SuDS Strategy

Project: XXXX
Reference: XXXX
Prepared for: XXXX
24 October 2025
Project number: XXXX

EXECUTIVE SUMMARY

This SuDS Strategy has been prepared in accordance with the requirements set out in the National Planning Policy Framework (NPPF) and the associated Planning Practice Guidance. It has been produced on behalf of XXXX in support of a planning application for a proposed dwelling at XXXX.

This report demonstrates that the proposed development is at an acceptable level of flood risk, subject to the recommended flood mitigation measures being implemented.

The site is located within Flood Zone 1, as identified on the Environment Agency's Flood Map for Planning. It is also assessed to be the following flood sources:

- River and sea (Fluvial) - Low risk
- Surface Water (Pluvial) - High risk
- Groundwater - Medium risk

Surface water drainage from the site will be appropriately managed through the installation of a permeable paving and soakaways. Runoff will be directed to a below-ground soakaways designed to temporarily store stormwater and infiltrate into soil. Flow from the soaraway system will be controlled by a Hydro-brake or similar flow control device, discharging to the local public combined sewer.

In line with the NPPF requirements, and subject to the mitigation measures outlined within this report, the proposed development can proceed without being subject to significant flood risk. Furthermore, through the implementation of suitable surface water management techniques, the development will not increase flood risk to the surrounding area.

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INTRODUCTION

Background

The purpose of this Flood Risk Assessment (FRA) is to evaluate the flood risks associated with the proposed development at XXXX. The FRA seeks to ensure that future occupants of the development will remain safe throughout the lifetime of the development, that the proposals will not increase flood risk either on-site or elsewhere, and, where practicable, that opportunities to reduce overall flood risk are incorporated. This assessment addresses flood risk in accordance with the requirements set out in national and local planning policies, and includes recommendations for appropriate mitigation measures where necessary.

Site Proposals

The proposed development consists of the rear extension of existing dwelling, demolition of garage and erection of bicycle shed. A copy of the proposed development plans is included within Appendix A.

National and Local Planning Policy

The National Planning Policy Framework (NPPF) outlines the Government's national approach to land use planning in England, specifically in relation to flood risk. It requires that flood risk be taken into account at all stages of the planning process. The accompanying Planning Practice Guidance (PPG) provides detailed technical direction and is available online.

The PPG classifies the vulnerability of different land uses to flooding and guides planning decisions accordingly. It promotes the siting of development in areas of lowest flood risk wherever feasible and emphasises the need to avoid any increase in flood risk beyond the site boundary, ensuring that flood risk to the wider catchment is not exacerbated.

The National Planning Policy Framework (NPPF) outlines the requirements for site-specific Flood Risk Assessments. A FRA is required for proposals that:

A. Are greater than 1 hectare in area within Flood Zone 1;
B. Involve new development (including minor development and changes of use) within Flood Zones 2 and 3;
C. Are located in an area within Flood Zone 1 that has been identified as having critical drainage problems; and where proposed development or a change of use to a more vulnerable class may be subject to other sources of flooding;
D. Are located in an area in Flood Zone 1 identified in a Strategic Flood Risk Assessment as being at increased future flood risk or subject to other sources of flooding.
E. In an area in Flood Zone 1 that may be subject to other sources of flooding, where its development would introduce a more vulnerable use.

This FRA has been prepared to provide sufficient information to demonstrate compliance with the requirements of the NPPF, Planning Practice Guidance (PPG), and relevant regional and local government policies.

The assessment evaluates the risk of flooding from all sources, including tidal, fluvial, surface water, groundwater, sewer, and artificial sources. It also proposes mitigation measures to ensure that flood risk to the site is minimised and that flood risk elsewhere is not increased as a result of the proposed development.

Sources of Information

This FRA has been based on the following sources of information:

- NPPF
- NPPF-PPG
- Site Layout Plan
- Ordnance Survey mapping
- Site Topographical Survey
- DEFRA Magic mapping
- Environment Agency mapping, consultation and model information
- Web Based Soil Mapping
- British Geological Survey Drift & Geology Maps
- Wycombe District Council Strategic Flood Risk Assessment (SFRA) Level 1 (2014)
- Wycombe District Local Plan (2019)
- Buckinghamshire Local Flood Risk Management Strategy (2024)
- Buckinghamshire County Council Preliminary Flood Risk Assessment Report Final (2011)

EXISTING SITE & HYDROLOGY CHARACTERISTICS

Site Location

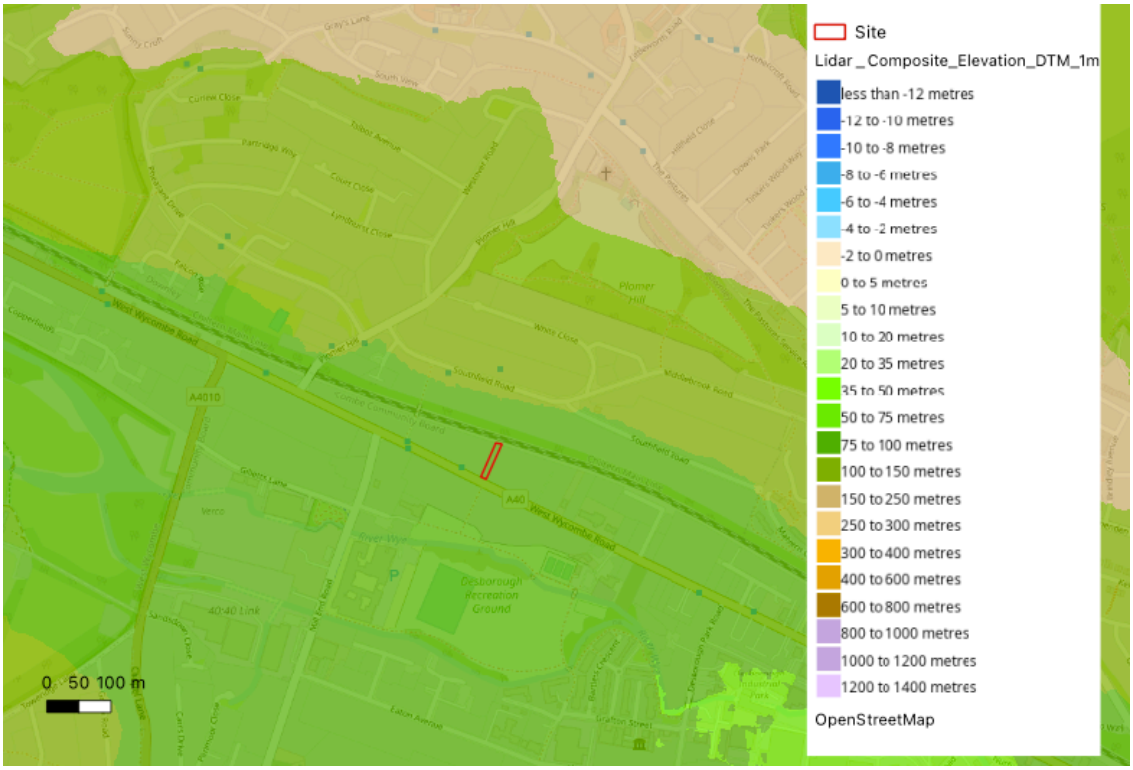
The site is located at XXXX, within the Buckinghamshire Council. It lies within a predominantly residential area characterised by traditional terraced housing and small-scale private gardens.

The site comprises previously developed brownfield land and is currently occupied by a residential building. It is bounded by existing dwellings on all sides and railway tracks on the north and is well integrated into the urban fabric of the surrounding neighbourhood.

The site location is approximately shown outlined in red in Figure below. The approximate central grid reference for the site is E: XXX; N: XXX.

Topography

LiDAR data indicates that ground levels across the site are sloping south-west (see Figure below). Level of site is consistent with the surrounding urban landscape and does not indicate any notable low-lying areas that may be prone to surface water accumulation.



Ground Conditions

Geological mapping from the British Geological Survey (BGS) indicates that the site is underlain by the New Pit Chalk Formation, a widespread chalk bedrock geology. No information was recorded as superficial deposit. Nearby borehole data—sourced from approximately 520 metres south east of the site (reference SU89SE68)—suggests chalk and gravel with water levels between 0.3m to 0.9m.

Soilscapes mapping indicates that the site is characterised by shallow lime-rich soils over chalk or limestones. These characteristics suggest that surface water infiltration may be possible.

Existing Drainage & Hydrology

The site at XXXX located within a fully urbanised setting in the Buckinghamshire Council, is not in immediate proximity to any main rivers, ordinary watercourses, or open drainage channels. There is River Wye approximately 100m south of the site. It is assumed that the property has existing connection at the front to a combined sewer.DEFRA's Magic Map (England and Wales) confirms there are no nearby designated sites of hydrological significance (e.g. SSSIs or flood storage reservoirs) in close proximity to the site. As such, the development is not anticipated to impact any environmentally sensitive receptors in terms of hydrological connectivity.

DEVELOPMENT VULNERABILITY & FLOOD ZONE CLASSIFICATION

National Planning Policy Framework

Local Planning Authorities (LPAs) have a statutory duty to consult the Environment Agency (EA) on relevant planning applications where flood risk may be a concern. The EA will review such applications in line with the National Planning Policy Framework (NPPF).

NPPF requires that, as part of the planning process:

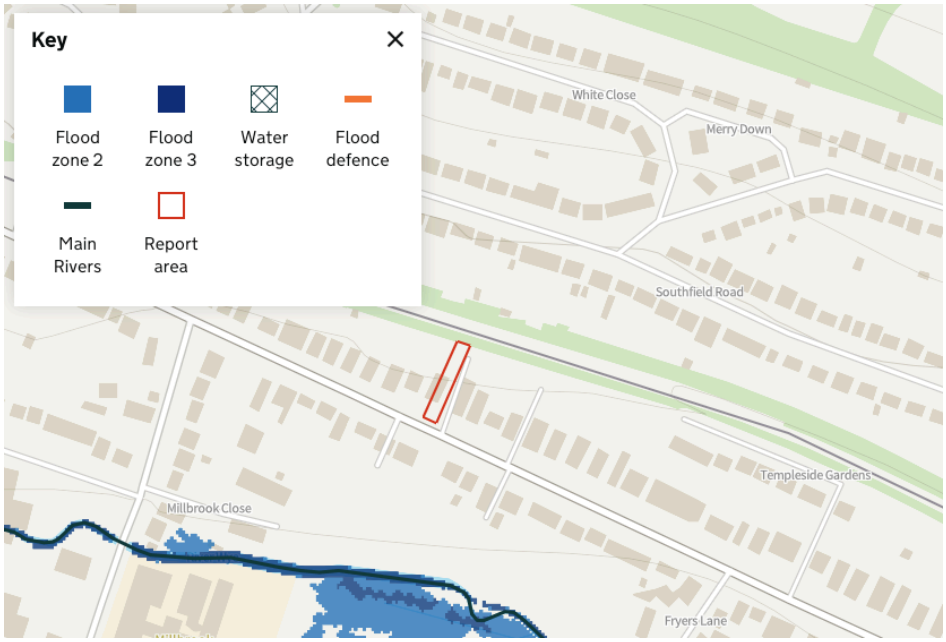
A. A 'site specific' Flood Risk Assessment will be undertaken for any site that has a flood risk potential.
B. Flood risk potential is minimised by applying a 'sequential approach' to locating 'vulnerable' land uses.
C. Sustainable drainage systems are used for surface water disposal where practical.
D. Flood risk is managed through the use of flood resilient and resistant techniques.
E. Residual risk is identified and safely managed.

Table 1 of NPPF, categorises flood zones into:

- Zone 1- Low risk, less than 0.1% Annual Event Probability (AEP) (< 1 in 1000 years)
- Zone 2- Medium risk, 0.1% AEP (1 in 1000 - 1 in 100 years)
- Zone 3a- High risk, 1% AEP (> 1 in 100 years)
- Zone 3b- High risk - Functional Floodplain, 3.33% AEP (>1 in 30 years)

Environment Agency Flood Map for Planning

The Environment Agency's Flood Map for Planning provides the most up-to-date representation of flood risk from rivers and the sea, assuming the absence of existing flood defences. These maps serve as a planning tool to determine whether sites fall within designated flood risk zones and inform the need for further assessment.



The site at XXXX is located within Flood Zone 1, as identified on the Environment Agency's Flood Map for Planning (see Figure above). Flood Zone 1 is defined as land at low probability of fluvial or tidal flooding, with an annual probability of flooding of less than 0.1%.

As such, the Sequential and Exception Tests are not required for this development.

FLOOD RISK ASSESSMENT

National Planning Policy Framework (NPPF)

In line with the NPPF, this Flood Risk Assessment (FRA) considers all potential sources of flooding, including:

A. Tidal flooding – from the sea;
B. Fluvial flooding – from rivers and streams;
C. Pluvial flooding – from surface water runoff and exceedance flows;
D. Groundwater flooding – from elevated groundwater tables or springs;
E. Flooding from sewers – including surcharge from combined or surface water systems;
F. Artificial sources – such as reservoirs, canals or infrastructure failure.

part from a number of sewer flood incidents in 2007. The site is not adjacent to any main river, and no incidents of riverine flooding have been reported within the vicinity. There are no Environment Agency records of past flood events at this location.

Fluvial Flooding

Fluvial flooding occurs when watercourses exceed their capacity and overflow into adjacent land. This process can be exacerbated when debris is mobilised by high flows and accumulates at structures.

The site is located within Flood Zone 1. This classification identifies the land as being at low risk of fluvial or tidal flooding, with an annual probability of flooding from rivers or the sea of less than 0.1%.

The Environment Agency flood mapping (see Appendix B) confirms that the site does not benefit from any formal flood defences providing protection up to a 1 in 100-year (1%) annual probability event. However, the site lies well outside the areas expected to be impacted by such events.

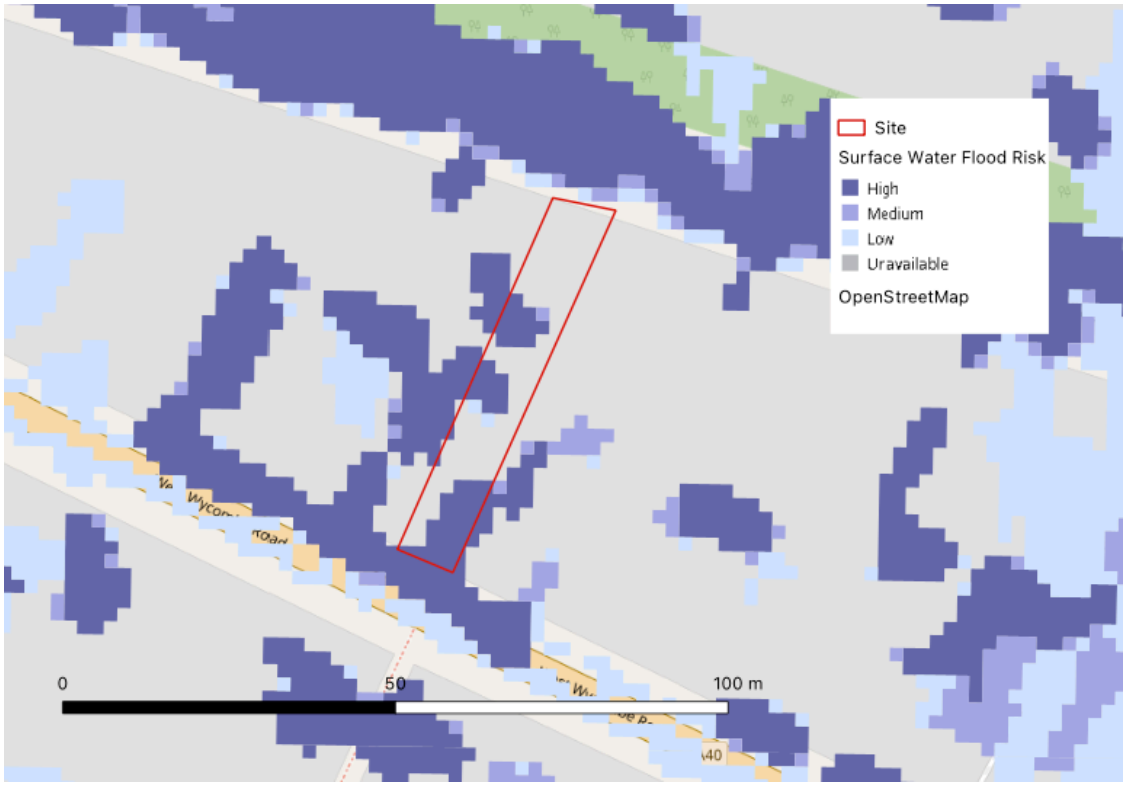
Given that the site is located entirely within Flood Zone 1, as defined by the Environment Agency's Flood Map for Planning, the fluvial flood risk is considered to be low.

Pluvial Flooding

Pluvial flooding arises when intense or prolonged rainfall events exceed the infiltration capacity of the ground or overwhelm the local drainage infrastructure, leading to the accumulation of surface water and the formation of overland flow paths.

Surface water flood risk mapping from the Environment Agency (Figure below) shows the modelled extent of potential surface water flooding for 1 in 30-year, 1 in 100-year, and 1 in 1000-year events. The mapping indicates that the site lies within identified areas of high surface water flood risk.

The proposed dwelling is to be situated on land that remains within the modelled extents of pluvial flood risk. As such, the risk of pluvial flooding to the proposed development is considered to be high.



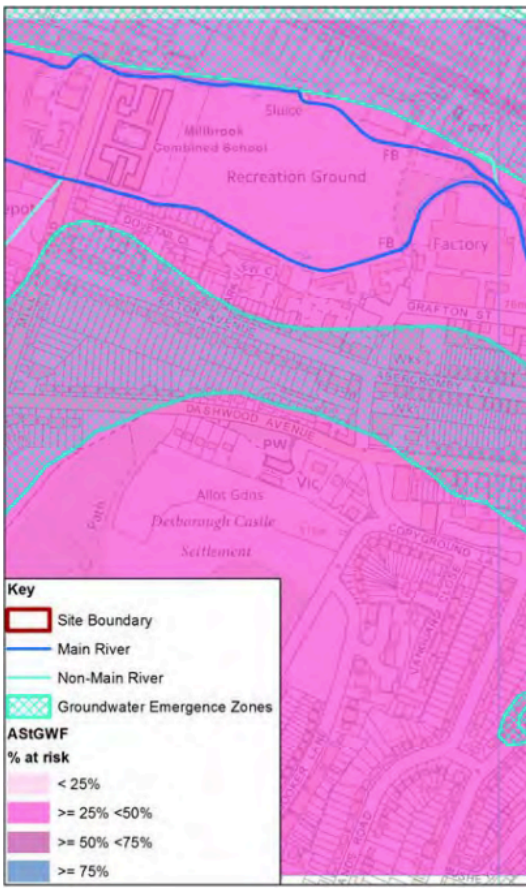
Groundwater Flooding

Groundwater flooding occurs when the water table rises above the surface, typically in low-lying areas underlain by permeable geology such as chalk or sand and gravel aquifers. These events are usually prolonged and can result in widespread disruption where poorly drained soils coincide with rising groundwater levels.

At XXXX the underlying geology comprises chalk, a high-permeability bedrock that typically indicates the risk of groundwater emergence at the surface.

According to the Wycombe Strategic Flood Risk Assessment (2024) groundwater flood mapping (see Figure on the right), the site lies within an area within of medium risk of groundwater flooding.

The risk of groundwater flooding is therefore considered to be medium.



SUDS STRATEGY

Introduction

Sustainable Drainage Systems (SuDS) are designed to replicate the natural drainage processes of a site prior to development. By managing rainfall close to where it falls, SuDS reduce both the quantity and rate of surface water runoff and, in doing so, lower the risk of flooding. Additionally, they enhance water quality and provide wider environmental benefits including amenity and biodiversity gains.

The SuDS management train considers three core objectives: flood risk reduction, pollution control, and landscape/ecosystem enhancement. Disposal of surface water should follow the SuDS hierarchy, in decreasing order of preference:

- Discharge to ground (infiltration and re-use);
- Discharge to a surface water body;
- Discharge to a surface water sewer;
- Discharge to a combined sewer (as a last resort).

The philosophy of SuDS is to manage runoff as close to source as possible, while also improving water quality prior to discharge. The benefits of this approach include:

- Reduction of runoff rates, thereby reducing downstream flood risk;
- Reduction in pollutant loading to watercourses;
- Support for groundwater recharge where appropriate;
- Improved visual and recreational amenity;
- Creation of ecological niches for biodiversity in developed areas.

Existing Drainage

The site currently comprises a residential dwelling with all drainage assumed discharging to a combined sewer. The plot includes soft landscaping and no permeable surfaces with concrete hardstanding.

Proposed Drainage

In accordance with the National Planning Policy Framework (NPPF) and best practice guidance, the proposed development at XXXX will incorporate a Sustainable Drainage System (SuDS). This system has been designed to manage rainfall on-site, reduce surface water runoff, and ensure that flood risk is not increased on or off-site.

The strategy is based on infiltration where feasible, supplemented by SuDS features such as permeable surfacing, soakaways, all tailored to the site's geological and spatial constraints.

Drawings illustrating the proposed drainage layout and features are provided in Appendix D.

Site Specific SUDS

The selection of SuDS features for the development at XXXX has been guided by site-specific opportunities and constraints, as well as the principles outlined in the CIRIA SuDS Manual (C753). The objective is to apply the SuDS management hierarchy as far up the hierarchy as possible, while acknowledging feasibility based on site layout, geology, and drainage requirements.

SuDS measures aim to replicate natural drainage processes by managing rainfall at or near the point where it falls. The most effective SuDS features are those that provide source control — intercepting and managing runoff as close to its origin as possible.

As outlined in the CIRIA SuDS Manual (C753), open surface SuDS are generally preferred to subsurface or end-of-pipe solutions because:

- They offer greater visibility, allowing for easier inspection and maintenance;
- Malfunctions can be more readily identified and rectified;
- They often provide added biodiversity, amenity, and aesthetic value to developments.

However, SuDS selection must also account for practical constraints such as site layout, geology, levels, and urban design. The table below provides a high-level assessment of the key SuDS features considered for this development, outlining their description, suitability, and justification based on the site-specific conditions.

Table below provides a summary of the SuDS options considered, along with their suitability for this development:

SuDS Feature	Description	Suitability / Comment
Green roofs	Vegetated roofs that reduce discharge rates and provide ecological benefits.	Not suitable due to the proposed roof structure.
Blue roofs	Temporary roof-level stormwater attenuation.	Not suitable due to the proposed roof structure.
Rainwater harvesting	Re-use of rainwater for non-potable use.	Not suitable due to the volume required for the demand.
Trees	Intercept rainfall and promote infiltration via soft landscaping.	Not suitable due to limited space and topographical constraints.
Infiltration systems	Soakaways and boreholes allow runoff to percolate into the ground.	Soakaways are proposed at the front of the site.
Pervious pavements	Permeable surfacing to allow water to infiltrate through construction layers.	Permeable block paving is proposed to replace existing hardstanding.
Bioretention systems	Vegetated depressions (e.g., rain gardens) to store and treat runoff.	Not suitable due to groundwater flooding risk.
Swales	Grass channels to convey and treat surface water.	Not suitable due to site topography and density.

Filter drains	Gravel-filled trenches to convey or infiltrate surface water.	Not suitable due to site topography and density.
Detention basins	Temporary storage basins for runoff during storm events.	Not suitable due to limited space and topographical constraints.
Ponds & wetlands	Permanent open water features for amenity and biodiversity.	Not suitable due to health and safety risks and limited green space.
Filter strips	Grass strips that slow runoff, encourage sedimentation.	Not suitable for site layout.
Attenuation storage tanks	Below-ground tanks to hold back runoff.	Not proposed. May be reconsidered if soakaways are considered to be not viable.
Proprietary treatment systems	Prefabricated treatment devices (e.g., catchpits, silt traps).	Catchpits will be used; no dedicated treatment unit required due to clean runoff profile.

SuDS Strategy

The site presents some constraints for the implementation of vegetated SuDS features such as swales and rain gardens. This is primarily due to the site's topography and the limited space available for soft landscaping within the development layout.

Permeable block paving and soakaways are proposed as main SUDS features in managing surface water.

Surface Water Drainage Strategy

The proposed drainage layout is presented in Appendix D, which includes a detailed plan showing:

- Permeable block paving;
- Soakaways;
- Associated SuDS features designed for source control and pollution mitigation.

To prevent sedimentation and maintain system performance, all SuDS elements and associated drainage infrastructure will be protected through the inclusion of catchpits and silt traps, incorporated into inspection chambers, gullies, and connecting pipework.

The runoff risk from hardstanding surfaces is considered low due to the scale and the planned interception systems.

Runoff Calculations

- Total site area: Approx. 540m^2
- Existing impermeable area: Approx. 335m^2
- Proposed impermeable area: Approx. 155m^2
- Proposed permeable block paving area: 175m^2
- Permeable graden: 210m^2

With permeable surfacing, soakaways and infiltration features installed, the overall runoff rates and volumes are expected to match or fall below those associated with the pre-development (brownfield) condition.

Table below compares pre- and post-development runoff rates and volumes, including greenfield runoff baseline.

Pre- and Post-Development Surface Water Runoff

Return Period	Existing Peak Runoff Rate [l/s]	Greenfield Runoff Rate [l/s]	Proposed Peak Runoff Rate [l/s]	Betterment from existing (%)
1 in 1 year	3.44	0.01	0.09	100%
1 in 30 years	13.49	0.02	0.09	100%
1 in 100 years	17.74	0.03	0.09	100%
1 in 100 years (+40%)	n/a	n/a	0.09	100%

- Existing and Proposed peak runoff rates were calculated using SuDS performance evaluation tool that was built by HR Wallingford as part of the EC StopUP project.
- Greenfield rates are derived using IH124 methodology and UKSUDS Greenfield runoff rate estimation tool.

Water Disposal Hierarchy

The water disposal hierarchy recommended by the Lead Local Flood Authority (LLFA), Thames Water, the SuDS Manual (CIRIA C753), and national planning guidance follows the order:

A. Re-use at source
B. Infiltration to ground
C. Discharge to watercourse
D. Discharge to surface water sewer
E. Discharge to combined sewer (only if no alternatives are available)

This hierarchy ensures surface water runoff is managed as close to its source as possible, mimicking the site's natural (predevelopment) hydrological response.

The proposed development complies with this hierarchy, as summarised below:

Discharge Method	Comment
Re-use at source	No re-use is proposed
Infiltration	Permeable block paving (175m^2) and soakaways (total volume of 6m^3) are proposed
Watercourse	No discharge to nearby watercourses.
Surface water sewer	Not used for this development.
Combined sewer	Discharged through the existing connection to a presumed combined sewer.

Peak Flow and Volume Control

This achieves full compliance with national and local policies requiring post-development runoff volumes and peak flows to be equal to or less than pre-development values.

Water Quality

The SuDS strategy incorporates robust source control features to manage and treat water quality. All surfaces will be treated through filtration, infiltration or sediment control structures (e.g. catchpits and silt traps).

The first 5 mm of rainfall — which contains the highest concentration of pollutants — will be fully retained and treated on-site, ensuring that water leaving the site (if ever) meets acceptable quality standards.

In accordance with SuDS Manual guidance, the following levels of treatment have been applied based on surface types:

A. Roofs – 1 level of treatment (e.g. infiltration, filtration through permeable surfaces).
B. Pedestrian areas and lightly trafficked roads – 2 levels of treatment.
C. Distribution roads (if applicable) – 3 levels of treatment (e.g. permeable paving, catchpits, soakaways).

The proposed development includes impermeable roof areas, green roofs and water butt only.

Surface runoff from these areas will receive:

- Primary treatment via sedum green roof, allowing infiltration and filtration of surface water;
- Secondary treatment through trapped gullies and catchpits positioned throughout the surface water network to intercept sediment and debris before entering combined sewer.

Design and Modelling Criteria

The drainage system has been designed to accommodate a 1 in 100-year storm event with a 40% climate change allowance, in line with current DEFRA guidance (upper-end uplift).

Supporting calculations, presented in Appendix C, confirm that the proposed SuDS infrastructure is sufficient to manage all runoff volumes generated by the critical design storm.

Hydraulic modelling assumptions include:

- PAF (Proportion of Area Flowing):
  - 1.0 for impermeable areas;
  - 0.25 for permeable areas (reflecting infiltration loss);
- Catchment runoff coefficient (Cv): 1.0 applied for both winter and summer conditions;
- Urban creep: No additional allowance made, due to application of maximum PAF.

Exceedance Flow Management

In the event that storm intensity exceeds the design capacity of the drainage system exceedance flows will be safely retained within the site boundary.

Maintenance Strategy

All proposed SuDS elements and drainage infrastructure will be maintained for the full lifecycle of the development by the appointed management entity.

A detailed maintenance schedule, in accordance with the CIRIA SuDS Manual (C753), is provided in Appendix E.

CONCLUSIONS

The site is located within Flood Zone 1, as identified on the Environment Agency's Flood Map for Planning. It is also assessed to be the following flood sources:

- River and sea (Fluvial) - Low risk
- Surface Water (Pluvial) - High risk
- Groundwater - Medium risk

Surface water drainage from the site will be appropriately managed through the installation of a permeable paving and soakaways. Runoff will be directed to a below-ground soakaways designed to temporarily store stormwater and infiltrate into soil. Flow from the soaraway system will be controlled by a Hydro-brake or similar flow control device, discharging to the local public combined sewer.

In line with the NPPF requirements, and subject to the mitigation measures outlined within this report, the proposed development can proceed without being subject to significant flood risk. Furthermore, through the implementation of suitable surface water management techniques, the development will not increase flood risk to the surrounding area and decrease surface water run-off rates to greenfield rates.

The proposed surface water network is to be designed to the 1 in 100 year storm event with an allowance of 40% for Climate Change.

APPENDIX A – PROPOSED DEVELOPMENT DRAWINGS

APPENDIX B – FLOOD DATA

APPENDIX C – DRAINAGE CALCULATIONS

APPENDIX D – DRAINAGE STRATEGY

APPENDIX E – SUDS MAINTENANCE PLAN

Operation and Maintenance Requirements for Soakaways

Maintenance Schedule	Required Action	Typical Frequency
Regular maintenance	Inspect for sediment and debris in pre-treatment components and floor of inspection tube or chamber and inside of concrete manhole rings	Annually
	Cleaning of gutters and any filters on downpipes	Annually (or as required based on inspections)
	Trimming any roots that may be causing blockages	Annually (or as required)
Occasional maintenance	Remove sediment and debris from pre-treatment components and floor of inspection tube or chamber and inside of concrete manhole rings	As required, based on inspections
Remedial actions	Reconstruct soakaway and/or replace or clean void fill, if performance deteriorates or failure occurs	As required
	Replacement of clogged geotextile (will require reconstruction of soakaway)	As required
Monitoring	Inspect silt traps and note rate of sediment accumulation	Monthly in the first year and then annually
	Check soakaway to ensure emptying is occurring	Annually

Operation and Maintenance Requirements for Pervious Pavements

Maintenance	Required Action	Typical Frequency
Regular maintenance	Brushing and vacuuming (standard cosmetic sweep over whole surface)	Once a year, after autumn leaf fall, or reduced frequency as required, based on site-specific observations of clogging or manufacturer's recommendations – pay particular attention to areas where water runs onto pervious surface from adjacent
Occasional	Stabilise and mow contributing and adjacent areas	As required
	Removal of weeds or management using glyphosate applied directly into the weeds by an applicator	As required – once per year on less frequently used pavements
Remedial Actions	Remediate any landscaping which, through vegetation maintenance or soil slip, has been raised to within	As required
	Remedial work to any depressions, rutting and cracked or broken blocks considered detrimental to the structural performance or a	As required
	Rehabilitation of surface and upper substructure by remedial sweeping	Every 10 to 15 years or as required (if infiltration performance is reduced due to significant clogging)
Monitori	Initial inspection	Monthly for three months after installation
	Inspect for evidence of poor operation and/or weed growth – if	Three-monthly, 48 h after large storms in first six months
	Inspect silt accumulation rates and establish appropriate brushing	Annually
	Monitor inspection chambers	Annually