

Flood Risk, Foul Sewage & Surface Water (Drainage) Assessment

The Byre, Bolney

Shire Barn Developments Ltd

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Author: Emma Rowlands/Maria Paola Espa

Checker: Paul Bond

Approver: Paul Bond

HM Project No: 38911

HM Office: Shackleton House
Hays Galleria
4 Battlebridge Lane
London
SE1 2HP

T: +44 (0)20 7940 8888

 hilsonmoran.com

 [@HilsonMoran](https://twitter.com/HilsonMoran)

 [hilson_moran](https://www.instagram.com/hilson_moran)

 [Hilson Moran](https://www.linkedin.com/company/HilsonMoran)

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Executive Summary

Hilson Moran Partnership Ltd ('Hilson Moran') has been appointed by Shire Barn Developments Ltd (the 'Client') to prepare a Flood Risk, Foul Sewage & Surface Water (Drainage) Assessment (FRFSSWA) for The Byre, Bolney (the 'site'). This assessment has been carried out to support the planning application for the construction of a 5-dwelling scheme.

This FRA includes a review of the flood risk from all sources, in line with National Planning Policy Framework 2025 (NPPF) and the proposed foul and surface water drainage strategies.

According to the Environment Agency (EA) Flood Map for Planning, the site is wholly located in Flood Zone 1, which is defined as low risk from fluvial or tidal flooding, having a less than 1 in 1,000 probability in any given year (0.1% Annual Exceedance Probability (AEP)).

The proposed scheme area is approximately 1.1 ha and, based on the National Planning Policy Framework (NPPF) vulnerability classification, will introduce "More Vulnerable" uses on site.

The Mid Sussex SFRA indicates that the site is not located in an area susceptible to groundwater flood risk.

The EA Flood Map for Planning indicates that a very small area classified as having a *high* risk of surface water flooding within the footprint of the existing "The Byre" dwelling and adjacent hardstanding. This is an isolated area of ponding with no velocity, which as observed on the site walkover, is located in a small depression in the topography. Although adjacent to the access, it will not compromise access and egress to the proposed development.

The EA reservoir flood risk map shows that there is no risk of flooding from reservoir failure to the site or within its vicinity.

A surface water drainage strategy for the scheme is presented, designed for the 1 in 100-year event plus 45% climate change. The strategy will reduce the runoff rates to Qbar greenfield rates (4.1 l/s), utilising a hydrobrake flow control device and permeable paving. The strategy has been developed in line with the Mid Sussex District Council and the West Sussex policy requirements, and it is appropriate for the site.

It is proposed to run new foul water drainage beneath the access road receiving discharge from the 5 new dwellings. The foul water drainage will connect into the Southern Water sewer (300 mmØ) routed below The Street at manhole 1102, which is located just outside of The Byre existing dwelling. The Peak Foul Flow is calculated to be 0.367 l/s.

The Byre existing dwelling will not be materially altered as part of the proposals and its surface water and foul drainage will remain as per the present situation.

With the proposed drainage strategies in place, the site is considered to be safe for present and future scenarios without increasing the risk of flooding elsewhere.

1. Introduction

1.1. Instruction

Hilson Moran Partnership Ltd ('Hilson Moran') has been appointed by Shire Barn Developments Ltd (the 'Client') to prepare a Flood Risk, Foul Sewage & Surface Water (Drainage) Assessment (FRFSSWA) for The Byre, Bolney (the 'site'). This assessment has been carried out to support the planning application for the construction of a 5-dwelling scheme. The site location is shown in Figure 1-1 below.



Figure 1-1. Site Location and Red Line Boundary (Source: © OpenStreetMap contributors).

1.2. Scope and Objectives

This document includes a review of the flood risk from all sources, in line with the NPPF and Mid Sussex District Council Local Planning policies to demonstrate that the proposed amendments will not increase the risk of flooding in the site or elsewhere.

This document includes Surface Water and Foul Drainage Strategies and demonstrates that the proposed is safe for present and future scenarios, without increasing flood risk elsewhere.

1.3. Limitations

This report has been prepared on behalf of and for the exclusive use of the Client, for whom the services were undertaken and is subject to and issued in connection with the provisions of the agreement set out by Hilson Moran Partnership Ltd. Hilson Moran Partnership Ltd accepts no liability or responsibility whatsoever for or in respect of any use of or reliance upon this report by any third party. Furthermore, this report is subject to the following limitations:

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2. Policies and Guidance

This report has been prepared in accordance with the policies detailed within Table 2-1 below.

Table 2-1 Summary of the applicable planning policies

Name	Release date	Type
National Planning Policy Framework (NPPF)	March 2012, Updated: February 2025	National Policy
National Planning Practice Guidance (NPPG)	March 2014, Updated: September 2025	
Department for Environment, Food & Rural Affairs (DEFRA) National Standards for Sustainable Drainage Systems (SuDS)	July 2025	National Guidance
CIRIA, Sustainable Drainage Manual	December 2015	
Building Regulations Part H: Drainage and Waste Disposal	December 2010	National Legislation
Water Industry Act	1991	
Environmental Protection Act	1990	
Flood and Water Management Act	2010	
West Sussex Local Flood Risk Management Strategy	July 2025	Local Policy
Mid Sussex District Plan (2014 - 2031)	March 2018	
Mid Sussex Level 1 Strategic Flood Risk Assessment (SFRA)	July 2024	

2.1. National Planning Policy Framework

The NPPF sets out policies that apply to the preparation of local plans, and development management decisions. This framework sets out the Government's economic, environmental, and social planning policies for England. Taken together, these policies articulate the Government's vision of sustainable

development, which should be interpreted and applied locally to meet local aspirations.

The NPPF states that flood risk and surface water disposal are material considerations for Local Planning Authorities (LPAs) when determining individual land-use planning proposals.

The NPPF reinforces the importance that the Government attaches to the management and reduction of flood risk in the land-use planning process, whilst also adopting a precautionary approach and fully accounting for the effects of climate change. The NPPF states how flood risk should be considered at all stages of planning and development, in an attempt to reduce future loss of life and damage to property.

The NPPF also states that surface water disposal is a material consideration for LPAs when determining individual land-use planning proposals and that SuDS should be incorporated into a development wherever practical development *“unless there is clear evidence that this would be inappropriate. The systems used should:*

- a) take account of advice from the lead local flood authority(LLFA);*
- b) have appropriate proposed minimum operational standards;*
- c) have maintenance arrangements in place to ensure an acceptable standard of operation for the lifetime of the development; and*
- d) where possible, provide multifunctional benefits.”*

The NPPF is supported by Planning Practice Guidance¹, which provides further information on key issues in the implementation of policies identified in the NPPF.

2.1.1. Flood Zones and Vulnerability Classification

The following NPPF tables provide guidance to identify the risk of flooding to a development:

- Figure 2-1 provides definitions of the Flood Zones, from low to high probability of river and sea flooding in line with the EA Flood Map for Planning.
- Figure 2-2 identifies the suitable developments for each Flood Zone and establishes when the Exception Test would be required.
- Figure 2-3 provides a vulnerability classification in relation to land uses. According to the NPPF, the proposed site is defined as *More Vulnerable*.

Flood Zone	Probability of Flooding	Definition
Zone 1	Low	Land having a less than 0.1% annual probability of river or sea flooding.
Zone 2	Medium	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.
Zone 3a	High	Land having a 1% or greater annual probability of river flooding; or Land having a 0.5% or greater annual probability of sea.
Zone 3b	Functional Floodplain	- 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).

Figure 2-1 NPPF Flood Zone Classification

(<https://www.gov.uk/guidance/floodrisk-and-coastal-change#table1>)

Vulnerability Classification	Flood Zone 1	Flood Zone 2	Flood Zone 3a	Flood Zone 3b
Essential Infrastructure	✓	✓	✓ (Exception Test)	X
Highly Vulnerable	✓	✓ (Exception Test)	X	X
More Vulnerable	✓	✓	✓ (Exception Test)	X
Less Vulnerable	✓	✓	✓	X
Water-Compatible	✓	✓	✓	✓ (Exception Test)

Figure 2-2 NPPF Flood Risk Vulnerability and Flood Zone “incompatibility”

(<https://www.gov.uk/guidance/flood-risk-and-coastal-change#table2>)

Vulnerability Classification	Permitted Development
Essential infrastructure	Essential transport infrastructure; Essential utility infrastructure which must be located in a flood risk area for operational reasons, including infrastructure for electricity supply including generation, storage and distribution systems; including electricity generating power stations, grid and primary substations storage; and water treatment works that need to remain operational in times of flood.
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.
More vulnerable	Hospitals; Non-residential uses for health services, nurseries and educational establishments. 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. Sites used for holiday or short-let caravans and camping, subject to a specific warning and evacuation plan. Landfill* and sites used for waste management facilities for hazardous waste.
Less Vulnerable	Police, ambulance and fire stations which are not required to be operational during flooding. 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. Car parks. Land and buildings used for agriculture and forestry. Waste treatment (except landfill* and hazardous waste facilities). 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.
Water Compatible	Flood control infrastructure; Water transmission infrastructure and pumping stations; Sewage transmission infrastructure and pumping stations. Water-based recreation (excluding sleeping accommodation); 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.

Figure 2-3: Annex 3: Flood risk vulnerability classification ([National Planning Policy Framework - Annex 3: Flood risk vulnerability classification - Guidance - GOV.UK](#))

2.1.2. Climate Change

The NPPF provides a series of guidance and allowances to be taken into account for new developments to take into account the effects of climate change, considering the design life of the development for Peak River Flow and Peak Rainfall Intensityⁱⁱ.

The site is located in the Adur & Ouse Management Catchment. Considering a design life of 100 years, a 45% climate change allowance for Peak Rainfall Intensity should be applied.

2.2. National Legislation

2.2.1. Building Regulations Part H: Drainage and Waste Disposal (2010)

Building Regulations Approved Document Part Hⁱⁱⁱ provides guidance on the hierarchy of options for surface water removal from a development site. The document states that, where feasible, the first choice for surface water removal should be to discharge such waters to an adequate soakaway or infiltration system. If this is not reasonably practicable then discharge should be to a

watercourse, with discharge to an existing sewer being the least favoured option. Infiltration techniques should therefore be applied wherever they are feasible.

Building Regulation H3 stipulates that “...[Infiltration devices should not be built] where the presence of any contamination in the run-off could result in the pollution of a groundwater source or resource”. This is reaffirmed in the SuDS Manual, which states that “in areas containing contaminated soils or contaminated groundwater, soakaways are not acceptable”.

2.2.2. Water Industry Act (1991)

Legislation covering connection to a public sewer is contained in Section 106 to Section 109 of the Water Industry Act 1991 (the Act)^{iv}. Section 106 of the Act stipulates that the owner or occupier of any premises may have their drains or private sewer connected to the public sewers of the sewerage undertaker.

In accordance with the Act, the following types of connection may (subject to approval) be made to the public sewerage system. The type of connection you make will depend on the sewerage system in the area of the required connection.

- a. Foul water into a foul sewer (e.g. from toilets, sinks, showers, and baths);
- b. Surface water into a surface water sewer (e.g. roof and paved area drainage);
- c. Foul and surface water into a combined water sewer (both a. and b. above); and
- d. Other types of connections may be permitted in exceptional circumstances, but they would be considered at the time of application.

2.2.3. Environmental Protection Act (1990)

Part II of the Environmental Protection Act 1990^v states that “contaminated land is any land which appears to be in such a condition, because of substances in, on or under the land, that:

- significant harm is being caused or there is a significant possibility of such harm being caused; or,
- pollution of controlled waters is being or is likely to be caused”.

2.2.4. Flood and Water Management Act (2010)

The Act states that construction work that has drainage implications may not be commenced unless a drainage system for the work has been approved by an approving body (unitary authority/ County Council)^{vi}.

In determining an application for approval, the approving body must “grant it, if satisfied that the drainage system if constructed as proposed will comply with national standards for sustainable drainage; or refuse it if not satisfied”.

The Act therefore removes the automatic right to connect to the public sewer if the proposed drainage strategy does not fully consider the feasibility of sustainable drainage techniques.

2.3. National Guidance

2.3.1. National Standards for Sustainable Drainage Systems (2025)

The National Standards for Sustainable Drainage Systems (SuDS) provide the updated national framework for the design, construction, operation and maintenance of surface water drainage systems for new development in England. The standards apply to greenfield and brownfield sites and are intended to support designers, developers, local planning authorities and Lead Local Flood Authorities (LLFAs) in delivering consistent and high-quality SuDS. While non-statutory, the standards are designed to underpin the future implementation of Schedule 3 of the Flood and Water Management Act 2010.

The seven-standard framework introduced in 2025, has been summarised below.

Standard 1 - Runoff Destination: establishes a ‘SuDS approach’ to address the management of surface water by the development and where it should be discharged. Runoff shall be treated as a resource and managed in a way that avoids negative impacts of the development on flood risk, the morphology and water quality of receiving waters and the associated ecology.

Runoff from the development shall be discharged to the following final destinations, to the maximum extent practicable, in accordance with the below hierarchy, with priority one being the highest to priority 5 being the lowest.

- Priority 1: collected for non-potable use;
- Priority 2: infiltrated to ground;
- Priority 3: discharged to an above ground surface water body;
- Priority 4: discharged to a surface water sewer, or another piped surface water drainage system; and
- Priority 5: discharged to a combined sewer.

Developers are required to demonstrate that higher-order, more sustainable options have been maximised before lower-order options are pursued.

Standard 2 - Everyday Rainfall Management: requires interception of the first 5 mm of rainfall on site for most developments, reducing runoff frequency and pollutant mobilisation through source-control measures such as green roofs, permeable paving, rain gardens and bioretention features.

Standard 3 - Extreme Rainfall and Flooding: sets criteria for managing rarer rainfall events, requiring no flooding in the 1 in 30-year event and controlled, low-hazard flooding for the 1 in 100-year plus climate change event. The standard emphasises exceedance routing, safe flow paths and the application of the latest climate change allowances.

Standard 4 - Water Quality: requires SuDS design to be informed by a proportionate water quality risk assessment, with appropriate treatment measures and treatment trains to manage pollution risks associated with the proposed land use.

Standard 5 - Amenity and **Standard 6 - Biodiversity** formally embed placemaking and environmental enhancement into drainage design. SuDS are expected to contribute positively to the public realm, recreational value and visual quality of developments, while also supporting biodiversity, ecological connectivity and alignment with Biodiversity Net Gain objectives.

Finally, **Standard 7 - Design of drainage for construction, operation, maintenance, decommissioning and structural integrity.** Requires clear, deliverable arrangements for long-term management, including access, funding and adoption responsibilities, to ensure SuDS remain effective throughout their design life.

2.3.2. CIRIA Sustainable Drainage Manual

The sustainable drainage manual sets out guidance on how develop adequate sustainable drainage systems for new developments. Adequate performance will usually be achieved if the drainage system:

- Conveys the flow via a suitable network or treatment systems to a suitable outfall (a soakaway, a watercourse, surface water, or combined sewer);
- Minimises the risk of blockage or leakage with good access for clearing blockages and any necessary maintenance;
- Has sufficient capacity to carry or retain the expected flow at any point in the system and so does not increase the vulnerability of the development to flooding; and
- Provides drainage from roofs or paved areas to an adequately and suitably designed drainage system

2.4. Local Policies

2.4.1. Local Flood Risk Management Strategy

This strategy sets out West Sussex County Council (WSCC) role as Lead Local Flood Authority (LLFA) to manage flood risks from surface water, groundwater, and small watercourses. It emphasizes collaboration with communities, businesses, and agencies to improve understanding and resilience. The strategy prioritizes reducing flood risk through sustainable measures, informed by climate change impacts and the borough's urban nature, while aligning with national policies and local plans. It also includes an action plan for implementing schemes that deliver environmental and community benefits.

2.4.2. Mid Sussex District Plan

The Mid Sussex District Plan (MSDP) 2014–2031, adopted in March 2018, is the statutory development plan guiding growth and decision-making across the district. It sets out a long-term vision and spatial strategy to address housing, employment, infrastructure provision, and environmental protection, while ensuring development is sustainable and responsive to local character. The Plan is designed to balance the need for growth with the protection and enhancement of Mid Sussex's high-quality natural and built environment, and it provides the policy framework against which planning applications are assessed.

Policy DP41 - Flood Risk and Drainage, seeks to ensure that new development is appropriately located and designed to minimise flood risk both on-site and elsewhere. The policy directs development away from areas at highest flood risk wherever possible and requires proposals to incorporate effective flood mitigation and sustainable drainage solutions. Developers are expected to demonstrate that surface water runoff is managed sustainably, hierarchy-based drainage options have been followed, and there is no increase in flood risk to existing communities or infrastructure, thereby supporting climate resilience and long-term environmental sustainability.

Policy DP42 - Water Infrastructure and the Water Environment, focuses on safeguarding water resources and ensuring that development does not place unacceptable pressure on water supply, treatment, or the wider water environment. The policy requires development to be supported by adequate water and wastewater infrastructure and promotes water efficiency measures within new developments. It also seeks to protect groundwater, watercourses, and water quality, recognising their ecological and community value and ensuring alignment with wider river basin management and environmental objectives.

2.4.3. Strategic Flood Risk Assessment (SFRA)

The SFRA provides an evidence base to guide planning decisions and ensure development is safe and sustainable in relation to flood risk. It applies a sequential, risk-based approach to steer development away from high-risk areas and manage residual risks, considering all sources of flooding—fluvial, tidal, surface water, groundwater, sewers, and reservoirs. The SFRA incorporates climate change projections and EA guidance, requiring site-specific Flood Risk Assessments (FRAs) and promoting measures such as SuDS to reduce and manage flood risk. It supports compliance with the NPPF and informs MSDP policies for resilience and adaptation.

3. Baseline Conditions

3.1. Existing Site

The site is located to the west of The Street, Bolney, Sussex, RH17 5PG at National Grid Reference 526081, 123183, with an area of approximately 1.1 hectares.

The site is presently occupied by The Byre (a residential property) and its driveway, and an undeveloped field to the rear of the property. The site is situated within the village of Bolney, which is approximately 7km to the west of Haywards Heath.

To the north of the site is a field with residential properties beyond, and to the east is the local highway (The Street), residential properties and a village hall. To the south are fields and to the west is a small patch of woodland.

3.2. Proposal

It is understood that Shire Barn Developments Limited (the 'Applicant') intends to submit a planning application for the construction of a 5-dwelling scheme. The red line boundary and proposed site plan is shown in Figure 3-1.

The proposed development is defined as '*more vulnerable*' in accordance with the NPPF (refer to section 2.1.1).



Figure 3-1 Red Line Boundary and Proposed Site Plan (Source: Shire Barn Developments Ltd, dated January 2026)

3.3. Topography

The site is relatively flat with levels ranging from approximately 41.2 mAOD on the northern site boundary sloping down to approximately 35.8 mAOD in the south eastern corner of the site. There are no distinct topographical features within the site. Figure 3-2 shows the LiDAR and contours for the site.

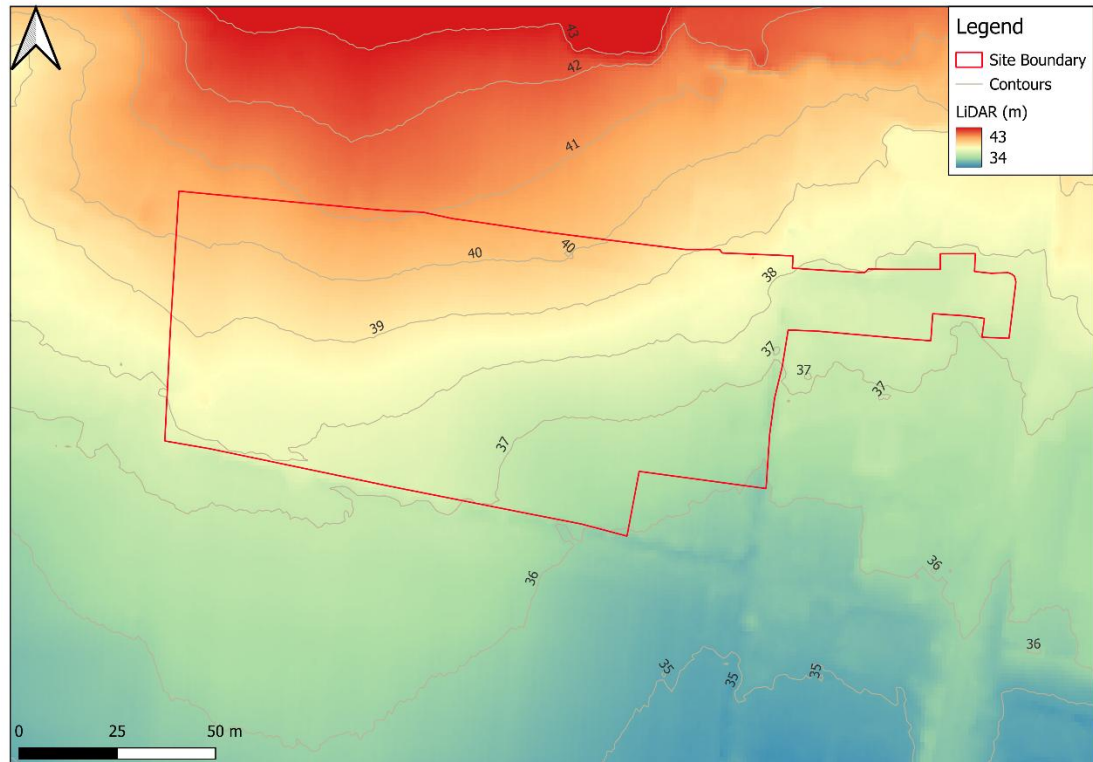


Figure 3-2 LiDAR 2022 DTM, 1 m resolution (Source: DEFRA)

3.4. Geology and Soils

The British Geological Survey's (BGS) Geology of Britain viewer^{vii} provides an understanding of the geological formations throughout Great Britain. A review of 1:50,000 scale mapping of the area shows there to be no superficial deposits underlying the site. The underlying bedrock geology comprises Upper Tunbridge Wells Sand (sandstone and siltstone) in the northern part of the site, and the Weald Clay Formation (mudstone) in the southern part of the site. The geology underlying the site is shown in Figure 3.3 below.

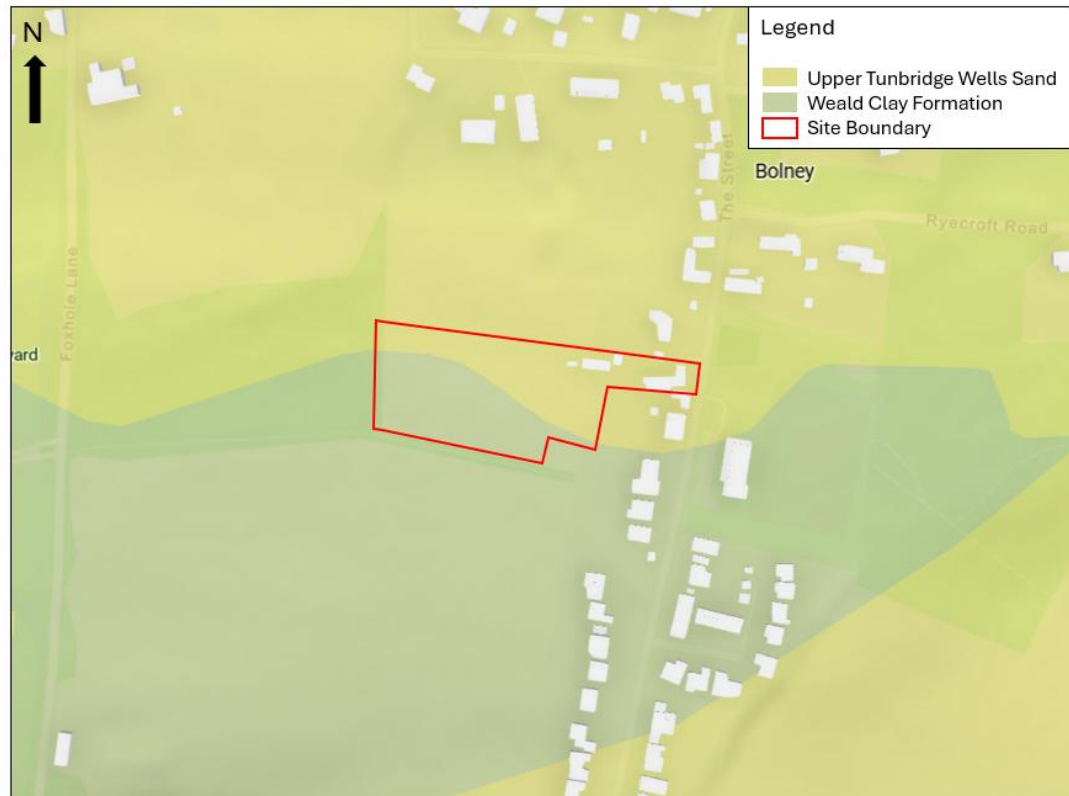


Figure 3-3 *Bedrock deposits underlying the site and surrounding area (Source: BGS)*

With reference to the National Soil Resources Institute (NSRI) Soilscape^{viii}, the soils at the site are shown to consist of slightly acid loamy and clayey soils with impeded drainage, as illustrated in Figure 3-1.

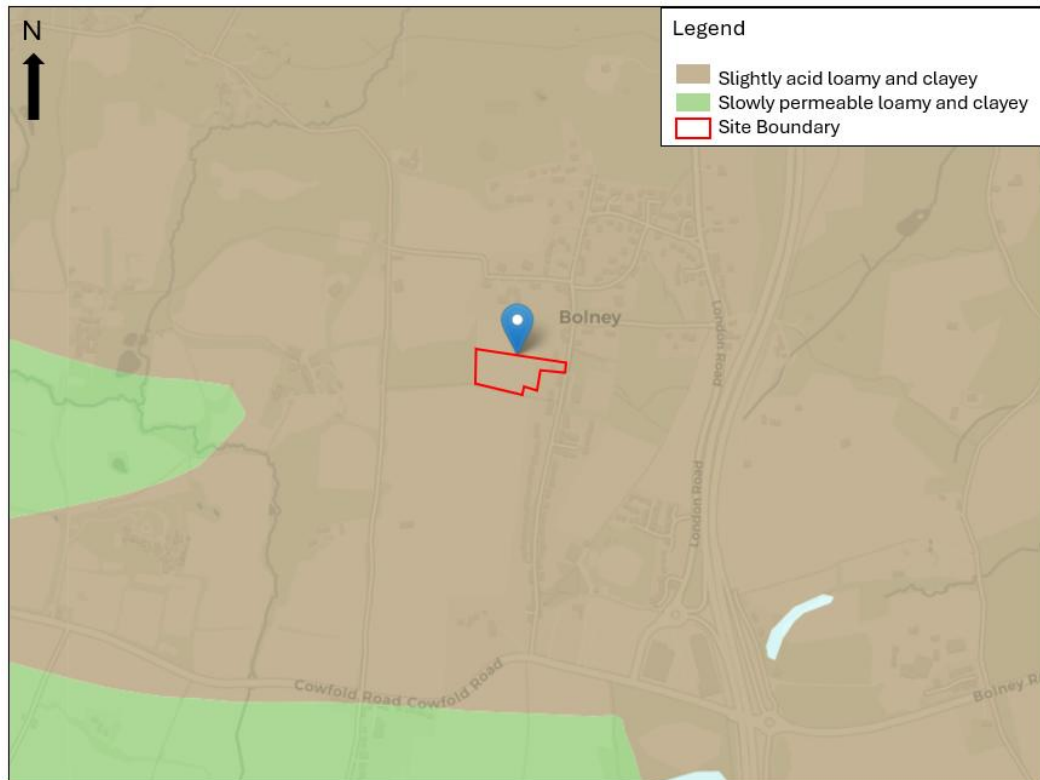


Figure 3-1 Soil map of the site and the surrounding area (Source: Soilscape).

3.4.1. Source Protection Zone

Source Protection Zones (SPZs) are defined as areas that contain groundwater that is used to supply drinking water and are protected by the EA. This includes wells, boreholes, and springs.

The EA's Magic Map^{ix} identified that the site is not located within a SPZ. The nearest SPZ is located over 9 km away to the south of the site.

4. Assessment of Flood Risk

4.1. Fluvial and Tidal

The EA Flood Map for Planning indicates that the site is wholly located in Flood Zone 1. This means that the area is defined as having a less than 1 in 1,000 probability in any given year (0.1% Annual Exceedance Probability (AEP)) of flooding from rivers or the sea (low risk of flooding) (Figure 4-1). The Flood Map for Planning also shows the risk of flooding in the future due to climate change (from 2070 to 2125) and shows that the site is not at risk of flooding in this period.

The nearest EA Main River to the site is the Bolney Sewer located approximately 300m west and the Adur East, at approximately 2.1 km south of the site.

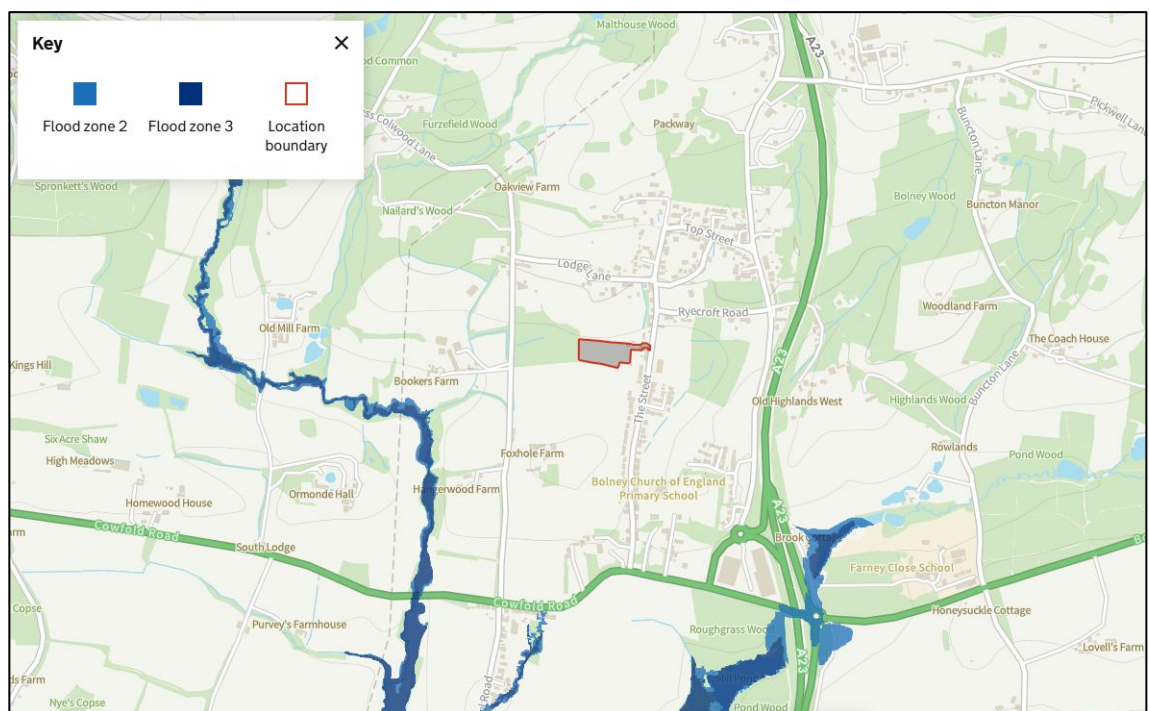


Figure 4-1 EA Flood Map for Planning (Source: EA, 2026).

4.2. Groundwater

Groundwater flooding occurs when water from underground emerges above the surface. Depending on the underlying geology and superficial geology of the area, flooding from this source usually occurs after a particularly heavy storm when the infiltrated rainfall raises the local water table, causing the flows to flood the surface. Flooding from groundwater is generally more common in winter months and in areas that are in low-lying areas, where the water table is likely to be shallow.

The Mid-Sussex SFRA contains groundwater flood risk data from Geosmart. The dataset shows areas at high risk of groundwater flooding (1 in 100 year event) as well as the 20 most at-risk regions (based on property count for the 1 in 100 year event) within the West Sussex boundary. The site does not fall within these areas, therefore, it is considered that the risk of groundwater flooding is low.

4.3. Surface Water Flooding (Pluvial)

Surface water flooding occurs when intense, often short-duration, precipitation events are unable to enter a drainage system due to blockages, breakages in water pipes, or where the drainage capacity has been exceeded. This may cause by a combination of factors including site topography, rainfall exceeding the capacity of local surface water/ combined systems, or blockages to the sewers systems.

There is an ordinary watercourse on the site, which is in a north-south orientation and located adjacent to the garage of the neighbouring dwelling to the north (Daltons Farm), then passing under the site access road and along the rear garden of plot 1. This is shown on the proposed masterplan in Figure 3-1, and a photography is shown below in Figure 4.2.



Figure 4-2 Ordinary watercourse observed on the site walkover

There are several surface water drains in the vicinity of the site, the closest ones being approximately 50 m to the north, 80 m to the north west and 123 m to the east of the site. There are also several ponds in the vicinity of the site, the nearest being located 65 m to the north west and 80 m to the south.

The EA Risk of Flooding from Surface Water (RoFSW) map shows that the majority of the site is not at risk of surface water flooding, with the exception of a very small isolated area, comprising the existing “The Byre” dwelling and an adjacent area of hard landscaping. The dwelling and adjacent hard landscaping are at risk in the 1 in 30 year event (3.3% AEP), which is a high risk of surface water flooding (shown in Figure 4-3). The maps show that there is a high chance of depths up to 300 mm, however for depths up to 600 mm, the chance is very low. This is an isolated area of ponding with no velocity, which as observed on the site walkover, is located in a small depression in the topography. Although adjacent to the access, it will not compromise access and egress to the proposed development.

The RoFSW map also shows the risk of flooding in the future due to climate change, from 2040 to 2060. The overall predicted flood extent is the same as in the current day, however a larger proportion of this is shown to be at medium and high flood risk. There is a high chance of flood depths up to 600mm, however for depths up to 900mm, the chance is very low.

The proposed surface water drainage strategy presented in section 5.1 of this report. The proposed strategy has been designed to attenuate runoff rates to 4 l/s for the 1 in 100 years plus 45% climate change flood event.

It is anticipated that with the strategy in place the risk from surface water flooding is considered to be *low*.

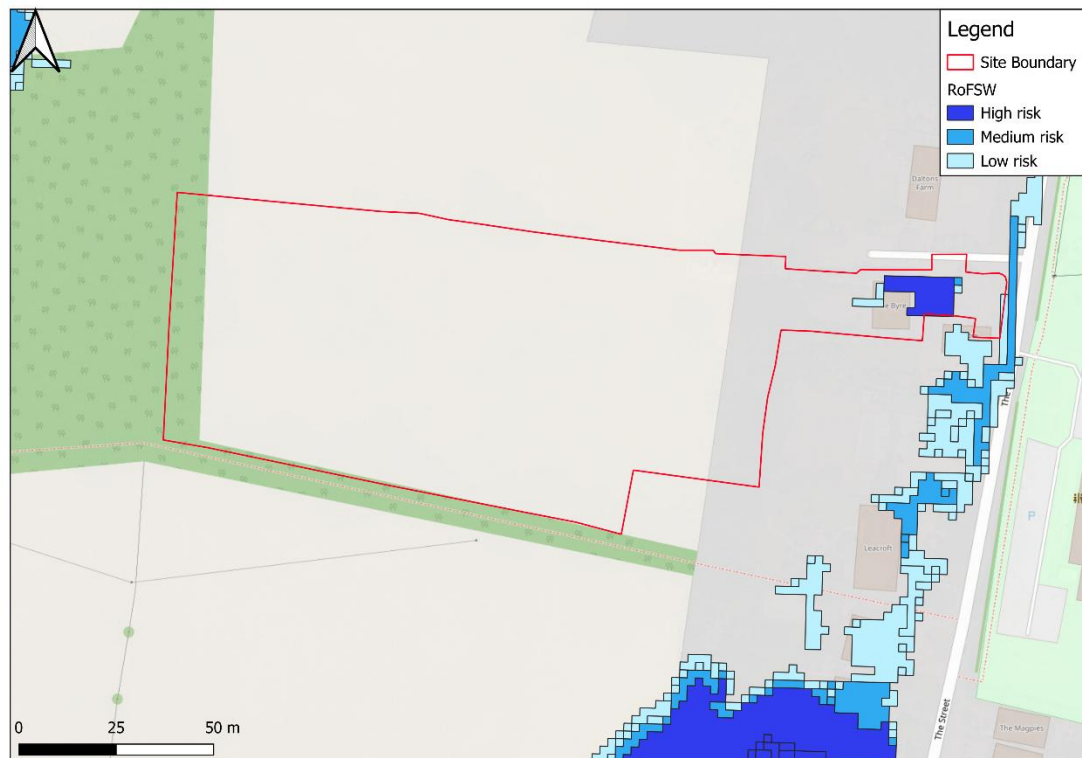


Figure 4-3 EA RoFSW Flood Map (current day) (Source: EA, 2026).

4.4. Sewer Flooding

Sewer flooding occurs when flows overload the capacity of the sewers. This can be from intense rainfall, but blockages and sewer failures can also lead to flooding downstream of the network.

The Mid-Sussex SFRA contains the DG5 register for Southern Water, which shows that there have been 2 internal and 9 external sewer flooding events in the RH17 5 postcode area (no date range has been provided). This postcode area has the fifth highest number of sewer flooding records in the Mid-Sussex area.

As the majority of the site is an undeveloped field with no existing sewers crossing the site (the nearest sewer is a foul sewer located at The Street to the east of the site), the risk from sewer flooding is considered to be *low*.

Records for nearby developments indicate that the proposed scheme is located in proximity of a foul sewer located beneath The Street highway, immediately east of the access to the site, whilst the Wates development directly to the south (Planning Ref. DM/25/1129) demonstrates that there is currently capacity within the local system to accommodate the proposed scheme.

The proposed foul water strategy is presented in section 5.2 of this report.

4.5. Reservoirs and Artificial Waterbodies

A reservoir is a large natural or artificial lake that is designed to collect and store water. Flooding from reservoirs is extremely unlikely as they require regular maintenance in line with Reservoirs Act 1975. An area is considered at risk if peoples' lives could be threatened in the event of a dam or reservoir failure.

The EA reservoir flood risk map shows that there is no risk of flooding from reservoir failure to the site or within its vicinity.

4.6. Records of Historical Flooding

The Mid-Sussex SFRA contains historical flooding records from both the EA and Mid-Sussex District Council (MSDC), and the West Sussex Local Flood Risk Management Strategy (LFRMS) contains records from all sources of flooding. The SFRA shows only one flood incident has been recorded in Bolney, beginning in January 2023 (with no end date listed), for which it was noted that the Met Office had recorded periods of exceptionally high groundwater during the period of flooding. No details on the exact location of the flooding were provided. The LFRMS contained no flood records for Bolney.

The SFRA shows flood records in the vicinity of Bolney at Pickwell Lane approximately 1.5 km to the north east of the site in 2016, with no cause of flooding listed. The SFRA also shows a flood record at Cowfold Road approximately 1.3 km south west of the site in 2023, with high groundwater listed as a possible cause. This is corroborated by the LFRMS. The LFRMS also shows a flood record of unknown source located approximately 500 m to the north west of the site.

5. Mitigation & Enhancement

5.1. Surface Water Drainage Strategy

5.1.1. General Design Concept

For new developments, there is a general expectation that a drainage system should be adequate, particularly with regard to drains created by developments subject to Building Regulations. Adequate performance will usually be achieved if the drainage system:

- Conveys the flow via a suitable network or treatment systems to a suitable outfall (a soakaway, a watercourse, surface water, or combined sewer);
- Minimises the risk of blockage or leakage with good access for clearing blockages and any necessary maintenance;
- Has sufficient capacity to carry or retain the expected flow at any point in the system and so does not increase the vulnerability of the development to flooding; and
- Provides drainage from roofs or paved areas to an adequately and suitably designed drainage system;

In considering the most appropriate SuDS for the proposed development, reference has been made to the CIRIA *“Sustainable Drainage System Manual”* (the *“SuDS Manual”*)^x, local LLFA Summary Guidance for developers and the Defra National Standards for SuDS.

5.1.2. Preliminary Runoff Calculations

The following section provides an empirical demonstration of the reduction in surface water runoff volumes and rates, anticipated from the installation of appropriate SuDS devices.

5.1.2.1. Methodology

Firstly, the greenfield peak runoff rates for a range of return periods have been estimated using the IH124 methodology, included within HR Wallingford’s Greenfield Runoff Rate Estimation Tool. For sites <50 ha, the method uses a *pro-rata* methodology based on IH Report 124 with growth curves from the Flood Studies Report and CIRIA Book 14. The method requires input of the standard average annual rainfall (SAAR) for the site (807 mm), as well as Standard Percentage Runoff (SPR) (0.387) and the Base Flow Index derived from HOST soil classification (BFHOST) (0.501).

In addition, Flood Estimation Handbook (FEH) / Flood Studies Report (FSR) methods have been employed to facilitate the determination of the surface water

runoff from the developed site for a range of return periods. The FEH Web service generates the design rainfall depth for a range of specified return periods and storm durations.

Results were obtained using:

- The FEH method to establish rainfall depths for a range of return periods;
- The Modified Rational Method to calculate peak discharges for each return period;
- Derivation of runoff volume from RUNVOL (volume of runoff expressed as mm over total area) using the Wallingford Procedure.

A range of storm return periods have been modelled, using the modified Wallingford Procedure, to simulate a range of worst-case scenario surface water runoff rates and volumes from the site.

The existing greenfield runoff volumes were approximated using the simple method presented on HR Wallingford's "*UK Sustainable Drainage Guidance & Tools*" website, whereby it is assumed that the greenfield runoff volume is equal to the Standard Percentage Runoff (SPR) value of the soil. With reference to the same website, a value of 0.37 has been determined for the Application Site.

Thus, the greenfield runoff volume for the rainfall event can be calculated as:

$$\text{Greenfield Vol} = \text{RD} \times \text{AREA} \times 10 \times \text{SPR}, m^3$$

Where RD = Rainfall Depth for the return period storm of interest.

Similarly, for those areas of impermeable surfaces, the following equation has been used:

$$\text{Runoff volume} = \text{RD} \times \text{AREA} \times \text{Runoff Coefficient}, m^3$$

Appropriate runoff coefficients have been sourced from the 2015 CIRIA SuDS Manual. A coefficient of 0.90 has been used for the proposed roofs and 0.75 for the proposed hardstanding in the calculations.

Furthermore, the 100-year critical storm event was also modelled, permitting the required attenuation volume for this event to be calculated, using the HR Wallingford UK SuDS Tool.

5.1.2.2. Greenfield runoff rates

Greenfield runoff rates were calculated using the methodology described above. The results of this procedure are presented in Table 5.1 and Appendix A, which demonstrates an estimated greenfield runoff rate for the 100-year event of **13.1 l/s**.

Table 5.2 Greenfield Runoff Rates

Return period (years)	Peak Greenfield runoff rate (l/s)	Peak Greenfield runoff rate (l/s/ha)
$Q_{bar_{rural}}$	4.1	4.00
1	3.5	3.18
30	9.5	8.64
100	13.1	11.91

5.1.2.3. Post-development Runoff Rates

Runoff rates have been calculated for the proposed development. The impermeable surface area within the site will increase from the existing scenario due to the introduction of hardstanding and this will increase the impermeable areas from 680 m² to 2,274 m². This is a percentage increase from 6% to 21%.

Within the design of drainage networks for new developments, the incorporation of an appropriate allowance for future climate change impacts on peak rainfall intensities is recommended to ensure that all future developments give rise to a net reduction in runoff rates and volumes throughout their operational lifetime.

Updated UK Government climate change allowances are available for the “Adur & Ouse Management Catchment peak rainfall allowance” online (refer to <https://environment.data.gov.uk/hydrology/climate-change-allowances/rainfall>).

Both central and upper end allowances for peak rainfall intensity are provided. Associated guidance advises that “*for flood risk assessments and strategic flood risk assessments, assessments should be provided for both the central and upper-end allowances to understand the range of impact*”. Assuming a 100 year lifetime for the proposed development, the guidance suggests that the total potential change anticipated for 2061 to 2125 is 45% for the upper end allowance in the 1 in 100 year event.

By making a precautionary 45% allowance for increased rainfall intensity over the anticipated lifetime of the proposed development, the proposed post-development 100-year critical storm event was modelled and returned a runoff rate of 4.0 l/s or 3.64 l/s/ha (Table 5.2 and Appendix B).

Table 5.2 Proposed runoff rates including climate change

Return Period (Years)	Critical Duration (minutes)	Peak Flow Q		Maximum Storage Volume (m ³)
		(l s ⁻¹)	(l s ⁻¹ ha ⁻¹)	

1	540	2.1	1.91	190
30	540	3.5	3.18	467
100	540	4.0	3.64	600

5.1.3. SuDS Hierarchy

Runoff from the development shall be discharged to the following final destinations in accordance with the below hierarchy:

1. **Priority 1: collected for non-potable use.** Water butts will be provided for each of the dwellings, which will be used for garden irrigation.
2. **Priority 2: infiltrated to ground.** The presence of Wealdstone Clay in the southern part of the site is generally unsuitable for infiltration. The bedrock geology in the northern part of the site is comprised of Upper Tunbridge Wells Sand (sandstone and siltstone), which has moderate permeability. The feasibility of infiltration would need to be confirmed by BRE365 infiltration testing, which should be completed at detailed design stage and secured by an appropriate Planning Condition.
3. **Priority 3: discharged to an above ground surface water body.** It is proposed to discharge runoff to the ordinary watercourse located on the site.
4. **Priority 4 - discharged to a surface water sewer, or another piped surface water drainage system.** There are no surface water sewers in the vicinity of the site. Discharging to the watercourse is higher up on the SuDS hierarchy and therefore is a more sustainable drainage solution.
5. **Priority 5: discharged to a combined sewer.** There are no combined sewers in the vicinity of the site. Discharging to the watercourse is higher up on the SuDS hierarchy and therefore is a more sustainable drainage solution.

5.1.4. SuDS Design Concept

The provision of SuDS within the site will be key to mitigating and future-proofing the site from surface water flooding. Section 5.1.4.1 below outlines the proposed SuDS to be utilised within the development.

5.1.4.1. Permeable Paving

Permeable paving is a type of hard surfacing that allows rainwater to infiltrate through the surface and into underlying layers, which can be temporarily stored before infiltrating into the ground or into attenuation layers. Permeable paving can be made from various materials, such as gravel, resin-bound gravel, concrete,

asphalt, and even reinforced grass. Typically, the paving material itself allows water to infiltrate through and water can be infiltrated through the space in between the paving's voids. An underdrain can be provided if a granular sub-base is used (Figure 5.1). Some of the advantages of permeable paving include reducing peak flows by intercepting surface water runoff. The voids can also act as a pollution control, can replace gullies and manholes, and they are typically low in maintenance.

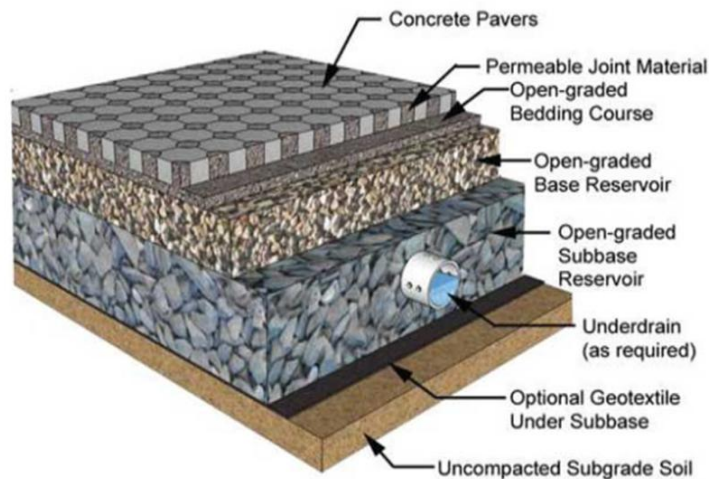


Figure 5.1 Example of cross-section of a permeable paving system (top layer) along with subsurface layers and drainage

5.1.5. Drainage Strategy

The main storage mechanism for the additional surface water runoff at the site will be via permeable paving located within the access road, and patios and driveways for each of the residential dwellings. The general unsuitability for infiltration due to the bedrock being clay (impermeable) means there will not be any infiltration of attenuated surface water into the ground. The SuDS features implemented will be lined (or "tanked") with an impermeable layer or geotextile to prevent infiltration.

It is intended that the surface water on the site will be positively drained from the site via gravity. From the drainage strategy drawing (Appendix C), these are mainly from conduit pipes that will connect impermeable areas (roofs, patios and driveways) to the permeable paving, which will then discharge to the on-site ordinary watercourse at the Qbar greenfield rate of 4 l/s.

The Byre existing dwelling will not be materially altered as part of the proposals and its surface water drainage will remain as per the present situation, therefore this has not been included within the drainage calculations.

With a maximum average depth of 450mm and an area of approximately 1,469 m² the proposed permeable paving will provide a storage volume of **628 m³**, which is enough storage to attenuate the additional flows from a 1 in 100-year critical storm event (including 10% urban creep and 45% climate change allowance).

5.2. Outline Foul Strategy

5.2.1. Existing Foul Water System

The road adjacent to the east of the site (The Street) is served by a foul water sewer that flows under gravity towards the south.

A review of the asset record information provided by Southern Water (refer to Appendix D) has shown the sewer sizes and depths to be:

Table 5.3 Foul water sewer sizes and depths

Manhole Reference	Pipe Size	Cover Level	Invert Level
1101	300 mmø	36.03 m	34.25 m
1102	300 mmø	37.46 m	35.78 m

The new development will be accessed from The Street. It is therefore proposed that the foul water drainage will utilise the sewer between manholes 1101 and 1002.

5.2.2. Proposed Foul Water Strategy

It is proposed to run new foul water drainage beneath the access road receiving discharge from the 5 new dwellings. The foul water drainage will connect into the Southern Water sewer (300 mmø) routed below The Street at manhole 1102, which is located just outside of The Byre existing dwelling.

A pre-development enquiry will be made with Southern Water for connection into their infrastructure. As part of the enquiry, the sewer's capacity will be hydraulically checked by Southern Water and increased in size if necessary, however, recent capacity inquiries for the Wates 200-dwelling residential development directly to the south has demonstrated there is currently significant capacity in the local network for new homes.

The peak foul flow has been calculated using the following equations:

Peak Foul Flow = Average Foul Flow x Peak Factor x Additional Capacity Requirement

Average Foul Flow = (Occupancy x Daily Demand)/86,400

Number of dwellings = 5

Occupancy = 2.4 persons per dwelling

Foul Water Generation / Daily Potable Demand = 110 l/person/day

Fixed Peak Factor = 4

Additional Capacity Requirement = 6

Day to Seconds Conversion = 86,400

The Peak Foul Flow is therefore calculated to be 0.367 l/s

The Byre existing dwelling will not be materially altered as part of the proposals and its foul water drainage will remain as per the present situation.

The proposed foul water drainage layout is included within Appendix E of this report.

All foul drainage sited below the estates roads will be constructed to an adoptable standard as per Sewerage Sector Guidance (SSG) and its embedded Design and Construction Guidance (DCG), and Part H of the Building Regulations. The suitability of design and quality of sewerage construction will be ensured by adopting high standards of workmanship and adhering to the Department for Environment, Food and Rural Affairs Protocol on Design, construction and Adoption of Sewers in England and Wales. Excavation for foul water connections and associated pipework will require the excavation of small amounts of spoil which will be managed responsibly.

Furthermore the inclusion of low water consumption appliances (low-flow toilets, showers, taps and white goods) and recycling throughout the proposed development, wherever possible, will minimise the volumes of potable water consumption and foul water discharge resulting from the site activity. Such measures will be considered at the detailed design stage.

It is anticipated that the detailed design of the new foul sewer infrastructure serving the site will be secured by an appropriate Planning Condition.

6. Summary & Conclusion

Hilson Moran Partnership Ltd ('Hilson Moran') has been appointed by Shire Barn Developments Ltd (the 'Client') to prepare a Flood Risk, Foul Sewage & Surface Water (Drainage) Assessment (FRFSSWA) for The Byre, Bolney (the 'site'). This assessment has been carried out to support the planning application for the construction of a 5-dwelling scheme.

This FRA includes a review of the flood risk from all sources, in line with National Planning Policy Framework 2025 (NPPF) and the proposed foul and surface water drainage strategies.

According to the Environment Agency (EA) Flood Map for Planning, the site is wholly located in Flood Zone 1, which is defined as low risk from fluvial or tidal flooding, having a less than 1 in 1,000 probability in any given year (0.1% Annual Exceedance Probability (AEP)).

The proposed scheme area is approximately 1.1 ha and, based on the National Planning Policy Framework (NPPF) vulnerability classification, will introduce "More Vulnerable" uses on site.

The Mid Sussex SFRA indicates that the site is not located in an area susceptible to groundwater flood risk.

The EA Flood Map for Planning indicates that a very small area classified as having a *high* risk of surface water flooding within the footprint of the existing "The Byre" dwelling and adjacent hardstanding. This is an isolated area of ponding with no velocity, which as observed on the site walkover, is located in a small depression in the topography. Although adjacent to the access, it will not compromise access and egress to the proposed development.

The EA reservoir flood risk map shows that there is no risk of flooding from reservoir failure to the site or within its vicinity.

A surface water drainage strategy for the scheme is presented, designed for the 1 in 100-year event plus 45% climate change. The strategy will reduce the runoff rates to Qbar greenfield rates (4.1 l/s), utilising a hydrobrake flow control device and permeable paving. The strategy has been developed in line with the Mid Sussex District Council and the West Sussex policy requirements, and it is appropriate for the site.

It is proposed to run new foul water drainage beneath the access road receiving discharge from the 5 new dwellings. The foul water drainage will connect into the Southern Water sewer (300 mm ϕ) routed below The Street at manhole 1102, which is located just outside of The Byre existing dwelling. The Peak Foul Flow is calculated to be 0.367 l/s.

The Byre existing dwelling will not be materially altered as part of the proposals and its surface water and foul drainage will remain as per the present situation.

With the proposed drainage strategies in place, the site is considered to be safe for present and future scenarios without increasing the risk of flooding elsewhere.

Appendix A – Greenfield Runoff Rates

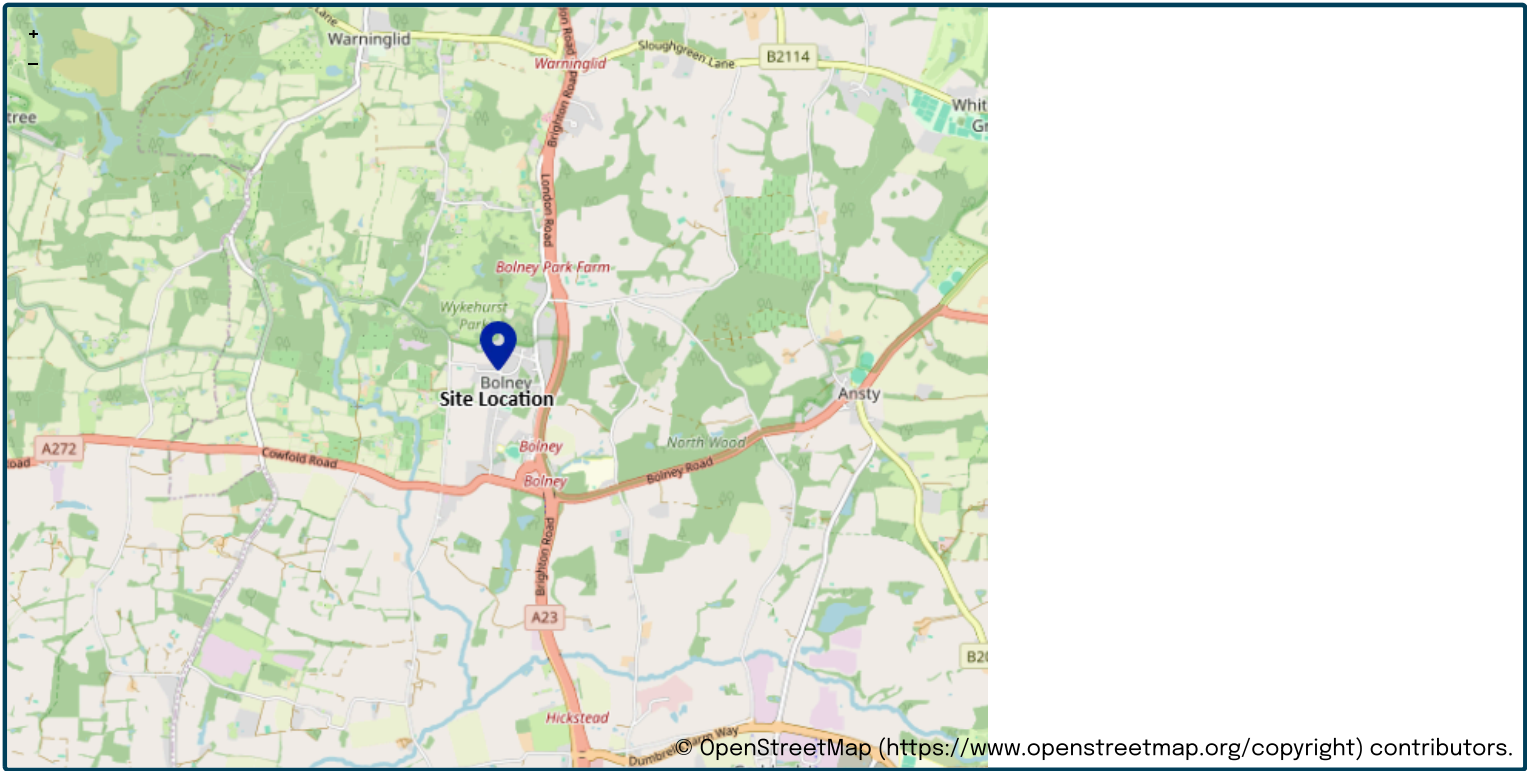
This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance “Rainfall runoff management for developments”, SC030219 (2013), the SuDS Manual C753 (CIRIA, 2015) and the non-statutory standards for SuDS (Defra, 2015). This information on greenfield runoff rates may be the basis for setting consents for the drainage of surface water runoff from sites.

Project details

Date	29/04/2026
Calculated by	MP E
Reference	38911
Model version	2.2.3

Location

Site name	The Byre
Site location	Bolney



Site easting (British National Grid)	526161
Site northing (British National Grid)	123231

Site details

Total site area (ha)	1.1	ha
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Greenfield runoff

Method

Method	IH124	
IH124		
SAAR (mm)	My value 807mm	Map value 807
How should SPR be derived?	Estimate using BFI	
BFIHOST	0.501	
SPR	0.387	
QBar (IH124) (l/s)	4.1	l/s

Growth curve factors

Hydrological region	My value 7	Map value 7
1 year growth factor	0.85	
2 year growth factor	0.88	
10 year growth factor	1.62	
30 year growth factor	2.3	
100 year growth factor	3.19	
200 year growth factor	3.74	

Results

Method	IH124	
Flow rate 1 year (l/s)	3.5	l/s
Flow rate 2 year (l/s)	3.6	l/s
Flow rate 10 years (l/s)	6.7	l/s
Flow rate 30 years (l/s)	9.5	l/s
Flow rate 100 years (l/s)	13.1	l/s
Flow rate 200 years (l/s)	15.4	l/s

Please note runoff estimation is subject to significant uncertainty. Results are therefore normally reported to only 1 decimal place. Where 2 decimal places are provided, this does not indicate accuracy to this level, it has been adopted to prevent 'zero' figures from being reported. Outputs less than 0.01 l/s are reported as 0.01 l/s.

Disclaimer

This report was produced using the Greenfield runoff rate estimation tool (2.2.3) developed by HR Wallingford and available at uksuds.com (<https://www.uksuds.com/>). The use of this tool is subject to the UK SuDS terms and conditions and licence agreement, which can both be found at uksuds.com/terms-conditions (<https://www.uksuds.com/terms-conditions>). The outputs from this tool have been used to estimate Greenfield runoff rates. The use of these results is the responsibility of the users of this tool. No liability will be accepted by HR Wallingford, the Environment Agency, Centre for Ecology and Hydrology, Wallingford Hydrosolutions or any other organisation for the use of these data in the design or operational characteristics of any drainage scheme.

Appendix B – Post-development Drainage Calculations

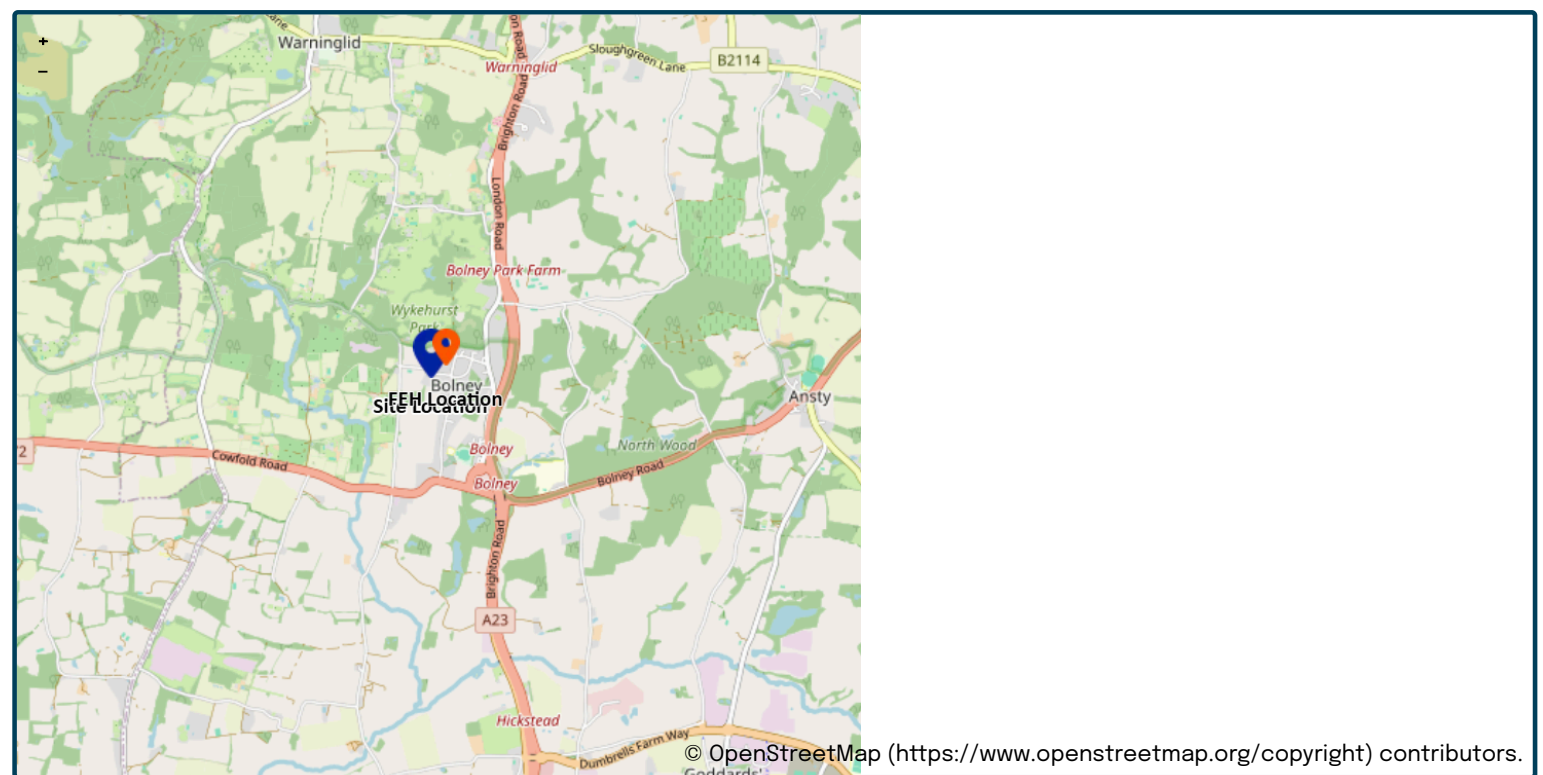
This is an estimation of the storage volume requirements that are needed to meet normal best practice criteria in line with Environment Agency guidance “Rainfall runoff management for developments”, SC030219 (2013), the SuDS Manual C753 (CIRIA, 2015) and the non-statutory standards for SuDS (Defra, 2015). It is recommended that the total storage volume for the site is distributed across the site using multiple SuDS and that hydraulic modelling software is used to undertake and finalise the detailed design of the drainage system.

Project details

Date	01/05/2026
Calculated by	ER
Reference	
Model version	2.2.3

Location

Site name	The Byre
Site location	Bolney



Site easting (British National Grid)	526024
Site northing (British National Grid)	123194

Site areas

Total site area (ha)	1.1	ha
----------------------	----------------	----

Roof area

Total roof area (ha)	0.0805	ha
----------------------	-------------------	----

Contributing roof area (ha)	0.0805	ha
-----------------------------	-------------------	----

Non-contributing roof area (ha)	0	ha
---------------------------------	--------------	----

Paved area

Total paved area (ha)	0.147	ha
-----------------------	------------------	----

Contributing paved area (ha)	0.147	ha
------------------------------	------------------	----

Non-contributing paved area (ha)	0	ha
----------------------------------	--------------	----

Grass / vegetated area

Total grass / vegetated area (ha)	0.872	ha
-----------------------------------	------------------	----

Contributing grass / vegetated area (ha)	0	ha
--	--------------	----

Non-contributing grass / vegetated area (ha)	0.872	ha
--	------------------	----

Total area

Total contributing area (ha)	0.2275	ha
------------------------------	-------------------	----

Contributing areas with urban creep allowance

Urban creep allowance factor	+10%
------------------------------	-----------------

Contributing roof area (adjusted for urban creep) (ha)	0.0805	ha
--	-------------------	----

Contributing paved area (adjusted for urban creep) (ha)	0.147	ha
---	------------------	----

Contributing grass / vegetated area (adjusted for urban creep) (ha)	0	ha
---	--------------	----

Storage design parameters

Storage base shape	Rectangular / square
--------------------	---------------------------------

Storage base length to width ratio	3:1
------------------------------------	----------------

Storage design depth (m)	0.45	m
--------------------------	-----------------	---

Storage side slope (1 in x)	Vertical sided
-----------------------------	---------------------------

Storage voids ratio (%)	30% (e.g. aggregate filled structure)
-------------------------	--

Storage volume design return period (years)	1:100 years
---	------------------------

Discharge flow rate from the site

Method

Type of site

Previously developed

Specify the method

IH124 + relaxation

IH124

My value

SAAR (mm)

807

mm

Map/default value

807

How should SPR be derived?

Estimate using BFI

BFIHOST

0.501

SPR

0.387

Total area for greenfield runoff calculation (ha)

1.0995

ha

1.0995

QBar (l/s)

4.1

l/s

Hydrological region

7

7

Return period (years)

Qbar (1:2.3 years)

Growth curve factor

1

Flow rate (IH124) (l/s)

4.1

l/s

Relaxation factor

1x

Final discharge rate

Runoff calculation method

IH124 + relaxation

Design flow rate (l/s)

4.1

l/s

Blockage risk

Specify the method

Flow rate

Minimum discharge flow rate to prevent blockage

1l/s

My value

Design orifice diameter (mm)

54

mm

Calculated value

54

Flow rate of orifice (l/s)

3.97

l/s

Rainfall and runoff

Rainfall input type

FEH22 CSV file

FEH_Point_Rainfall_FEH22_AM_526147_123190.csv

Distance from FEH location to site (km)

0.1

km

Climate change allowance factor

145%

Specify the runoff method from grass / vegetated areas

Fixed percentage - based on rainfall event depth and SPR

My value

How should SPR be derived?

Estimate using BFI

Map value

Model results

- Maximum discharge flow rate: 4.0 (l/s)
- Outflow orifice diameter: 54 (mm)
- Storage base length: 63 (m)
- Storage base width: 21 (m)
- Storage base area: 1337 (m²)
- Storage total volume: 600 (m³)
- Storage total water volume: 180 (m³)
- Storm return periods run: 1, 2, 10, 30, 100, 200 (years)
- Storm durations run: 15, 30, 60, 120, 180, 240, 360, 540, 720, 900, 1080, 1440, 1800, 2160, 2880, 3600, 4320, 5040, 5760 (minutes)

Return Period (years)	Critical Duration (minutes)	Peak Flow Rate (l/s)	Max Depth (m)	Max water volume (m ³)	Max storage volume (m ³)
1	540	2.1	0.14	57	190
2	540	2.3	0.17	67	223
10	540	3.0	0.28	111	370
30	540	3.5	0.35	140	467
<u>100</u>	<u>540</u>	<u>4.0</u>	<u>0.45</u>	<u>180</u>	<u>600</u>
200	720	4.1	0.47	211	703

Please note runoff estimation and storage volume estimation are subject to uncertainty. Storage volume results are therefore reported to the nearest 1 m³ value, unless storage volumes are less than 10 m³, in which case, storage volumes are provided to 1 decimal place.

Disclaimer

This report was produced using the surface water storage volume design tool (2.2.3) developed by HR Wallingford and available at uksuds.com (<https://www.uksuds.com/>). The use of this tool is subject to the UK SuDS terms and conditions and licence agreement, which can both be found at [uksuds.com/terms-conditions](https://www.uksuds.com/terms-conditions) (<https://www.uksuds.com/terms-conditions>). The outputs from this tool have been used to estimate surface water storage volumes for the whole site based on a limiting discharge rate from the site. The use of these results is the responsibility of the users of this tool. No liability will be accepted by HR Wallingford, the Environment Agency, Centre for Ecology and Hydrology, Wallingford Hydrosolutions or any other organisation for the use of these data in the design or operational characteristics of any drainage scheme.

HR Wallingford are not responsible for any rainfall data shared that is subject to licensing terms imposed by UK Centre for Ecology & Hydrology's Flood Estimation Handbook web service (<https://fehweb.ceh.ac.uk/Home/Terms> (<https://fehweb.ceh.ac.uk/Home/Terms>)).

Appendix A – Rainfall Depths

Rainfall depths (mm) with climate change

Duration (minutes)	Duration (hours)	1 years	2 years	10 years	30 years	100 years	200 years
15	0.25	8.46	11.31	22.23	29.13	36.58	40.99
30	0.5	11.13	14.85	29.33	38.66	49.01	55.48
60	1	14.10	18.76	37.08	49.15	62.93	71.35
120	2	21.29	26.59	47.33	60.48	75.83	85.48
180	3	25.95	31.61	53.66	67.77	84.30	94.99
240	4	29.37	35.28	58.25	73.12	90.71	102.38
360	6	34.11	40.40	64.77	80.65	100.25	113.77
540	9	38.86	45.49	71.28	88.42	110.58	126.57
720	12	42.27	49.14	75.99	94.15	118.44	136.44
900	15	44.92	52.01	79.75	98.79	124.90	144.54
1080	18	47.18	54.45	82.91	102.66	130.36	151.32
1440	24	51.19	58.68	88.06	108.81	139.10	161.92
1800	30	54.66	62.35	92.55	114.13	146.20	170.14
2160	36	57.83	65.70	96.63	118.91	152.34	177.06
2880	48	63.63	71.83	104.04	127.43	162.73	188.50
3600	60	69.19	77.66	110.90	134.99	171.45	197.91
4320	72	74.53	83.23	117.35	142.00	179.23	206.20
5040	84	79.67	88.59	123.53	148.60	186.38	213.76
5760	96	84.71	93.83	129.51	154.92	193.10	220.78

Rainfall depths (mm) without climate change

Duration (minutes)	Duration (hours)	1 years	2 years	10 years	30 years	100 years	200 years
15	0.25	5.84	7.80	15.33	20.09	25.23	28.27
30	0.5	7.68	10.24	20.23	26.66	33.80	38.26
60	1	9.72	12.94	25.57	33.90	43.40	49.21
120	2	14.68	18.34	32.64	41.71	52.30	58.95
180	3	17.90	21.80	37.01	46.74	58.14	65.51
240	4	20.26	24.33	40.17	50.43	62.56	70.61
360	6	23.53	27.86	44.67	55.62	69.14	78.46
540	9	26.80	31.37	49.16	60.98	76.26	87.29
720	12	29.15	33.89	52.41	64.93	81.68	94.10
900	15	30.98	35.87	55.00	68.13	86.14	99.68
1080	18	32.54	37.55	57.18	70.80	89.90	104.36
1440	24	35.30	40.47	60.73	75.04	95.93	111.67
1800	30	37.70	43.00	63.83	78.71	100.83	117.34

Duration (minutes)	Duration (hours)	1 years	2 years	10 years	30 years	100 years	200 years
2160	36	39.88	45.31	66.64	82.01	105.06	122.11
2880	48	43.88	49.54	71.75	87.88	112.23	130.00
3600	60	47.72	53.56	76.48	93.10	118.24	136.49
4320	72	51.40	57.40	80.93	97.93	123.61	142.21
5040	84	54.95	61.10	85.19	102.48	128.54	147.42
5760	96	58.42	64.71	89.32	106.84	133.17	152.26

Appendix C – Proposed Surface Water Drainage Strategy

Appendix D – Southern Water Sewer Records

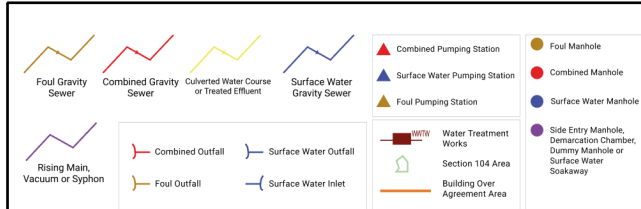


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The positions of pipes shown on this plan are believed to be correct, but Southern Water Services Ltd accept no responsibility in the event of inaccuracy. The actual positions should be determined on site. This plan is produced by Southern Water Services Ltd (c) Crown copyright and database rights 2026 Ordnance Survey AC0000808122. This map is to be used for the purposes of viewing the location of Southern Water plant only. Any other uses of the map data or further copies is not permitted.

WARNING: BAC pipes are constructed of Bonded Asbestos Cement.

WARNING: Unknown (UNK) materials may include Bonded Asbestos Cement.

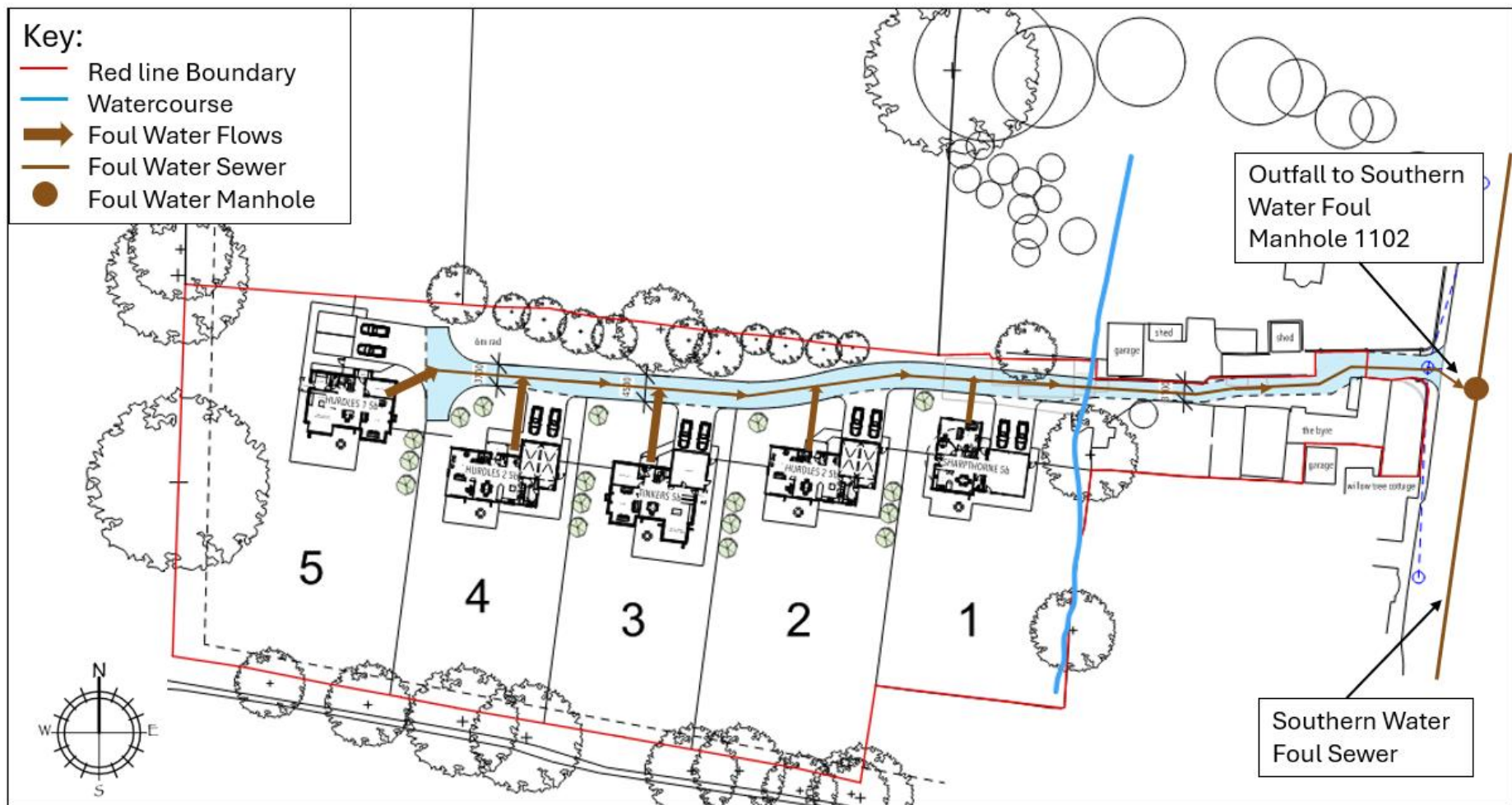


erowlands@hilsonmoran.com

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Appendix E – Proposed Foul Water Strategy



References

- ⁱ Ministry of Housing, Communities and Local Government (2022). Planning Practice Guidance – Flood Risk and Coastal Change – refer to <https://www.gov.uk/guidance/flood-risk-and-coastal-change>.
- ⁱⁱ Ministry of Housing, Communities and Local Government (2022). Planning Practice Guidance – Flood Risk and Coastal Change – refer to <https://www.gov.uk/guidance/flood-risk-and-coastal-change>.
- ⁱⁱⁱ HM Government (2010) – Drainage and waste disposal, Approved Document H
- ^{iv} HM Government (1991) - Water Industry Act, HMSO.
- ^v HM Government (1990) - Environmental Protection Act, HMSO.
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- ^{vii} British Geological Survey - Geology Viewer
- ^{viii} Cranfield Soil and Agrifood Institute- Soilscales website: <https://www.landis.org.uk/soilscales/>
- ^{ix} Environment Agency (2025) - <https://magic.defra.gov.uk/MagicMap.aspx>
- ^x CIRIA C753 (2015) – The SuDS Manual



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