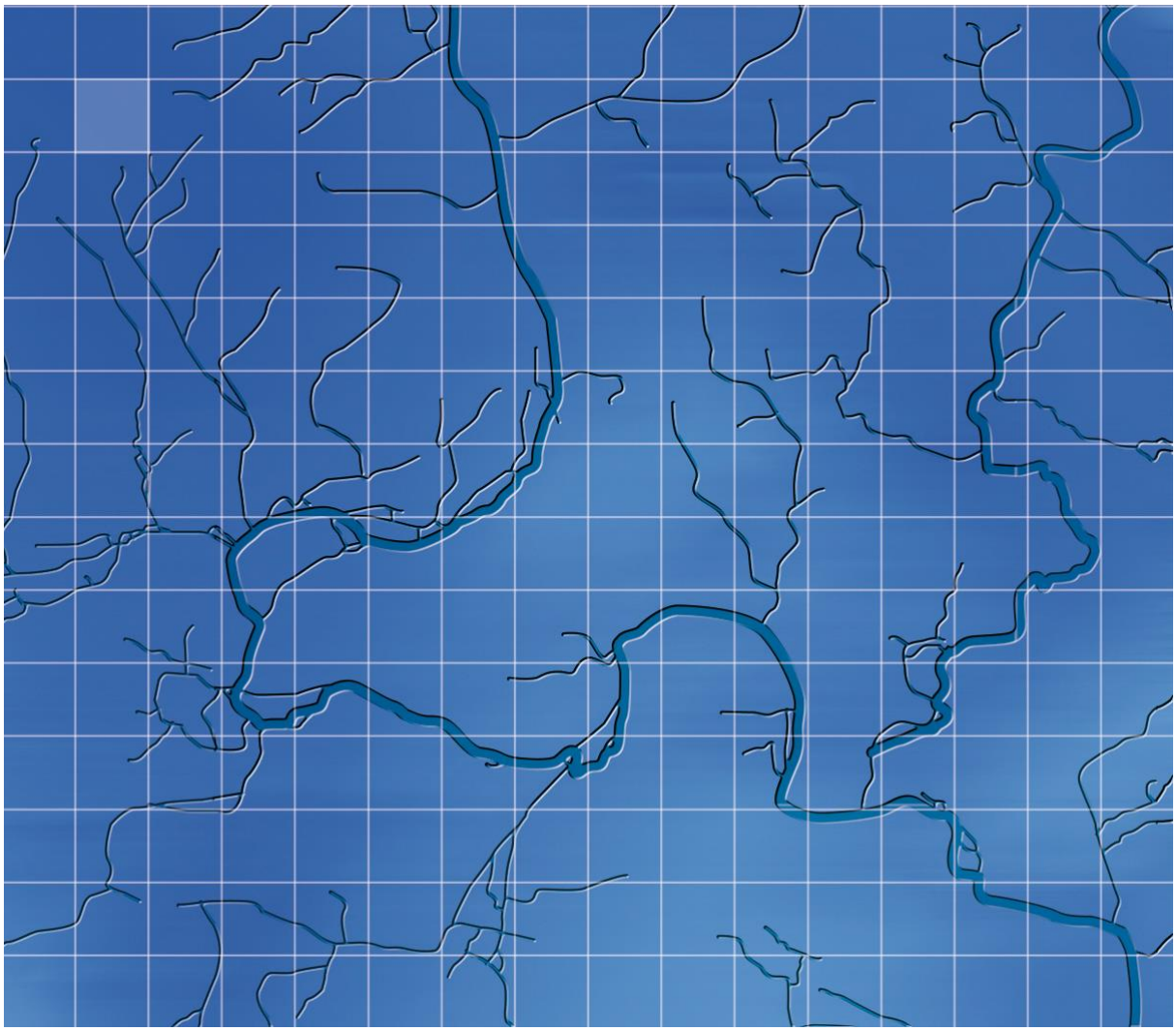
Reading Borough Council

May 2025

Reading Level 2 Strategic Flood Risk Assessment



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Reading Level 2 Strategic Flood Risk Assessment

Document issue details

WHS10135

Version	Issue date	Issue status	Prepared By	Approved By
1.0	02/05/2025	Draft	Daniel Hamilton (*Principal Consultant*)	Paul Blackman (*Director*)

For and on behalf of Wallingford HydroSolutions Ltd.

The WHS Quality & Environmental Management system is certified as meeting the requirements of ISO 9001:2015 and ISO 14001:2015 providing environmental consultancy (including monitoring and surveying), the development of hydrological software and associated training.

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1 Introduction

Wallingford HydroSolutions (WHS) Ltd has been commissioned by Reading Borough Council (RBC) to undertake a Level 2 Strategic Flood Risk Assessment (SFRA) in accordance with the National Planning Policy Framework (NPPF)[1], Planning Practice Guidance (PPG)[2] and associated guidance from the Environment Agency (EA). The main analysis and documentation on flood risk for the Reading Borough currently comprises a Level 1 SFRA[3], completed in November 2024.

Following this analysis, 24 sites were identified as requiring a Level 2 SFRA, given that a significant amount of land for development cannot be allocated outside flood risk areas. Table 1 lists the sites requiring an assessment and the location of these sites is shown in Figure 1.

This Level 2 SFRA includes a detailed assessment of flooding at each of the sites based on available model data, flood defence information, surface water flood mapping and historical flood data. The assessments also include guidance for the preparation of site-specific Flood Risk Assessments (FRAs), From this information the appropriateness of development on the sites has been determined.

This document details the methodology applied. The specific site assessments are provided in Appendix 1 which detail the results of the flood risk analysis along with the conclusions and recommendations reached for each of the sites.

Table 1- Level 2 SFRA Sites

Reference	Address	Development
WR3b	2 Ross Road and Meadow Road	Residential
WR3w	Part of Tesco Car Park, Portman Road	Residential
SR4g	Reading Link Retail Park, Rose Kiln Lane	Residential
CR14w	Reading Bridge House, George Street	Residential (Change of Use)
SR1a	Land south of Island Road	Employment
CR14v	2 Norman Place	Residential
CR11g	Riverside	Residential
CR11f	West of Caversham Road	Residential
CR14x	Part of Tesco Car Park, Napier Road	Residential
CR12a	Cattle Market	Mixed
CR11e	North of the Station	Mixed
CR11i	Napier Court	Residential
WR3k	784-794 Oxford Road	Residential
CR12b	Great Knollys Street and Weldale Street	Residential
CR14s	20-22 Duke Street	Residential (Change of Use)
CR14m	Caversham Lock Island	Energy & Employment
CA1a	Reading Boat Club, Thames Promenade	Residential
WR3i	Land at Portman Way	Residential
CR14g	The Oracle Riverside East	Mixed
WR3u	132-134 Bath Road	Residential
ER1m	Land adjacent to 17 Craven Road	Residential
CR13c	Forbury Business Park and Kenavon Drive	Residential
SR4c	169-173 Basingstoke Road	Residential
SR4a	Pulleyn Park	Residential

[1] Ministry of Housing, Communities & Local Government (2024) *National Planning Policy Framework*, https://assets.publishing.service.gov.uk/media/67aafe8f3b41f783cca46251/NPPF_December_2024.pdf
[2] UK Government (2022) Planning practice guidance- Flood risk and coastal change https://www.gov.uk/guidance/flood-risk-and-coastal-change
[3] WHS (2024) Reading Borough Level 1 Strategic Flood Risk Assessment *WHS10135- Reading Level 1 SFRA v1.2.pdf*

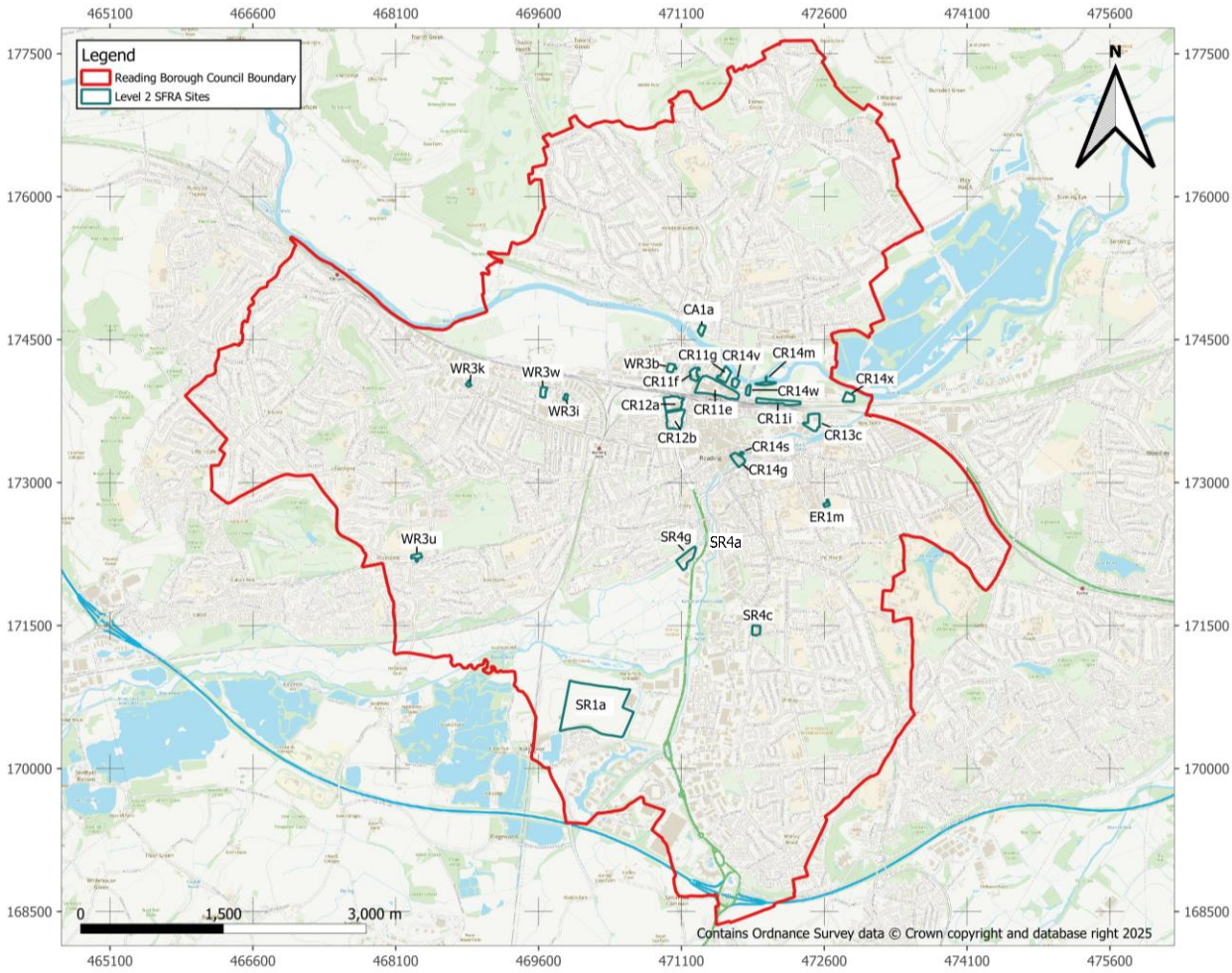

Figure 1- Site Locations Plan

2 Methodology

2.1 Sources of Data

This Level 2 SFRA presents an assessment of the risk of flooding from all sources at each of the sites. To inform this, existing information and model data have been identified and collated for different sources of flooding. The latest model data for the Reading Borough have been incorporated into the site-specific assessments, along with details on flood defences, surface water flooding and groundwater conditions.

The main sources of data used to inform this SFRA include;

- EA Fluvial Flood Maps[4] [5] [6]– to quantify fluvial flood risk where detailed model data are not available. This includes the existing fluvial flood maps and the NAFRA2 outputs.
- EA Surface Water Flood Maps[7] [8] – to quantify the pluvial flood risk and flood risk from ordinary watercourses where appropriate. This includes the existing surface water flood maps and the NAFRA2 outputs.
- EA Reservoir Flood Mapping[9] – to quantify the risk of reservoir flooding
- EA Historical Flood Map[10] and Recorded Flood Outlines[11] – to review historical flood events
- Hydraulic modelling data for the River Kennet (2018)[12] – to assess fluvial flood risk from the River Kennet and major tributaries
- Hydraulic modelling data from the Thames (Pangbourne to Sonning) (2021)[13] – to assess fluvial flood risk from the River Thames and major tributaries.
- EA flood defence structures[14] – to assess existing formal and informal flood defences present
- British Geological Survey (BGS) geoviewer[15] – To determine local bedrock and its expected permeability informing assessment of groundwater flood risk
- Soilscapes map[16] – To determine local soil and its expected permeability informing assessment of groundwater flood risk
- Thames Water sewer flooding data[17] – to determine risk of sewer flooding based on incidences of sewer flooding

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[4] EA (2023) *Flood Map for Planning (Rivers and Sea) – Flood Zone 2* https://www.data.gov.uk/dataset/cf494c44-05cd-4060-a029-35937970c9c6/flood-map-for-planning-rivers-and-sea-flood-zone-2
[5] EA (2023) *Flood Map for Planning (Rivers and Sea) – Flood Zone 3* https://www.data.gov.uk/dataset/cf494c44-05cd-4060-a029-35937970c9c6/flood-map-for-planning-rivers-and-sea-flood-zone-3
[6] EA (2025) *Risk of Flooding from Rivers and Sea https://environment.data.gov.uk/dataset/96ab4342-82c1-4095-87f1-0082e8d84ef1*
[7] EA (2023) *Risk of surface water flooding* https://environment.data.gov.uk/DefraDataDownload/?Mode=rofsw
[8] EA (2025) *Risk of Flooding from Surface Water https://environment.data.gov.uk/dataset/b5aaa28d-6eb9-460e-8d6f-43caa71fbe0e*
[9] EA (2025) *Risk of Flooding from Reservoirs - Maximum Flood Extent* https://www.data.gov.uk/dataset/44b9df6e-c1d4-40e9-98eb-bb3698ecb076/risk-of-flooding-from-reservoirs-maximum-flood-extent-web-mapping-service
[10] EA (2025) *Recorded Flood Outlines,* https://www.data.gov.uk/dataset/16e32c53-35a6-4d54-a111-ca09031eaaaf/recorded-flood-outlines
[11] EA (2025) *Historic Flood Map,* https://www.data.gov.uk/dataset/76292bec-7d8b-43e8-9c98-02734fd89c81/historic-flood-map
[12] JBA (2018) Lower Kennet Hydraulic Modelling Study.
[13] Jacobs (2021) Reading and Caversham Flood Alleviation Scheme Baseline Modelling
[14] 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
[15] BGS (2025) *BGS Geology Viewer*, https://geologyviewer.bgs.ac.uk/
[16] Cranfield Soil and Agrifood Institute (2025) *Soilscapes map*, http://www.landis.org.uk/soilscapes/
[17] Thames Water (2024) *DG5 Sewer Flooding Records for Reading Postcode Areas* Reading SFHD_Sep24.xlsx

- Canal and River Trust Overtopping and Breach data (2024)[18] [19]- to review flood risk from the Kennet and Avon Canal in the Borough

2.2 Updates to Hydraulic Models

The River Kennet model (Tyle Mill to Thames Confluence) (2018) and the River Thames model (Pangbourne to Sonning) (2021) were supplied by EA for the Level 1 SFRA. The models predate the latest climate change allowances released in May 2021 and currently apply the older allowances for the wider Thames Basin. The models have therefore been updated to include the latest central and higher central allowances for the Kennet and Tributaries management catchment (21% and 35%) and the Thames and Southern Chilterns management catchment (31% and 43%). These have been applied to the 1.0% AEP event which relates to Flood Zone 3.

Based on the latest NPPF and PPG the central allowance is to be applied to more vulnerable infrastructure and less vulnerable infrastructure which covers the development proposed across both of the sites.

2.3 Assessment of Flood Risk

For the sites, a detailed assessment of the nature of flood hazard was undertaken. This included using the relevant fluvial modelling data to assess:

- The proportion of the site inundated for a range of return periods
- The speed of onset
- Flood depth
- Flood velocity
- Overall flood hazard (ZUK0) and potential impacts

The sites were assessed against a range of return periods, however the design event, the 100-year (plus 25% climate change) event, was considered most important for planning purposes.

In addition to the analysis of modelling data, the location, standard and condition of existing flood defences was assessed. Other sources of flooding were also reviewed at each site. This included an assessment of surface water flooding and an assessment of groundwater flooding based on available hydrogeological information and AStGWE mapping. Potential access/egress routes were identified with respect to the risk posed from all sources of flooding.

Following a review of flood risk, flood defences and the identification of access/egress routes, an assessment was made on whether a future site-specific FRA would be able to show that the site can be allocated for development. The assessment takes into account the NPPF's flood risk vulnerability and flood zone compatibility classifications shown in Table 2, the scale of development proposed along with any requirements for the Exception Test (see section 2.4). In this context, any mitigative actions in the form of ground raising and compensatory storage are identified, in accordance with paragraph 173 of the NPPF.

[18] Canal and River Trust (2024) *Breach Archive* Breach archive.shp
[19] Canal and River Trust (2024) *Overtopping Archive* Overtopping archive.shp

Table 2- 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 required	✓	✓	✓
Zone 3a	Exception Test required	x	Exception Test required	✓	✓
Zone 3b	Exception Test required	x	x	x	✓

Note, to determine final finished floor levels and the specific volume of compensatory storage required a modelling assessment would be needed incorporating information on the site layout. The layouts for each site are not available at this stage and would typically be determined at the planning stage. Therefore, at this stage the assessment reviews the likely degree of ground raising (if any) required based on the baseline flood levels. From this information a qualitative assessment of potential offsite impacts and compensatory storage requirements is undertaken.

The site assessments also include guidance for the preparation of FRAs, including information about the use of SuDS.

2.4 Exception Test

The NPPF outlines the use of the Exception Test for determining whether a particular development is suitable within areas vulnerable to flooding. The Exception Test is required if a development is:

- Highly vulnerable and in Flood Zone 2
- Essential infrastructure in Flood Zone 3a or 3b
- More vulnerable in Flood Zone 3a

The Exception Test comprises the following two requirements, which the NPPF states must be passed for development to go ahead:

- It must be demonstrated that the development provides wider sustainability benefits to the community that outweigh flood risk.
- It must demonstrate that the development will be safe for its lifetime taking account of the vulnerability of its users without increasing flood risk elsewhere, and where possible, will reduce flood risk overall.

This Level 2 SFRA provides a high-level review of the second part of the Exception Test considering the likelihood of each of the sites passing this element. This has considered i) the safety of future occupants in terms of finished floor levels and safe access/egress, ii) whether the scale of development is appropriate with respect to off site impacts and iii) whether flood risks onsite can be reduced.

The layouts for each site are not available at this stage and would typically be determined at the planning stage. If the sites are allocated, a site-specific FRA will need to undertake a more detailed assessment of flood risk and design mitigation measures where required to ensure that the development is safe for its lifetime.

Appendix 1 – Site Specific Assessments