BURO HAPPOLD

Manchester Metropolitan University All Saints Library

Flood Risk Assessment

1350B-BHE-XX-XX-RP-W-200000

14 November 2025

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Contents

1 Executive Summary 6

2 Introduction 7

2.1 Background 7

2.2 Site Description 7

2.3 Proposed Site Description 9

3 Planning Context 11

3.1 Overview 11

3.2 National Planning Policy Framework 11

3.2.1 Strategic Flood Risk Assessment 11

3.2.2 Flood Risk Assessments 12

3.2.3 Flood Zone Assessment 12

3.2.4 Sequential Test 13

3.2.5 Climate Change 13

3.3 Local Plans 14

3.3.1 Manchester City Council Local Flood Risk Management Strategy 14

3.3.2 Manchester Core Strategy 15

4 Appraisal of Flood Risk 16

4.1 National Planning Policy Framework 16

4.1.1 Flood Zone 16

4.1.2 Flood Risk Vulnerability Classification 16

4.2 Fluvial and Tidal Flooding 17

4.3 Surface Water and Sewer Flooding 19

4.3.1 Baseline 19

4.3.2 Proposed 20

4.4 Flooding from Combined Sewers 21

4.4.1 Baseline 21

4.4.2 Proposed 21

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4.5 Groundwater Flooding 22

4.6 Flooding from Reservoirs and Canals 23

5 Summary and Conclusion 25

Appendix A Planning Practice Guidance Tables 26

Appendix B Groundwater Flooding 31

Table of Tables

Table 3—1 Climate change allowances for peak rainfall intensity in the Irwell Management Catchment. 14

Table 3—2 Climate change allowances for peak river flow in the Irwell Management Catchment 14

Table of Figures

Figure 2—1: Site Location Plan with Nearest Watercourses (Environment Agency data) 8

Figure 2—2: Levels across the site (Environment Agency LiDAR) 8

Figure 2—3: General arrangement of ground floor of existing library (Source: Hawkins Brown: 1350B-HBA-XX-00-DR-A-010101) 9

Figure 2—4 General arrangement of ground floor of proposed library development (Source: Hawkins Brown: 1350B-HBA-XX-00-DR-A-200002) 10

Figure 2—5 General arrangement of proposed landscaping (Source: PLANIT: 1350B-PLA-XX-XX-DR-L-000001) 10

Figure 4—1: Flood map for Planning, Flood Zone 2 and 3 (Environment Agency data) 16

Figure 4—2: Risk of Flooding from Rivers and Seas Map (Environment Agency data) 18

Figure 4—3 Risk of Flooding from Rivers and Seas Map with an allowance for Climate Change (Environment Agency data) 18

Figure 4—4: Surface Water Flood Map (Environment Agency data) 20

Figure 4—5 Groundwater Flood Map from the Manchester City Council SFRA (2011) with the site highlighted in yellow. 23

Figure 4—6: Maximum extent of flooding from reservoir failure (Environment Agency data) 24

Figure B—1 Manchester City Council Local Flood Risk Assessment Figure 4: Groundwater Flood risk, with approximate site boundary shown in red. 31

Figure B—2 Manchester City Council Strategic Flood Risk Assessment Groundwater Flood Risk Map (GW_2.1). 32

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Glossary

Term	Definition
BGS	British Geological Survey
CDA	Critical Drainage Area
EA	Environmental Agency
FRA	Flood Risk Assessment
LLFA	Lead Local Flood Authority
LPA	Local Planning Authority
NPPF	National Planning Policy Framework
SFRA	Strategic Flood Risk Assessment
SuDS	Sustainable Drainage Features
SWMP	Surface Water Management Plan
UU	United Utilities

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1 Executive Summary

This Flood Risk Assessment has been prepared to support the full planning application for the proposed transformation of the Manchester Metropolitan University All Saints Library, Manchester. The table below provides an executive summary of the report.

Subject	Findings
Site Description	The project site is in Manchester Metropolitan University, Manchester. It has an approximate total area of 0.60 ha. The levels across the site range from approximately 36.9mAOD to the south-west of the site to 37.2mAOD to the north-east of the site.
Proposal Description	The Proposed Development comprise the development of a nine-storey library building (Use Class F1), public realm, access and servicing arrangements and other associated works.
Vulnerability Classifications & Design Life	The Proposed Development is an educational facility which classifies the Proposed Development as More Vulnerable within the NPPF. Based on the Proposed Development, the development has been assessed for the impacts of climate change in the 1 in 100-year event.
Sequential & Exception Test	The Sequential Test and Exception Test are not required as the Proposed Development is in Flood Zone 1.
Fluvial & Tidal	The Proposed Development is located within Flood Zone 1, defined as being at low risk of fluvial and tidal flooding. The Proposed Development remains at a low risk from fluvial flooding in the future with the impact of climate change.
Surface Water & Sewers	The Proposed Development has a low probability of surface water flooding. The majority of the Proposed Development is classified as having a very low probability of surface water flooding. There are areas of low to high probability of flooding along the northern and southern site boundary. This corresponds to ponding beneath Mancunian Way and along All Saints Park, respectively. The site of the Proposed Development has no recorded instances of sewer flooding.
Groundwater	Groundwater flood risk is considered to be low. There are no records of historic groundwater flooding at the site and the Groundwater Flooding Map in the Manchester City Council SFRA indicates that the site is not in an area at risk of groundwater flooding.
Artificial Sources	The Proposed Development is located within the maximum extent of flooding that would occur if an upstream reservoir were to fail when river levels are normal and when they are flooded. The Environment Agency (EA) advise that flood risk from reservoir flooding is extremely low due to the regular safety work undertaken at reservoirs to meet the Reservoirs Act 1975. The risk of flooding from canals is deemed to be low. As such, the risk of flooding from artificial sources is considered to be low.
Drainage Strategy	The surface water drainage strategy is designed to manage surface water runoff associated with the 1 in 100-year +45% climate change event. The proposed surface water drainage strategy uses sustainable drainage measures, such as permeable paving and tree pits, alongside channel drains and an attenuation tank to manage the surface water flood risk and provide a betterment of 75% in surface water run off rates compared to existing rates. With this strategy in place, the risk of surface water flooding is considered to be low.
Summary and Conclusion	The risk of flooding from all sources, for the Proposed Development's design life is considered to be low and that the Proposed Development will not increase the risk of flooding elsewhere.

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2 Introduction

2.1 Background

This site-specific Flood Risk Assessment (FRA) has been prepared by Buro Happold as part of a full planning application for the site known as Manchester Metropolitan University All Saints Library, hereafter referred to as the 'Proposed Development'. This assessment has been developed in accordance with the National Planning Policy Framework (NPPF).

The purpose of this report is to assess and describe the impact of the proposed works in terms of flood risk. In order to comply with the NPPF, this FRA will identify the potential flood risks and demonstrate appropriate flood mitigation measures to ensure that the risk to the site is acceptable for the level of development proposed. The flood risks considered are from fluvial, tidal, surface water (pluvial), combined sewer, artificial (reservoir and canal) and groundwater sources. A summary of the proposed drainage strategy is included within this report.

2.2 Site Description

The site is in Manchester City Centre, Greater Manchester, within the administrative boundary of Manchester City Council. It is located within the Manchester Metropolitan University's campus and centred on National Grid Reference 384236, 397166. The address is All Saints Park, Manchester M15 6BH.

The site is bound by Oxford Road to the east, by the Mancunian Way to the north, Manchester Metropolitan University's Faculty of Business and Law to the west, and All Saints Park to the south. This can be seen in Figure 2-1. The Site currently comprises the vacant All Saints Library Building- a seven-storey brick building. The building on site is considered no longer fit for purpose and has been vacant since summer 2024.

The site has an approximate area of 0.60 hectares. The levels across the site range from approximately 36.9mAOD to the SW of the site to 37.2mAOD to the NE of the site (see Figure 2-2). This indicates a gentle gradient across the area, with the highest point located towards the north-east and the lowest towards the south-west.

The site is located in the Irwell Management catchment, and on the border of the Croal Irwell and Roch Irk Medlock Operational Catchments. The nearest watercourse is the River Medlock, approximately 200m to the NW of the site. The proximity and classification of the River Medlock are important considerations for any site development or flood risk assessment.

The site is within Flood Zone 1. The nearest areas within Flood Zone 2 and 3, a medium and high risk of flooding respectively, are located approximately 110m and 140m to the north-east of the Proposed Development, respectively.

The online GeoIndex tool produced by the BGS indicates that the bedrock geology underlying the site is sandstone (Chester Formation). The site lies on superficial deposits of Diamicton.

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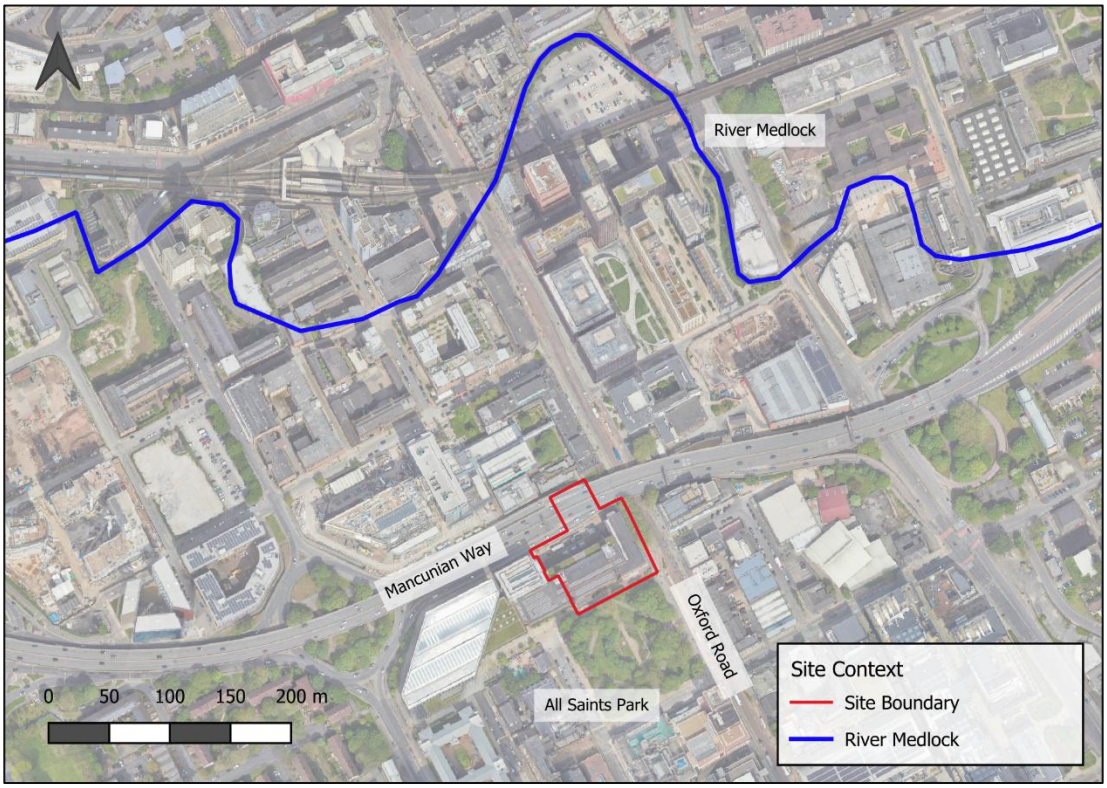


Figure 2—1: Site Location Plan with Nearest Watercourses (Environment Agency data)

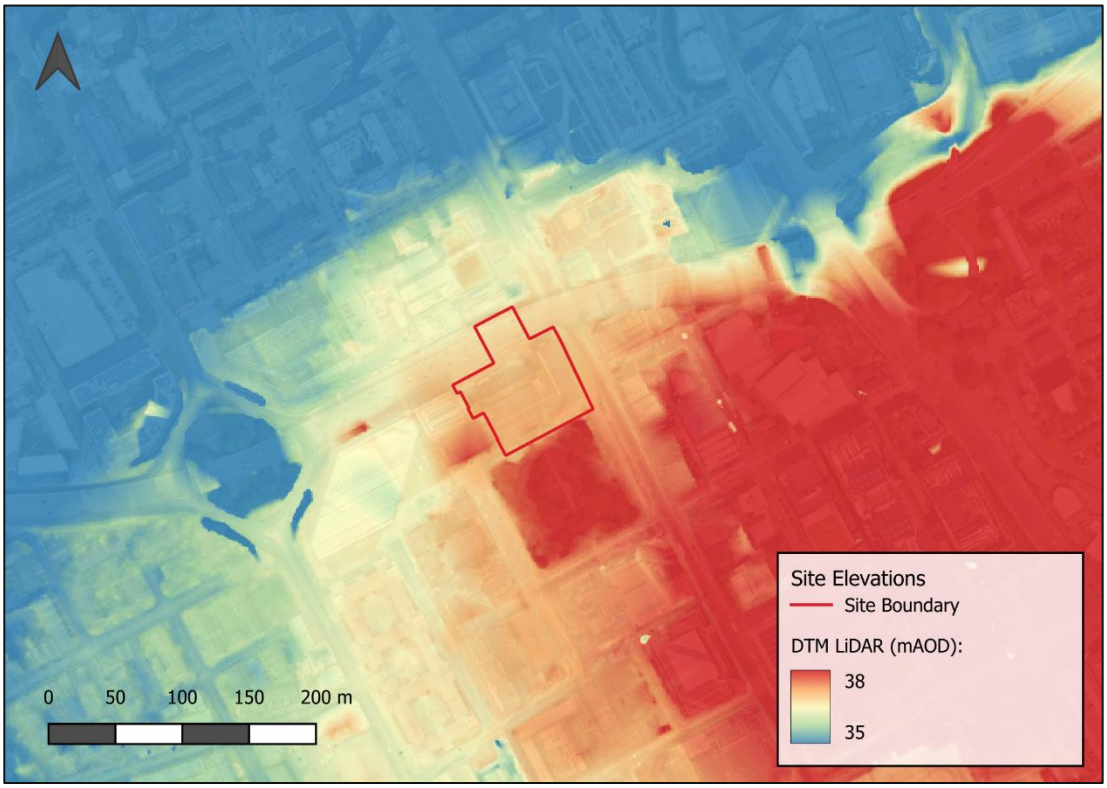


Figure 2—2: Levels across the site (Environment Agency LiDAR)

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2.3 Proposed Site Description

The Proposed Development comprise the development of a nine-storey library building (Use Class F1), public realm, access and servicing arrangements and other associated works.

Figure 2—3 shows the existing Library, with Figure 2—4 showing the ground level of the newly proposed library. The landscape plan can be seen in Figure 2—5.

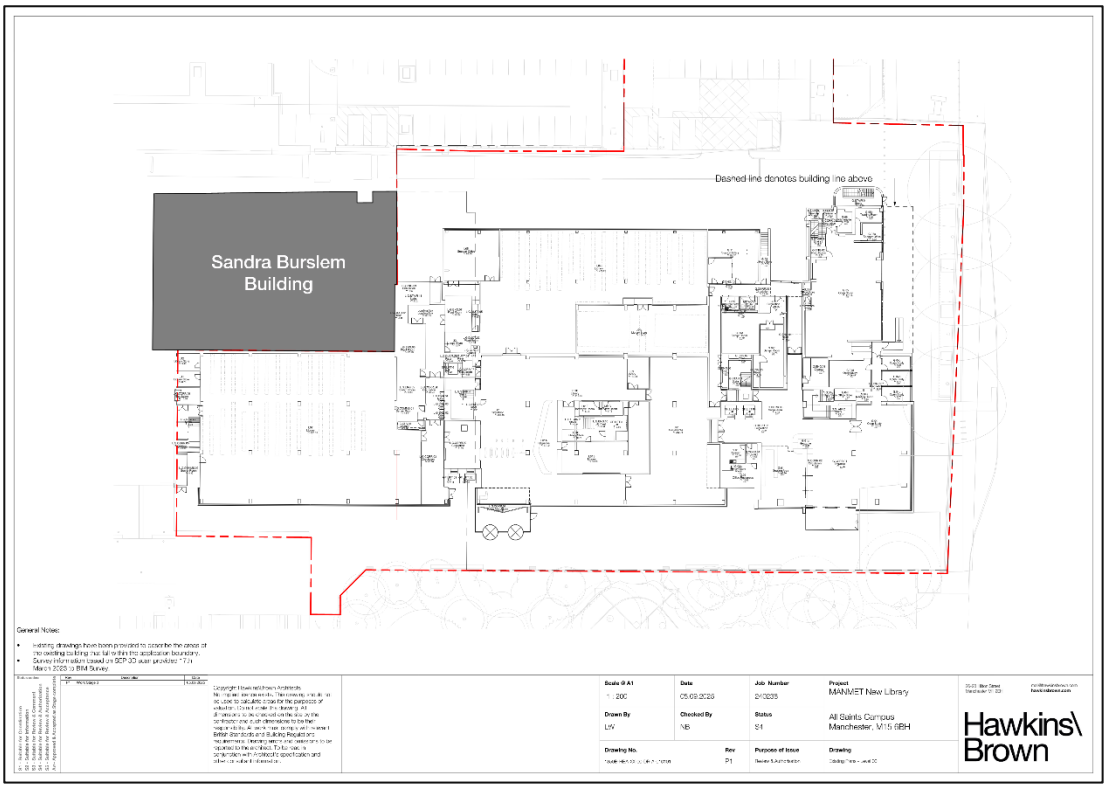


Figure 2—3: General arrangement of ground floor of existing library (Source: Hawkins Brown: 1350B-HBA-XX-00-DR-A-010101)

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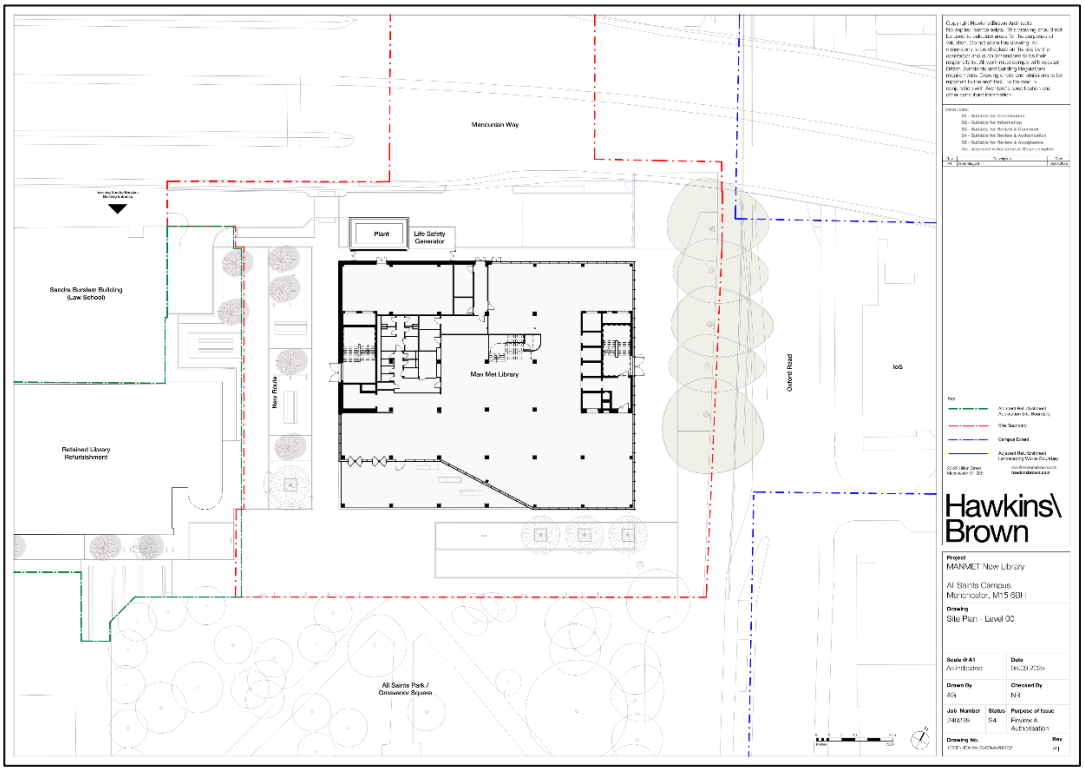


Figure 2—4 General arrangement of ground floor of proposed library development (Source: Hawkins Brown: 1350B-HBA-XX-00-DR-A-200002)

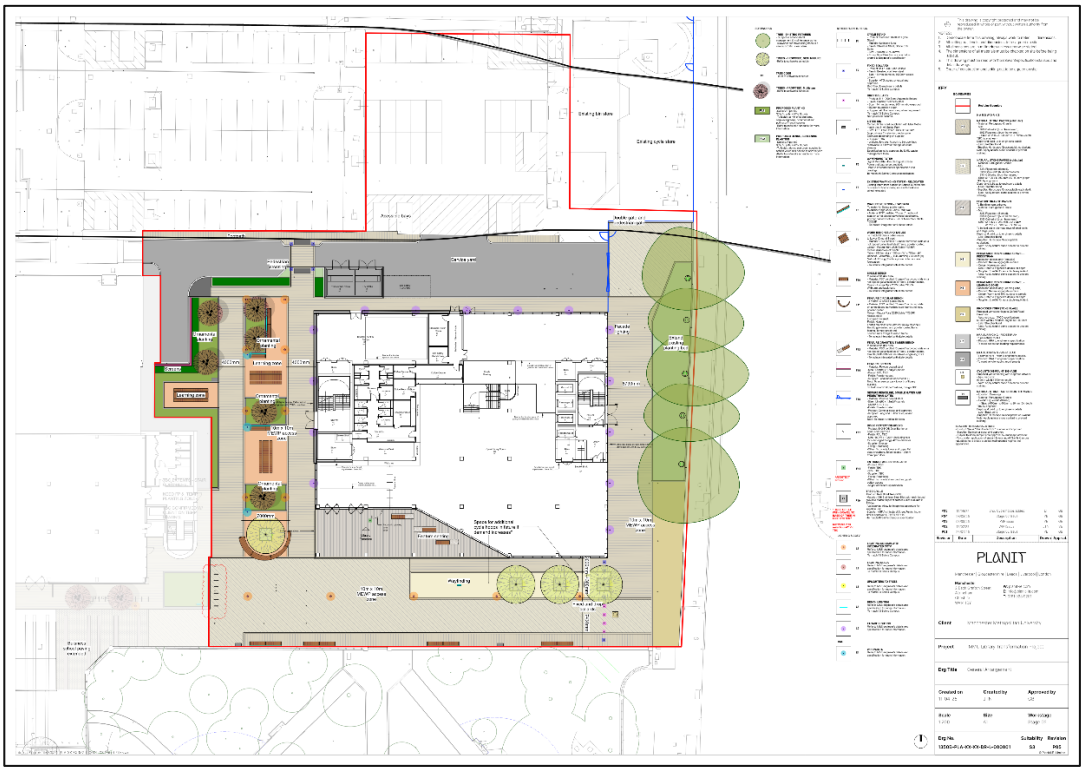


Figure 2—5 General arrangement of proposed landscaping (Source: PLANIT: 1350B-PLA-XX-XX-DR-L-000001)

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3 Planning Context

3.1 Overview

This Flood Risk Assessment (FRA) has been prepared in accordance with the policies and guidance applicable to the Proposed Development, outlined within the following publications:

- National Planning Policy Framework (March 2012, revised February 2025);
- National Planning Policy Framework Planning Practice Guidance (November 2016, revised September 2025);
- Manchester City Council Local Flood Risk Management Strategy (March 2014);
- Manchester City Council Strategic Flood Risk Assessment (SFRA) Level 1 and 2 (March 2010 and 2011 respectively);
- Greater Manchester Combined Authority (GMCA), 2019-2020 SFRA (October 2020); and
- Manchester's City Council Core Strategy (Adopted July 2012, Updated March 2024).

3.2 National Planning Policy Framework

Land use planning policy in England is governed by the NPPF, introduced in 2012 and revised in 2018, 2019, 2021, 2023 and 2024. This FRA has been carried out in accordance with the December 2024 revision of the NPPF. The NPPF is issued by the Government Department for Levelling Up, Housing and Communities (DLUCH), as named since September 2021, formerly known as the Ministry of Housing, Communities and Local Government (MHCLG) at the time of issue.

As part of the wider sustainability objectives of the NPPF, the framework requires that Proposed Developments mitigate and adapt to the impacts of climate change, accounting for the long-term implications for flood risk (Ref. 162).

The framework also requires that inappropriate development in areas of flood risk be avoided (Ref. 170), stating that where development is necessary in areas of flood risk, it should 'be made safe' for its lifetime without increasing flood risk elsewhere.

3.2.1 Strategic Flood Risk Assessment

As stipulated in the NPPF, local authorities are required to carry out and keep up-to-date a strategic assessment of flood risk (SFRA) for the governed area, considering the management of risk from all sources and the cumulative impacts of flooding in local areas susceptible. SFRAs are required to be carried out by the Local Authorities to guide developers on the authority's strategies to avoid, reduce and manage flood risk.

The most relevant SFRAs to the site are as follows:

- **Manchester City, Salford City and Trafford Council (MST), 2010-2011** - A Level 1 SFRA , Level 2 SFRA and accompanying maps were prepared by JBA in 2010-2011 for Manchester City, Salford City and Trafford Councils covering the site. The risk of groundwater flooding is covered in the Level 1 report only while a more detailed assessment of the risk of fluvial, canal, surface water and sewer flooding were provided

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in the Level 2 report. The SFRA does not cover the risk of reservoir flooding on the grounds of national security.

- **Greater Manchester Combined Authority (GMCA), 2019-2020** - A Level 1 SFRA has been prepared by JBA for the Greater Manchester Combined Authority (GMCA) in March 2019, of which Manchester City Council (MCC) is a constituent authority. A Level 2 SFRA was also prepared in October 2020. This SFRA had a focus on sites related to the development of the Greater Manchester Spatial Framework.

Both SFRAs considers the risk of flooding from the following potential sources:

- Fluvial;
- Surface water;
- Sewers;
- Groundwater and;
- Reservoirs.

The risk of flooding to the Proposed Development from each flood source is described in Section 4.

3.2.2 Flood Risk Assessments

Applications are required to be supported by a Flood Risk Assessment where the site is located in Flood Zone 2 or 3 (NPPF Footnote 63) or where a site in Flood Zone 1 is:

- Of 1 hectare or more;
- Land which has been identified by the Environment Agency (EA) as having critical drainage problems;
- Land identified in a strategic flood risk assessment as being at increased flood risk in future;
- Land that may be subject to other sources of flooding, where its development would introduce a more vulnerable use.

The Proposed Development is located within the Conurbation Core Critical Drainage Area and therefore qualifies for assessment to support planning.

3.2.3 Flood Zone Assessment

The NPPF aims to avoid inappropriate development in areas at highest risk of flooding. The NPPF aims to avoid inappropriate development in areas at highest risk of flooding. The Planning Practice Guidance to the NPPF contains a series of tables that help identify the risk of flooding to a development, see Appendix A for the tables. A summary is provided below:

- Table 1 defines four Flood Zones based on the annual probability of river or sea flooding;
- Table 2 identifies where development is appropriate for each flood risk vulnerability classification and whether the Exception Test is required; and

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- Annex 3 identifies specific land use types for each of the five flood risk vulnerability classifications (Essential Infrastructure, Highly Vulnerable, More Vulnerable, Less Vulnerable and Water Compatible Uses). For example, residential units are classified as More Vulnerable.

The Flood Zones defined in the NPPF are as follows:

Flood Zone 1 Low Probability:

Land having a less than 0.1% (< 1 in 1,000) annual probability of river and sea flooding.

Flood Zone 2 Medium Probability:

Land having between a 1% and 0.1% (1 in 100 and 1 in 1,000) annual probability of river flooding; or land having between a 0.5% and 0.1% (1 in 200 and 1 in 1,000) annual probability of sea flooding.

Flood Zone 3a High Probability:

Land having a !% of greater (> 1 in 100) annual probability of river flooding; or land having a 0.5% or greater (> 1 in 200) annual probability of sea flooding.

Flood Zone 3b The Functional Floodplain:

This zone comprises land where water from rivers or the sea has 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% chance or greater (> 1 in 30) 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 a 0.1% annual probability of flooding).

3.2.4 Sequential Test

The NPPF requires that all plans should take a sequential approach to locating development (Ref. 173), providing a risk-based assessment of the location of the development. The aim is to steer development to areas with the lowest risk of flooding from all sources (NPPF Ref. 174).

The Proposed Development is located within Flood Zone 1 and has a low risk of flooding from all other sources of flood risk (See Section 4). As such, it is not thought that a formal Sequential Test is not considered to be required for the site.

3.2.5 Climate Change

Allowances for the predicted effects of climate change should be taken into account when preparing site-specific FRA. The guidance[1] published by the EA to support the NPPF contains sensitivity ranges that are recommended to be applied to peak rainfall intensities, peak river flows, sea level rise, offshore wind speeds and extreme wave heights. The general trend is for each parameter to increase in the future, which in turn increases the risk of flooding to any site. The Proposed Development is situated within the Irwell Management catchment, and the allowances for peak rainfall intensity are given in Table 3—1. Climate change allowances for peak river flow are also provided using

[1] Environment Agency. 2022. *Flood Risk Assessments: Climate Change Allowances*. [online] Available at: https://www.gov.uk/guidance/flood-risk-assessments-climate-change-allowances [Accessed 20 October 2025].

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information generated by the UK Centre for Ecology and Hydrology using UK Climate projections and are summarised for the Irwell Management catchment in Table 3—2.

Table 3—1 Climate change allowances for peak rainfall intensity in the Irwell Management Catchment.

Allowance Category	3.3% AEP		1% AEP	
	'2050s'	'2070s'	'2050s'	'2070s'
Upper End	35%	40%	40%	45%
Central	25%	30%	25%	30%

Table 3—2 Climate change allowances for peak river flow in the Irwell Management Catchment

Epoch	Central Allowance (based on 50th percentile)	Higher Central Allowance (based on 70th percentile)	Upper End Allowance (based on 95th percentile)
2020s (2015-2039)	12%	15%	24%
2050s (2040-2069)	19%	26%	43%
2070s (2070-2125)	35%	46%	75%

It is recommended by the EA that both the central and upper allowances are assessed to understand the range of potential impacts

A design life of 75 years is typical for non-residential developments. The EA recommends that for developments with lifetimes between 2061 and 2100, the central allowance of the 2070 epoch is adopted. For developments with a lifetime beyond 2100, it is recommended that the upper end allowance for the 2070 epoch is adopted.

As the development is non-residential and in Flood Zone 1, the central allowance is deemed an appropriate Climate Change allowance. As such, the Design Flood Event (DFE) for the Proposed Development is therefore the 1 in 75-year plus 30% allowance for the impact of climate change on rainfall intensities.

The Surface Water Drainage Strategy, also prepared by Buro Happold, has made an allowance for a 45% increase in peak rainfall intensity.

3.3 Local Plans

3.3.1 Manchester City Council Local Flood Risk Management Strategy

The Manchester City Council LFRMS (adopted March, 2014) is a strategic overview of development in Manchester. It aims to provide understanding of local flood risk and the mitigations required to manage local flood risk from tidal, surface water, groundwater and ordinary watercourses.

The strategy defines 9 policies. These are summarised below.

- **Policy 1**: Maintain and improve evidence used to support risk assessments and future flood risk management measures.
- **Policy 2:** Seek to introduce measures that reduce the likelihood, severity and consequences of flooding.
- **Policy 3:** Key stakeholders should work together to progress the management of flood risk.
- **Policy 4:** Monitor and maintain drainage infrastructure.

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- **Policy 5:** Promote awareness of local flood risk and ways that the risk can be managed by people.
- **Policy 6:** Ensure that local flood risk is properly considered for new development proposals.
- **Policy 7:** Ensure that the Lead Local Flood Authority (LLFA) responds to appropriate consultation exercises on matters affecting local flood risk management.
- **Policy 8:** Lead Local Flood Authority (LLFA) to appropriately investigate and report on flood incidents.
- **Policy 9:** Contribute to sustainable development through the consideration of flood risk.

3.3.2 Manchester Core Strategy

The Core Strategy 2012-2027 was adopted in July 2012 to guide development within Manchester. It sets the out the long-term strategic policies for Manchester's future development and will form the framework that planning applications will be assessed against. The following policies relate to flood risk:

- Policy EN8 describes the expected measures to be taken to ensure development is adaptable to climate change. These include minimisation of flood risk by appropriate siting, drainage, and treatment of surface areas to ensure rain water permeability and provision of linked and diverse green infrastructure.
- Policy EN14 focuses on reduction of flood risk and references PPS25 (now superseded by the NPPF PPG Flood Risk and Coastal Change). In addition, all new development should minimise surface water run-off, including through Sustainable Drainage Systems (SuDS). Where feasible and appropriate, developments should seek to open up culverted sections of river to reduce flood risk and any danger of collapse.
- Policy EN17 is about water quality. Development should minimise surface water run-off from development and associated roads and maximise the use of SuDS.

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4 Appraisal of Flood Risk

4.1 National Planning Policy Framework

4.1.1 Flood Zone

The Flood Map for Planning (Figure 4-1) produced by the EA shows that the site is located entirely within Flood Zone 1. Flood Zone 1 is defined as an area with an annual probability of flooding from rivers or the sea of less than 0.1%.

By definition, the risk of flooding from rivers or the sea in Flood Zone 1 is classified as low, having an annual exceedance probability of 0.1% or 1 in 1,000 years. In accordance with EA guidance, the focus of this FRA will therefore be on the management of surface water run-off and the risk of flooding from other sources.

The nearest areas within Flood Zone 2 and 3, a medium and high risk of flooding respectively, are located approximately 110m and 140m to the north-east of the Proposed Development, respectively.

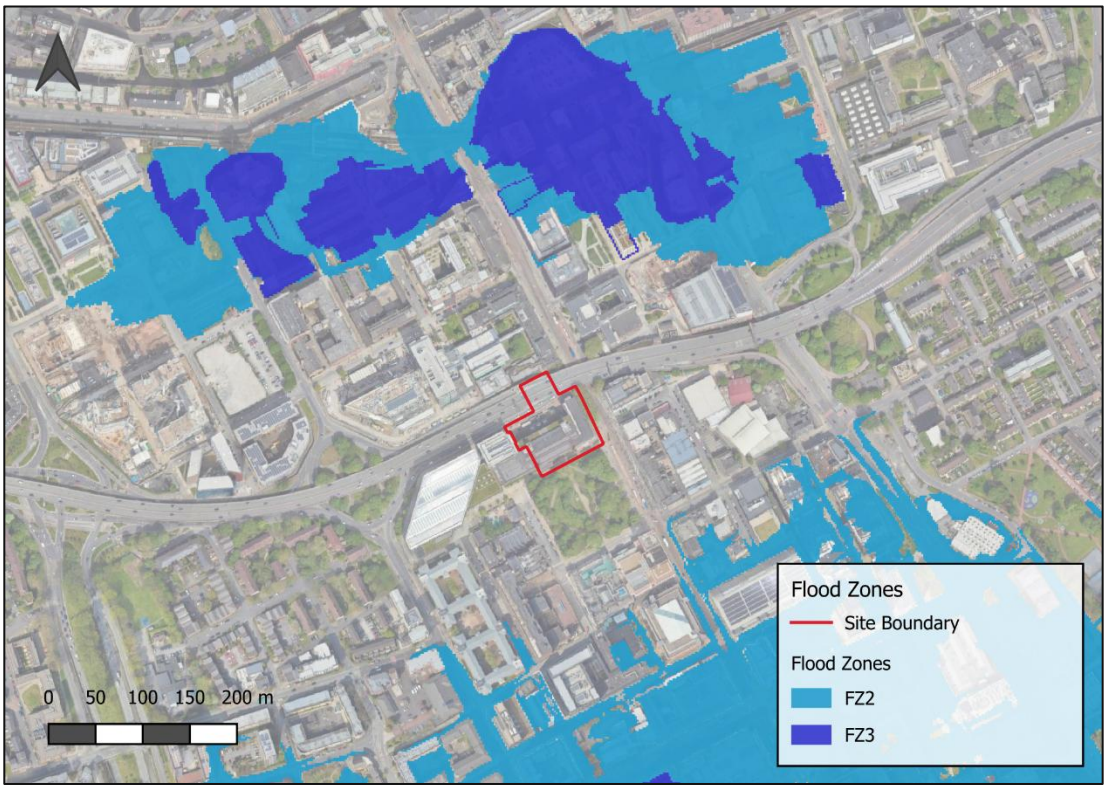


Figure 4—1: Flood map for Planning, Flood Zone 2 and 3 (Environment Agency data)

As the site is in Flood Zone 1, it is considered to have low risk of flooding.

4.1.2 Flood Risk Vulnerability Classification

The NPPF Planning Practice Guidance contains a series of tables which identify where development should be permitted, based on the Flood Zone in which the development is located and the proposed uses of that development. These tables are included in Appendix A.

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The Proposed Development is an educational establishment, which classifies the Proposed Development as *More Vulnerable* within the NPPF. These land uses are considered compatible with Flood Zone 1, in accordance with Annex 3 of the Planning Practice Guidance.

4.2 Fluvial and Tidal Flooding

Fluvial flooding occurs when sustained or intense rainfall events increase the flow in rivers causing the water level to rise above the level of the banks and into the surrounding areas.

Tidal flooding occurs when particularly high tides coincide with storm surges. Storm surges are caused by low atmospheric pressure events resulting in temporary localised raising of sea levels.

The EA flood maps for planning show that the Proposed Development is currently within Flood Zone 1, which as described above, has a low probability of flooding. The nearest area at risk of flooding in the present-day scenario is associated with fluvial flooding from the River Medlock. The area is 160m to the north north-east of the site. This is shown in Figure 4—2.

Figure 4—3 shows that the site is also not at risk of flooding in the future day scenario, when allowances for the impact of climate change have been made. It should be noted that information on the risk of flooding from the River Medlock in this scenario is unavailable. The mapping shows that the area at risk of flooding to the south of the site has increased, with the probability of flooding increasing in numerous areas.

It is expected that the nearest area at risk of flooding in the future-day scenario will be to the north of the site, however due to the absence of data, it is instead shown to be ~120m to the south of the site.

Based on the LiDAR data shown in Figure 2—2, the expansion of the flood extent to the south of the site corresponds to ~0.15m increase in flood depths. The ground elevations around the River Medlock to the north of the site are between +32.0mAOD and +34.0mAOD. Considering the +0.15m increase in flood depths seen to the south of the site, and the on-site minimum elevation of +36.0mAOD, there is sufficient elevation difference between the river and the site and therefore it is not expected that climate change will result in flooding of the site from the River Medlock.

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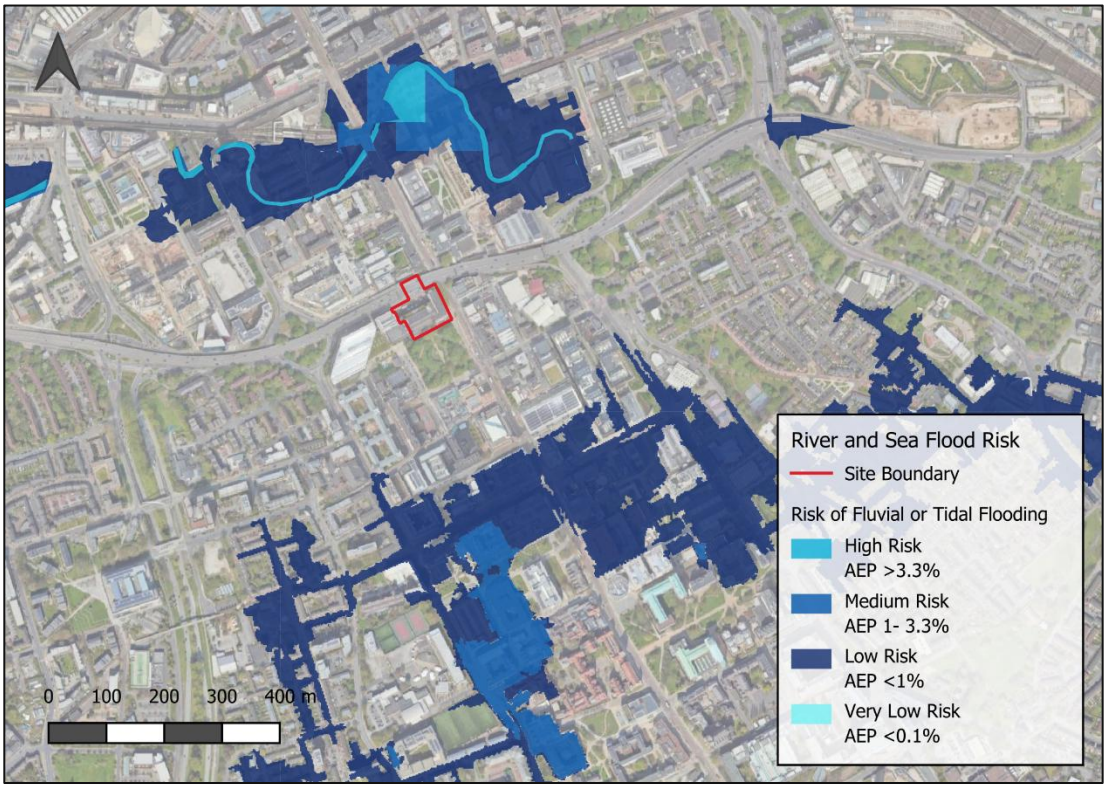


Figure 4—2: Risk of Flooding from Rivers and Seas Map (Environment Agency data)

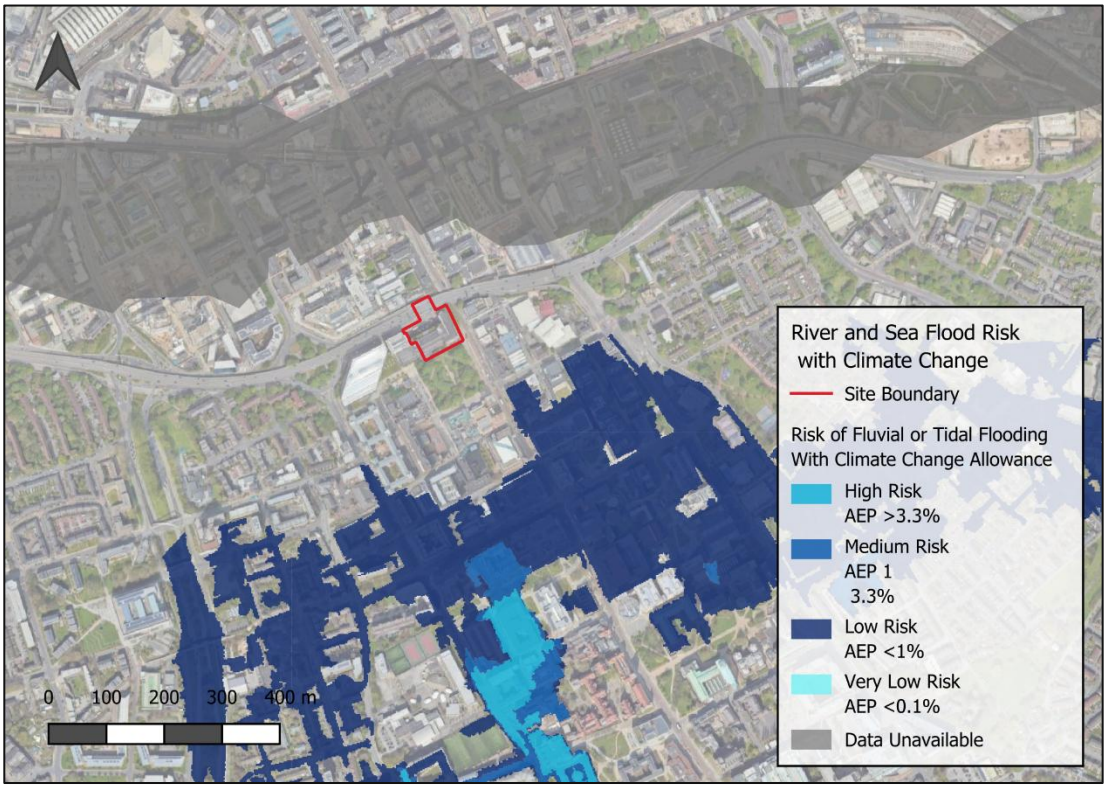


Figure 4—3 Risk of Flooding from Rivers and Seas Map with an allowance for Climate Change (Environment Agency data)

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Since the Proposed Development is located entirely within Flood Zone 1, now and in the future, the baseline fluvial and tidal flood risk to the Proposed Development during demolition and after construction is considered to be low in present and future scenarios.

4.3 Surface Water and Sewer Flooding

Surface water flooding occurs when intense rainfall is unable to naturally soak into the ground due to impermeable ground covering such as concrete or tarmac, or low permeability ground conditions preventing infiltration. This excess surface water can flow through built-up areas and open space and pond in lower-lying areas causing localised flooding.

4.3.1 Baseline

The surface water flood map produced by the EA (Figure 4—4) indicates that in its existing condition, the majority of the Proposed Development has a very low probability of surface water flooding. There are areas at risk of surface water flooding along the northern and southern site boundary. This risk of flooding here varies between low and high risk and is associated with water gathering below Mancunian Way and the North side of All Saints Park. These are related to local depressions in the topography.

These areas are not deemed that this is a high risk to users of the site as it is along the site boundary and is confined to existing public realm or minor roads. Safe access and egress from the site during a flood event remains viable.

The Manchester City Council SFRA identifies that the site is within the Conurbation Core Critical Drainage Area (CDA). A CDA is an area that is particularly sensitive to an increase in the rate and/or volume of surface water runoff.

The site currently drains via existing combined water private drains, before discharging to a combined water public sewer (United Utilities). Hydraulic modelling of the existing network estimates that the existing discharge rate is 44.7 l/s.

The risks identified represents the risk to the site during the demolition to construction stage of the project. Based on the above assessment, the surface water flood risk during the stage between demolition and construction is low.

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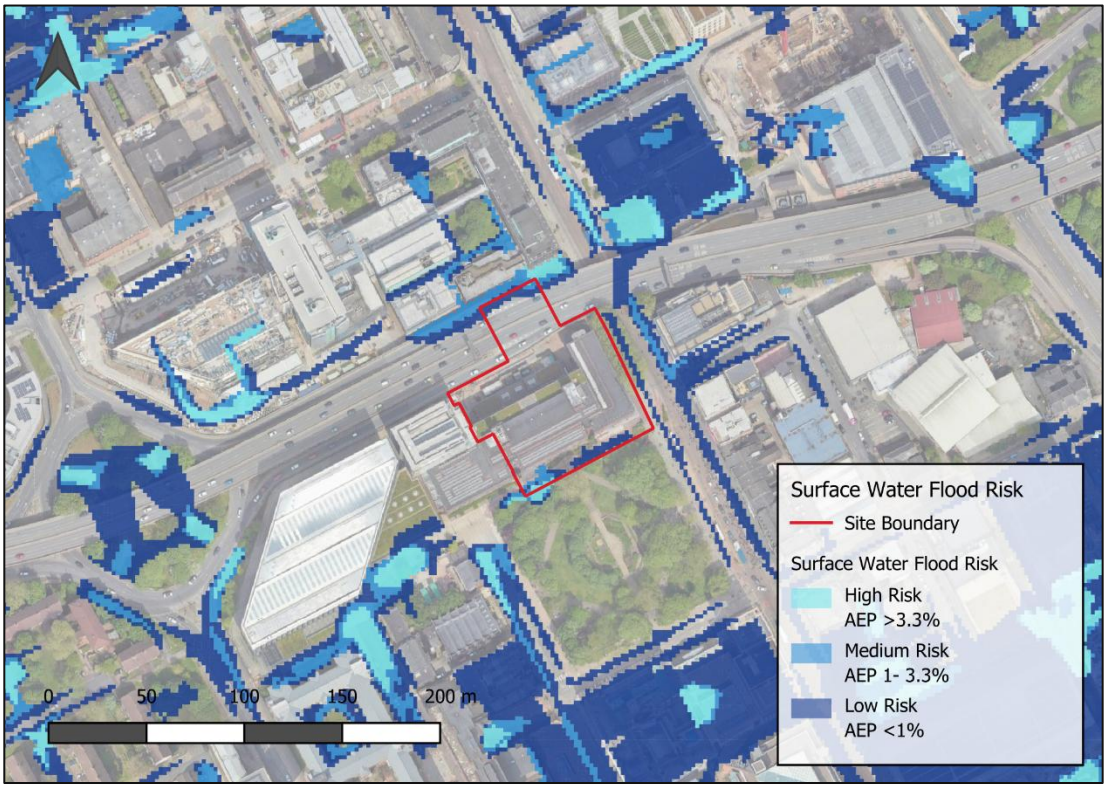


Figure 4—4: Surface Water Flood Map (Environment Agency data)

4.3.2 Proposed

The proposed drainage strategy has been developed in accordance with Manchester City Council LFRMS and based on discussions with Manchester City Council and United Utilities. A meeting was held with Manchester City Council on the 31st of July 2025 to discuss the proposed strategy, with written response also received on the 31st July 2025, accepting the proposal, subject to a letter of approval from United Utilities. United Utilities was engaged during the pre-development enquiry in March 2025. On the 15th August, written approval was received confirming the approval of the strategy. Further details on the correspondence can be found in the Drainage Strategy (1350B-BHE-XX-XX-RP-C-100000, November 2025).

The drainage strategy aims to adhere to the drainage hierarchy: infiltration, discharge to watercourse, discharge to existing surface water sewer or discharge to existing combined water sewer.

Under the proposed drainage strategy, the site will continue to discharge to the existing combined water public sewer, as per the baseline condition. A separate surface and foul water system is proposed. It is proposed that surface water runoff is directed to areas of permeable paving, tree pits and channel drains. From here, a piped network will direct the runoff to below ground attenuation tanks. A total attenuation volume of 225m^3 is provided in the form of an attenuation tank and permeable paving storage. From the attenuation tank, the runoff will discharge at a restricted rate using a control chamber. The proposed discharge rate is 11.0 l/s, providing a betterment of 75%.

The drainage network will be designed to accommodate the 1 in 100-year storm event with a 45% allowance for Climate Change.

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Predominantly, the levels on site are to remain unchanged. In areas of minor changes, the proposed levels will fall positively towards the proposed drainage network. As such, it is not expected that the Proposed Development will displace the surface water pooling to the north and south of the site.

Additionally, as the proposed surface water drainage strategy accounts for all flows up to and including the 1 in 100-year +45% Climate Change storm event, and provides a betterment in discharge rates, it is unlikely that the Proposed Development will detrimentally impact the risk of surface water flooding both on and off site.

It should also be noted that the recent development of All Saints Park includes a surface water drainage strategy that also takes into account the impact of climate change (075050-CUR-XX-XX-RP-D-72500, V02, Curtins, Issued 27 October 2020). With both schemes managing the risk from large storm events, the area of ponding identified in the EA surface water flood map shown in Figure 4—4 along the southern site boundary will likely be effectively managed.

Based on the proposed strategy, the surface water flood risk on site is deemed to remain low.

For further information and detailed calculations, refer to the drainage strategy report prepared by Buro Happold report reference, 1350B-BHE-XX-XX-RP-C-100000, November 2025.

4.4 Flooding from Combined Sewers

Flooding from combined sewers may occur during periods of intense rainfall when high volumes of surface water run-off exceed the capacity of the drainage system water can be forced back up through surface water sewers or combined sewer overflows.

4.4.1 Baseline

The existing drainage on site is combined (surface and foul water). As such, all foul water flows from the site to the combined water public sewer (United Utilities) to the north of the site.

There are no known issues associated with lack of capacity or operation of the existing foul water network. The risk of flooding from surcharge of the foul water system is therefore considered to be low.

The Public sewer network is deep and as such, a surcharge is unlikely to cause flooding to the site. For further information, refer to the Buro Happold drainage strategy report (1350B-BHE-XX-XX-RP-C-100000, November 2025).

4.4.2 Proposed

As mentioned above, a separate surface and foul water system is proposed.

The Public sewer network is proposed to be maintained.

The Private sewer network is being replaced with new network to serve the Proposed Development. The proposed foul water strategy will convey foul water through a new piped network to the north of the site before discharging to the existing combined water drainage network at an unrestricted rate. This has been agreed in principle with UU.

The risk of foul sewer surcharge remains to be considered low.

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4.5 Groundwater Flooding

Groundwater flooding generally occurs in low-lying areas above permeable rock aquifers where the water table meets, and rises above, the ground surface. According to the BGS, groundwater flooding "*occurs as a result of water rising up from the underlying rocks or from water flowing from dormant springs. This tends to occur after long periods of sustained high rainfall. Higher rainfall means more water will infiltrate into the ground and cause the water table to rise above normal levels*".

Unlike flooding from rivers and the sea, groundwater flooding does not generally pose a significant risk to life, but is more associated with significant damage to property, with flooding persisting over a number of weeks for some types of groundwater flooding.

According to the Manchester SFRA Groundwater Flood Map, the site is not at risk of flooding from groundwater. There is an area ~100m to the west of the site that is at risk of groundwater flooding. A section of the SFRA mapping is shown in Figure 4—5 with the full map extent provided in Figure B—2.

The Manchester City Council LFRMS uses the EA's data to identify that the site is susceptible to groundwater flooding (Figure 4 of the LFRMS, included in Appendix B). It is recognised in the LFRMS that the mapping is coarse and is largely based on geology. The mapping included within the SFRA is referred to for a more detailed investigation of the risk of groundwater flooding.

A ground investigation was conducted for the site by Geotechnical Engineering Ltd in July 2023 (reported December 2023). Eight boreholes were taken around the site. For most locations, the groundwater table was between 2.3 and 2.9 m below ground level (mBGL), indicating that the risk of groundwater flooding is likely low. The only anomaly is BH03, where the groundwater table was measured at 1.2 mBGL. BH03 is located at the northeast corner of the site. This should be considered during the demolition and construction phases, where pumping from the excavation may be required.

Combining the above-mentioned sources, it is deemed that the risk of groundwater flooding is likely to be low.

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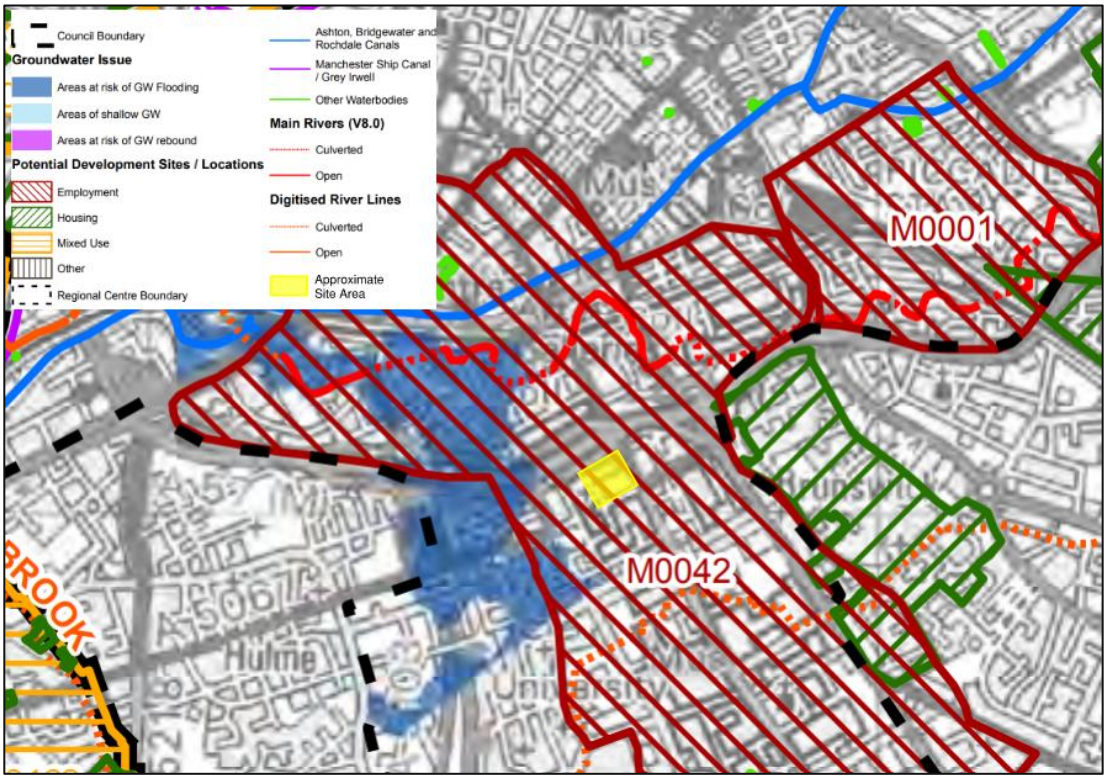


Figure 4—5 Groundwater Flood Map from the Manchester City Council SFRA (2011) with the site highlighted in yellow.

4.6 Flooding from Reservoirs and Canals

There are several non-natural sources of flood risk including flooding from canals, reservoirs and man-made lakes. These sources of flooding can occur when the facility is overwhelmed by high rainfall or when a dam or bank fails. Flooding from such sources can happen suddenly and can cause significant damage and danger to life.

Figure 4—6 shows the risk of flooding from reservoirs. This indicates that the site is within the maximum extent of flooding that would occur if an upstream reservoir were to fail and therefore is at risk of flooding. Despite this, the EA advise that flood risk from reservoir flooding is extremely low due to the regular safety work undertaken at reservoirs to meet the Reservoirs Act 1975. As such, the Proposed Development can be considered to be at a low risk of flooding from reservoirs provided that the Reservoir Act 1975 is adhered to.

Canals may flood in a similar fashion to reservoirs, for instance by overtopping as facilities become overwhelmed or as a result of bank failure. As with reservoirs, water can be released quickly from canal floods. The Rochdale canal is the nearest canal to the site. It is located approximately 400m to the north of the site, to the north of River Medlock. The SFRA describes Rochdale canal as a "Broad" canal, which is a relatively shallow canal with raised embankments, mainly used today for tourism or for the movement of small boats. The SFRA states that Broad canals "do not pose a direct flood risk as they are controlled water bodies with regulated flows". The residual risk associated with the canals, such as the stability of the canal embankments or the source of water into the canals, is deemed to be low due to the continued maintenance of the canals Canal Trust.

The risk of flooding from canals is therefore considered to be low.

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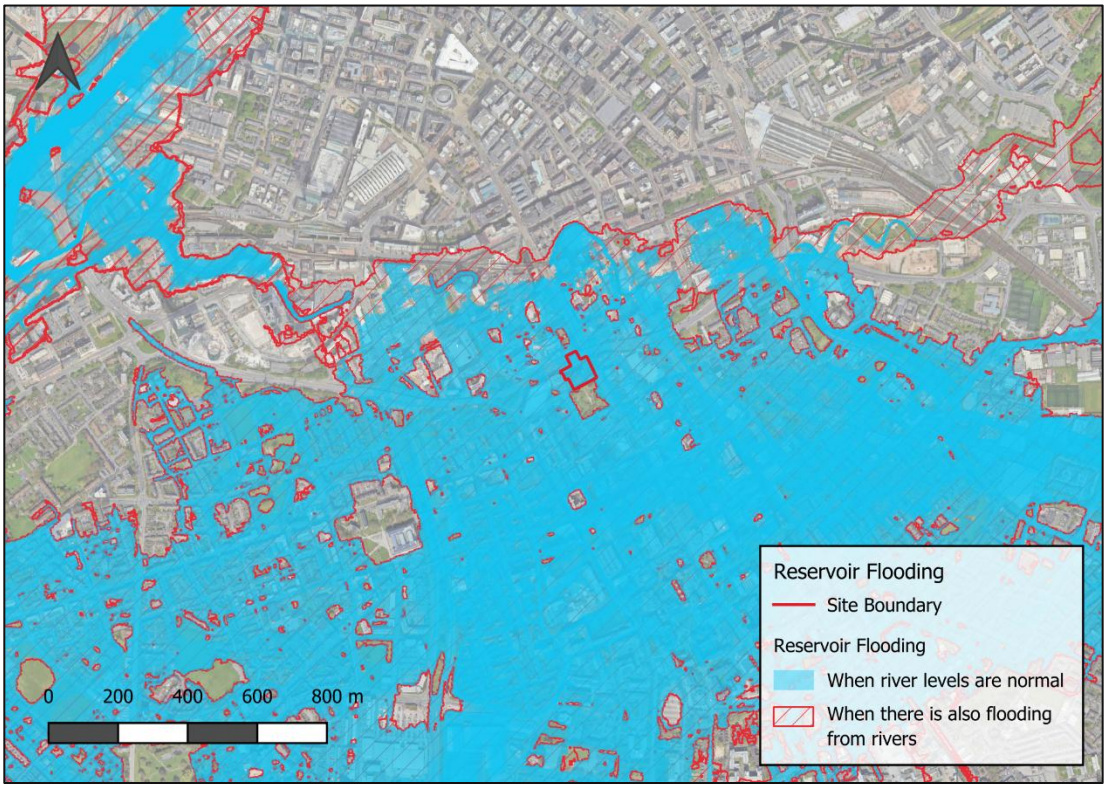


Figure 4—6: Maximum extent of flooding from reservoir failure (Environment Agency data)

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5 Summary and Conclusion

This FRA has been prepared to support the full planning application for the proposed transformation of the Manchester Metropolitan University All Saints Library, Manchester.

The Proposed Development comprise the development of a nine-storey library building (Use Class F1), public realm, access and servicing arrangements and other associated works.

According to the national flood map produced by the EA, the entirety of the site is located within Flood Zone 1, which is defined as having a low risk of flooding, less than 1 in 1,000 years (0.1% chance in any given year), from rivers and the sea. Tidal and fluvial flood risk is therefore considered to be low in the present- and future-day scenarios, with an allowance made for the impact of climate change. Climate change does show to increase flood extents, however the existing elevations on site are grater than the flood levels estimated. As such, additional measures to reduce this risk will not be required.

In accordance with the NPPF, all of the land uses for the Proposed Development are appropriate for Flood Zone 1. The proposed land uses in the Proposed Development are classified as More Vulnerable within the NPPF.

The EA's surface water flood map indicates that the majority of the site has very low probability of surface water flooding. There are areas at a high risk of surface water flooding along the northern and southern site boundary. This is associated with water gathering below Mancunian Way and the North side of All Saints Park. This is not deemed a high risk to users of the site as it is along the site boundary and is confined to existing public realm or minor roads. Safe access and egress from the site during a flood event remains viable.

The proposed surface water drainage strategy has been developed to manage surface water runoff throughout the lifetime of the development, considering the potential impacts of climate change. The proposed surface water drainage strategy uses sustainable drainage measures, such as permeable paving and tree pits, alongside channel drains and an attenuation tank to manage the surface water flood risk and provide a betterment of 75% in surface water run off rates compared to existing. With this strategy in place, the risk of surface water flooding is considered to remain low.

The site is not located within an area at risk of groundwater flooding according to the Groundwater Flooding Map in the Manchester City Council SFRA. GI surveys indicates that there may be areas of an increased groundwater table present at the site. It is not thought that these pose a flood risk above ground. It should be noted that during construction, pumping from the excavation may be required.

The map showing the risk of flooding from reservoirs produced by the EA indicates that the site is located within the maximum extent of flooding that would occur if an upstream reservoir were to fail when river levels are normal and when they are flooded. However, the EA advise that flood risk from reservoir flooding is extremely low due to the regular safety work undertaken at reservoirs to meet the Reservoirs Act 1975. Additionally, the risk of flooding from canals is deemed to be low. As such, the Proposed Development is considered to be at *Low* risk of flooding from artificial sources.

It is concluded that the risk of flooding from all sources, for the Proposed Development's design life is considered to be low and that the Proposed Development will not increase the risk of flooding elsewhere.

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Appendix A Planning Practice Guidance Tables

Table 1: Flood Zones

Flood Zone	Definition
Zone 1 Low Probability	Land having a less than 0.1% annual probability of river or sea flooding. (Shown as 'clear' on the Flood Map for Planning – all land outside Zones 2, 3a and 3b)
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. (Land shown in light blue on the Flood Map)
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. (Land shown in dark blue on the Flood Map)
Zone 3b The Functional Floodplain	This zone comprises land where water from rivers or the sea has 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). Local planning authorities should identify in their Strategic Flood Risk Assessments areas of functional floodplain and its boundaries accordingly, in agreement with the Environment Agency. (Not separately distinguished from Zone 3a on the Flood Map)

Note: The Flood Zones shown on the Environment Agency's Flood Map for Planning (Rivers and Sea) do not take account of the possible impacts of climate change and consequent changes in the future probability of flooding. Reference should therefore also be made to the Strategic Flood Risk Assessment when considering location and potential future flood risks to developments and land uses.

Paragraph: 078 Reference ID: 7-078-20220825

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Flood risk assessment requirements
All development proposals in this zone should be accompanied by a flood risk assessment.

Policy aims
In this zone, developers and local authorities should seek opportunities to:
- reduce the overall level of flood risk in the area through the layout and form of the development and the appropriate application of sustainable drainage systems;
- relocate existing development to land in zones with a lower probability of flooding; and
- create space for flooding to occur by restoring functional floodplain and flood flow pathways and by identifying, allocating and safeguarding open space for flood storage.

Zone 3b - the functional floodplain

Definition
This zone comprises land where water has to flow or be stored in times of flood.

Local planning authorities should identify in their Strategic Flood Risk Assessments areas of functional floodplain and its boundaries accordingly, in agreement with the Environment Agency. The identification of functional floodplain should take account of local circumstances and not be defined solely on rigid probability parameters. But land which would flood with an annual probability of 1 in 20 (5%) or greater in any year, or is designed to flood in an extreme (0.1%) flood, should provide a starting point for consideration and discussions to identify the functional floodplain.

Appropriate uses
Only the water-compatible uses and the essential infrastructure listed in table 2 that has to be there should be permitted in this zone. It should be designed and constructed to:
- remain operational and safe for users in times of flood;
- result in no net loss of floodplain storage;
- not impede water flows; and
- not increase flood risk elsewhere.

Essential infrastructure in this zone should pass the Exception Test.

Flood risk assessment requirements
All development proposals in this zone should be accompanied by a flood risk assessment.

Policy aims
In this zone, developers and local authorities should seek opportunities to:
- reduce the overall level of flood risk in the area through the layout and form of the development and the appropriate application of sustainable drainage systems;
- relocate existing development to land with a lower probability of flooding.

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Table 2: Flood risk vulnerability and flood zone 'incompatibility'

Flood Zones	Flood Risk Vulnerability Classification				
	Essential infrastructure	Highly vulnerable	More vulnerable	Less vulnerable	Water compatible
Zone 1	✔	✔	✔	✔	✔
Zone 2	✔	Exception Test required	✔	✔	✔
Zone 3a †	Exception Test required †	X	Exception Test required	✔	✔
Zone 3b *	Exception Test required *	X	X	X	✔ *

Key:

✔ Exception test is not required

X Development should not be permitted

Notes to table 2:

- This table does not show the application of the Sequential Test which should be applied first to guide development to the lowest flood risk areas; nor does it reflect the need to avoid flood risk from sources other than rivers and the sea;
- The Sequential and Exception Tests do not need to be applied to those developments set out in National Planning Policy Framework footnote 56. The Sequential and Exception Tests should be applied to 'major' and 'non major' development;
- Some developments may contain different elements of vulnerability and the highest vulnerability category should be used, unless the development is considered in its component parts.

"†" In Flood Zone 3a essential infrastructure should be designed and constructed to remain operational and safe in times of flood.

"*" In Flood Zone 3b (functional floodplain) essential infrastructure that has passed the Exception Test, and water-compatible uses, should be designed and constructed to:

- remain operational and safe for users in times of flood;
- result in no net loss of floodplain storage;
- not impede water flows and not increase flood risk elsewhere.

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Annex 3: Flood risk vulnerability classification

ESSENTIAL INFRASTRUCTURE

- Essential transport infrastructure (including mass evacuation routes) which has to cross the area at risk.
- Essential utility infrastructure which has to be located in a flood risk area for operational reasons, including infrastructure for electricity supply including generation, storage and distribution systems; and water treatment works that need to remain operational in times of flood.
- Wind turbines.
- Solar farms

HIGHLY VULNERABLE

- Police and ambulance stations; fire stations and command centres; telecommunications installations required to be operational during flooding.
- Emergency dispersal points.
- Basement dwellings.
- Caravans, mobile homes and park homes intended for permanent residential use.
- Installations requiring hazardous substances consent. (Where there is a demonstrable need to locate such installations for bulk storage of materials with port or other similar facilities, or such installations with energy infrastructure or carbon capture and storage installations, that require coastal or water-side locations, or need to be located in other high flood risk areas, in these instances the facilities should be classified as 'Essential Infrastructure'.)

MORE VULNERABLE

- Hospitals
- Residential institutions such as residential care homes, children's homes, social services homes, prisons and hostels.
- Buildings used for dwelling houses, student halls of residence, drinking establishments, nightclubs and hotels.
- Non–residential uses for health services, nurseries and educational establishments.
- Landfill* and sites used for waste management facilities for hazardous waste.
- Sites used for holiday or short-let caravans and camping, subject to a specific warning and evacuation plan.

LESS VULNERABLE

- Police, ambulance and fire stations which are not required to be operational during flooding.

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- Buildings used for shops; financial, professional and other services; restaurants, cafes and hot food takeaways; offices; general industry, storage and distribution; non-residential institutions not included in the 'more vulnerable' class; and assembly and leisure.
- Land and buildings used for agriculture and forestry.
- Waste treatment (except landfill* and hazardous waste facilities).
- Minerals working and processing (except for sand and gravel working).
- Water treatment works which do not need to remain operational during times of flood.
- Sewage treatment works, if adequate measures to control pollution and manage sewage during flooding events are in place.
- Car parks.

WATER-COMPATIBLE DEVELOPMENT

- Flood control infrastructure.
- Water transmission infrastructure and pumping stations.
- Sewage transmission infrastructure and pumping stations.
- Sand and gravel working.
- Docks, marinas and wharves.
- Navigation facilities.
- Ministry of Defence installations.
- Ship building, repairing and dismantling, dockside fish processing and refrigeration and compatible activities requiring a waterside location.
- Water-based recreation (excluding sleeping accommodation).
- Lifeguard and coastguard stations.
- Amenity open space, nature conservation and biodiversity, outdoor sports and recreation and essential facilities such as changing rooms.
- Essential ancillary sleeping or residential accommodation for staff required by uses in this category, subject to a specific warning and evacuation plan.

* Landfill is as defined in Schedule 10 of the Environmental Permitting (England and Wales) Regulations 2010.

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Appendix B Groundwater Flooding

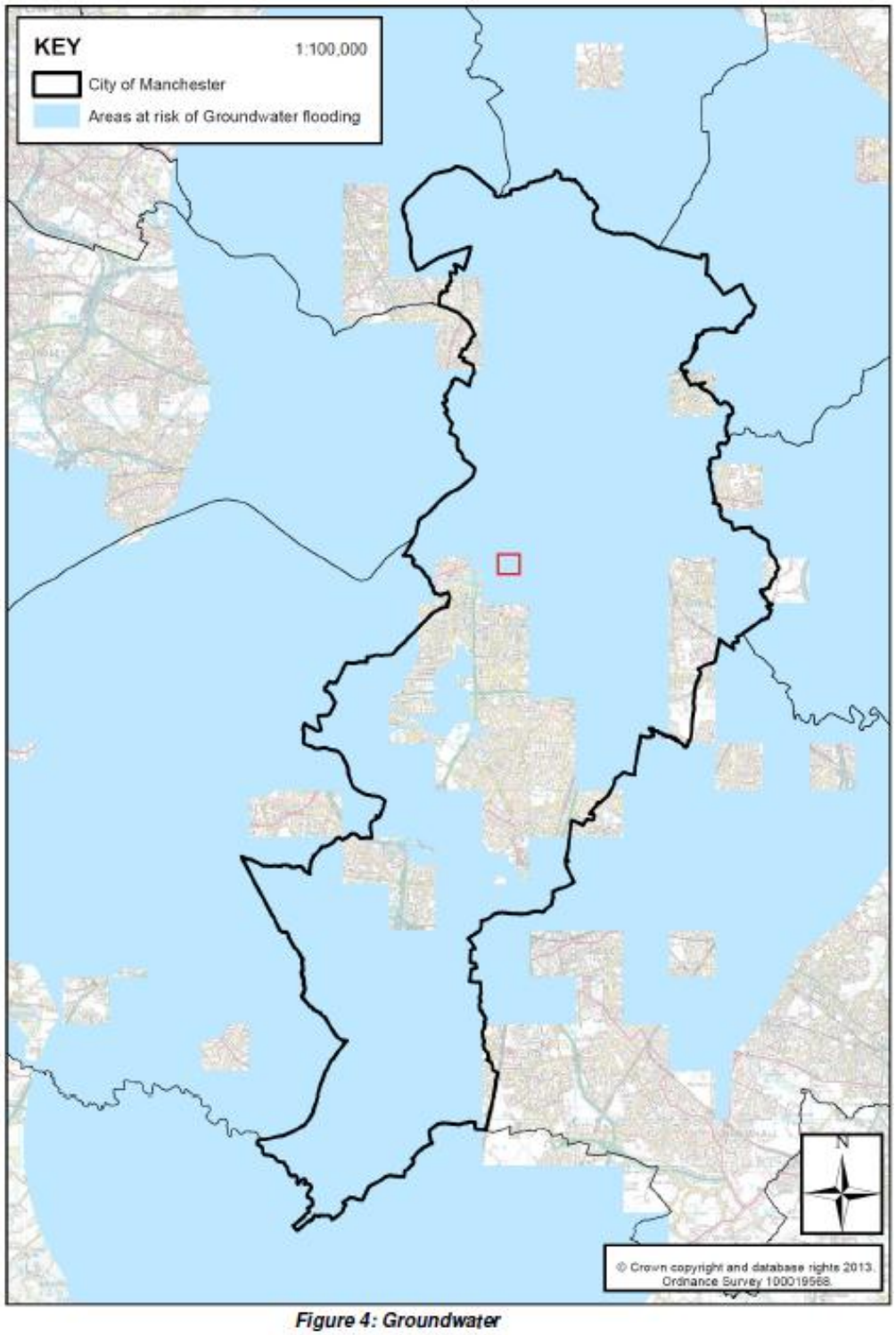


Figure 4: Groundwater

Figure B—1 Manchester City Council Local Flood Risk Assessment Figure 4: Groundwater Flood risk, with approximate site boundary shown in red.

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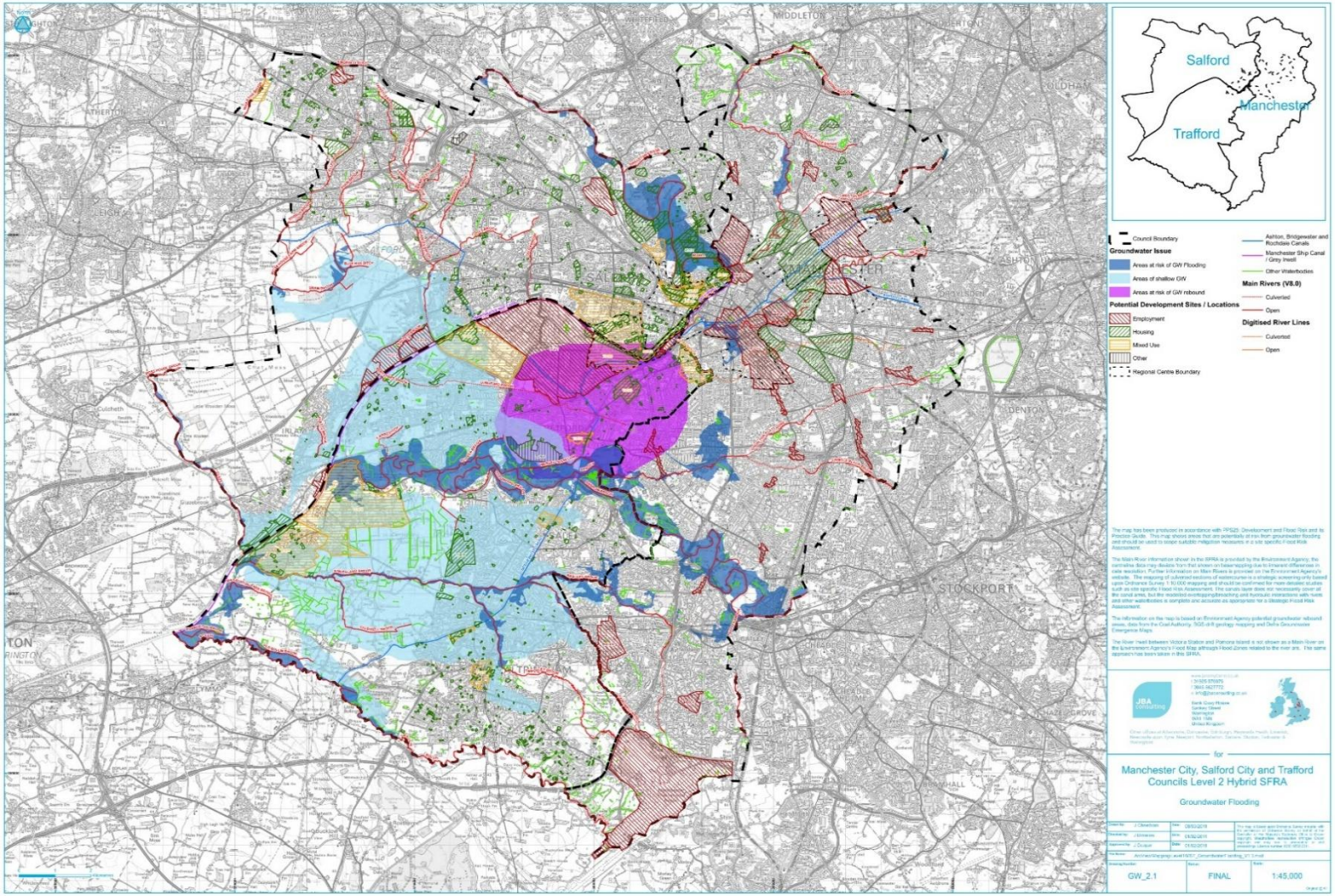


Figure B—2 Manchester City Council Strategic Flood Risk Assessment Groundwater Flood Risk Map (GW_2.1).

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