate Change

- 1.3.4.1 The EA release guidance⁴ on how local planning authorities, developers and their agents should use climate change allowances in flood risk assessments. Making allowances for climate change minimises vulnerability and provides resilience to flooding and coastal change.
- 1.3.4.2 The climate change allowances are predictions of anticipated change and are provided for:
- Peak river flow
 - Peak rainfall intensity
 - Sea level rise
 - Offshore wind speed and extreme wave height
- 1.3.4.3 There are allowances for different climate scenarios over different epochs, or periods of time, over the coming century. For Mansfield the peak river flow and peak rainfall intensity allowances are relevant and are covered in more detail below.

Peak river flow

- 1.3.4.4 Peak river flow climate change allowances show the anticipated changes to peak flow by management catchment. Management catchments are sub-catchments of river basin districts.
- 1.3.4.5 The range of allowances provided for each management catchment is based on percentiles. A percentile describes the proportion of possible scenarios that fall below a set level. The 50th percentile is the point at which half of the possible scenarios for peak flow fall below, and half fall above⁴. Three climate change allowances are provided for peak river flow and are based on the following percentiles:
- 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

⁴ EA (2022) *Flood risk assessments: climate change allowances*, <https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances>

- 1.3.4.6 The Mansfield District Council administrative boundary is located wholly within the Idle and Torne management catchment. The peak river flow allowances for the Idle and Torne management catchment are summarised in Table 2.

Table 2- Peak river flow allowances for the Idle and Torne management catchment

Allowance	Total Potential Change (2020s)	Total Potential Change (2050s)	Total Potential Change (2080s)
Central	9%	12%	27%
Higher	14%	19%	39%
Upper	27%	39%	69%

- 1.3.4.7 The guidance states that both the central and higher central allowances should be assessed as part of an SFRA. When applied at a site specific level for the purposes of a flood risk assessment (FRA), the flood risk vulnerability classification as defined in the NPPF should first be used to classify the vulnerability of your development. Subsequently the location of the development with respect to different flood zones should be determined. Following this exercise, the recommended allowances are summarised in Table 3.

Table 3 - Recommended allowances for flood risk vulnerability classifications

Flood Risk Vulnerability	Flood Zone 2 or 3a	Flood Zone 3b
Essential Infrastructure	Higher central allowance	Higher central allowance
Highly Vulnerable	Central allowance (development not permitted in Flood Zone 3a)	Development not permitted
More Vulnerable	Central allowance	Development not permitted
Less Vulnerable	Central allowance	Development not permitted
Water Compatible	Central allowance	Central allowance

- 1.3.4.8 The peak river flow allowances should also be applied to development that is currently located in Flood Zone 1 but might be in Flood Zone 2 or 3 in the future.

Peak rainfall

- 1.3.4.9 Increased rainfall affects surface water flood risk and the design of drainage systems. Peak rainfall allowances are provided for the central and upper percentile and across two epochs. Once more the allowances are specified for the Idle and Torne management catchment. These allowances are summarised in Table 4.

Table 4- Peak rainfall allowances for the Idle and Torne management catchment

Allowance	Total Potential Change (2050s)	Total Potential Change (2070s)
3.3% Annual Exceedance Probability (AEP)		
Central	20%	25%
Upper	35%	35%
1.0% Annual Exceedance Probability (AEP)		
Central	20%	25%
Upper	40%	40%

- 1.3.4.10 In terms of what allowances to apply, the guidance is based on the proposed lifetime of the development. For developments with a lifetime beyond 2100, FRAs should assess the upper end allowances. This must be done for both the 1% and 3.3% annual exceedance probability (AEP) events for the 2070s epoch (2061 to 2125).
- 1.3.4.11 For development with a lifetime between 2061 and 2100, take the same approach but use the central allowance for the 2070s epoch (2061 to 2125).
- 1.3.4.12 For development with a lifetime up to 2060, take the same approach but use the central allowance for the 2050s epoch (2022 to 2060).

1.3.5 Flood and Water Management Act 2010

- 1.3.5.1 The Flood and Water Management Act (FWMA) (2010)⁵, sets out legislation on the management of risks in connection with flooding and coastal erosion for the United Kingdom. It highlights the need for an effective flood risk strategy, which must be developed, maintained, applied, and monitored regularly to adequately manage flood risk.
- 1.3.5.2 It gives a responsibility to the EA for developing a National Flood and Coastal Risk Management Strategy and gives a responsibility to local authorities (LAs), as LLFAs, to co-ordinate flood risk management in its area.
- 1.3.5.3 Duties for the LLFA include being the statutory consultee for ordinary watercourses, investigating significant flooding incidents (typically defined as five or more properties), maintaining a register of designated flood assets and provision of information.

⁵ UK Parliament (2010) *Flood and Water Management Act*.
<https://www.legislation.gov.uk/ukpga/2010/29/contents>

1.3.6 National Flood and Coastal Erosion Risk Management Strategy for England

- 1.3.6.1 The Flood and Water Management Act 2010 sets out how the EA must develop, maintain and apply a National Strategy for Flood and Coastal Erosion Risk Management (FCERM) in England.
- 1.3.6.2 The most recent strategy was published in July 2020⁶. The strategy sets out how the EA will manage the risks from flooding and coastal erosion across England. It clarifies roles and responsibilities before setting out the policies and direction for all England's Flood Risk Management Authorities to follow, with measures to explain how targets will be achieved. The strategy highlights the importance of climate resilience in the development of future infrastructure.

1.3.7 Non-Statutory Standards for SuDS

- 1.3.7.1 The national standards⁷ for SuDS published by DeFRA (2025), sets out the non-statutory standards for the design, maintenance, and operation of SuDS systems in England. There are seven national standards for SUDS as described below:
- Runoff destinations: discharge must follow the drainage hierarchy.
 - Management of everyday rainfall (interception): at least the first 5mm of rainfall should not result in runoff from the site to surface waters or piped drainage systems.
 - Management of extreme rainfall and flooding: when discharging to an above ground surface water body, sewer or other piped drainage system, the surface water runoff (rate and volume) for the 1% annual exceedance probability (AEP) event shall be controlled to ensure the runoff from the development does not increase flood risk elsewhere.
 - Water Quality: protect surface waters, groundwater and coastal waters by managing the quality of the surface water runoff to adequately address water quality risks from the development.
 - Amenity: maximise benefits for amenity through the creation of multi-functional places and landscapes.
 - Biodiversity: maximises biodiversity benefits throughout the development lifecycle.
 - Design of drainage for construction, operation, maintenance, decommissioning and structural integrity: surface water drainage systems are designed so they can be easily and safely constructed, operated and maintained taking account of the need to minimise negative impacts on natural resources and the environment.

⁶ EA (2020) *National Strategy for Flood and Coastal Erosion Risk Management*. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/920944/023_15482_Environment_agency_digitalAW_Strategy.pdf

⁷ Department for Environmental, Food and Rural Affairs (2025) *National standards for sustainable drainage systems*. <https://www.gov.uk/government/publications/national-standards-for-sustainable-drainage-systems>

1.3.8 Overview of Local Guidance and Past Studies

- 1.3.8.1 A wide range of local planning documents developed by Nottinghamshire County Council exist related to flood risk and surface water management. As the LLFA, Nottinghamshire County Council is responsible for flooding from surface water, groundwater and ordinary watercourses. Their Preliminary Flood Risk Assessment (PFRA) assesses both historic and future surface water flood risk across the county⁸. Nottinghamshire County Council are also responsible for developing a Local Flood Risk Management Strategy⁹. The strategy sets a long-term programme for the reduction of flood risk, establishes how to identify areas where flood risk management will achieve multiple benefits and seeks to facilitate greater engagement with the community. The strategy is due for review and an update in the near future.
- 1.3.8.2 Existing planning policy in Mansfield District includes the Local Plan 2013-2033¹⁰. This is currently being reviewed within the Mansfield District Local Plan Review (2023-2043). The Local plan 2013-2033 has provided a framework for the development of new homes, jobs, community facilities and infrastructure within the district up to 2033. It was supported by an addendum in 2018¹¹ to the Level 1 SFRA originally completed in 2008¹². The plan sets out specific policies for the management of flood risk, sustainable drainage systems, and river and waterbody corridors.

⁸ Nottinghamshire County Council (2023) *Nottinghamshire Preliminary Flood Risk Assessment 2023-2029*. <https://www.nottinghamshire.gov.uk/media/5082530/nottinghamshirepreliminaryfloodriskassessment2023-2029.pdf>

⁹ Nottinghamshire County Council (2021) *Nottinghamshire Local Flood Risk Management Strategy 2021-27*. <https://www.nottinghamshire.gov.uk/media/a2jlshmi/nottinghamshire-local-flood-risk-mangement-strategy-2021-27.pdf>

¹⁰ Mansfield District Council (2020) *Mansfield District Local Plan 2013-2033*. <https://www.mansfield.gov.uk/downloads/file/1645/mdc-adopted-local-plan-2020>

¹¹ Mansfield District Council (2018) *Addendum to the Strategic Flood Risk Assessment*. <https://www.mansfield.gov.uk/downloads/file/535/addendum-to-the-strategic-flood-risk-assessment-2018>

¹² Mansfield District Council. (2008) *Mansfield Strategic Flood Risk Assessment – Technical Report*. <https://www.mansfield.gov.uk/downloads/file/529/strategic-flood-risk-assessment-technical-report-2008>

Policy CC2: Flood Risk

Development proposals in areas at risk of flooding will only be supported where it is satisfactorily demonstrated, through a site-specific flood risk assessment, that:

- the sequential test and, if required, the exception test have been met;
- the development will remain flood resistant, resilient and safe throughout its lifetime, taking account of increases in flood levels due to climate change;
- it will not increase flood risk on site or elsewhere and where possible reduce it;
- water management measures are incorporated, on and / or off-site to reduce and manage flood risk in accordance with Policy CC3;
- open access to flood defences are retained; and
- where applicable, the functioning and integrity of natural systems or areas that benefit from flooding are not prejudiced.

Policy CC3: Sustainable Drainage Systems

All development proposals should, wherever possible, include measures to reduce and manage surface water through appropriate sustainable drainage systems (SuDS) so as to minimise and manage flooding, improve water quality, complement water efficiency, and enhance biodiversity, place shaping and amenity. To be supported, proposals are required to satisfactorily demonstrate all of the following:

- that sustainable drainage systems have been incorporated in the development design unless:
 - for major developments, a SuDS is inappropriate and surface water run-off can be alternatively managed in an appropriate manner; or
 - for minor developments a SuDS is not viable or technically feasible and surface water run-off can be alternatively managed in an appropriate manner; and
- that adequate arrangements have been made for the adoption, management and maintenance of any SuDS provided over the lifetime of the development; and
- that the discharge of surface run-off is as high up the SuDS hierarchy of drainage as possible.

Proposals for retrofitting of sustainable drainage systems will be supported.

Policy CC4: River and Waterbody Corridors

Development proposals will be supported where they:

- lead to the de-culverting and naturalising of watercourses which improves the overall connectivity for wildlife;
- avoid the culverting of watercourses and not prejudicing future opportunities for de-culverting;
- provide or retain a minimum 8m natural or semi-natural habitat buffer to a watercourse, and include a long term landscape and ecological management plan for this buffer; and
- contribute to the creation and/or enhancement of green SuDS priority areas and low water flow areas.

Development proposals which would have a significant adverse impact on the water quality, functions and setting of any watercourse and its associated corridor will not be supported.

- 1.3.8.3 Mansfield District Council have also produced a SuDS Supplementary Planning Document (SPD)¹³ in 2023 to provide additional guidance to developers on how they can demonstrate their proposals have met the requirements of the relevant planning policies (CC3, CC2, IN2, and NE2) set out within the Local Plan.
- 1.3.8.4 Mansfield District also falls within the catchment of the River Trent and so is subject to the Trent Catchment Flood Management Plan¹⁴ (CFMPs) developed by the EA in 2009. The CFMP seeks to establish the scale and extent of flooding now and in the future and sets policies for managing flood risk within the catchment. It should be used to inform planning and decision making by local authorities.

1.4 Data Sources

- 1.4.1.1 To inform the assessment of flood risk, existing information and model data have been identified and collated for different sources of flooding. Any recent and relevant studies on flood risk within the study area have also been incorporated into the SFRA, along with details on flood defences and flood management schemes. This information and the available model data have been used to assess flood risk across the study area. Detailed flood maps utilising the latest GIS software have also been created. The main sources of data to inform this SFRA include:
- EA Fluvial Flood Maps^{15 16 17 18} – to quantify fluvial flood risk where detailed model data are not available.
 - EA Surface Water Flood Maps^{19 20} – to quantify the pluvial flood risk and flood risk from ordinary watercourses where appropriate.
 - EA Reservoir Flood Mapping^{21 22} – to quantify the risk of reservoir flooding
 - EA Historical Flood Map²³ and Recorded Flood Outlines²⁴ – to review historical flood events

¹³ Mansfield District Council (2023) *Sustainable Drainage Systems (SuDS) Supplementary Planning Document (SPD)*. <https://www.mansfield.gov.uk/downloads/file/6635/sustainable-drainage-systems-spd-final-version-for-adoption>

¹⁴ EA (2009) *Trent Catchment Flood Management Plan*. https://assets.publishing.service.gov.uk/media/5a7b7bf7e5274a7202e177a7/River_Trent_Catchment_Management_Plan.pdf

¹⁵ EA (2025) *Flood Map for Planning – Flood Zones* <https://environment.data.gov.uk/dataset/04532375-a198-476e-985e-0579a0a11b47>

¹⁶ EA (2025) *Flood Map for Planning – Climate Change Extents (defended and undefended)* <https://environment.data.gov.uk/dataset/610d6830-0637-4f5b-b6ce-61f5fa5635d3>

¹⁷ EA (2025) *Flood Map for Planning – 3.3% AEP defended (present day)* <https://environment.data.gov.uk/dataset/56fb30ae-f20d-490a-9149-a94f3e640261>

¹⁸ EA (2025) *Flood Map for Planning – 3.3% AEP defended (Climate Change)* <https://environment.data.gov.uk/dataset/b9418b89-aa59-4153-91dd-470f473152dd>

¹⁹ EA (2025) *Risk of Flooding from Surface Water* <https://environment.data.gov.uk/dataset/b5aaa28d-6eb9-460e-8d6f-43caa71fbc0e>

²⁰ EA (2025) *Risk of Flooding from Surface Water – Climate Change 1* <https://environment.data.gov.uk/dataset/e5b38de2-99b3-44ee-b10c-b244926878ef>

²¹ EA (2025) *Reservoir Flood Extents - Wet Day (National)* <https://environment.data.gov.uk/dataset/d81646cf-37e5-4e71-bbcb-b7d5b9ca3a1c>

²² EA (2025) *Reservoir Flood Extents - Dry Day (National)* <https://environment.data.gov.uk/dataset/c66ee97f-49d2-454e-9a19-d48a47bd22ad>

²³ EA (2025) *Recorded Flood Outlines*, <https://www.data.gov.uk/dataset/16e32c53-35a6-4d54-a111-ca09031eaaaf/recorded-flood-outlines>

²⁴ EA (2025) *Historic Flood Map*, <https://www.data.gov.uk/dataset/76292bec-7d8b-43e8-9c98-02734fd89c81/historic-flood-map>

- Hydraulic modelling data from the Mansfield Maun (2024) model²⁵
- Hydraulic modelling data from the Meden EA (2020) climate change update model²⁶
- Flooding incident data provided by LLFA – to provide information on local and historical flooding from surface water flooding across the study area²⁷
- EA flood defence structures²⁸ – to assess existing formal and informal flood defences present
- British Geological Survey (BGS) Geology Viewer²⁹ – To determine local bedrock and its expected permeability informing assessment of groundwater flood risk
- Soilsmap map³⁰ – To determine local soil and its expected permeability informing assessment of groundwater flood risk
- Previous flood risk studies previously completed by MDC^{11,12} and the LLFA^{8,9}

1.5 Limitations & Assumptions

1.5.1 Age and Extent of Modelling Data

- 1.5.1.1 The EA regularly review and update the Flood Map, with any amendments to the Flood Zone mapping being informed by more detailed information as and when it becomes available. This can either be because of more detailed hydraulic modelling carried out by the EA and/or external parties; or recorded flood extents following a flood event. Furthermore, real-world upgrades to flood defence infrastructure will also alter the degree of flood risk in a particular area. In this regard, the SFRA is a snapshot of flood risk based on data available at the time of publication, with the conclusions on flood risk presented subject to change in accordance with any updates to the EA Flood Map and existing flood defence infrastructure.
- 1.5.1.2 Detailed modelling data from 2024 are available for the River Maun through the centre of Mansfield. Modelling is also available for the entire River Maun (produced in 2007) as well as the River Meden (produced in 2008 and updated with climate change factors in 2021). However, sections of these models have been replaced by the National Flood Risk Assessment 2 (NAFRA2) national scale model released in 2025. Therefore, the national scale model will be taken as the most up-to-date modelling data available in these locations.

1.5.2 Assessing the Impacts of Climate Change

- 1.5.2.1 As part of SFRAs, LPAs should assess and map the effects of climate change on flood risk to identify areas where flood risk will increase and ensure that future development is sustainable.

²⁵ EA (2024) *Mansfield Maun Products 5-7*

²⁶ EA (2020) *Meden EA climate change updates Products 6-7*

²⁷ Nottinghamshire County Council (2025) *The Council's role*. <https://www.nottinghamshire.gov.uk/planning-and-environment/flooding-help-and-advice/the-councils-role>

²⁸ EA (2025) *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>

²⁹ BGS (2025) *BGS Geology Viewer*, <https://geologyviewer.bgs.ac.uk/>

³⁰ Cranfield Soil and Agrifood Institute (2025) *Soilsmap map*, <http://www.landis.org.uk/soilsmap/>

- 1.5.2.2 The Mansfield Maun modelling results provide extents for the 1.0% AEP event plus the central (27%), higher central (39%), and upper end (69%) climate change allowances. Where detailed modelling is unavailable or has been superseded by the NAFRA2 mapping, the Flood Map for Planning – Climate Change extents will be used to assess the impact of climate change.
- 1.5.2.3 The approach outlined above is suitable for the purposes of a level 1 SFRA. However, where detailed modelled outcomes for new climate change scenarios are unavailable for sites at risk of fluvial flooding, further detailed modelling will need to be undertaken to refine the assessment of the latest allowances. This should be carried out as part of a site-specific FRA.

2 Summary of Flood Risk in Mansfield District

2.1 Review of Flooding Sources

The following sections provide a detailed summary of baseline flood risk from all relevant sources across the Mansfield District. They identify where flood risk is most significant and is likely to pose a risk to people or property. The assessment of flood risk has been based on the collation of available model data, historical information on flooding and details on flood risk management infrastructure. Where data is available, the future scenario considering the impacts of climate change is also considered. A series of supporting GIS maps offer a visual representation of the risks outlined and are provided in Appendix 1-7 of this report.

2.1.1 Fluvial Flood Risk

- 2.1.1.1 The risk of fluvial flooding has been assessed using the mapped flood extents throughout Mansfield District, as shown by existing hydraulic modelling data and the EA's Fluvial Flood Map for Planning. Flood risk from the main rivers running across the district is summarised below. Larger watercourses are usually designated as main rivers. The EA carries out maintenance, improvement or construction work on main rivers to manage flood risk. Maps showing the extent of the flood outlines for the fluvial flood maps during the present day across the district are provided in Figures A and B of Appendix 1.

River Maun

- 2.1.1.2 The EA Flood Zone 2, 3a, and 3b extents for the River Maun are largely informed by the most recent NaFRA2 national scale model. However, within the centre of Mansfield, the Mansfield Maun (2024) model has been used in addition to the national model.
- 2.1.1.3 The River Maun flows north-eastwards through the district bisecting the town of Mansfield. No significant tributaries are present along its course within the district.
- 2.1.1.4 The flood zone associated with the River Maun covers largely undeveloped land along its course through the district; however, a number of buildings are located within Flood Zone 2 and 3 in the centre of Mansfield Town. The majority of these buildings are commercial or industrial though some residential properties along Deakins Court, Lime Tree Place, Rock Valley, and Bath Lane are located within Flood Zone 2. A small number of properties adjacent to the River Maun along Bridge Street are located within Flood Zone 3b. The main area of flood risk from the River Maun is within the east of Mansfield Town centre approximately 350 m northeast of Mansfield Train Station.

River Meden

- 2.1.1.5 The EA Flood Zone 2, 3a, and 3b extents for the River Meden are informed by the River Meden (2008) model from Skegby to Pearlthorpe and by the most recent NaFRA2 national scale model from Pearlthorpe to the confluence with the River Idle near West Drayton. Areas of Flood Zone 2 have also been informed by historic flood extents.
- 2.1.1.6 The River Meden flows north-eastwards through the north of the district forming the district boundary for approximately 5.5 km, to the west of Mansfield Woodhouse. Its route flows between the towns of Market Warsop and Church Warsop in the north of the district.

- 2.1.1.7 The flood zone associated with the River Meden covers predominantly undeveloped agricultural land; however, a small number of properties closest to the river within Market Warsop and Church Warsop are located within Flood Zone 2. The majority of these properties are residential. Approximately two properties in Church Warsop are also located within Flood Zones 3a and 3b as they are located directly adjacent to the River Meden.

Leas Brook

- 2.1.1.8 The EA Flood Zone 2 and 3 extents for the Leas Brook are informed by the most recent NaFRA2 national scale model.
- 2.1.1.9 Leas Brook flows from south to north within the north of the Mansfield District. The brook flows from Mansfield Woodhouse to its confluence with the River Meden approximately 550 m southwest of Market Warsop.
- 2.1.1.10 The flood zone associated with the Leas Brook covers undeveloped agricultural land for the entirety of its route, with no buildings located within either Flood Zone 2, 3a, or 3b due to the brook.

2.1.2 Climate change

- 2.1.2.1 This section provides a summary of potential impacts of climate change on fluvial flood risk based on the modelling data available and the EA Flood Map for Planning. Maps showing the extent of the flood outlines for the fluvial flood maps across the district, including an allowance for climate change, are provided in Figures C and D of Appendix 1.

River Maun

- 2.1.2.2 The Mansfield Maun (2024) model and the EA Flood Map for Planning Climate Change maps have been used to assess the potential impacts of climate change on the River Maun.
- 2.1.2.3 When considering the central allowance for the 1.0% AEP event, the flood risk extent associated with the River Maun increases to cover a larger area within the east of Mansfield town centre compared to Flood Zone 3 (1.0% AEP). The increase in extent is smaller for other areas of the district.
- 2.1.2.4 Reviewing the higher central and upper end allowance flood extents for the Mansfield Maun (2024) model, shows the greatest increases in extent to the east of the Water Meadows Swimming Centre and to the east of the central Market Place.

River Meden

- 2.1.2.5 The Meden EA (2021) climate change updated model and the EA Flood Map for Planning Climate Change maps have been used to assess the potential impacts of climate change on the River Meden.
- 2.1.2.6 When considering the central allowance for the 1.0% AEP event, the flood risk extent increases along all parts of the river. Notable areas of increase include south of Meden Vale, west of Gleadthorpe Farm, and in the area of land between the River Meden and Leas Brook.
- 2.1.2.7 As the Meden EA (2021) climate change updated model does not provide extents for the higher central or upper end climate change allowances, the 50% climate change extent has been assessed as a proxy. This design event shows notable increases in extent along the A60 between Market Warsop and Church Warsop, south of Meden Vale, and in the area of land between the River Meden and Leas Brook.

Leas Brook

- 2.1.2.8 The EA Flood Map for Planning Climate Change maps have been used to assess the potential impacts of climate change on the Leas Brook.
- 2.1.2.9 When considering the central allowance for the 1.0% AEP event, the flood risk extent increases along the stretch of the brook north of Mansfield Woodhouse, with a notable increase in extent in the area of land between the River Meden and Leas Brook. Within Mansfield Woodhouse, the increase in extent is limited.
- 2.1.2.10 No detailed modelling data is available for the Leas Brook.

2.1.3 Surface Water Flooding

- 2.1.3.1 Surface water flooding is the result of high peak rainfall intensities, and/or insufficient capacity in the sewer network. Surface water flooding is a significant flood risk in urban areas due to the high proportion of impermeable surfaces, which cause a significant increase in runoff rates and consequently the volume of water that flows into the sewer network.
- 2.1.3.2 Although managing the risk of flooding from surface water is the responsibility of LLFAs, the EA have produced the Risk of Flooding from Surface Water (RoFSW) map¹⁹ under its strategic role in England. This map is intended to be the best single source of information on surface water flooding, incorporating the latest EA modelling techniques and local data. It is used to describe surface water flooding across the district.
- 2.1.3.3 The NaFRA2 surface water flood map shows areas of High Risk, which relates to land estimated to flood in a 3.3% AEP or greater pluvial event, Medium Risk, which relates to land estimated to flood in a 3.3% - 1.0% AEP pluvial event, and Low Risk, which relates to land estimated to flood in a less than 1% AEP pluvial event. Maps showing surface water flood risk across the district are available in Appendix 2. Figure A shows the present-day extents while Figure B indicates the extents when including an allowance for climate change.
- 2.1.3.4 The maps are currently based on a number of assumptions and only indicate where surface water flooding would occur as a result of local rainfall. Caution should be exercised when reviewing the maps as it may show an over or under-estimation of the surface water flood risk in certain areas. Furthermore, due to the modelling techniques used, the mapping picks out depressions in the ground surface and simulates some flow along natural drainage channels and smaller rivers (a drainage sump in the latest NAFRA2 mapping removes this for main rivers). Where this is the case, the dominant flooding mechanism is considered to be fluvial, covered by the fluvial EA flood maps, and these areas are therefore ignored in the assessment of surface water flooding throughout Mansfield District.
- 2.1.3.5 Based on the assumptions and limitations listed above the maps should only be used at the strategic planning level. Where applicable, Section 19 reports from Nottinghamshire County Council have also been used to inform the assessment of surface water flood risk. In this regard, the analysis has sought to combine both data sources to identify areas at significant risk of surface water flooding; particularly where historical incidents corroborate flooding shown by the mapping. The at-risk areas are summarised below:
 - **Mansfield** – The surface water flood maps indicate the main areas of surface water flood risk, during the present day and in the future, within Mansfield are along Ladybrook

Ln, Stockwell Gate, West Gate, Church Street, Newlands Rd, Bridge St, Debdale Ln, and Sandlands Way. Other areas of localised risk are present across the town. During July 2016, there was major surface water flooding across the west of Mansfield with affected areas including Ladybrook Ln, Rosemary St, Welbeck St, Manvers St, Edingley Av, Kaye Rd, Armstrong Rd, and Winthorpe St³¹.

- **Mansfield Woodhouse** – The surface water flood maps indicate the main areas of surface water flood risk, during the present day and in the future, within Mansfield Woodhouse are to the east of Manor Academy, and along Station St, High St and Worcester Av.
- **Market Warsop** – The surface water flood maps indicate the main areas of surface water flood risk, during the present day and in the future, within Market Warsop are along Sherwood St and Wood St.
- **Church Warsop** – The surface water flood maps indicate the main areas of surface water flood risk, during the present day and in the future, within Church Warsop are localised areas along Manor Rd, Rectory Rd, and Eastlands Ln.

2.1.4 Ordinary Watercourses

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

2.1.4.2 To assess flood risk from these watercourses, the updated EA NaFRA2 Risk of Flooding from Rivers and Sea¹⁷, and Risk of Flooding from Surface Water maps were used. The ordinary watercourses within the district and the flood risk associated with each are summarised below. Figure 1 highlights the ordinary watercourses within the district whilst the maps in Appendix 1 indicate the flood risk associated with them.

- **Sookholme Bath:** Sookholme Bath is a tributary of the River Meden that rises within Shirebrook Wood on the northwestern boundary of the district. Its confluence with the River Meden is located at E: 455481, N:367840. Two small watercourses join the Sookholme Bath along its reach, both flowing in a south-eastern direction. The Flood Zone 2, 3a, and 3b extents for the Sookholme Bath do not inundate any properties along its course during the present day and when including an allowance for climate change. The Risk of Flooding from Surface Water maps indicate a risk of flooding to a small number of properties close to where the Sookholme Bath is culverted beneath Carter Lane E: 454503, N:367745.
- **Cauldwell Brook:** Cauldwell Brook rises south of Mansfield and confluent with the River Maun at E: 452976, N: 359870. The brook flows through predominantly agricultural and forested land. At E: 453241, N: 359685 the brook flows into Mill Pond where its outflow is then culverted for the majority of its final reach before its confluence with the River Maun. The Flood Zone 2, 3a, and 3b extents for the Cauldwell Brook during both the present day and climate change events inundate one industrial building downstream of the Mill Pond. The Risk of Flooding from Surface Water maps indicate limited additional flood risk associated with the Cauldwell Brook within Mansfield District.

³¹ Nottinghamshire County Council (2016) Section 19 Report – Flood in Mansfield on 10 June 2016.

2.1.5 Groundwater Flooding

- 2.1.5.1 Groundwater flooding is defined as the emergence of groundwater at ground level. There are limited local data with respect to groundwater flooding. However, for a strategic level assessment of the potential for groundwater flooding, the BGS UK Geoviewer has been used to determine the bedrock across the study area, with the Landis Soils map used to determine the soils present. Maps showing the bedrock, superficial deposits, and soils across the district are provided in Appendix 3.
- 2.1.5.2 BGS mapping shows the district is underlain by a variety of sedimentary bedrock types. Bedrock across the district varies from west to east. The east and centre of the district are predominantly underlain by sandstone bedrock in the form of Chester and Lenton formations. The west of the district is generally underlain by Cadeby formation dolostone with some areas underlain by Edlington formation mudstone and sandstone. The BGS Hydrogeology map identifies the Chester and Lenton formation sandstones and Cadeby formation dolostone as highly productive aquifers, with the Chester and Lenton formations part of a principal sandstone aquifer. The mapping also identifies the Edlington formation mudstones and sandstones as rocks with essentially no groundwater.
- 2.1.5.3 Superficial deposits are only present in isolated areas within the district, most notably areas of alluvium close to the watercourse channels, and glaciofluvial and till deposits in the south of the district.
- 2.1.5.4 Soils mapping indicates that a large portion of the district is urbanised, particularly in the towns of Mansfield, Mansfield Woodhouse, and Market Warsop. Therefore, these areas are likely to be associated with low groundwater flood risk due to the extent of impermeable surfaces. Within the rural areas of the district, located predominantly along the boundaries of the district area, soils are generally freely draining. An exception to this, are the floodplain soils associated with the River Meden and Leas Brook located to the north and west of Market Warsop, and an area of soils with impeded drainage located in the northwest of the district. The areas of the district with freely draining soils are likely to have a moderate risk of groundwater flooding, most notably where they are also underlain by a highly productive aquifer. This is because the freely draining soil allows the water table to be mobile.

2.1.6 Sewer Flooding

- 2.1.6.1 Sewer flooding often occurs due to an existing drainage system having insufficient capacity to drain rainfall, consequently causing the release of water at manholes. Sewer flooding can also occur should there be a fault/failure at an existing drainage system. The responsible authority for sewer flooding across the study area is Severn Trent Water (STW) and was contacted to gather available data on sewer flooding.
- 2.1.6.2 A summary of the spatial distribution of incidents of sewer flooding between July 1989 and February 2024 by post code area is summarised in Table 5. This indicates that 324 incidents of sewer flooding have occurred within Mansfield District, with the central southern and eastern areas of Mansfield experiencing the most incidents.
- 2.1.6.3 It should be noted that the historic records are somewhat dependent on reporting and are given for a point location. In this regard, caution should be exercised when ascribing a sewer flood risk to a particular area.

Table 5 - Sewer Flooding Incidents by Post Code Area

Post Code	Settlements	External Flooding	Internal Flooding	Total
NG18	Central, southern and eastern Mansfield	118	58	176
NG19	Mansfield Woodhouse, Pleasley Hill, Radmanthwaite, northwest Mansfield	84	39	123
NG20	Market Warsop, Church Warsop, Meden Vale	25	0	25
Total		227	97	324

- 2.1.6.4 Between 2022 and 2025, STW have retrofitted over 340 SuDS features across Mansfield town with the aim to reduce flood risk and improve the capacity of the town's sewer system to deal with storm events by reducing the volume of flood waters entering the system. Due to the recency of the project, the impact it may have on the frequency of surface water and sewer flooding is yet to be assessed.

2.1.7 Reservoir Flooding

- 2.1.7.1 In 2021 the EA published updated maps showing the flood risk associated with reservoirs. Dam breach and flood modelling techniques were used to produce a new national set of reservoir flood maps for England. The maps show two flooding scenarios, including a 'dry-day' and a 'wet-day'. The 'dry-day' scenario predicts the flooding that would occur if the dam or reservoir failed when rivers are at normal levels. The 'wet day' scenario predicts how much worse the flooding might be if a river is already experiencing an extreme natural flood. The extents were updated in June 2025 to reflect the updated NaFRA2 dataset.
- 2.1.7.2 The main reservoirs which could impact Mansfield include the following:
- Gleadthorpe. Owner: G Bacon & Sons.
 - King's Mill. Owner: Ashfield District Council.
 - South Farm Reservoir No. 1. Owner: Trustees of The Thoresby Settlement.
 - South Farm Reservoir No. 2. Owner: Naish Farms Limited.
 - Sutton Lawn Dam. Owner: Ashfield District Council.
- 2.1.7.3 The modelled flood extents lie along the River Maun and the reach of the River Meden downstream of Market Warsop. The Kings Mill and Sutton Lawn Dam reservoirs impact the River Maun, whilst the South Farm and the Gleadthorpe reservoirs impact the River Meden. Areas affected include Meden Vale and the areas of Mansfield town located close to the River Maun. Maps showing the reservoir flood extents in the district are provided in Appendix 4.
- 2.1.7.4 Whilst these areas are shown to be at risk, it should be noted that reservoir failure is a rare event with a very low probability of occurrence. Current reservoir regulation, which has been further enhanced by the FWMA, aims to make sure that all reservoirs are properly maintained and monitored to detect and repair any problem.

- 2.1.7.5 However, the EA have previously raised concerns on development downstream of Kings Mill Reservoir due to the very high hazard associated with a breach flood. They recommend the LPA seeks advice from emergency planners to determine the safety of any proposed developments downstream of the reservoir and that on-site flood heights during a breach scenario are calculated and incorporated into the FRA for any proposed development, along with mitigation measures suitable for the associated flood breach hazard.

2.2 Review of Historic Flood Events

- 2.2.1.1 Historical flood events are recorded by the EA and subsequently documented in the form of reports, photographs and maps. However, as surface water flooding is generally monitored and recorded by the LLFA, only major surface water flood events are included within the EA Recorded Flood Outlines map. Therefore, information provided by MDC and the LLFA on previous flood events has also been used to identify any events not shown in the EA records. Appendix 5 shows the EA's recorded merged flood outlines for the district.
- 2.2.1.2 In Mansfield District 13 flood events have been identified dating back to August 1858, however only four are shown in the EA recorded flood outlines mapping. Those included within the mapping date to 1947, 1977, June 2007, and October 2023. However, it is noted that some areas known to have flooded during 2007 and 2023 are not included within the EA mapping extents as they arose from surface water flooding. Table 6 shows the full list of the notable flood events identified.
- 2.2.1.3 Most instances of historic flood events within Mansfield District are associated with heavy rainfall, particularly on already saturated soils.

Table 6- Summary of Historic Flood Events within Mansfield District

Date	Notes on Event	Location
August 1858	Flash floods	Mansfield area
August 1873	Flash floods	Mansfield
March 1889	High rain and snowfall	Mansfield
May 1912	Flash floods	Mansfield town centre
August 1922	Flash floods	Mansfield
1947	Flooding from River Maun and River Meden	
July 1968	River Maun overtopped after prolonged rainfall	Bridge Street, Mansfield
1977	Flooding from River Maun and River Meden	
October 2001	Flash floods	Mansfield Meden Vale
August 2002	Flash floods	Mansfield
August 2006	Flash floods	Mansfield
June 2007	Widespread surface water and fluvial flooding (River Meden)	Carter Lane and Church Road, Warsop Vale Field Mill Dam overtopped into Nottingham Road Pleasley Sookhome Road, Spion Kop
June 2016	Extreme rainfall – surface water flooding	
October 2023	Prolonged rainfall caused by Storm Babet	Nottingham Road, Beck Lane, and A617/A60 Mansfield Church Warsop Pleasley

2.3 Review of Flood Defences

- 2.3.1.1 The EA Asset Information Management System (AIMS) contains details of flood defence assets associated with main rivers. This dataset shows that the majority of the watercourses in the district are not formally defended but may be informally protected by natural high ground on either side of the watercourse. Where formal protection exists, this is generally in the form of engineered high ground. A map of flood defences within the district is available in Appendix 6.
- 2.3.1.2 Table 7 provides a summary of the flood defences including, where available, their condition, extent and standard of protection.

Table 7- Flood Defences in Mansfield

Location	Defence Type	Length	Condition	Design
River Maun Left Bank – Titchfield Park (E: 453953, N: 360492)	Engineered High Ground	336	-	100
River Maun Right Bank – Titchfield Park (E: 453910, N: 360467)	Engineered High Ground	337	-	100
River Maun Left Bank – St Peter’s & St Paul’s Church (E: 454119, N: 361024)	Engineered High Ground	48	-	100
River Maun Right Bank – St Peter’s & St Paul’s Church (E: 454129, N: 360994)	Engineered High Ground	35	-	100
River Maun Right Bank – St Peter’s & St Paul’s Church (E: 454124, N: 361025)	Engineered High Ground	41	-	100
River Maun Left Bank – St Peter’s & St Paul’s Church (E: 454124, N: 360993)	Engineered High Ground	41	-	100
River Maun Right Bank – Rock Court (E: 454122, N: 361124)	Engineered High Ground	113	-	100
River Maun Left Bank – Rock Court (E: 454118, N: 361132)	Engineered High Ground	116	-	100
River Maun Left Bank – Water Meadows Swimming Complex (E: 454045, N: 360617)	Engineered High Ground	38	-	100
River Maun Left Bank – Water Meadows Swimming Complex (E: 454076, N: 360657)	Engineered High Ground	51	-	100
River Maun Right Bank – Water Meadows Swimming Complex (E: 454080, N: 360649)	Engineered High Ground	57	-	100
River Maun Right Bank – Viaduct (E: 451965, N: 359779)	Engineered High Ground	19	-	100
River Maun Right Bank – Viaduct (E: 451955, N: 359748)	Engineered High Ground	52	-	100
River Maun Left Bank – Viaduct (E: 451987, N: 359817)	Engineered High Ground	48	-	100
River Maun Left Bank – Viaduct (E: 451953, N: 359761)	Engineered High Ground	82	-	100
River Maun Right Bank – Field Mill Pond (E: 453703, N: 360307)	Engineered High Ground	30	-	10
River Maun Left Bank – Field Mill Pond (E: 453682, N: 360340)	Engineered High Ground	128	-	10
River Maun Left Bank – St Peter’s Way (E: 454122, N: 360862)	Engineered High Ground	33	3	100

Location	Defence Type	Length	Condition	Design
River Maun Right Bank – St Peter's Way (E: 454148, N: 360888)	Engineered High Ground	128	-	100
River Maun Left Bank – The Old Brewery (E: 454075, N: 360700)	Engineered High Ground	53	-	100
River Maun Right Bank – The Old Brewery (E: 454080, N: 360699)	Wall	48	-	100

- 2.3.1.3 The condition of flood defences owned by the Environment Agency are graded on a scale of 1 to 5, where 1 is Very Good (cosmetic defects that will have no effect on performance) and 5 is Very Poor (severe defects resulting in complete performance failure)³².
- 2.3.1.4 Only one engineered flood defence within Mansfield District is maintained by the Environment Agency, located on the left bank of the River Maun adjacent to a car park on Church Lane. This asset has a condition rating of 3 which is classed as Fair (defects that could reduce the performance of the asset). The other identified assets within the district do not have an associated condition rating as they are maintained by either the local authority or a private individual.
- 2.3.1.5 The design Standard of Protection (SOP) refers to the flood level (expressed as a return period) which the flood defence asset was designed to protect against³². The majority of the assets in Mansfield District have a design SOP of 100 years, meaning they are designed to protect up to the 1.0% AEP design event. The defences around Field Mill Pond are designed to a lower 10 year SOP.

2.4 Review of Flood Warning

- 2.4.1.1 The EA is responsible for issuing flood warnings in the district. In regularly monitoring the river network they aim to give the public notice of any local main river overtopping its bank (flood alert) or flooding properties (flood warning).
- 2.4.1.2 Water levels are monitored at a number of locations, and this information is used to inform flood warnings at the four flood warning areas within the study area. Flood warning areas are geographical areas where the EA expect flooding to occur and where the EA provide a flood warning service. A flood warning is issued when there is a risk of property flooding. Maps showing the location of the flood warning and alert areas are available in Appendix 7. The flood warning areas in the study area are listed below:

- River Maun at Mansfield
- River Maun at Sherwood Forest Caravan Park near Kings Clipstone
- River Meden at Market Warsop, Church Warsop and Meden Vale
- River Meden at Pleasely

³² EA (2017) *Spatial Flood Defences (including standardised attributes) Product Description*. <https://environment.data.gov.uk/asset-management/downloads/spatial-flood-defences.pdf>

2.4.1.3 Gauges along watercourses are also used to issue flood alerts across wider flood alert areas. Flood alert areas are geographical areas where it is possible for flooding to occur. A flood alert is issued to warn people of the possibility of flooding. The flood alert areas in the study area are listed below:

- River Maun in Nottinghamshire
- River Meden in Nottinghamshire

2.4.1.4 The timings of flood alerts and warnings are typically determined by trigger levels at the gauges which relate to the following:

- **FAL – Flood Alert:** The level where flood waters first come out of bank if there were no defences.
- **FW – Flood Warning:** The level where flood waters flood 1 property.
- **SFW – Severe Flood Warning:** The level where flood waters flood 50 properties.

2.4.1.5 Flood alerts and warnings are available from the EA by a preferred contact method e.g. by phone or email. It is recommended that landowners/property owners in flood risk areas sign up to this service.

2.4.1.6 The catchments of the River Maun and River Meden in Mansfield District are both predominantly underlain by relatively permeable sandstone bedrocks. However, the catchment of the River Maun is heavily urbanised likely resulting in faster response times. The River Meden catchment has a higher proportion of agricultural land which is likely to result in a less flashy catchment than the River Maun.

3 Flood Risk at Site Allocations

3.1 Sequential Test

- 3.1.1.1 This SFRA provides information to support the application of the sequential test to the preferred sites identified by Mansfield District Council.
- 3.1.1.2 The Sequential Test ensures that a sequential, risk-based approach is followed to steer new development to areas with the lowest risk of flooding, taking all sources of flood risk and climate change into account. Where it is not possible to locate development in areas at low-risk from all sources, now and in the future, the Sequential Test should go on to compare reasonably available sites:
- within medium risk areas; and
 - within high-risk areas, only where there are no reasonably available sites in low and medium risk areas.
- 3.1.1.3 The Sequential Test should then consider the spatial variation of risk within medium and then high flood risk areas to identify the lowest risk sites. Highly or more vulnerable development should be prioritised for areas where flood risk is lowest and less vulnerable development located in areas at higher risk if necessary.
- 3.1.1.4 Site specific FRAs should apply the Sequential Test at a site level prioritising development in low risk areas before considering areas at medium or high flood risk from any source. To support such an assessment, information on flood depth, velocity, hazard and speed-of-onset should be considered along with the role of flood management infrastructure and the potential impacts of climate change.

3.2 Exception Test

- 3.2.1.1 In situations where sites at lower risk of flooding are not available following application of the Sequential Test, potential development may be located in medium to high-risk areas. In these cases, it may be necessary to apply the Exception Test.
- 3.2.1.2 The Exception Test requires two additional elements to be satisfied before allowing development to be allocated or permitted. It should be demonstrated that:
- development will provide wider sustainability benefits to the community that outweigh flood risk; and
 - the development will be safe for its lifetime taking account of the vulnerability of its users, without increasing flood risk elsewhere, and, where possible, will reduce flood risk overall.
- 3.2.1.3 Table 8 sets out the circumstances when the exception test will be required. More guidance on application of the sequential and exception test is provided in the NPPF and flood risk and coastal change PPG.

Table 8- Flood risk vulnerability and flood zone 'incompatibility'

Flood Zones	Essential infrastructure	Highly vulnerable	More vulnerable	Less vulnerable	Water compatible
Zone 1	✓	✓	✓	✓	✓
Zone 2	✓	Exception Test	✓	✓	✓
Zone 3a	Exception Test	X	Exception Test	✓	✓
Zone 3b	Exception Test	X	X	X	✓

3.3 Cumulative Impacts of Development and Land Use Change

- 3.3.1.1 The cumulative flood risk impacts of development proposed within the Local Plan and additional windfall development needs to be considered as part of the planning process. Land use and land management influences the characteristics of how rainwater runs off land into local water networks. Localised changes in land use can alter the baseline behaviour of an area. Where this occurs in multiple areas within a catchment, it can collectively cause a change in flooding characteristics for the catchment. As such, localised changes in land use may incur detrimental impacts downstream on a catchment-wide scale.
- 3.3.1.2 An instance where this can occur is the development of previously rural land causing an increase to the area of impermeable surfaces. If insufficient measures are taken to mitigate these changes, surface runoff following rainfall can increase in volume and velocity. When instances of this happen repeatedly across a catchment, it may result in a reduced time between rainfall events and peak flood levels within a catchment resulting in greater magnitude floods, making effective flood response more difficult.
- 3.3.1.3 In addition, the development of pre-existing open land may result in loss of floodplain area, reducing floodplain storage capacity. This may have a detrimental impact on flood risk to immediately neighbouring land as well as downstream of the development. Practices that may cause this include changes to a building's footprint, which could reduce flood storage area, and the raising of ground levels above the existing floodplain, which may interfere with storage and floodwater conveyance.
- 3.3.1.4 The strategic policies of MDC's local plan will be informed by this SFRA, with a sequential approach taken in the allocation of land to steer new development to the areas with the lowest flood risk based on an understanding of flood risk from all sources.
- 3.3.1.5 For allocated and non-allocated sites, developers must follow advice provided by the EA and LLFA to mitigate against detriment to downstream areas in the instance of a flooding event. FRAs supporting developments should incorporate evidence that the cumulative effects of development in the area, both in terms of past and present developments, have been considered and shown to be sufficiently mitigated.
- 3.3.1.6 Additionally, developers should have a suitable surface water drainage strategy and SuDS plan that demonstrate there is no increase in surface water flood risk as a result of any new impermeable surfaces that may be present within a development. A further cumulative impact of development that should be considered is the impact on sewer capacity. Severn Trent Water should be consulted in this regard.
- 3.3.1.7 More detail is provided in section 4 on the requirements for site specific FRAs and how development impacts can be mitigated.

4 Flood Risk Management

SFRAs should include information on i) opportunities to reduce the causes and impacts of flooding and ii) recommendations on how to address flood risk in development. This section focuses on these two areas and details the specific requirements for site-specific FRAs. As outlined in PPG³³, developers should refer to the SFRAs and site-specific FRAs to identify opportunities to reduce flood risk overall and to demonstrate that the measures go beyond just managing the flood risk resulting from the development. This is closely tied into the requirements of the exception test in ensuring development is safe and provides wider sustainability benefits that outweigh the flood risk incurred by it. This includes benefits that could reduce flood risk to the wider community.

4.1 Opportunities to Reduce Flood Risk

4.1.1.1 This section identifies at a strategic level how a proposed development has the potential to improve the water environment via the use of SuDS and Natural Flood Management (NFM), in addition to remedial work on structures (i.e. culverts and bridges) and the provision of green spaces. Some of the potential measures and key benefits are outlined below:

- Runoff control using SuDS - SuDS slow the rate of surface water run-off and where viable use infiltration to mimic natural drainage in both rural and urban areas. This reduces the risk of “flash-flooding” which occurs when rainwater rapidly flows into the public sewerage and drainage systems. Runoff is controlled at or near source and typically, greenfield rates are maintained or there is a betterment on brownfield rates at existing development sites. This minimises excess runoff to third party land, thereby managing and reducing flood risk where possible. Provided SuDS are correctly implemented they should safeguard against the cumulative impact of development within Mansfield District.
- Promoting the use of rainwater re-use – In accordance with the drainage hierarchy contained in Approved Document H of the Building Regulations³⁴ and the need to mitigate against water scarcity, surface water drainage should consider rainwater re-use (e.g. rainwater harvesting, greywater recycling) before discharge to the ground, a watercourse or a sewer. This approach recognises water as a valuable resource with rainwater collected (harvested) for non-potable use where practicable. This not only reduces potable water demand, but it can also reduce the volume of surface water runoff requiring disposal.
- Promoting the use of infiltration SuDS – Water re-use can be used for small rainfall events, however for larger order events, typically water will need to be discharged elsewhere. The PPG sets out the hierarchy of drainage to promote the use of SuDS, by aligning modern drainage systems with natural water processes. The most sustainable option is considered to be infiltration of surface water run-off into the ground as it aligns closely with natural processes. This generally requires i) soils and/or bedrock to be permeable ii) groundwater levels to be a significant distance below the surface reducing the risk of groundwater emergence, iii) minimal land stability issues and iv) sites to be

³³ Ministry of Housing, Communities & Local Government (2022) Paragraph: 037 Flood risk and coastal change, <https://www.gov.uk/guidance/flood-risk-and-coastal-change>

³⁴ HM Government (2010) *Approved Document H- Drainage and waste disposal*
<https://www.gov.uk/government/publications/drainage-and-waste-disposal-approved-document-h>

flat or gently sloping. Where infiltration is proposed, infiltration rates should be confirmed through BRE Digest 365 Soakaway Tests. Additional groundwater monitoring may also be required where there is a risk of groundwater emergence.

- Increasing flood storage and attenuation using natural flood management (NFM) - NFM involves techniques that aim to work with natural hydromorphological processes, features and characteristics to manage the sources and pathways of flood waters. Examples include the introduction of storage/conveyance features such as water meadows, and the incorporation of riverside vegetation or leaky barriers to help slow overland flows and increase interception. This in turn prevents a flashy catchment response and serves to attenuate peak flows, mainly for lower order rainfall events and in smaller catchments.
- Maintaining 10 m riparian buffer zones around watercourses - Development close to watercourses can cause issues if there is insufficient space to construct flood risk management measures or to be able to adequately access watercourses for proper maintenance. In order to achieve this, a separation distance of at least 10 metres will normally be required, free from built development, parking areas and private gardens. Where a watercourse runs through a proposed development, a buffer should be provided on both banks. New development on previously developed sites should seek to reinstate a buffer zone wherever feasible. As well as allowing for maintenance, such areas can reduce sediment entering the watercourse, provide scope for re-meandering the river and may provide biodiversity opportunities through natural or seminatural habitat creation and for passive recreation. They can also provide for active travel links in appropriate cases. Where relevant, there should be a long-term landscape and ecological management plan for this buffer.
- Land management using NFM - Incorporating good practice into the management of land for the purpose of increasing infiltration of water and sediments into soils and reducing surface runoff. This relates to encouraging the use of infiltration SuDS where feasible at new development sites as well as improving management on existing land. Woodland creation is also encouraged in some cases.
- River and floodplain restoration using NFM - The stabilisation of excessively eroding riverbanks in order to reduce deposition of sediment downstream and works that restore an altered river to a more appropriate shape, in turn reconnecting the river with its floodplain. These options could be considered at both the catchment and site scale. For example, where future development is located in the vicinity of an eroding riverbank or altered river, restoration could be considered as part of the scheme to bring wider benefits.
- Maintaining and removing existing structures/channels - Developments can serve to adapt problem structures within a watercourse/floodplain, which can improve conveyance and reduce impact of flooding. Diverting and daylighting of culverted watercourses can also provide more effective flow routing through an area alongside environmental benefits. However, it should be noted that de-culverting has the potential to substantially alter the flood characteristics of a watercourse. Often these changes are positive, though de-culverting may have the potential to increase flood risk elsewhere. Therefore, hydraulic modelling should be carried out to assess the impacts of any alterations to culverts.

- Managing water quality using SuDS - Incorporation of SuDS features which provide filtration and capture of pollutants. These can include features such as permeable pavements and swales within the surface water system, which can settle and filter contaminants to provide treatment of surface water before being discharged. The level of treatment provided can be set relative to the risk index of the site. Particular attention should be applied to sites in groundwater source protection zones (SPZs) where additional measures may be necessary to protect the water environment. In sites where waterbodies are proximal, the EA and LLFA should be consulted to determine local sensitivities and any specific requirements.
- Enhancing biodiversity & amenity - Developments can improve the quality of existing habitats and help create new habitats through landscape change. Sites offer an opportunity to establish green corridors and create coherent ecological networks. Development sites can also provide amenity benefits in the form of publicly accessible green spaces and improved access networks. SuDS and NFM often create new water features which can, if correctly implemented, bring associated educational benefits. For the allocated sites and for future development in general, biodiversity and amenity should always be factored into site design and the provision of SuDS/NFM.

4.2 SuDS

- 4.2.1.1 This section provides more detail on SuDS design considerations and requirements at a site-level. The NPPF states that any development should give priority to their use, and local authorities assess planning proposals based on their ability to mitigate the impacts that development has on surface water runoff rates and volumes.
- 4.2.1.2 In Mansfield District, all developments must incorporate SuDS as appropriate and in line with the Government's Standards⁷ and the MDC SuDS Supplementary Planning Document (SPD)¹². Smaller schemes are encouraged to incorporate SuDS, where possible. All new developments in areas of flood risk should give priority to SuDS. The SuDS Manual published in 2007 and updated in 2015³⁶ incorporates research, industry practice and construction methods for a range of SuDS components providing guidance on their design, implementation, and maintenance.
- 4.2.1.3 SuDS measures have been implemented within public spaces in Mansfield via the Severn Trent Water Green Recovery Programme³⁵. Between 2022 and 2025 more than 340 SuDs schemes were retrofitted across Mansfield including a combination of detention basins, permeable paving, verge rain gardens, and bioswales. Alongside reducing flood risk, a major aim of this project was to divert surface water runoff away from sewers increasing their capacity during a storm event. In turn this aims to reduce sewer flooding events and storm overflows to watercourses, improving water quality. The scheme also provides biodiversity and amenity benefits within the urban area.

³⁵ Severn Trent Water (2026) *Reducing flood risk in Mansfield*. <https://www.stwater.co.uk/wonderful-on-tap/green-recovery/mansfield-sustainable-flood-resilience/>

- 4.2.1.4 SuDS designs should provide multi-functional benefits, enhancing amenity, biodiversity and water quality as well as managing surface water. Features such as ponds, wetlands, filter strips, bio-swales, and rain gardens can provide potential new habitats for wildlife and contribute towards the green infrastructure and enhanced urban design of the district. Some SuDS interventions can also provide water quality improvements by reducing sediment and contaminants from runoff.
- 4.2.1.5 SuDS include a wide range of components, allowing the design to be tailored to the specific needs of a site. These components are generally split into two main categories; infiltration systems and attenuation systems, which can be defined as follows:
- Infiltration Systems - Infiltration components facilitate the infiltration of water into the ground. These often consist of temporary storage zones which allow for the slow release of water into the soil. They include permeable surfaces such as gravel, grassed areas, swales and permeable paving; and sub-surface components such as filter drains, geocellular systems, and soakaways.
 - Attenuation Systems – Attenuation SuDS capture runoff and control its subsequent discharge off-site. They are divided into conveyance systems, which convey flows to downstream storage systems; and storage systems, which control the flows being discharged from a site by storing water and slowly releasing it. Examples of attenuation SuDS include detention basins, wetlands, ponds, and swales.
- 4.2.1.6 A central design component for SuDS is the SuDS management train. SuDS should not be thought of as individual components, but as an interconnected system designed to manage, treat, and make best use of surface water. The use of a sequence of components that collectively provide the necessary processes to control runoff and water quality is therefore often encouraged.
- 4.2.1.7 The use of both infiltration and attenuation systems is determined by the permeability of the soil and a site's topography. Relatively flat or gently sloping sites are often necessary for infiltration SuDS, and geotechnical investigations required to determine whether infiltration rates are sufficient. If ground conditions cannot support infiltration systems, surface water may need to be attenuated using measures to capture surface water. Attenuation systems do not offer the same range of sustainability benefits as infiltration systems and therefore infiltration SuDS are always preferred where viable.
- 4.2.1.8 In developing an interconnected system, the layout and function of drainage systems should be considered at the start of the design process for a new development. This will help ensure better integration with road networks and other infrastructure which can maximise the availability of developable land. This in turn can lead to the provision of multi-functional benefits and reduced land-take. Maintenance requirements and adoption arrangements should also be incorporated into the planning process for any SuDS systems proposed. These should consider and encompass the lifetime of the development.

- 4.2.1.9 When determining SuDS design, it is necessary to estimate runoff rates and volumes for a development site. These can be derived using the FEH methods, specifically the rainfall runoff method implemented in ReFH 2. This is the current recommended method outlined in the CIRIA SuDS Manual³⁶. Existing run-off rates are estimated by extracting point or catchment data. This data includes variables which describe rainfall and runoff characteristics in a particular area. For a development site the runoff characteristics derived can be linearly scaled based on the site area, yielding runoff rates and volumes for that area.
- 4.2.1.10 Note, when considering brownfield sites, these often coincide with critical drainage areas (CDAs), and the incorporation of SuDS is seen as key opportunity that may benefit existing hardstanding areas at flood risk.
- 4.2.1.11 At the time of writing Schedule 3 of the Flood and Water Management Act 2010 is expected to be implemented in England following the January 2023 review³⁷ of its proposed implementation. However, its implementation date is yet to be confirmed. Schedule 3 will make SuDS mandatory on all developments exceeding 100m² and provides a framework for the approval and adoption of drainage systems. A sustainable drainage system approving body (SAB) will be formed within unitary and county councils, and national standards on the design, construction, operation, and maintenance of sustainable drainage systems for the lifetime of the development should be published.

4.3 Flood Resilience

- 4.3.1.1 Property Flood Resilience (PFR) is another flood risk management option available for new and existing development. It is an approach to building design which aims to reduce flood damage and speed up recovery and reoccupation following a flood. It uses a combination of flood resistance and recovery measures.
- 4.3.1.2 It is described in the industry-developed CIRIA Property Flood Resilience Code of Practice³⁸, which provides advice for both new-build and retrofit. PFR is also now a key consideration in the NPPF (paragraph 181b) for new developments in flood risk areas. This states that all new development in areas at risk of flooding should be appropriately flood resistant and resilient such that, in the event of a flood, it could be quickly brought back into use without significant refurbishment. The associated PPG for Flood Risk and Coastal Change also identifies flood resilience in new developments as a way of ensuring that developers can adapt to the challenges of a changing climate. The latest EA national strategy on flood risk and coastal change, also identifies flood resilience measures as a key means to adapt to the threats from flooding and coastal change, enabling growth in a sustainable and climate resilient way.
- 4.3.1.3 The NPPF is supported by the PPG for Flood Risk and Coastal Change, this states that the first preference is to apply the avoidance measures set out in the sequential approach to planning. Where this is not possible, flood resistance and flood resilience measures may need to be incorporated into the design of buildings and other infrastructure, including behind flood defence systems.
- 4.3.1.4 Resistance and resilience measures are unlikely to be suitable as the only mitigation measure to manage flood risk, but they may be suitable in some circumstances, such as:
- Water-compatible and less vulnerable uses where temporary disruption is acceptable, and the development remains safe;

- Where the use of an existing building is to be changed and it can be demonstrated that the avoidance measures set are not practicable, and the development remains safe;
 - As a measure to manage residual flood risk from flood risk management infrastructure when avoidance measures have been exhausted.
- 4.3.1.5 In these cases, and where existing development is already in flood risk areas, flood resilience measures could be considered. These are typically defined as sustainable measures that can be incorporated into the building fabric, fixtures and fittings to reduce the impact of floodwater on property. They allow for easier drying and cleaning, ensure that the structural integrity of the building is not compromised, and reduce the amount of time until the building can be re-occupied. Flood repairability should also be considered, which involves the design and construction of building elements to ensure the ease of replacement and repair should they suffer flood damage.
- 4.3.1.6 As part of being resilient, buildings should be structurally sound and remain in situ during the worst-case flooding effects (depth and velocity). Any measures in place to ensure structural soundness during a flood should not cause a hazard to people.
- 4.3.1.7 Some of the main measures to ensure structural safety and resilience are outlined below:
- Flood doors and windows - These can prevent water from entering a property by creating a watertight seal during a flood.
 - Flood barriers - These can be fitted to external doorways, windows, across driveways, garage doors and gardens. It is recommended that they are not fitted higher than 600mm in order to prevent structural damage to walls.
 - Flooring - Concrete floors with damp proof membranes can be used in properties which are at particular risk of groundwater flooding as they prevent water rising up through the floors.
 - Walls - Pointing which is in poor condition should be repaired with a water-resistant mortar and any cracks or holes in brickwork can be repaired with a waterproof silicone sealant.
 - Drains and pipes - Fitting non-return valves to pipes will prevent backflow from toilets, sinks, drains and manholes when drains and sewers become overwhelmed with flood water.
 - Airbricks and vents - There are a number of products available, including automatic (self-closing) air bricks which allow ventilation but prevent flood water entering during a flood event. Alternatively, air brick covers can be placed over airbricks.
 - Adaption measures - Where flooding does occur waterproof plaster, solid concrete floors and tiled floor coverings, can reduce flood damage and greatly shorten the recovery

³⁶ CIRIA (2015) *The SuDS Manual (C753)*

³⁷ DeFRA (2023) The review for implementation of Schedule 3 to The Flood and Water Management Act 2010
https://assets.publishing.service.gov.uk/media/63bc504dd3bf7f263846325c/The_review_for_implementation_of_Schedule_3_to_The_Flood_and_Water_Management_Act_2010.pdf

³⁸ CIRIA (2021) *Code of practice for property flood resilience (C790)*
https://www.ciria.org/CIRIA/Resources/Free_publications/CoP_for_PFR_resource.aspx

time after a flood. Other steps include raising electric sockets to preserve electricity supply and moving paperwork and valuables to higher levels to minimise potential damage.

- 4.3.1.8 Planning and building standards have a complementary role in flood management and the use of flood damage resistant and mitigation measures could be considered at the proposed preferred sites where appropriate. These may be required as part of ensuring that consequences of flooding are acceptable.
- 4.3.1.9 It should be noted that mitigation and flood resilience measures are not sufficient justification to permit a development if the tolerable conditions are exceeded during an extreme flood event. High velocities and/or depths of floodwater pose a potential risk to life, may cause structural damage to buildings and could impact on human health and wellbeing.

4.4 Site Specific FRA Considerations

4.4.1.1 An FRA is required for the following development scenarios:

- In Flood Zone 2 or 3 including minor development and change of use.
- More than 1 hectare (ha) in Flood Zone 1.
- Less than 1 ha in Flood Zone 1, including a change of use in development type to a more vulnerable class (for example from commercial to residential), where they could be affected by sources of flooding other than rivers and the sea (for example surface water drains, reservoirs).
- In an area within Flood Zone 1 which has critical drainage problems as notified by the EA.

4.4.1.2 In general, FRAs should address the points below, full advice is available within the EA's FRA guidance^{39,40}:

- The proposed site's address.
- Description of the proposed development.
- An assessment of the flood risk from all sources of flooding for the proposed development, including consideration for an allowance for climate change.
- The estimated flood level for the proposed development which takes into account the impacts of climate change over the proposed development's lifetime.
 - The estimated flood level is the depth of flooding predicted on a proposed development site in either a) a 1 in 100-year river flood plus an allowance for climate change b) a 1 in 200-year tidal flood event plus an allowance for climate change.
 - It should also be noted that if a proposed development is in an area with flood defences present, that the estimated flood level should account for residual flood risk if they breached or were overtopped.

³⁹ DeFRA & EA (2017) *Flood risk assessments if you're applying for planning permission*
<https://www.gov.uk/guidance/flood-risk-assessment-for-planning-applications>

⁴⁰ Planning Portal (2026) *What to include in your flood risk assessment*.
<https://www.planningportal.co.uk/permission/commercial-developments/understanding-and-assessing-flood-risk/your-flood-risk-assessment> Accessed: 09/02/26

- Flood levels may be available from the EA or Local Planning Authority but if not, these can be calculated by specialist flood risk consultants if required.
 - Details of the finished floor levels; these should be a minimum elevation of the design flood level plus a freeboard.
 - Details of flood resistance and resilience plans.
 - All supporting plans and drawings.
 - All other information for example planning correspondence.
- 4.4.1.3 As indicated, liaison should be sought when making a planning application and it is also recommended that the LLFA and local authority be contacted for area specific advice on flood risk requirements. The following sections provide more detail on some of the areas mentioned above.

4.5 Residual Risk

- 4.5.1.1 Residual risk should be minimised at each stage of the planning process. Residual risks include those that result from the failure or overtopping of flood defences; the blockage of drainage systems; failures in flood forecasting or flood warning issue, receipt, or response; and failure of active measures such as demountable flood barriers. It can be minimised by taking a sequential approach to development. For example, in locating the buildings in areas at lowest risk, raising floor levels, managing site levels (where appropriate), raising vulnerable uses to upper floors, and ensuring that appropriate passive flood resistant/resilient and recovery measures have been incorporated.
- 4.5.1.2 Where an assessment shows that flood risk and residual risks are a consideration for a plan or development proposal, the Avoid - Control - Mitigate - Manage residual risk process should be followed. More detail is provided in paragraph 4 of the Flood Risk and Coastal PPG.
- 4.5.1.3 To determine the level of risk and safety implications for development proposed in a site allocation or planning application, the following should be considered:
- the characteristics of a possible flood event,
 - the safety of people within a building if it floods,
 - the safety of people around a building and in adjacent areas,
 - the structural safety of buildings; and,
 - the impact of a flood on the essential services provided to or from a development.
- 4.5.1.4 Within Mansfield district, the main residual flood risks relate to reservoir breach and culvert blockages.
- 4.5.1.5 The EA have previously raised concerns of the residual risk of reservoir breach on proposed developments directly downstream of the Kings Mill Reservoir in the southwest of the district. They recommend the LPA seeks advice from emergency planners to determine the safety of any proposed developments downstream of the reservoir and that on-site flood heights during a breach scenario are calculated and incorporated into the FRA for any proposed development, along with mitigation measures suitable for the associated flood breach hazard.

- 4.5.1.6 Furthermore, the River Maun is culverted in several locations across Mansfield town, therefore, culvert blockages may exacerbate flooding resulting in greater depths and extents. Culvert blockage scenarios should be considered by developers within an FRA where their sites may be affected.
- 4.5.1.7 The EA should be contacted directly regarding culvert blockages of main watercourses. At the time of this SFRA, the EA can provide some blockage information on request (including a model report) for the 25%, 50%, 75% and 95% blockages of:
- Field Mill Culvert NGR SK5368860347
 - Gas Board Mansfield NGR SK5409760787
 - Maun Bridge Street Culvert NGR SK5412361045
 - Metalbox Upstream Culvert NGR SK5414161187
 - Metalbox Downstream Culvert NGR SK5429561448
- 4.5.1.8 More detail is provided in paragraph 5 of the Flood Risk and Coastal PPG.

4.6 Emergency Planning

- 4.6.1.1 Another consideration to ensure that development is safe is whether adequate flood warnings would be available to people using the development. An emergency plan will be needed wherever emergency flood response is an important component of making development safe. Emergency plans will need to take account of the impacts of climate change on escape routes. Residual risk mitigation measures may also include the provision of a safe refuge above the extreme (0.1% with climate change AEP) residual risk flood levels with a freeboard. Emergency flood plans should follow the ADEPT and EA guidance⁴¹. More detail is provided on managing residual risk and emergency planning in paragraph 42-48 of the Flood risk and Coastal PPG.
- 4.6.1.2 Across the District as a whole, the Civil Contingencies Act 2004⁴² is one of the most relevant pieces of legislation to emergency planning for flooding. It lists local authorities, the EA and emergency services as 'Category 1' responders to emergencies. It places duties on these organisations to:
- Undertake risk assessments;
 - Manage business continuity;
 - Carry out emergency planning; and
 - Warn and advise the public during times of emergency.

⁴¹ Adept and EA (2019) Flood risk emergency plans for new development
<https://www.adeptnet.org.uk/system/files/documents/ADEPT%20%26%20EA%20Flood%20risk%20emergency%20plans%20for%20new%20development%20September%202019....pdf>

⁴² UK Parliament (2004) Civil Contingencies Act
<https://www.legislation.gov.uk/ukpga/2004/36/section/1/enacted>

- 4.6.1.3 The EA has a key role in relation to flooding. It is the lead agency for warning those at risk and maintaining and improving flood defences.
- 4.6.1.4 Local resilience forums (LRFs) – of which the EA is a member in all regions – have developed multi-agency flood plans (MAFPs). These cover various elements associated with a flood. The LRF applicable to Mansfield District is the Nottinghamshire Resilience Forum⁴³. All the organisations that make up the Nottinghamshire Resilience Forum work together to ensure that preparations and plans are in place for major emergencies and incidents affecting the county. These are regularly reviewed, tested and updated so that agencies can respond immediately and effectively to any threat or incident.

4.7 Finished Floor Levels

- 4.7.1.1 As mentioned in section 4.4, details of the finished floor levels should be included within an FRA. These need to consider design flood levels and climate change in view of the nature and lifetime of the development. More detail on the design event and climate change allowances applicable to different development types is provided in the PPG on climate change allowances⁴. Development should be set at a floor level to provide an appropriate freeboard above the design flood level which should be calculated with climate change considered. A freeboard is defined as an additional amount of height above the design flood level which is used as a factor of safety to account for any uncertainty. Typically, it is set to 300 or 600mm above the design flood level. The freeboard allowance should be agreed with the EA, LLFA and/or local authority depending on the scale of the development and flood risks present. More detail is provided in the PPG for preparation of an FRA.

4.8 Third Party Impacts

- 4.8.1.1 Development, or the cumulative impacts of development, has the potential to increase the risk of flooding elsewhere. This increase flood risk elsewhere can occur through the loss of floodplain storage, the redirection of flood flow routes, or inadequate surface water management.
- 4.8.1.2 Where development is located within an area of existing flood risk, it may result in a loss of floodplain storage. Loss of storage often occurs when finished floor levels are raised above the design flood level. While this raising is necessary to protect the development, the volume occupied by the building's raised footprint reduces the capacity of the floodplain. Consequently, the water that would have occupied that space is displaced, potentially increasing flood risk in the surrounding area.
- 4.8.1.3 Even if a development is located outside of existing flood risk areas, the increase in impermeable area and the inadequate management of surface water may also result in flood risk impacts to third parties. Where this is the case, a site-specific FRA should include an assessment of 3rd party impacts. The EA and LLFA should be contacted to confirm the requirements for assessing 3rd party impacts (e.g. hydraulic modelling), mitigation and compensatory storage.
- 4.8.1.4 Where a development is proposed that results in a loss to floodplain storage, compensatory storage will be required by the EA. Compensatory storage refers to a practice of offsetting the effects of a development that encroaches into floodplain storage by providing a hydraulically equivalent, excavated floodplain storage capacity onsite, or elsewhere if hydraulically and hydrologically linked. This replacement floodplain storage is required on an equivalent level-for-level and volume-for volume basis.

4.9 Flood Risk Activity Permits

4.9.1.1 A permit or exemption is required for any of the following activities under the Environmental Permitting (England and Wales) Regulations 2016:

- Erecting any temporary or permanent structure in, over or under a main river;
- Altering, repairing or maintaining any temporary or permanent structure in, over or under a main river, where the work could affect the flow of water in the river or affect any drainage work;
- Building or altering any permanent or temporary structure designed to contain or divert flood waters from a main river;
- Dredging, raising or removing any material from a main river;
- Diverting or impounding the flow of water or changing the level of water in a main river;
- Quarrying or excavation within 16 metres of any main river, flood defence or culvert;
- Any activity within 8 metres of the bank of a main river, or 16 metres if it is a tidal main river;
- Any activity within 8 metres of any flood defence structure or culvert on a main river, or 16 metres on a tidal river;
- Any activity within 16 metres of a sea defence structure;
- Activities carried out on the floodplain of a main river, more than 8 metres from the river bank, culvert or flood defence structure (or 16 metres if it is a tidal main river), if you do not have planning permission.

4.9.1.2 Further information regarding flood risk permits can found in the EA guidance for permits⁴⁴.

4.10 Ordinary Watercourse Land Drainage Consent

4.10.1.1 If works are required close to an ordinary watercourse where they have the potential to alter, obstruct, or culvert small watercourses, ordinary watercourse land drainage consent is likely to be required.

4.10.1.2 Nottinghamshire County Council should be contacted regarding any requirements for ordinary watercourses. If located within an Internal Drainage Board (IDB) area, applications may also be required to be submitted to the relevant IDB.

⁴³ Nottinghamshire Local Resilience Forum (2025) <https://www.nottinghamshire.police.uk/police-forces/nottinghamshire-police/areas/about-us/about-us/additional-services/nottinghamshire-local-resilience-forum-lrf/>

⁴⁴ EA (2024) *Flood risk activities: environmental permits* <https://www.gov.uk/guidance/flood-risk-activities-environmental-permits>

5 Conclusions and Recommendations

5.1 Conclusions

- 5.1.1.1 A collation of potential sources of flood risk has been carried out in accordance with NPPF and associated legislation and guidance. Data to support the assessment has been acquired through consultation with the EA, LLFA, and STW.
- 5.1.1.2 The dominant flooding mechanism in Mansfield District tends to be fluvial in origin associated with flooding from the River Maun and River Meden.
- 5.1.1.3 A number of properties lie within the River Maun fluvial flood extents in Mansfield Town. These properties are predominantly commercial or industrial, although a number of residential properties are also at risk.
- 5.1.1.4 The River Meden flows through predominantly undeveloped, agricultural land. However, a small number of residential properties in Market Warsop and Church Warsop are located within the fluvial flood extent of the River Meden.
- 5.1.1.5 Localised flood risk also arises from surface water flooding, particularly within the urbanised areas of Mansfield, Mansfield Woodhouse, Market Warsop, and Church Warsop.
- 5.1.1.6 In terms of groundwater flood risk, the areas of the district with freely draining soils are likely to have a moderate risk of groundwater flooding, most notably where they are also underlain by a highly productive aquifer. However, this predominantly occurs within the rural areas of the district.
- 5.1.1.7 Sewer flooding incidents have been recorded across Mansfield District. Mansfield Woodhouse and northwest Mansfield has the highest risk with 123 out of the 241 recorded incidents (51%) occurring in this area.
- 5.1.1.8 Reservoir flooding has been assessed using EA's reservoir flood maps. The areas at risk include Meden Vale, and the areas of Mansfield town located close to the River Maun.
- 5.1.1.9 Historic flood events indicate that flooding within Mansfield District is often associated with heavy summer rainfall, particularly on already saturated soils and urbanised areas.
- 5.1.1.10 Engineered high ground is the main flood defence infrastructure located along the River Maun in Mansfield town centre. Flood defence infrastructure is not located anywhere else within the district.
- 5.1.1.11 There are a total of four flood warning areas and two flood alert areas within Mansfield District. The catchments of the River Maun and River Meden in Mansfield are both predominantly underlain by relatively permeable sandstone bedrocks however are likely to be influenced by significant areas of urbanised land in their catchment, in particular the River Maun. This is highlighted by the number of historic flash flood events.
- 5.1.1.12 A major SuDS scheme has been implemented within Mansfield town between 2022 and 2025 with the aim to reduce flood risk in the town by reducing the load on the town's sewer network during a storm event.

5.2 Recommendations

- 5.2.1.1 In general, development should be located in areas of low flood risk wherever possible. In cases where this is not possible, a sequential approach should be taken where the spatial variation of risk within medium and then high flood risk areas is considered to identify the lowest risk sites. Highly or more vulnerable development should be prioritised for areas where flood risk is lowest and less vulnerable development located in areas at higher risk if necessary.
- 5.2.1.2 Where flood risk is significant and access may be compromised in extreme events, a comprehensive Emergency Flood Plan can help manage any residual risk.
- 5.2.1.3 Sustainable drainage principles should be followed at every site to safeguard against increasing flood risk both onsite and to third party land downstream.
- 5.2.1.4 For greenfield development sites runoff rates should be controlled to be no greater than the existing greenfield rate of runoff from the site.
- 5.2.1.5 For developments on previously developed brownfield sites the rate of runoff should not exceed the runoff of the site in its previously developed condition, and may seek a betterment on pre-existing rates, especially in locations where drainage is poor.
- 5.2.1.6 Many parts of the district offer good potential for infiltration SuDS given their geology and topography. The use of infiltration SuDS should be encouraged where possible.
- 5.2.1.7 Where possible, opportunities to reduce flood risk at sites and downstream should be identified, for example through the creation of wetland features, encouraging vegetation growth and use of NFM practices. The limited rural spaces within the urban areas of the district (predominantly Mansfield town) may prevent NFM measures being implemented in some areas.
- 5.2.1.8 This SFRA does not replace the need for site specific FRAs. A greater level of detail should be provided by such assessments. FRAs should factor in the latest climate change guidance where sites are at risk.
- 5.2.1.9 Site specific FRAs are required for all sites over 1 hectare in size and for all sites located within Flood Zones 2 and 3. FRAs for sites within Flood Zone 1 may be required to assess surface water and non-fluvial forms of flood risk.

Appendix 1 – Fluvial Flood Maps

Appendix 2 – Surface Water Flood Maps

Appendix 3 – Geological and Soils Mapping

Appendix 4 – Reservoir Flood Maps

Appendix 5 – Recorded Flood Extents

Appendix 6 – Flood Defences

Appendix 7 – Flood Warning and Alert Areas