

CHALDICOTT BARNES, SEMLEY

Flood Risk Assessment & Drainage Strategy

September 2026

Chaldicotts Ltd



COMMERCIAL
CHALDICOTT BARNS
SEMLEY

FLOOD RISK ASSESSMENT & DRAINAGE STRATEGY

CONTROLLED DOCUMENT

<i>Document No:</i>	020.51075/FRADS/1	
<i>Status:</i>	Original	
	<i>Name</i>	<i>Date</i>
<i>Prepared by:</i>	Ollie Terry	September 2026
<i>Checked by:</i>	Jon Soar	September 2026
<i>Approved by:</i>	Jonathan Reyes-Hughes	September 2026

<i>Revision Record</i>				
<i>Rev.</i>	<i>Date</i>	<i>By</i>	<i>Summary of Changes</i>	<i>Aprvd</i>
1	18.09.2026	OT	First Issue	JRH

Disclaimer

This document has been prepared in accordance with the scope of Paul Basham Associates Ltd's appointment with its client and is subject to the terms of that appointment. It is addressed to and for the sole use and reliance of Paul Basham Associates clients. Paul Basham Associates accepts no liability for any use of this document other than by its client and only for the purposes, stated in the document, for which it was prepared and provided. No person other than the client may copy (in whole or in part), use or rely on the contents of this document, without the prior written permission of a Director of Paul Basham Associates. Any advice, opinions, or recommendations within this document should be read and relied upon only in the context of the document as a whole. The contents of this document are not to be construed as providing legal, business or tax advice or opinion.

© Paul Basham Associates Limited



Chaldicotts Limited
24-25 Barnack Business Centre
Blakey Road
Salisbury
Wiltshire
SP1 2LP

Paul Basham Associates Ltd
The Bothy
Cams Hall Estate
Fareham
Hampshire
PO16 8UT

COMMERCIAL CHALDICOTT BARNs SEMLEY

FLOOD RISK ASSESSMENT & DRAINAGE STRATEGY

Contents

1. EXECUTIVE SUMMARY	3
2. INTRODUCTION	4
3. SITE DESCRIPTION	5
4. PLANNING POLICY	8
5. CLIMATE CHANGE	10
6. FLOOD RISK	12
7. RESIDUAL FLOOD RISK	18
8. DRAINAGE STRATEGY	19
9. WATER QUALITY	26
10. SUMMARY AND CONCLUSION	28

Figures

Figure 1: Site Location Plan	4
Figure 2: BGS bedrock mapping	5
Figure 3: BGS extract - Bedrock permeability	6
Figure 4: BGS Extract - Depth to groundwater table.	6
Figure 5: NPPF Planning Practice Guidance Table – Flood Risk Vulnerability and Flood Zone Compatibility	11
Figure 6: Flood Map for Rivers and Seas	13
Figure 7: Long term flood risk from reservoirs map	14
Figure 8: Flood map for planning surface water depths 1 in 100 year (2061 to 2125)	15
Figure 9: EA Ground Water Flood risk	16
Figure 10: Groundwater Emergence South West Wiltshire	17
Figure 11: The four pillars of SuDS	19
Figure 12: Table 26.2 of the SuDS Manual	26
Figure 13: Table 26.3 of the SuDS Manual	26

Tables

Table 1: Peak Rainfall Intensity allowance in small and urban catchments. 3.3%AEP Events	10
Table 2: Peak Rainfall Intensity allowance in small and urban catchments. 1.0%AEP Events	10
Table 3: Summary of Existing and Residual Flood Risk	18
Table 4: Summary of SuDS features	21
Table 5: Runoff volumes	22
Table 6: Hydraulic Modelling Parameters	22

Table 7: Summary of Interception Storage	24
Table 8: Water Quality Summary	27

Appendices

Appendix A: Illustrative masterplan
Appendix B: Topographical Survey
Appendix C: BGS SuDS infiltration Report
Appendix D: Greenfield Run off Calculations
Appendix E: Proposed Surface and Foul Water Drainage Strategy
Appendix F: Wessex Water Pre Dev

1. EXECUTIVE SUMMARY

- 1.1 This Flood Risk Assessment (FRA) and Drainage Strategy has been prepared by Paul Basham Associates to support a full planning application for the Chaldicott Barns northern expansion, for a mixed-use industrial building and its associated external yard. Development proposals are for a standalone mixed use industrial building with ancillary uses, external yards and associated car parking with access through the existing business park.
- 1.2 This FRA has been prepared by review of site details such as location, topography, geology, hydrology, existing drainage, potential sources of flood risk and climate change effects.
- 1.3 This FRA has been prepared in accordance with the National Planning Policy Framework (NPPF) and associated Planning Practice Guidance, as well as the local planning policies set out by Wiltshire Council.
- 1.4 The development is located entirely within Flood Zone 1 and the proposed industrial use is classified as 'Less Vulnerable'. Therefore, the development is considered appropriate in accordance with the NPPF and does not require the Exception Test.
- 1.5 The proposed industrial building has a design lifetime of 75 years. As such, flood risk has been assessed up to 2106 (allowing a buffer of five years from the preparation of this report).
- 1.6 Residual flood risk from:
 - Fluvial and tidal flooding is considered to be Low Risk
 - Reservoirs flooding is considered to be Very Low Risk
 - Surface water flooding is considered to be Very Low Risk
 - Groundwater flooding is considered to be Very Low Risk
- 1.7 Discharge rates shall be restricted to 18.6 l/s

2. INTRODUCTION

- 2.1 This Flood Risk Assessment (FRA) and Drainage Strategy has been prepared by Paul Basham Associates on behalf of Chaldicotts Limited to support a full planning application for the Chaldicott Barns northern expansion, for a mixed-use industrial building and its associated external yard and parking.
- 2.2 The land is located to the west of Tokes Lane within the Chaldicott Barns business and retail park and is a greenfield parcel for the northern expansion of the facility. The site's postcode is SP7 9AW and the location is shown in **Figure 1** below.
- 2.3 The application boundary size of the northern expansion parcel is approximately 1.86 ha and the land is currently an unused open grassland field within the business park.



Figure 1: Site Location Plan

- 2.4 The development proposals are for a standalone mixed use industrial building for storage with associated external yards and car parking with access provision through the existing business park. An illustrative masterplan showing the development proposals is included in **Appendix A**.

3. SITE DESCRIPTION

Topography

- 3.1 A topographical survey was carried out by Land Development Services Ltd in May 2026. The topographical survey shows that the site generally slopes down from the southwest corner of the site to the northeast corner at an average gradient of around 1 in 35. The highest point of the site is approximately 126.43mAOD, with the lowest point approximately 120.52mAOD. The full topographical survey is included in **Appendix B**.

Geology

- 3.2 A review of the British Geological Survey (BGS) mapping indicates that the bedrock geology beneath the site is *"Kimmeridge Clay Formation-Mudstone. These sedimentary rocks are shallow-marine in origin. They are detrital, ranging from coarse to fine-grained (locally with some carbonate content) forming interbedded sequences."* See **Figure 2** for the BGS map extract.



Figure 2: BGS bedrock mapping

- 3.3 The BGS mapping indicates the site doesn't have any superficial geological deposits.

- 3.4 A BGS 'Infiltration SuDS GeoReport' has been obtained and states that "*Bedrock deposits are likely to be poorly draining*", as shown in **Figure 3**.

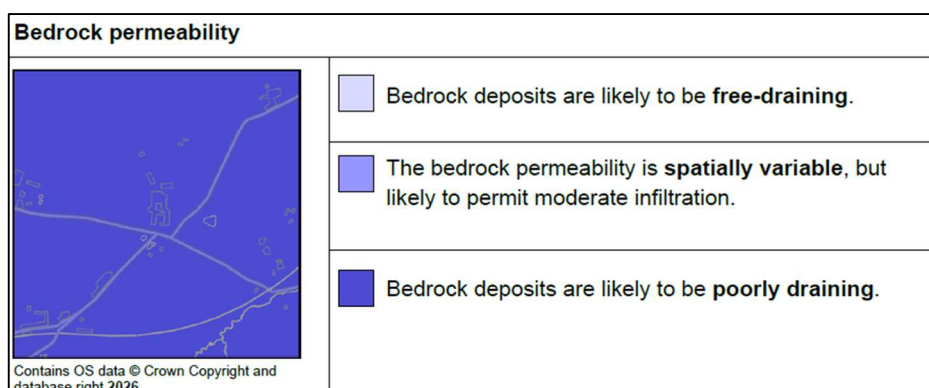


Figure 3: BGS extract - Bedrock permeability

- 3.5 The BGS infiltration SuDS GeoReport also states that "*the depth to the groundwater table is likely to be less than 3m below ground surface for at least part of the year*" in the northern areas of the site. The majority of the site is classified as "*groundwater is likely to be between 3 and 5m below the ground surface for at least part of the year*". This is shown below in **Figure 4**. The full report is shown in **Appendix C**.

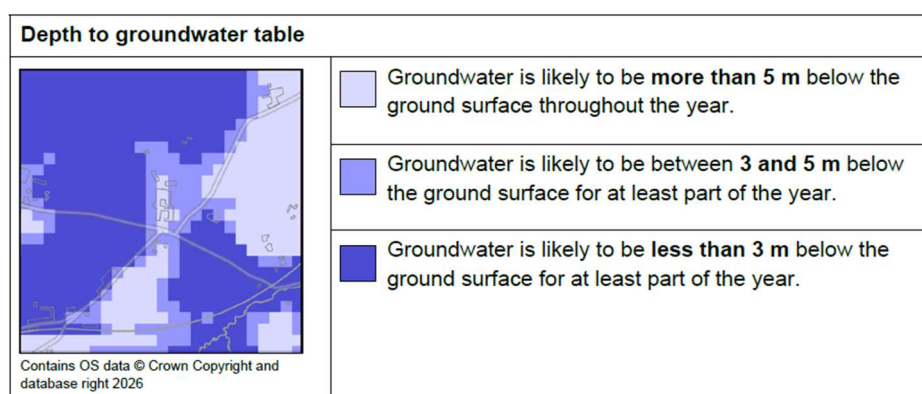


Figure 4: BGS Extract - Depth to groundwater table.

Hydrology

- 3.6 The nearest named watercourse is the River Sem, located approximately 1.75 miles to the East of the site.
- 3.7 Existing ditches/watercourses within the wider estate, run along the northern and eastern boundaries of the site and convey flows northwards towards the River Sem, with assumed connectivity on leaving the site and its estate.

Public Sewer

- 3.8 The site is currently greenfield with no on site sewers.
- 3.9 Based on the Wessex water sewer records there are no public sewers within close proximity to the application site. A pre-development enquiry has been undertaken with Wessex Water that confirmed there are no nearby sewers within close proximity to the site.
- 3.10 The buildings to the south of the site have an individual wastewater treatment plant which discharges into a ditch running along Tokes Lane. This approach would be considered for this building too.

4. PLANNING POLICY

- 4.1 The planning policies and guidance that are relevant to the proposed Development with regard to flood risk and surface water management are outlined below.

National Planning policy

- 4.2 2026 updated National Planning Policy Framework (NPPF) and the associated continuously updated Planning Practice Guidance (PPG) by the Department for Levelling Up, Housing and Communities and Ministry of Housing, Communities & Local Government.

- EA National Strategy for Flood and Coastal Erosion Risk Management 2020
- 2015 published EA National Flood Risk Standing Advice (updated in 2026)
- Defra Non-Statutory; National Standards for sustainable drainage systems (SuDS) 2025
- CIRIA C753 The SuDS Manual 2015
- Flood and Water Management Act 2010
- Flood Risk Regulations 2009
- Flood risk assessments: climate change allowances 2016 (updated in 2022)

Regional Planning policy

- 4.3 As the Lead Local Flood Authority (LLFA), Wiltshire Council has prepared guidance and policies relating to flood risk and the management of surface water, including:

- Wiltshire Local Flood Risk management strategy (April 2015)
- Wiltshire groundwater management strategy 2016
- Wiltshire surface water management plan
- Wiltshire Strategic flood risk assessment 2024

Local Planning Policy

- 4.4 The Wiltshire Core Strategy contains the following policies relating to flooding, drainage, and surface water.
- Core Policy 67 -Flood Risk

4.5 Based on the above policies, the key requirements in relation to the surface water management and flood risk for the proposed Development are considered to be as follows:

- National Planning Policy Framework (2025): “A site-specific flood risk assessment should be provided for all development in Flood Zones 2 and 3. In Flood Zone 1, an assessment should accompany all proposals involving: sites of 1 hectare or more; land which has been identified by the Environment Agency as having critical drainage problems; land identified in a strategic flood risk assessment as being at increased flood risk in future; or land that may be subject to other sources of flooding, where its development would introduce a more vulnerable use.”
- CIRIA C753 The SuDS manual 2015: “Control the quantity of runoff to support the management of flood risk and maintain and protect the natural water cycle. To ensure that the surface water runoff from a developed site does not have a detrimental impact on people, property, and the environment, it is important to control how fast runoff is discharged from the site (i.e., the peak runoff rate) and how much runoff is discharged from the site (i.e., the runoff volume). Suds that are designed to manage water quantity in this way reduce the likelihood of flooding caused by the development. They can help protect natural water cycles by promoting the recharge of soil moisture levels, by maintaining stream and river baseflows and by replenishing groundwater”.

5. CLIMATE CHANGE

Peak Rainfall Intensity Allowance

- 5.1 The “Flood Risk Assessments: Climate Change Allowances Guidance” 2016 (updated in 2022) published by the EA indicates that climate change is currently expected to result in increased peak rainfall and rising sea levels.
- 5.2 The development is classified as ‘less vulnerable’, and the design life for the commercial use building is between 60 – 75 years.
- 5.3 Due to the commercial use of the building, the central allowance peak rainfall intensity allowances for the 2070s epoch will be applied subject to a sensitivity test. This is as a result of the buildings design life being between 60-75 years.

Epoch	Central Allowance	Upper End Allowance
2050s	20%	35%
2070s	25%	40%

Table 1: Peak Rainfall Intensity allowance in small and urban catchments. 3.3%AEP Events

Epoch	Central Allowance	Upper End Allowance
2050s	25%	40%
2070s	25%	45%

Table 2: Peak Rainfall Intensity allowance in small and urban catchments. 1.0%AEP Events

National Planning Policy Framework (NPPF)

- 5.4 This report has been prepared considering the National Planning Policy Framework (NPPF) Technical Guidance and the Environment Agency’s (EA) flood risk standing advice.
- 5.5 Table 2 from the Department for Levelling Up, Housing and Communities and Ministry of Housing, Communities & Local Government Flood risk and coastal change guidance has been included as **Figure 5** below. This provides the classes of development (based on flood risk vulnerability) that are permitted within each of the flood zones.
- 5.6 The Flood Risk Vulnerability Classification for the site is ‘Less Vulnerable’ as it is a commercial industrial use development, which is defined in Annexxe 3 of the NPPF.
- 5.7 The development is in Flood Zone 1; therefore, no exception test is required.

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

Table 2 - Flood risk vulnerability and flood zone 'compatibility'

Key: ✓ Exception test not required X Development should not be permitted.

Notes to table 2:

- This table does not show the application of the [Sequential Test](#) which should be applied first to guide development to Flood Zone 1, then Zone 2, and then Zone 3; nor does it reflect the need to avoid flood risk from sources other than rivers and the sea;
- The Sequential and [Exception Tests](#) do not need to be applied to [minor developments](#) and changes of use, except for a change of use to a caravan, camping or chalet site, or to a mobile home or park home site;
- Some developments may contain different elements of vulnerability and the highest vulnerability category should be used, unless the development is considered in its component parts.

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

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

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

Figure 5: NPPF Planning Practice Guidance Table – Flood Risk Vulnerability and Flood Zone Compatibility

6. FLOOD RISK

6.1 In line with the EA Standing Advice, the estimated flood level is considered to be the higher of:

- A river flood level with a 1 in 100 or greater annual probability plus an allowance for climate change; and
- A tidal flood level with a 1 in 200 or greater annual probability plus an allowance for climate change.

6.2 The following Flood Zone definitions ignoring flood defence, are set out in the Planning Practice Guidance:

- Zone 1 Low Probability - Land assessed as having a less than 1 in 1,000 annual probability of river or sea flooding (<0.1%);
- Zone 2 Medium Probability - Land assessed as having between a 1 in 100 and 1 in 1,000 annual probability of river flooding (1% – 0.1%), or between a 1 in 200 and 1 in 1,000 annual probability of sea flooding (0.5%– 0.1%) in any year; and
- Zone 3 High Probability - Land assessed as having a 1 in 100 or greater annual probability of river flooding (>1%), or a 1 in 200 or greater annual probability of flooding from the sea (>0.5%) in any year.

Fluvial Flood Risk

- 6.3 Flood mapping obtained from the government's 'flood map for planning' website has identified that the site falls entirely within Flood Zone 1 as shown in **Figure 6**.

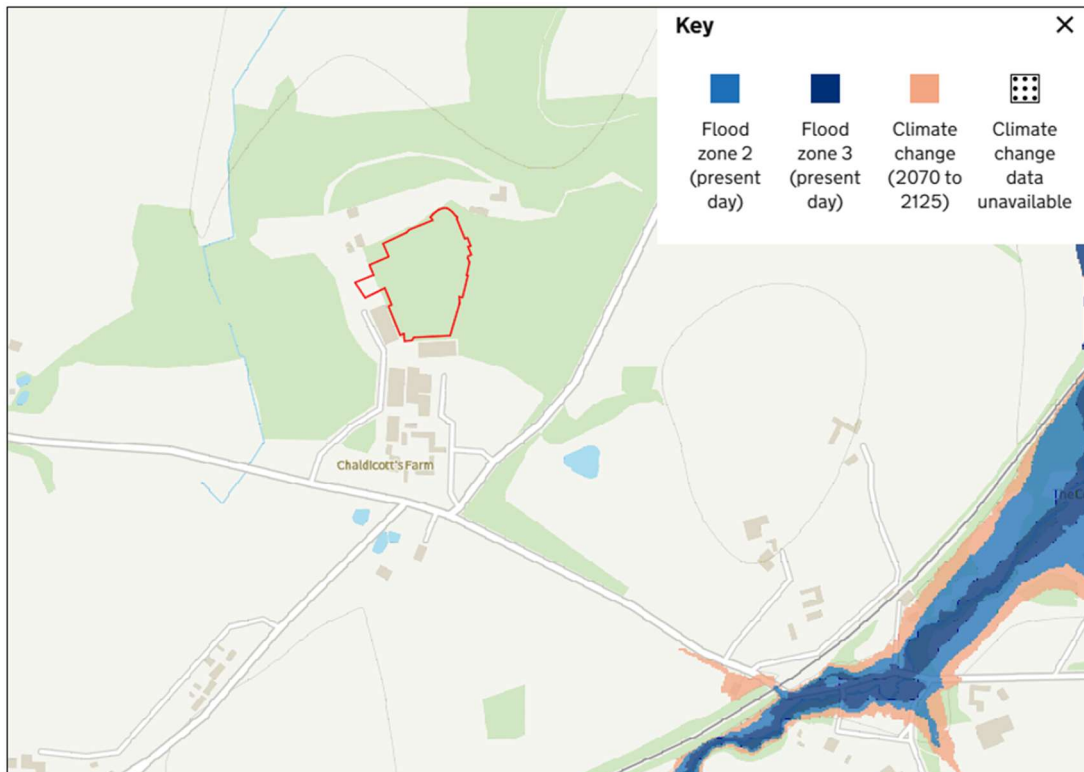


Figure 6: Flood Map for Rivers and Seas

Fluvial flooding – Residual Risk

- 6.4 Based on the above information the site is considered to be at Low risk of flooding from rivers and seas.

Reservoirs Flood Risk

- 6.5 The long-term flood risk from reservoirs shows that the site is considered to be at Very Low risk of flooding from reservoirs.

Reservoirs[More about your reservoir flood risk](#)

Flooding from reservoirs is unlikely in this area.

What a reservoir is

A reservoir is a large natural or artificial lake that is designed to collect and store water.

They are usually formed by building a dam across a river, or by building a large tank or surrounding embankment. If one of these dams or embankments fails, then water could escape from the reservoir. This would result in land or properties being flooded.

Figure 7: Long term flood risk from reservoirs map

Reservoirs – Residual Risk

- 6.6 Based on the above information the site is considered to be Very Low risk of flooding from reservoirs.

Surface Water Flood Risk

- 6.7 Surface water or 'pluvial' flooding results from rainfall running over ground before eventually entering a watercourse or sewer. It is usually associated with high intensity rainfall events but can also occur with lower intensity rainfall or melting snow where the ground is already saturated, frozen, developed (for example in an urban setting), or otherwise has low permeability.
- 6.8 The flood map for planning surface water map, 1 in 100 year including climate change (2061 to 2125), shows that the site is not considered to be at risk of flooding from surface water at any depth. There is some surface water flood risk offsite which corresponds with watercourses identified but this does not impact the application site.

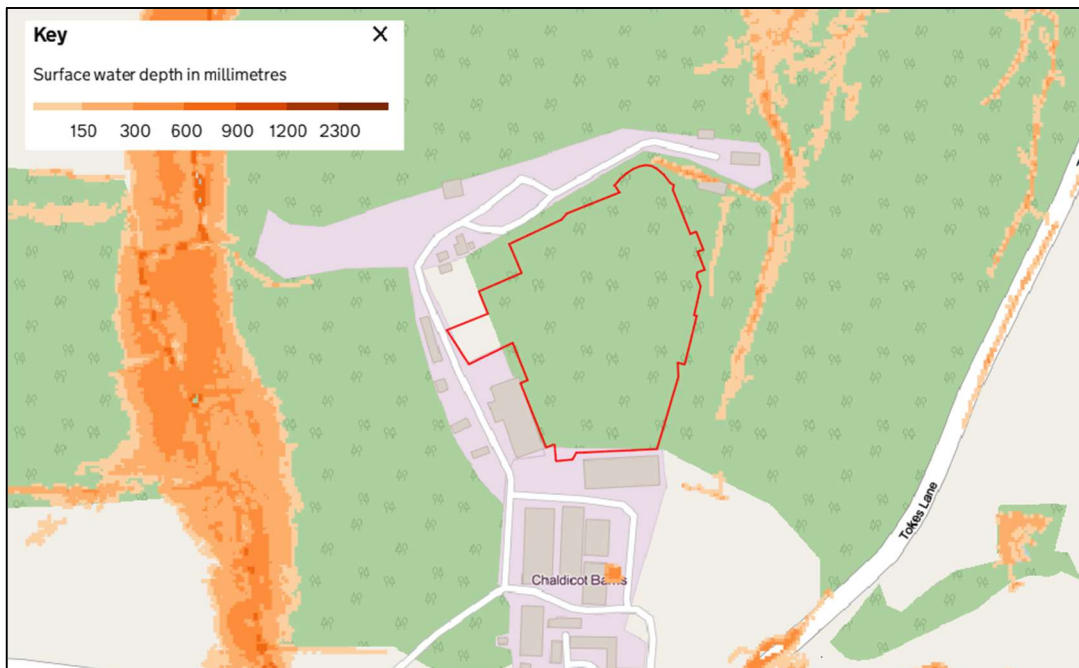


Figure 8: Flood map for planning surface water depths 1 in 100 year (2061 to 2125)

Surface Water – Residual Risk

- 6.9 Based on the above information the site is considered to be at Very Low risk of flooding from surface water.

Groundwater Flood Risk

- 6.10 Groundwater flooding occurs when groundwater levels increase sufficiently for the water table to intersect the ground surface. Groundwater flooding can occur in a variety of geological settings including valleys and in areas underlain by chalk, and in river valleys with thick deposits of alluvium and river gravels.
- 6.11 The BGS SuDS Infiltration GeoReport identifies that groundwater is likely to be less than 5.0m below ground level across the site and less than 3.0m below ground level in places, as shown in **Figure 4**.
- 6.12 The EA's long-term flood mapping identifies the site as being outside of a groundwater flood alert area, demonstrated in **Figure 9** below.

Groundwater[More about your groundwater flood risk](#)

We use groundwater flood alert areas to check the risk of flooding from groundwater.

This location is outside of a groundwater flood alert area.

► [What this means](#)

What groundwater is

Groundwater is the water that is usually held in rocks and soil underground.

Groundwater flooding happens when this water rises and flows above the surface.

Flooding from rivers is more likely when groundwater levels are high.

Figure 9: EA Ground Water Flood risk

- 6.13 The Wiltshire Level 1 Strategic Flood Risk Assessment Appendix G – Groundwater Emergence map, identifies the site as “This Zone is deemed as having a negligible risk from groundwater flooding due to the nature of the local geological deposits.”

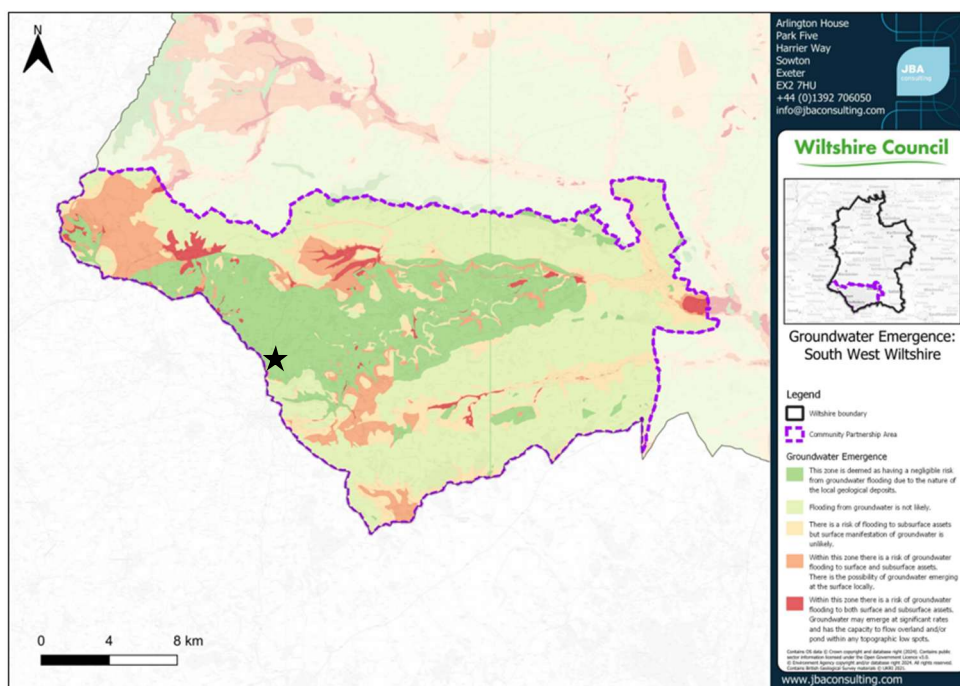


Figure 10: Groundwater Emergence South West Wiltshire

Groundwater – Residual Risk

- 6.14 Based on the above information the site is considered to be at Very Low risk of flooding from groundwater.

7. RESIDUAL FLOOD RISK

7.1 **Table 3** outlines the initial qualitative assessment of risk posed by the potential sources of flooding, the mechanisms for flooding and the likely consequences. It also includes a review of possible mitigation measures and the effect that the proposed mitigation measures are likely to have on the residual risk posed by the potential flood source.

Flood Risk	Flood Mechanism and Possible Consequences	Existing Assessment of Risk	Mitigation Measures	Residual Risk
Fluvial	Flooding Caused by local rivers exceeding capacity.	Low	The site is wholly Flood Zone 1	Low
Reservoirs	Flooding caused by reservoir failure.	Very Low	There are no reservoirs in the vicinity of the site.	Very Low
Surface Water (Pluvial)	Flooding caused by local watercourses exceeding capacity and localised flood risk due to low spots.	Very Low	There are no areas presented at risk of Surface Water flood risk	Very Low
Groundwater	Flooding due to a high groundwater table.	Very Low	Searches have identified very limited likelihood of groundwater flooding.	Very Low

Table 3: Summary of Existing and Residual Flood Risk

8. DRAINAGE STRATEGY

Sustainable Drainage Principles

8.1 Sustainable drainage systems (SuDS) are designed to manage storm water as close to its source as possible to mimic natural drainage arrangements and where possible, encourage its infiltration, attenuation and passive treatment. SuDS should be designed to both manage the flood and pollution risks resulting from urban runoff and to contribute wherever possible to environmental enhancement and place making. With this in mind, the multi-functionality and multiple benefits of SuDS should always be considered. There are four pillars of SuDS that should consider the delivery of multiple benefits through design. These are as defined by **Figure 11** below.

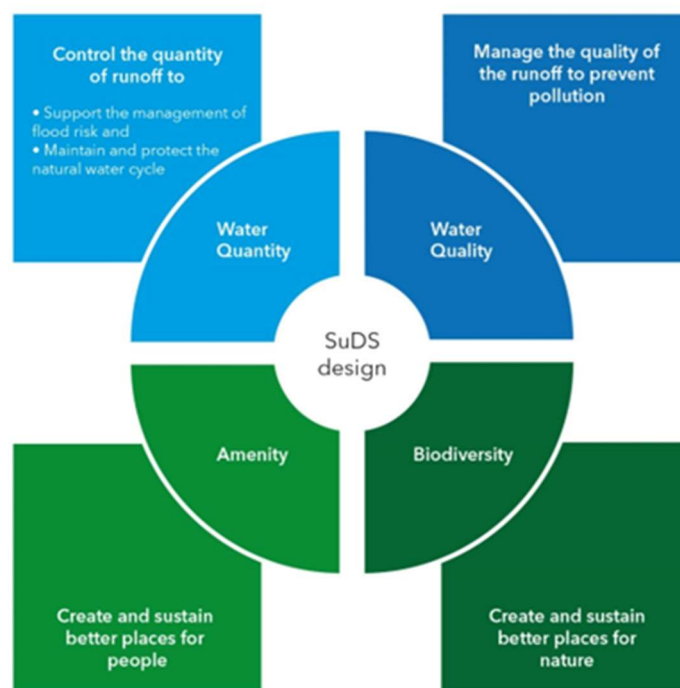


Figure 11: The four pillars of SuDS

8.2 Runoff from development should be discharged to the final destinations in accordance with the National Standards for sustainable drainage systems (NSS) to the hierarchy in order of preference:

- 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 other piped surface water drainage system
- priority 5: discharged to a combined sewer

- 8.3 The NSS require the application of a 'SuDS approach' so at least the first 5mm of rainfall for the majority of rainfall events does not result in runoff from the site to surface water drainage systems, known as Interception storage.
- 8.4 SuDS principles are proposed to control and manage the storage of all design rainfall events including allowance for climate change. They are also proposed to convey flows towards a single point of outfall from the site.
- 8.5 Water quality requires application of a SuDS approach that protects surface waters and groundwater by managing the quality of the surface water runoff to adequately address water quality risks from the development. The proposed SuDS management train, as listed and summarised below in **Table 4**, would include a water quality risk assessment, appropriate to the pollution hazard and sensitivity of receiving waters using the SuDS Manual's Simple Index Approach, reflecting implementation of best practice industry recognised guidance. This is detailed in **Section 9** below.

Proposed SuDS feature	Potential	Consideration
Permeable paving	Permeable paving systems provide good amenity value including passive surface water treatment. Storage of runoff is provided within the sub-base of the paving and can be controlled to limit overwhelming of downstream storage features. Permeable paving systems are low maintenance.	The road surface cannot be maintained in the same way as an impermeable road surface and must be vacuum sucked to clear sediment from joints with jointing material renewed on a regular basis. Where used this can contribute to NSS Standards 2 - 5.
Detention basin	A vegetated basin(s) can provide large volume storage prior to disposal, above ground and within the earthworks of site preparation. Vegetated basins provide inherent treatment of runoff prior to discharge from site and can be used to fully or partially infiltrate subject to infiltration rates and receiving groundwater levels. Basins can hold a significant depth of water which needs to evaluate carefully the amenity implications.	Infiltration is precluded from the site investigation works detailed in Section 3 of this report. Appropriate land take should be allowed where used but vegetation can contribute to other design targets, including BNG. Where used this can contribute to NSS Standards 2 - 6.
Attenuation tank	A buried attenuation tank can provide large volume storage prior to disposal, below ground. Attenuation tanks do not provide treatment of runoff prior to discharge from site and must be used in conjunction with other measures to ensure appropriate treatment stages are provided.	Sediment control within the drainage network is imperative to prevent ingress to the buried tank. Catchpit manholes should be used immediately upstream and maintained on a regular basis. Where used this can contribute to NSS Standard 3.
Vortex separator	A vortex separator is a manhole that incorporates stages of surface water treatment contained within itself and is used in conjunction with other SuDS features where more passive treatment measures cannot be provided, typically due to space constraints with the site.	Installation and maintenance in line with the manufacturer's specification is required to ensure optimal performance over its lifetime. Where used this can contribute to NSS Standard 4.

Table 4: Summary of SuDS features

Greenfield runoff

- 8.6 The pre- and post-development greenfield rates and volumes have been calculated for the whole site catchment area contributing to the drainage system for the proposed development. The values are as given in **Table 5** and demonstrated in **Appendix D**.

Rainfall Event	Catchment Area (ha)	Greenfield Rate (L/s)	Post Development Rate (L/s)
100.0% AEP	1.86	18.60	18.60
50.0% AEP		19.20	18.60
3.3% AEP		50.30	18.60
1.0% AEP		69.70	18.60

Table 5: Runoff volumes

Hydraulic Calculations

8.7 The below table contains the parameters used in the supporting network modelling

Parameter	Input	Guidance/notes
Rainfall data	FSR FEH 22	Storm durations < 60 mins Storm durations > 60 mins up to 10,080 mins
Urban Creep	0.0%	The access arrangements serving the building would prohibit urban creep associated with the building and its use.
Cv (Summer and Winter)	1.0	Best practice estimation of the proportion of rainfall that enters the drainage system as surface runoff
MADD factor	0.0m ³	Eliminated to avoid underestimation of network storage
Climate Change 3.3% AEP 1.0% AEP	40% 45%	EA Climate change allowances for peak rainfall in England
Half drain time	1,440 mins	Storage features should half drain to accommodate consecutive storm events

Table 6: Hydraulic Modelling Parameters

Outfall and Storage

- 8.8 Infiltration is precluded due to the prevailing Kimmeridge Clay Formation soil being considered Unproductive for surface water disposal via infiltration.
- 8.9 The greenfield rate is calculated for the site drainable area and proposed to be restricted to the 100.0% AEP (1 in 1 year) rate, see **Appendix D**. This will provide a significant reduction in the rate of runoff for all return periods over and above the 100.0% AEP.
- 8.10 The site is divided into three separate catchments by virtue of the split-level arrangement and its access roads, to suit the existing topography and proposed site layout. Overall, the storage features work to combine behind a single flow control prior to discharge to the watercourse and is demonstrated on the Proposed Surface and Foul Water Drainage Strategy included in **Appendix E**.
- 8.11 Storage is provided in the form of permeable paving for the car parking access and parking areas, two buried attenuation tanks and a vegetated detention basin. The two buried attenuation tanks are provided online with direct outfall to the flow control manhole but also serve a secondary offline function for high level over flow from the detention basin. These features work in conjunction providing a holistic approach to the storage and control of runoff from the development.
- 8.12 Outfall is identified to be made by a new connection to the nearby watercourse running adjacent to the northern boundary of the site, which remains within the wider estate ownership and management. By limiting all runoff to the calculated greenfield rate of runoff for the 100.0% AEP, it can be considered there is a betterment of flood risk downstream of site for all return periods over and above the 100.0% AEP event.

Interception Storage

- 8.13 Interception shall be delivered within the development for the first 5mm of rainfall for the majority of rainfall events, for both winter and summer seasons. This is to prevent runoff from the site for the majority of small (frequent) rainfall events and for the initial depth of rainfall for larger events. For compliance to be demonstrated, 80% interception shall be achieved during the summer (May to October) and 50% in winter (November to April).
- 8.14 Evidence is provided to demonstrate the runoff from each positively drained surface is either collected for use, infiltrated into the ground, or else captured, conveyed and stored within SuDS features, see **Table 7** below. These features naturally absorb or retain runoff where it will be lost to soils or the atmosphere and will not discharge from the site. A simplified approach to delivering interception is proposed where the below is considered to be compliant for each system.
- 8.15 Detention basins; development area drained to a basin with a flat unlined base is assumed to comply where the drained impermeable surface area is up to 5 times the vegetated basin surface area receiving the runoff for any soil type. The area of the basin that is assumed to contribute to interception of runoff shall be below the outlet level of the basin.
- 8.16 Permeable surfaces; lined or not, are assumed to comply with no additional area drained to the permeable pavement. Where the surface also drains an adjacent impermeable area, compliance shall be assumed for all soil types where the system is unlined if the additional impermeable area is no greater than the permeable area.

Catchment	Imp. Area to be Intercepted (m ²)	Interception Provided (m ²)		Interception Achieved (m ²)
		Basin (x5)	Permeable Paving (x2)	
Total	15991.43	121.31 (606.55)	8639.13	6745.75

Table 7: Summary of Interception Storage

Foul Water Drainage

- 8.17 The site is a Greenfield open field land use with no sewers on the site.
- 8.18 Wastewater facilities are required as part of the building's operation but would be domestic scale effluent predominately associated with the office use. No industrial level trade effluent would be generated within the building's operation.
- 8.19 Foul water drainage is proposed at the southern end of the building associated with the office use element of the development.
- 8.20 A pre-development enquiry has been raised with the Water Authority, Wessex Water, included within **Appendix F**. This considers there is no capability for connection to the public sewer network due to the absence of connection from the wider Chaldicott Barns estate.
- 8.21 Given the natural topography's influence of the application site, it is determined a pumped outfall would be necessary to serve the development. Foul water drainage is proposed to be collected and conveyed to a dedicated private package pump station, sited to the east of the development, and is proposed to pump flow at a fixed flow rate.
- 8.22 Building Regulations criteria requires provision for 24 hours emergency storage within a pumped drainage system. This is typically provided within the wet well and below the invert level of the incoming drain.
- 8.23 The point of connection and viability for receipt of flow will need to be investigated and reported to an Engineer to determine if any upgrade or remedial works prove necessary.
- 8.24 Outfall may be subject to an Environmental Permit where it cannot be demonstrated to comply with the Environment Agency's general binding rules.

9. WATER QUALITY

9.1 Figure 12 to Figure 13 are extracted from the SuDS Manual and demonstrate the pollution risks associated with various discharge situations.

TABLE 26.2	Pollution hazard indices for different land use classifications				
	Land use	Pollution hazard level	Total suspended solids (TSS)	Metals	Hydrocarbons
	Residential roofs	Very low	0.2	0.2	0.05
	Other roofs (typically commercial/ industrial roofs)	Low	0.3	0.2 (up to 0.8 where there is potential for metals to leach from the roof)	0.05
	Individual property driveways, residential car parks, low traffic roads (eg cul de sacs, homezones and general access roads) and non-residential car parking with infrequent change (eg schools, offices) ie < 300 traffic movements/day	Low	0.5	0.4	0.4
	Commercial yard and delivery areas, non-residential car parking with frequent change (eg hospitals, retail), all roads except low traffic roads and trunk roads/motorways ¹	Medium	0.7	0.6	0.7
	Sites with heavy pollution (eg haulage yards, lorry parks, highly frequented lorry approaches to industrial estates, waste sites), sites where chemicals and fuels (other than domestic fuel oil) are to be delivered, handled, stored, used or manufactured; industrial sites; trunk roads and motorways ¹	High	0.8 ²	0.8 ²	0.9 ²

Figure 12: Table 26.2 of the SuDS Manual

TABLE 26.3	Indicative SuDS mitigation indices for discharges to surface waters			
		Mitigation indices ¹		
	Type of SuDS component	TSS	Metals	Hydrocarbons
	Filter strip	0.4	0.4	0.5
	Filter drain	0.4 ²	0.4	0.4
	Swale	0.5	0.6	0.6
	Bioretention system	0.8	0.8	0.8
	Permeable pavement	0.7	0.6	0.7
	Detention basin	0.5	0.5	0.6
	Pond ⁴	0.7 ³	0.7	0.5
	Wetland	0.8 ³	0.8	0.8
	Proprietary treatment systems ^{5,6}	These must demonstrate that they can address each of the contaminant types to acceptable levels for frequent events up to approximately the 1 in 1 year return period event, for inflow concentrations relevant to the contributing drainage area.		

Figure 13: Table 26.3 of the SuDS Manual

9.2 The UKSuDS Water Quality toolkits (based on the Simple Index Assessment method) has been used to assess water quality improvement for the site. **Table 8** below summarises the results of the toolkit.

Land Use			SuDS Component			Water Treatment
Industrial roofs			Watercourse (swale)			Sufficient
Pollution Indices			Mitigation Indices			
TSS	Metals	Hydrocarbons	TSS	Metals	Hydrocarbons	
0.3	0.2	0.05	0.5	0.5	0.6	
Low Traffic Roads			Permeable Pavement			Sufficient
Pollution Indices			Mitigation Indices			
TSS	Metals	Hydrocarbons	TSS	Metals	Hydrocarbons	
0.5	0.4	0.4	0.7	0.6	0.7	
Commercial yard and delivery areas			Vortex Separator Watercourse (swale)			Sufficient
Pollution Indices			Mitigation Indices			
TSS	Metals	Hydrocarbons	TSS	Metals	Hydrocarbons	
0.7	0.6	0.7	0.75	0.8	0.9	

Table 8: Water Quality Summary

10. SUMMARY AND CONCLUSION

- 10.1 This Flood Risk Assessment (FRA) and Drainage Strategy has been prepared by Paul Basham Associates to support a full planning application for the Chaldicott Barns northern expansion, for a mixed-use industrial building and its associated external yard. Development proposals are for a standalone mixed use industrial building for storage and research & development purposes, comprising office space, external yards and associated car parking with access through the existing business park.
- 10.2 This FRA has been prepared by review of site details such as location, topography, geology, hydrology, existing drainage, potential sources of flood risk and climate change effects.
- 10.3 This FRA has been prepared in accordance with the NPPF and Planning Practice Guidance, as well as the local planning policies set out by Wiltshire Council.
- 10.4 The development is in Flood Zone 1 and has been categorised as "less vulnerable"; therefore, in accordance with NPPF, the proposals are acceptable, and the site will not require an exception test.
- 10.5 The proposed industrial building has a design lifetime of 75 years. As such, flood risk has been assessed up to 2106 (allowing a buffer of five years from the preparation of this report).
- 10.6 Summary of residual flood risk
- Fluvial and tidal flooding is considered to be Low Risk
 - Reservoirs flooding is considered to be Very Low Risk
 - Surface water flooding is considered to be Very Low Risk
 - Groundwater flooding is considered to be Very Low Risk
- 10.1 The surface water drainage proposal is to capture runoff at source, attenuate on-site within a basin and discharge into the existing ditch to the North of the site via a Hydrobrake at the proposed discharge rate of 18.60l/s. Additional storage is provided within 3 tiered attenuation crates and the sub-base of the permeable paving.
- 10.2 All runoff (up to and including the 1-in-100-year rainfall event (+45% climate change)) shall be restricted to the proposed impermeable area's 1-in-1 Year rate.
- 10.3 Permeable paving shall be proposed for the standard vehicular roads to improve source control and improve water quality.
- 10.4 Hydraulic calculations confirm that the network does not flood during the 100%AEP, 3.3%AEP (+40% Climate change allowance) and the 1%AEP storm events (45% Climate change allowance).

- 10.5 Foul water drainage is proposed to be collected and conveyed to a dedicated private package pump station, sited to the east of the development, before passing through a private wastewater treatment plant, and is proposed to pump flow at a fixed flow rate.