



OLD MANOR FARM

Wedhampton, Wiltshire, SN10 3QE

FLOOD RISK ASSESSMENT

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Control Sheet

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CONTENTS

1	INTRODUCTION	1
2	SITE AND HYDROLOGICAL CONTEXT	2
3	FLOOD RISK	5
4	IMPACT ON LOCAL DRAINAGE	9
5	SUMMARY	12

Tables

Table 2-1	PPG Development Vulnerability Classification	8
Table 3-1	EA Flood Zone Classification	5
Table 4-1	Water Quality Indices (as per C753 The SuDS Manual)	10
Table 4-2	Planter Maintenance	11

Figures

Figure 2-1	Site Location (redline is approximate)	2
Figure 2-2	Topography and Hydrology	4
Figure 3-1	RoFSW with Climate Change	6
Figure 3-1	Wiltshire SFRA Risk of Flooding from Groundwater Flooding Mapping	7

1 INTRODUCTION

1.1 Background

1.1.1 Calibro has been appointed to undertake a Flood Risk Assessment (FRA) for the renovation and conversion of the existing farm buildings at Old Manor Farm in Wedhampton for residential use.

1.1.2 The National Planning Policy Framework (NPPF) requires that the planning system takes full account of flood risk. This requires that:

- Within the site, the most vulnerable development is located in areas of lowest flood risk, unless there are overriding reasons to prefer a different location;
- The development is appropriately flood resistant and resilient such that, in the event of a flood, it could be quickly brought back into use without significant refurbishment;
- It incorporates sustainable drainage systems, unless there is clear evidence that this would be inappropriate;
- Any residual risk can be safely managed;
- Safe access and escape routes are included where appropriate, as part of an agreed emergency plan.

1.1.3 Footnote 63 of the NPPF states that a site-specific FRA will be required for proposals:

- a) that are greater than 1 hectare in area within Flood Zone 1;
- b) that are located in Flood Zones 2 and 3;
- c) in an area within Flood Zone 1 which has critical drainage problems;
- d) in an area within Flood Zone 1 identified in a Strategic Flood Risk Assessment (SFRA) as being at flood risk now or in the future;
- e) in an area in Flood Zone 1 that may be subject to other sources of flooding, where its development would introduce a more vulnerable use.

1.1.4 The site has been identified by the Wiltshire SFRA mapping as being at predicted risk of groundwater flooding. Consequently, in accordance with the NPPF, the application requires an FRA which considers the risk of all sources of flooding.

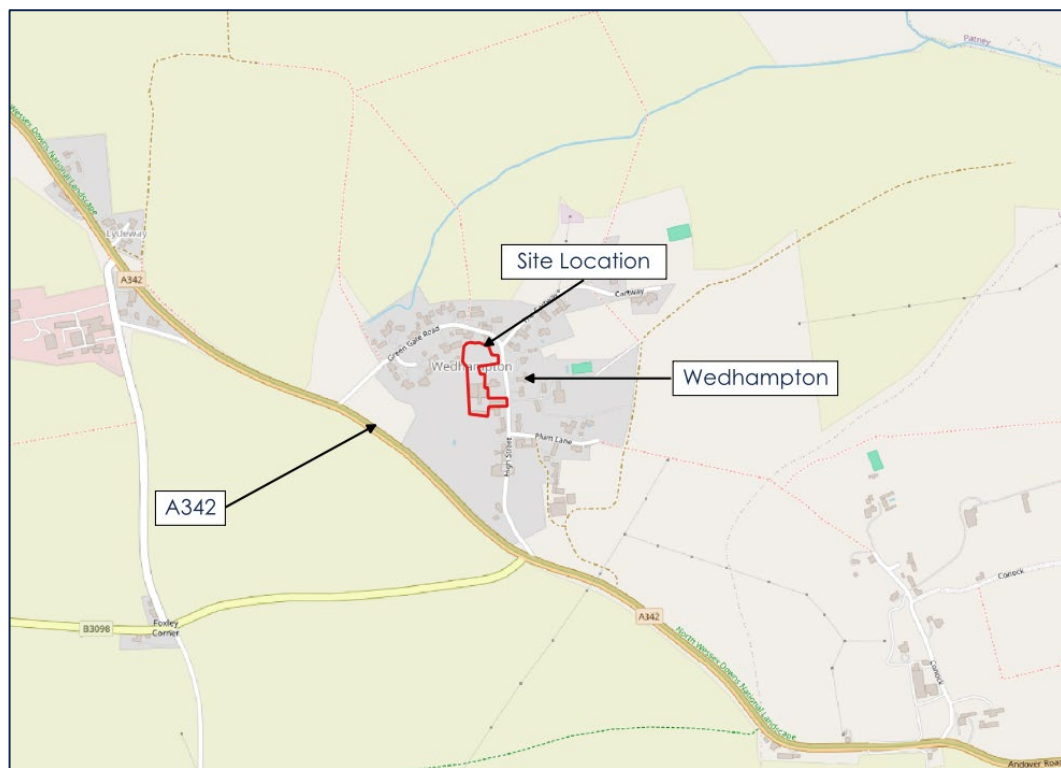
1.1.5 This assessment considers the risks of all types of flooding to the site for the lifetime of the development and assess if there would be an impact of flooding to third parties, recommending mitigation if a risk is identified.

2 SITE AND HYDROLOGICAL CONTEXT

2.1 Site Description and Proposals

- 2.1.1 The site is located on the High Street in Wedhampton, Wiltshire. The postcode for the site is SN10 3QE and the approximate co-ordinates at the centre of the site are 407160, 157540.
- 2.1.2 Although the redline boundary covers the wider property, the proposed development relates specifically to the conversion of existing barns and outbuildings for residential uses.
- 2.1.3 The site location is shown in Figure 2-1.

Figure 2-1 Site Location (redline is approximate)

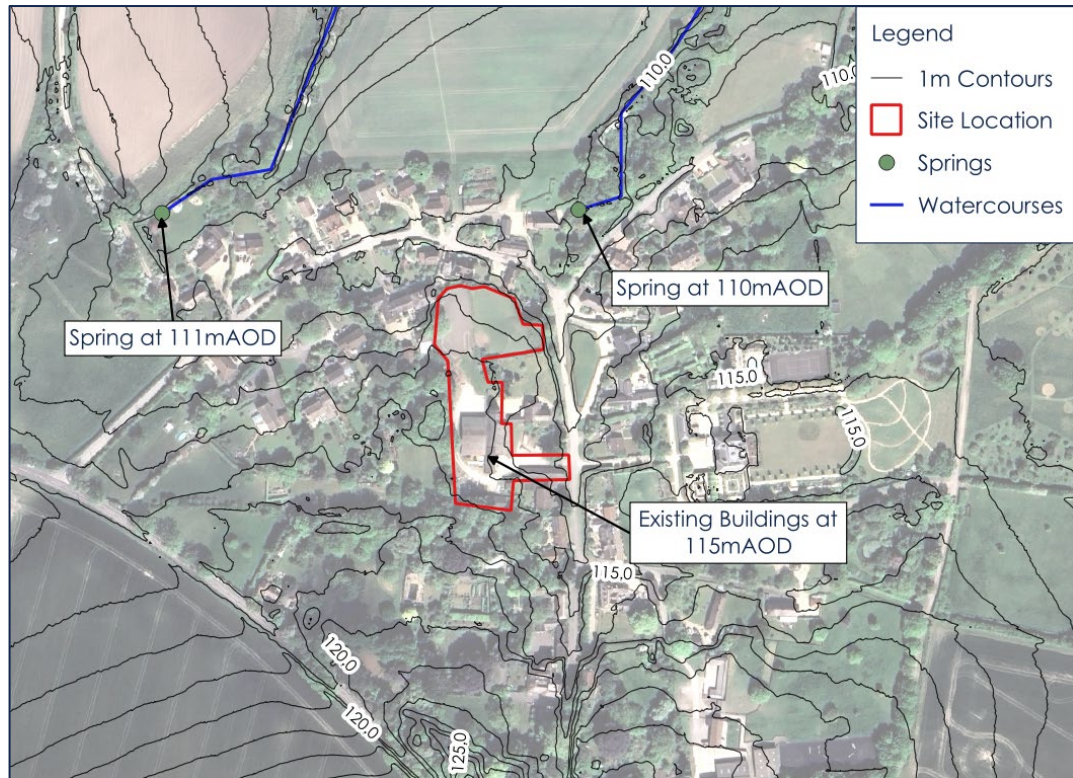


- 2.1.4 The proposals are for the renovation of existing barns and outbuildings, including an area of access and parking. The access and parking would be formed from permeable materials.
- 2.1.5 The proposals would be renovation of existing buildings only, with negligible change to their footprint and the impermeable area of the site.
- 2.1.6 The expected lifetime of the proposals is 100 years.

2.2 Local Topography and Hydrology

- 2.2.1 There are no known watercourses within the immediate vicinity of the site. The closest watercourses to the site are tributaries of the River Avon, which lie over 100m to the northwest of the site and approximately 65m to the northeast respectively.
- 2.2.2 A review of relevant OS mapping shows 'Issues' at the heads of these watercourses, suggesting they are spring fed. The topographic levels of the potential springs are 111mAOD for the northwestern watercourse and 110mAOD for the northeastern, as shown in Figure 2-2.
- 2.2.3 The existing buildings are understood to be fitted with guttering and downpipes that discharge to the ground surface, unattenuated, as is typical for such agricultural buildings.
- 2.2.4 In the absence of a topographic survey, LiDAR analysis of the site has been undertaken, shown in Figure 2-2.
- 2.2.5 The site sits partway up a slope, with levels at the site being approximately 115mAOD and the land to the south rising to 120mAOD at the A342 highway. Beyond the site to the north the land continues to fall to approximately 110mAOD before flattening out where the River Avon tributaries flows. The rivers flow to the north and the land continues to fall in that direction.
- 2.2.6 The existing buildings are therefore set at least 4m above the levels of the potential springs.

Figure 2-2 Topography and Hydrology



2.3 Geology

- 2.3.1 Geological data held by the British Geological Survey (BGS) show that the site and immediate surroundings is underlain by 'Upper Greensand Formation', which is a sandstone. There is no mapped superficial geology at the site but a narrow band of 'Head – Clay, silt, sand and gravel' lies beneath the northwestern watercourse.
- 2.3.2 Soils mapping indicates that the soils under the site are 'Freely draining slightly acid loamy soils'.
- 2.3.3 BGS hydrogeological mapping indicates the sandstone beneath the site is a 'Moderately productive aquifer'.

3 FLOOD RISK

3.1 National Planning Policy Framework

3.1.1 In accordance with the NPPF, this FRA considers the following sources of flooding:

- a) Tidal Flooding – from the sea;
- b) Fluvial Flooding – from rivers and streams;
- c) Surface Water Flooding – from intense rainfall events;
- d) Groundwater Flooding – from elevated groundwater levels or springs;
- e) Flooding from Sewers – from existing sewer systems; and
- f) Artificial Sources – from reservoirs, canals etc.

3.2 Flood Zones

3.2.1 The Flood Zones are based on the assessed probability of the site flooding from rivers and the sea, ignoring the presence of flood defences. The flood zone classifications from the PPG are presented in Table 3-1.

Table 3-1 EA Flood Zone Classification

Flood Zone	Risk	Fluvial Flooding Annual Chance	Tidal Flooding Annual Chance
1	Low	≥ 1 in 1,000	
2	Medium	Between 1 in 1,000 and 1 in 100	Between 1 in 1,000 and 1 in 200
3	High	≤ 1 in 100	≤ 1 in 200
3b	Functional Floodplain	Land where water has to flow or be stored in times of flood. This is defined in the relevant SFRA.	

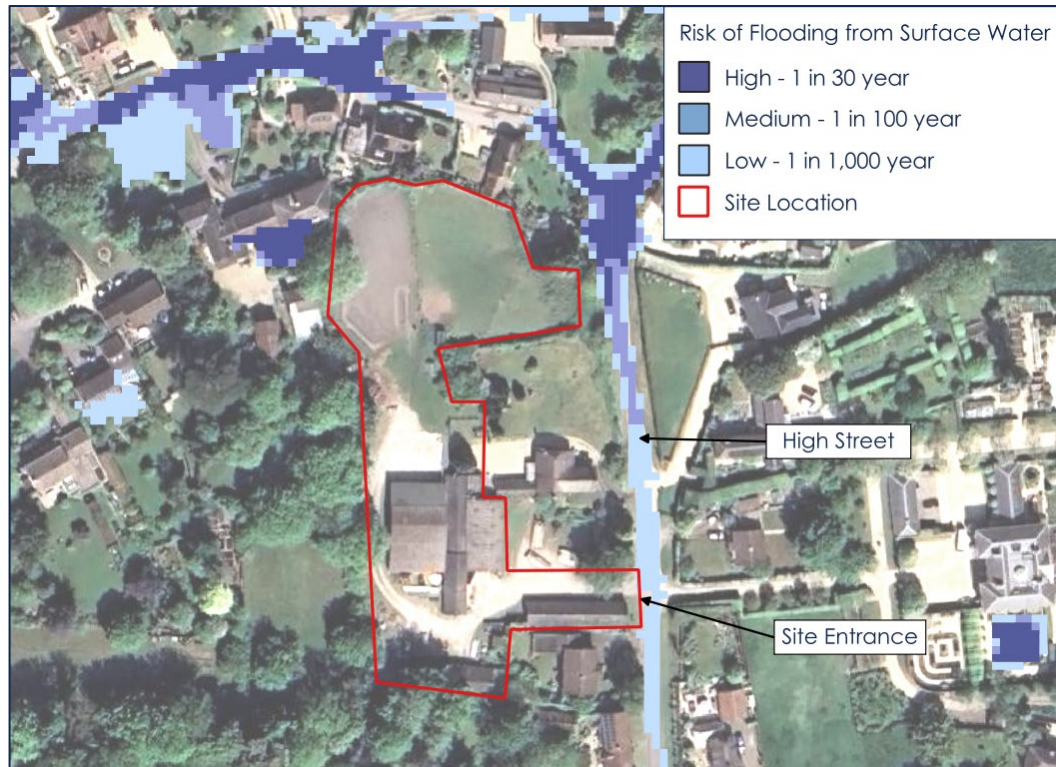
3.2.2 The Flood Map for Planning defines the site as falling entirely within Flood Zone 1, meaning the site is at **Low** risk of fluvial flooding. The site is well beyond any tidal limits.

3.3 Surface Water Flooding

3.3.1 The Risk of Flooding from Surface Water (RoFSW) dataset indicates areas where surface water is likely to flow and accumulate, inclusive of a climate change. The dataset predicts that surface water flooding is not expected at the site and is therefore at **Very Low** risk of surface water flooding.

3.3.2 As shown in Figure 3-1, although the site would remain flood-free during a modelled surface water flood event, there could be flooding on High Street itself. However, inspection of the RoFSW mapping shows this flooding would be shallow, less than 200mm, even in the extreme 1 in 1,000 year event and therefore would not impact site access and egress.

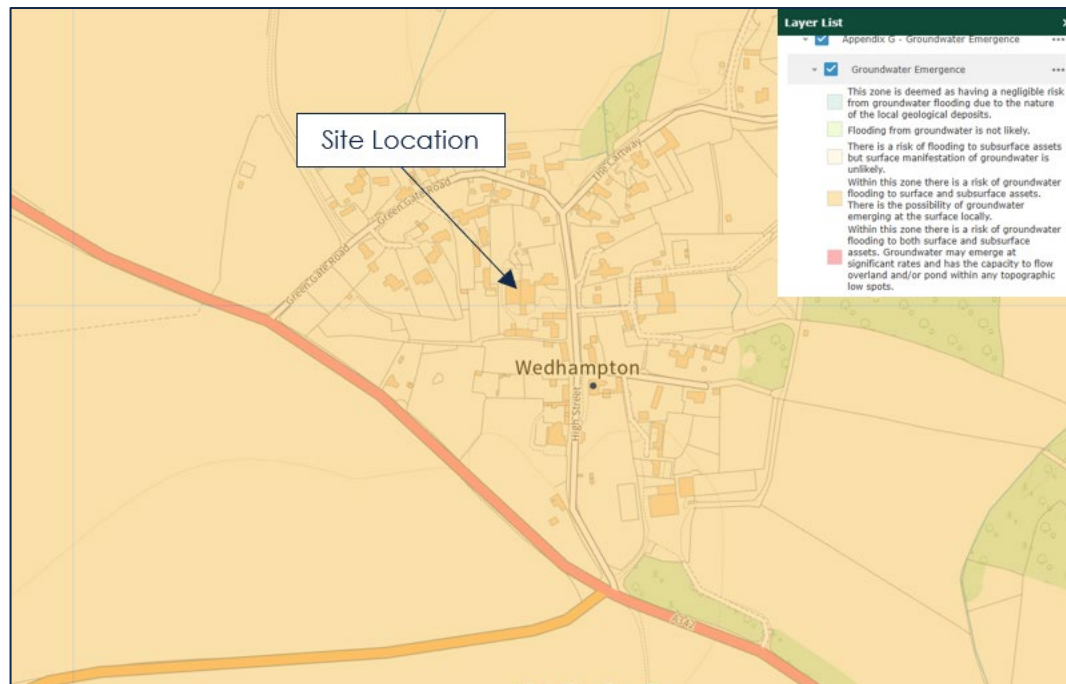
Figure 3-1 RoFSW with Climate Change



3.4 Groundwater Flooding

- 3.4.1 The Wiltshire SFRA and its accompanying online Data Explorer contains a risk of groundwater map. This map shows the expected levels of groundwater below the ground.
- 3.4.2 The map shows that groundwater levels are between 0.025m and 5m below the ground surface for the site and entire surrounds, as shown by Figure 3-2.

Figure 3-2 Wiltshire SFRA Risk of Flooding from Groundwater Flooding Mapping



- 3.4.3 The nearby suspected springs suggests the presence of groundwater within the sandstone layer.
- 3.4.4 However, as identified in Section 2.3, the springs are located over 4m below the existing ground level of the site. This means that the groundwater level at the site would be at the deeper end of the scale predicted by the SFRA mapping.
- 3.4.5 Given the topography of the site and surroundings, additional groundwater flows generated during prolonged rainfall would likely emerge in a similar location to the existing spring. The existing watercourses would form a preferential flow path for such additional flows, meaning water would flow to the north, away from the site.
- 3.4.6 Similarly, given the local topography, if groundwater emerged at the surface, it would flow to the north without ponding at the site.
- 3.4.7 As a result of the above, the risk of groundwater flooding at the site is assessed as being **Low**.
- 3.4.8 However, as a precaution, it is proposed to raise the finished floor levels (FFLs) by approximately 100mm to provide resilience against elevated groundwater. Such raising is subject to detailed design and impact on level access, ceiling heights or other design issues.

3.5 Flooding from Sewers

- 3.5.1 Given the rural and elevated setting of the site, it is unlikely there are any significant sewers located upstream of the site to generate sewer flooding.

3.5.2 Therefore, the risk of sewer flooding to the site is considered to be **Negligible**.

3.6 Flooding from Artificial Sources

3.6.1 The Environment Agency 'Reservoir Flood Extents – Wet Day' national dataset predicts that the site would not be affected by reservoir flooding.

3.6.2 The risk of flooding from artificial sources is assessed to be **Negligible**.

3.7 Development Vulnerability and Sequential Test

3.7.1 Table 2 of the Flood Risk and Coastal Change Planning Practice Guidance (PPG) defines which types of development are acceptable in each flood zone and is reproduced in Table 2-1. In accordance with Annex 3 of the NPPF, the proposals are considered to be More Vulnerable, which is deemed appropriate in Flood Zone 1 and in areas of low risk of flooding.

3.7.2 As a change of use of existing buildings, the Sequential Test does not apply.

Table 2-2 PPG Development Vulnerability Classification

Flood Zone	Flood Risk Vulnerability				
	Essential Infrastructure	Highly Vulnerable	More Vulnerable	Less Vulnerable	Water Compatible
1	✓	✓	✓	✓	✓
2	✓	Exception Test Required	✓	✓	✓
3a	Exception Test Required	✗	Exception Test Required	✓	✓
3b	Exception Test Required	✗	✗	✗	✓

4 IMPACT ON LOCAL DRAINAGE

- 4.1.1 The existing site is understood to discharge roof runoff unattenuated to the ground surface.
- 4.1.2 The proposals would result in a negligible alteration to the impermeable footprint of the site. It is therefore proposed to retain the same general drainage arrangements for the site.
- 4.1.3 The proposed access and parking would be permeable surfaced and therefore mimic a greenfield site with no additional mitigation required.
- 4.1.4 However, to ensure the proposals result in betterment in terms of runoff, it is proposed to discharge the building downpipes to raised beds sustainable drainage (SuDS) planters. These are simple, prefabricated raised beds that accommodate flows from downpipes, slowing the flow of water before discharging to the existing discharge arrangements at low rates. They are planted to provide additional biodiversity and amenity benefits and provide water cleansing.
- 4.1.5 To assist with percolation and augment the betterment proposed, the discharge from the planters could be into small, shallow gravel sumps in the ground.
- 4.1.6 If space allows, water butts could be installed to provide further betterment, promoting the reuse of water collected from rainstorms in order to maintain garden areas. However, the capacity provided in water butts cannot be relied upon to provide attenuation storage as they may be at capacity when storms occur.
- 4.1.7 The proposed planters would be considered a betterment compared to the existing drainage situation of the building and therefore strongly align with the core aims of the NPPF.
- 4.1.8 The specific formation, distribution and location of the SuDS planters is subject to detailed design considerations. For example, they will need to be located to not impede access. In accordance with relevant guidance such as the CIRIA SuDS Manual, the surface area for the planters (bioretention features) should be 2%-4% of the total area draining to them. This criterion will be applied to the detailed designs.

4.2 Design for Exceedance

- 4.2.1 The proposed planters would provide more storage and would result in betterment even in exceedance events when compared to the existing site. In the unlikely event the capacity of the SuDS planters and gravel sump was exceeded, water would gradually flow onto surrounding landscaped areas where it would percolate to the ground, as per the existing site and antecedental conditions (albeit at lower rates than the existing site).

4.3 Water Quality

- 4.3.1 The SuDS Manual (CIRIA C753) states that the design of surface water drainage should consider minimising contaminants in surface water runoff discharged from the site. The level of treatment required depends on the proposed land use, according to the pollution hazard indices. To provide adequate treatment, the SuDS mitigation indices for the development must be equal to, or exceed, the pollution hazard indices.
- 4.3.2 Surface water runoff from 'residential roofs' are considered by Table 26.3 of the SuDS Manual to present a Very Low hazard to water quality (see Table 4-1).
- 4.3.3 Table 26.4 of the SuDS Manual provides SuDS mitigation indices for various SuDS methods discharging to the ground, as summarised in Table 4-1. This shows that the bioretention system (SuDS planters) will provide sufficient mitigation of the likely pollutants expected alone.

Table 4-1 Water Quality Indices (as per C753 The SuDS Manual)

		Pollution Hazard Level	Total suspended solids	Metals	Hydro-carbons
Land Use	Residential roofs	Very Low	0.2	0.2	0.05
SuDS Mitigation Indices	Bioretention system	-	0.8	0.8	0.8

4.4 Operation and Maintenance

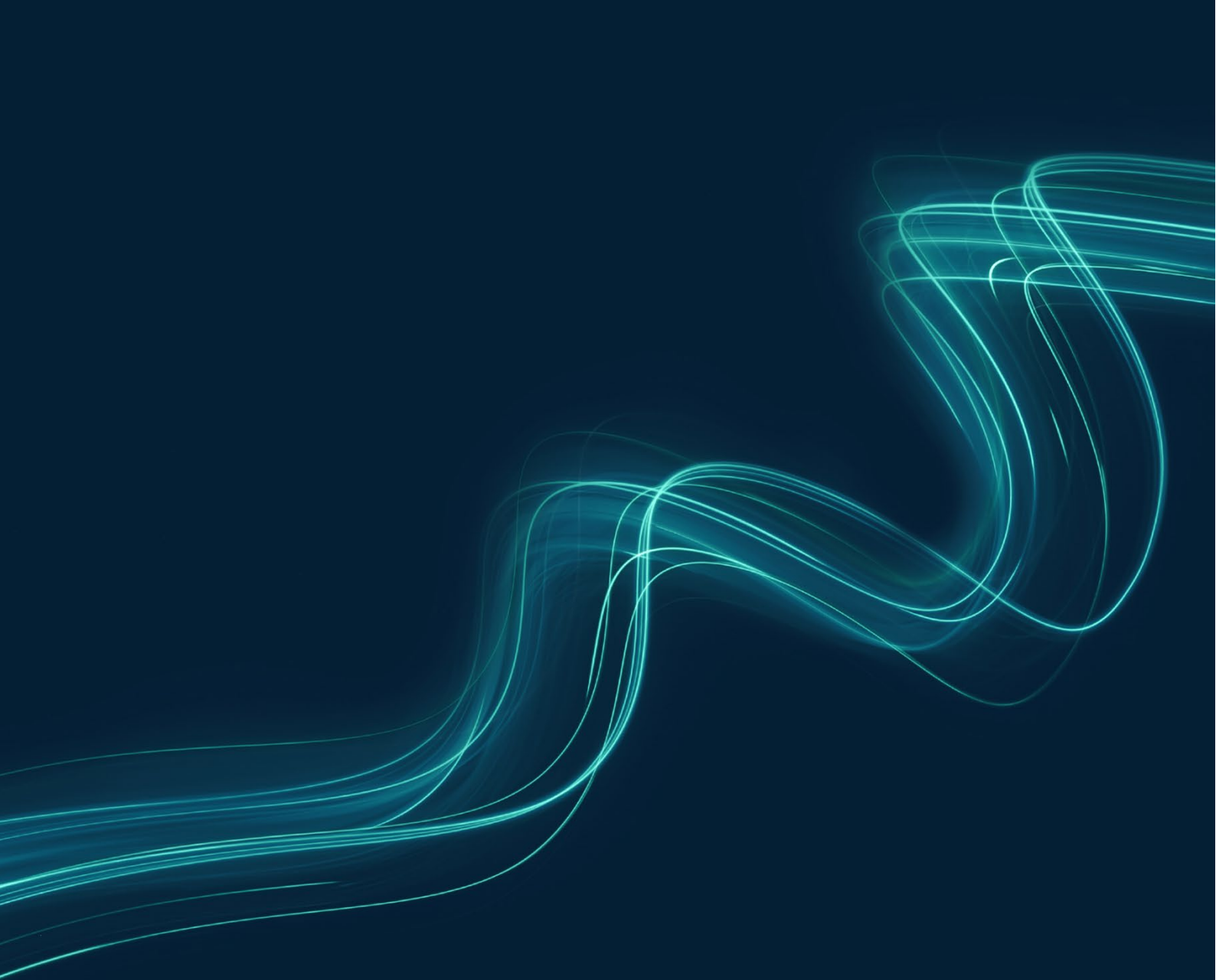
- 4.4.1 Maintenance of the proposed drainage infrastructure is essential for their operation. The maintenance responsibility will lie with the site owner. The proposed maintenance activities outlined below in Table 4-2 has been sourced from the CIRIA SuDS Manual.

Table 4-2 Planter Maintenance

Maintenance Schedule	Required Action	Typical Frequency
Regular maintenance	Inspect surface for silting or ponding, assess outflow and overflow for evidence of blockage	Quarterly
	Assess plants for disease infection, poor growth, invasive species etc. and replace as needed	Quarterly
Occasional maintenance	Remove litter, surface debris and weeds	Quarterly/as required
	Replace plants to maintain density	Quarterly/as required
Remedial actions	Seek advice as to remediation techniques suitable for the type of performance issue and location.	As required if above does not improve performance
	Replace damaged or clogged media or geotextiles	As required
	Repair or improve erosion controls if required	As required
Monitoring	Initial inspection should be provided as post construction survey.	Immediately after construction
	Inspect for evidence of poor operation via water level and if required, take remedial action	3 monthly, 48 hours after large storms in first 6 months
	Inspect silt/debris accumulation rates and establish appropriate sediment/debris removal frequencies	Annually

5 SUMMARY

- 5.1.1 It is proposed to convert and renovate existing farm buildings to provide residential accommodation at Old Manor Farm in Wedhampton.
- 5.1.2 The site falls within Flood Zone 1 and is at low risk of flooding from rivers and the sea. The proposals constitute a 'More Vulnerable' use and is considered to be appropriate in Flood Zone 1.
- 5.1.3 The site is not expected to be at risk from surface water flooding and although the High Street is predicted to flood in extreme conditions, it would not hinder access or egress.
- 5.1.4 The Wiltshire SFRA groundwater flood risk map predicts that groundwater levels are between 0.025m and 5m below the ground surface.
- 5.1.5 Nearby watercourses issue from the ground near the site, but at elevations at least 4m below the level of the site. In addition, the site lies on sloping ground, meaning groundwater would flow to the north if it emerged, away from the buildings.
- 5.1.6 Nonetheless, as a precaution, it is proposed to raise FFLs by approximately 100mm to provide additional resilience, subject to wider design impacts.
- 5.1.7 The site has been assessed as being at overall low to negligible risk of flooding from all other sources, so no mitigation is required.
- 5.1.8 The proposals would not alter the hardstanding footprint of the site and consequently the impact on local drainage would be negligible.
- 5.1.9 However, raised bed SuDS planters are proposed to be fitted to some or all downpipes to provide betterment. Water butts would also be fitted where space allows. These would discharge to small gravel sumps in the ground to improve percolation potential. This system would provide overall betterment over the existing drainage regime.
- 5.1.10 This FRA shows that the development is at a low to negligible risk of flooding from all sources and promotes measures to improve local drainage and therefore meets the requirements of the NPPF.



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