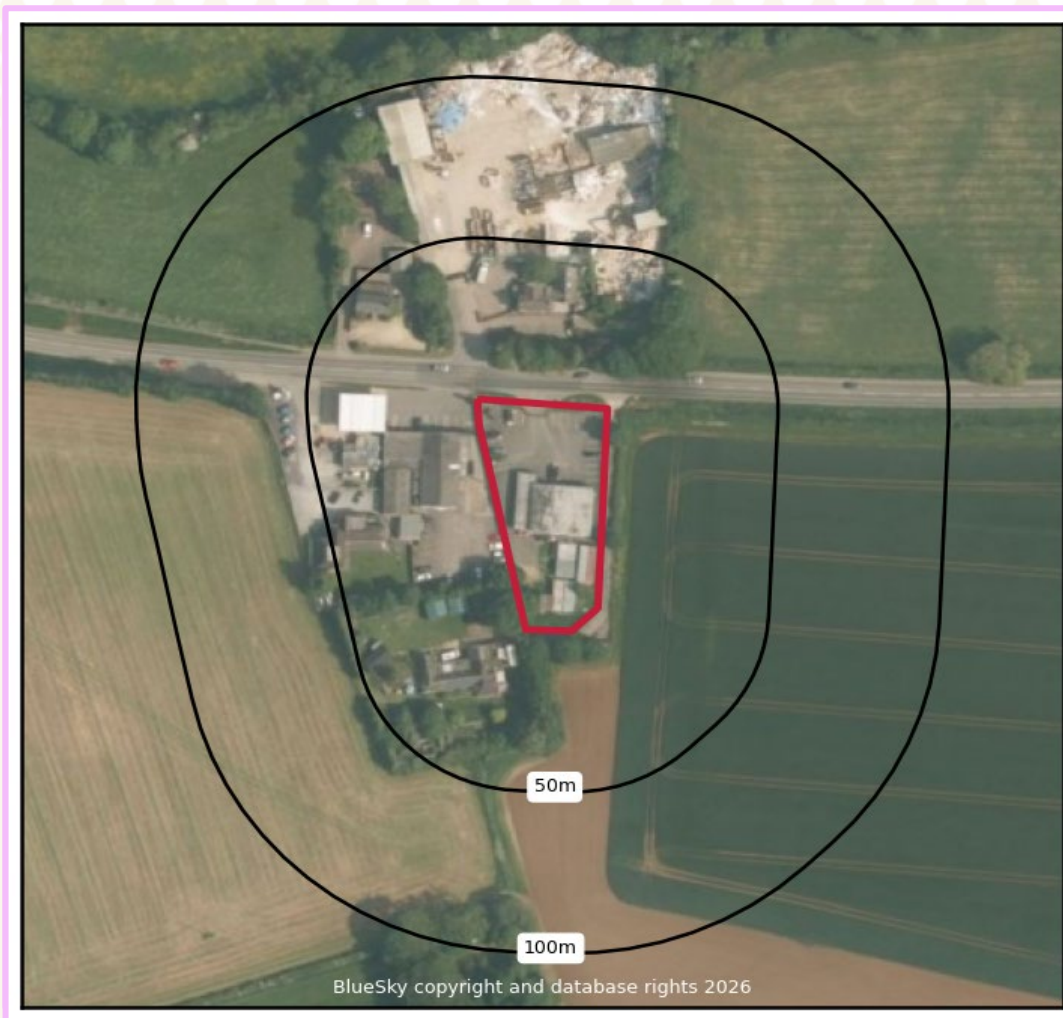


Sustainable Drainage Assessment

Infiltrate to Ground

The proposed Sustainable Drainage Scheme (SuDS) strategy is comprised of rain planters and a soakaway to attenuate surface water runoff during the 1 in 100 plus 45% climate change event.

Surface water will infiltrate to ground, subject to confirmation of the underlying infiltration rate and depth to groundwater, as well as the incorporation of SuDS.



Report prepared for

Beaufort Holdings Ltd

Site Address

Beaufort Building

Bristol Road

Allington

Chippenham

SN14 6NA

Date

14/05/2026

Site Area

2101 m²

Grid Reference

389070, 174580

Report Status

FINAL

Report Reference

91342R1

 SuDSmart Plus

Version Control

Report Version	Date	Report Author	Report Checker	Report Reviewer
91342R1	14/05/2026	Harriet Parker Consultant	Annabel Elleray Senior Project Consultant	Bob Sargent Associate

1. Executive summary

This report assesses the feasibility of a range of Sustainable Drainage Scheme (SuDS) options in support of the Site development process. A SuDS strategy is proposed to ensure surface water runoff can be managed effectively over the lifetime of the development.

SuDS suitability

Risk	Issue	Result
Runoff destination feasibility	Priority 1: rainwater collected for non-potable use	No
	Priority 2: infiltration to ground	High
	Priority 3: discharge to an above ground surface water body	High
	Priority 4: discharge to surface water sewer	Low
	Priority 5: discharge to combined sewer	Low
Flooding	What is the river (fluvial) and/or tidal flood risk at the Site?	Very Low
	What is the surface water (pluvial) flood risk at the Site?	Very Low to High
	What is the groundwater flood risk at the Site?	Negligible
Pollution	Is the groundwater a protected resource?	Yes
	Is the surface water feature a protected resource?	No

Summary of existing and proposed development

The Site is currently used within a commercial capacity. At present there is a main building in the north with several structures used for storage to the south (including two brick buildings, two porta cabins and two containers). The remainder of the Site comprises hardstanding with car parking spaces, and landscaped areas.

Development proposals comprise the demolition and removal of the storage structures in the south of the Site, followed by the construction of a single warehouse building. The building and hardstanding in the north of the Site are to remain unchanged. Site plans and drawings are provided in Appendix A.

National Standard 1: Runoff Destinations

Priority 1: collection for non-potable use

In line with DEFRA's national guidance, the potential for the collection of rainwater for non-potable use across the proposed development has been considered.

Given the use of the Site within a light industrial capacity, with minimal proposed landscaped or vegetated areas, there is limited scope for the collection and re-use of rainwater within the proposed development. As such, rainwater harvesting is not considered to be feasible.

Priority 2: infiltration to ground

GeoSmart's SuDS Infiltration Potential (SD50) map indicates that the Site has a High potential for infiltration, primarily due to the anticipated high permeability of the underlying geology (limestone).

There are potential issues identified relating to Site contamination, and the Site is located within a SPZ.

Infiltration to ground is therefore likely to be feasible, subject to confirmation of both the infiltration potential as well as the contamination risks associated with the current Site use and historic land use.

Priority 3: discharge to above ground surface water body

Ordnance Survey (OS) mapping indicates that there are no surface water features within 100 m of the Site. However, according to the Client, a surface water feature (a drainage ditch) is located adjacent to the northern boundary of the Site, and the Site currently discharges to this location; as such, discharge of runoff to this feature is considered to be feasible.

Priority 4: discharge to surface water sewer

The asset location plan included in Appendix C confirms that there are no public surface water sewers within the vicinity of the Site that could feasibly be discharged to. As such, discharge to surface water sewer is not considered to be feasible.

Priority 5: discharge to combined sewer

The asset location plan included in Appendix C confirms that there are no public combined sewers within the vicinity of the Site that could feasibly be discharged to. As such, discharge to combined sewer is not considered to be feasible.

Runoff rate and attenuation requirements

Discharging via infiltration requires 27.59 m³ of attenuation to be provided to ensure there is no flooding as a result of the development in all storm events up to and including the 1 in 100 year including a 45% allowance for climate change. This volume has been calculated using Causeway Flow v.10.7 based on an assumed infiltration rate of 1 x 10⁻⁵ m/s taken from Table 25.1 of the CIRIA SuDS (C753) (2015) as the worst case scenario for 'slightly silty slightly clayey sand' soil type. This is subject to the results of infiltration testing and would ensure runoff is not increased above the greenfield scenario.

Discharging off-Site requires 11.74 m³ of attenuation to be provided to ensure there is no flooding within the development in all storm events up to and including the 1 in 100 year including a 45% allowance for climate change. This volume is subject to the discharge rate

being restricted to 2 l/s (as close to the equivalent Greenfield 1 in 100 year rate as possible, without increasing the potential for blockages).

Proposed SuDS strategy

SuDS features comprised of rain planters and a soakaway are proposed to attenuate a minimum of 27.59 m³ of surface water runoff. The SuDS features would provide some water quality benefits (interception and filtration) prior to infiltrating to ground. Focused infiltration features should be sited at least 5 – 10 m from building foundations.

The proposed SuDS strategy would ensure surface water runoff is stored on-Site in SuDS features for the 1 in 100 year event including a 45% allowance for climate change and will not cause flooding to the proposed development in accordance with DEFRA's national standards for SuDS (2025).

Amenity and Biodiversity

The inclusion of rain planters will provide sufficient biodiversity and amenity benefits to the areas of proposed development. Roof runoff fed into the downpipes will be used to water vegetation within the planters and ensure their long-term viability as amenity features. Furthermore, filtration by the vegetation and soils will improve the water quality being infiltrated to ground.

SuDS & drainage network maintenance

The management and maintenance of the SuDS features, in line with the details and schedules outlined in Section 10 of this report, will be undertaken by contractors appointed by the owners and management of the new building.

Recommendations / Next steps

A site investigation is required to confirm the infiltration capacity of the ground in line with BRE 365 guidelines to confirm the infiltration rate and the groundwater level.

A review of the land contamination risks at the Site should be considered to confirm there would be no constraints associated with the use of infiltration SuDS.

Where site investigation confirms the underlying ground conditions are not conducive to infiltration, the presence, condition and capacity of the drainage ditch should be confirmed and permission should be obtained from the Local Council any permits required.

2. Proposed SuDS strategy

The most suitable SuDS options are outlined below and a SuDS strategy schematic is shown overleaf. Supporting information is provided in subsequent sections.

Table 1. Proposed SuDS type, features, discharge location and rate restriction

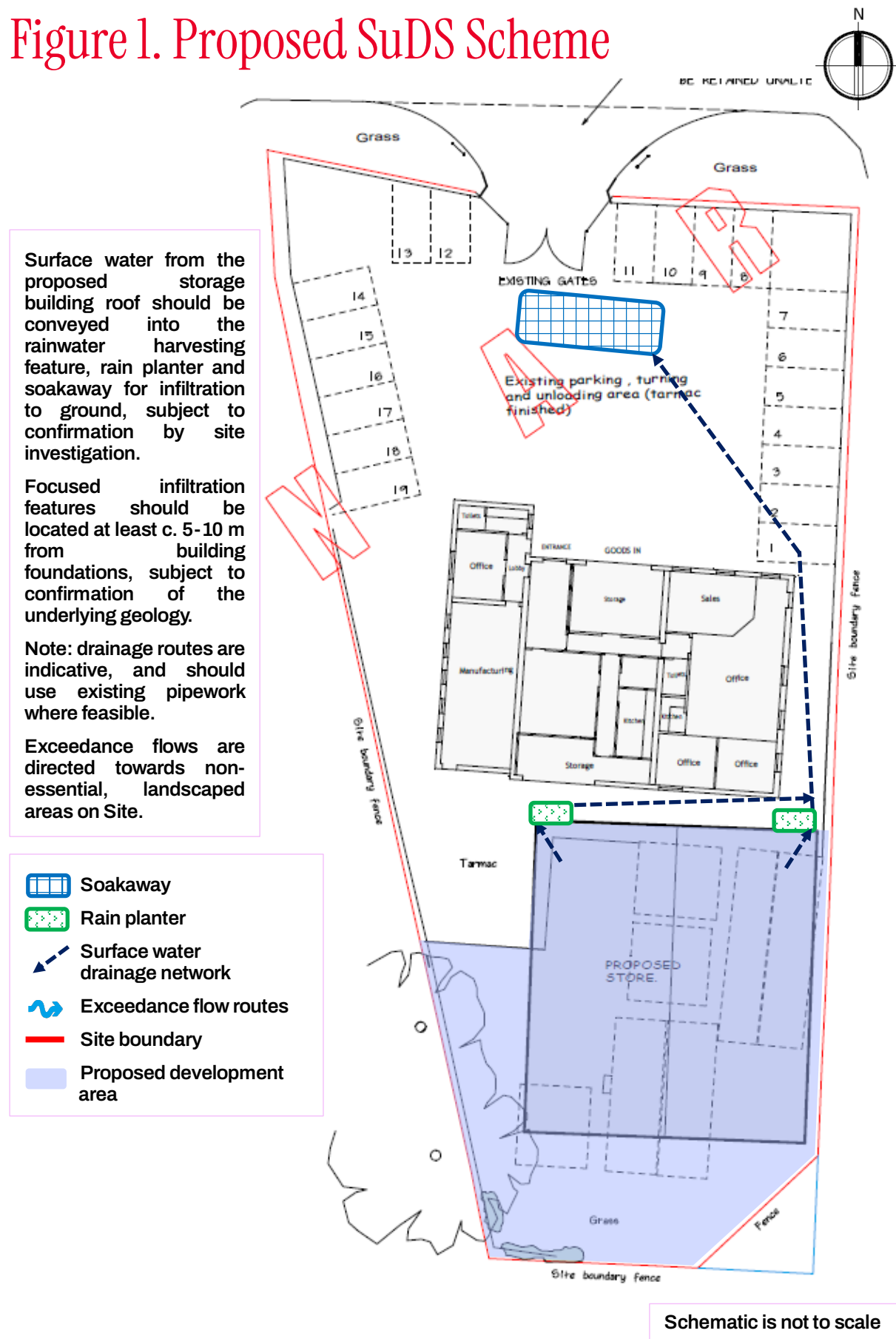
SuDS type	Source control (interception) and infiltration SuDS.
SuDS features	Rain planters and soakaway.
Discharge location	Infiltration.
Discharge rate	$1 \times 10^{-5} \text{ m/s}^*$

*Based upon an assumed worst-case infiltration rate for 'slightly silty, slightly clayey sand' soil types, taken from Table 25.1 of the CIRIA SuDS manual (C753) (2015) - to be confirmed via infiltration testing.

Table 2. Proposed SuDS sizing (dimensions) and attenuation volumes

Rain planters	Where feasible, rain planters should be incorporated at the base of downpipes to provide water quality, amenity and biodiversity benefits. In terms of attenuation storage within this SuDS scheme, the volume of run-off which could be attenuated by the rain planters has not been considered within the SuDS strategy.
Soakaway	A soakaway within the car park area with a length of 9 m, width of 3 m and depth of 1.2 m, comprising geocellular crates with a void ratio of 95%, would provide c. 27.59 m ³ of attenuation.
Total attenuation provided	27.59 m³
Total attenuation required	27.59 m³

Figure 1. Proposed SuDS Scheme



3. National & local policy context

National Guidance

DEFRA – National standards for sustainable drainage systems (SuDS) (2025)

Standard 1: runoff destinations

A ‘SuDS approach’ shall be adopted 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:

- 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
- priority 5: discharged to a combined sewer

Note 1: priority 1 is the highest priority and priority 5 is the lowest.

Note 2: for the purposes of this standard, a combined sewer is a sewer intended to receive both foul sewage and surface runoff and does not include a sewer intended to receive only foul sewage, even if it has the capacity to accommodate additional flows or has an element of surface water in it already.

To utilise a lesser priority final destination, appropriate evidence shall be provided that demonstrates all higher priority final destinations have been utilised to the maximum extent practicable. Higher cost alone shall not be a reason to utilise lower priority final destinations.

Where more than one final destination is utilised, each final destination’s ability to accept runoff shall be maximised in order of priority.

Standard 2: management of everyday rainfall (interception)

Apply a ‘SuDS approach’ so that at least the first 5mm of rainfall for the majority of rainfall events does not result in runoff from the site to surface waters or piped drainage systems.

Evidence shall be provided that the approach to managing runoff from ‘everyday’ rainfall has been developed alongside and in support of the management of runoff quality (standard 4) and the delivery of amenity and biodiversity benefits (standards 5 and 6).

Standard 3: management of extreme rainfall and flooding

A 'SuDS approach' shall be adopted to address the management of development runoff during extreme rainfall, including allowances for climate change and urban creep to:

- protect people and property on the development from flooding of the surface water drainage system
- mitigate any increased flood risk to people and property adjacent to or downstream of the development
- protect the receiving water body from morphological damage or minimise the impact on sewer capacity

When discharging to an infiltration feature, the system shall be appropriately sized to accommodate the design event based on ground conditions and contributing areas.

When discharging to an above ground surface water body, sewer or other piped drainage system, the surface water runoff (rate and volume) for the 1% annual exceedance probability (AEP) event shall be controlled to ensure the runoff from the development does not increase flood risk elsewhere.

When discharging to an above ground surface water body, sewer or other piped drainage system, the surface water runoff rate for the 50% AEP event shall be controlled to ensure development runoff from an event of this magnitude has no negative impact.

Any flooding from the surface water drainage system for events up to the 1% AEP event shall be managed within the development.

Any flooding from off-site sources for the 1% AEP event should be managed on site or safely routed through the site, ensuring any downstream risks are not increased compared to the pre-development scenario.

The risks (both on and off the development) associated with flooding from the surface water drainage system for exceedance events greater than the 1% AEP event shall be appropriately managed.

Standard 4: water quality

Apply a 'SuDS approach' that protects surface waters, groundwater and coastal waters by managing the quality of the surface water runoff to adequately address water quality risks from the development.

The proposed SuDS management train(s) shall be based on a robust water quality risk assessment, appropriate to the pollution hazard and sensitivity of receiving waters, reflecting industry recognised guidance or other quantitative assessment as agreed with the approving body and permitting requirements.

Standard 5: amenity

A 'SuDS approach' shall be adopted that maximises benefits for amenity through the creation of multi-functional places and landscapes.

Standard 6: biodiversity

A 'SuDS approach' shall be adopted to ensure the surface water drainage system maximises biodiversity benefits throughout the development lifecycle.

The surface water drainage system shall add biodiversity value by:

- creating diverse, self-sustaining, resilient local ecosystems which contribute to net gains in biodiversity
- supporting and promoting natural local habitat and species, for example, through local nature recovery strategies (LNRS)
- contributing to the delivery of local biodiversity strategies
- contributing to habitat connectivity

Standard 7: design of drainage for construction, operation, maintenance, decommissioning and structural integrity

A 'SuDS approach' shall be adopted to ensure that surface water drainage systems are designed so they can be easily and safely constructed, operated and maintained taking account of the need to minimise negative impacts on natural resources and the environment.

The designer shall provide a management and maintenance plan that supports the design objectives detailed in standards 1 to 6 and ensures the performance of the surface water drainage system with regards to runoff destinations, everyday and extreme rainfall, water quality, amenity and biodiversity is maintained throughout the lifetime of the development.

Surface water drainage design shall examine for the likelihood and consequences of potential failure scenarios that may occur during the operation phase and safely manage the associated risks.

The surface water drainage system shall be designed to ensure structural integrity of all components under anticipated loading conditions for the design life of the development so that it does not affect the structural integrity of any existing or proposed components within, or adjacent to, the development.

Urban creep

Within developments an urban creep uplift factor shall be applied by adding a percentage increase to the calculated area of the impermeable area within the property curtilages. This shall be 10% for all developments unless there are no external private permeable spaces, for example, flats and apartments, when it shall be 0%.

Ministry of Housing, Communities & Local Government – National Planning Practice Guidance: Flood risk assessments: climate change allowances (2022)

The Peak rainfall intensity allowances section provides advice on the increased rainfall effects on river levels and land and urban drainage systems. As of May 2022, the applicable climate change allowance is defined by specific Management Catchment for the 1 in 30 ($\geq 3.3\%$ AEP) and 1 in 100 (< 3.3 to 1% AEP) year event.

As the Site is located within the Avon Bristol and North Somerset Streams Management Catchment the following climate change allowances are applicable.

Table 3. Avon Bristol and North Somerset Streams Management Catchment peak rainfall allowances

Avon Bristol and North Somerset Streams Management Catchment	3.3% Annual exceedance rainfall event		1% Annual exceedance rainfall event	
	2050s	2070s	2050s	2070s
Central	20%	25%	25%	25%
Upper end	35%	40%	40%	45%

The drainage system should be designed to make sure there is no increase in the rate of runoff discharged from the Site for the upper end allowance.

Where on-Site flooding for the upper end allowance presents a significant flood hazard (for example, depths and velocities of surface water runoff cause a significant danger to people), you will need to take further mitigation measures to protect people and property (for example, raising finished floor levels). As a minimum, there should be no significant flood hazard to people from on-Site flooding for the central allowance.

Local policy

Wiltshire Council Drainage Betterment Strategy (June, 2024).

1.2 - Infiltration:

Where possible infiltration must be used in order to prevent increased volumes of water being discharged from the site.

1.2.1 - What we expect to see as the LLFA:

It should be noted that the potential for infiltration can vary across the county due to soil types, ground water levels, topography, and risk of contamination. Sufficient ground investigations and infiltration testing should be undertaken and supplied to support any application.

Any ground investigations should include data from the British Geological Society, intrusive testing such as borehole tests (to determine soil type, depth and the depth of water table), detailed topographic drawings, and infiltration testing in line with the BRE365 testing procedure and the infiltration testing methods found in chapter 25 of the CIRIA SuDS Manual C753. This testing requests that three consecutive tests are required within each test pit and if infiltration is found to be viable then the lowest rate should be used.

In addition, when conducting detailed infiltration testing, the tests should be carried out at the location, depth and head of water that replicates the proposed design. Groundwater monitoring should preferably be undertaken between November and April. When seasonal groundwater levels are below average levels, professional judgement should be applied to determine likely groundwater level. Any onsite monitoring should be adjusted accordingly.

At the outline stage of the planning process, it is accepted that intensive infiltration testing is not always achievable, therefore a preliminary investigation on the soil and geology of the site is acceptable. Dependent on the scale, and perceived risk of the development, the LLFA may accept borehole testing or a desktop study with the condition that infiltration testing is undertaken at a later stage. Where the capacity to infiltrate is undetermined from a desk study a borehole percolation test could be undertaken to ascertain the likelihood of infiltration. If infiltration is the chosen discharge option within an outline application and detailed testing has

not been possible, then an alternative approach should also be provided in case subsequent infiltration testing demonstrates that discharge to the ground will not be viable.

Ground stability should be considered wherever infiltration is proposed. The base of the soakaway should be at least 1 m higher than the peak winter groundwater levels. Point infiltration features (such as soakaways / infiltration basins) should not be within 5m of a building as per the requirements of Building Regulations Part H. If infiltrating into chalk, clearance from buildings, public highways, structures etc. will be dependent on the structure & density of the chalk, and potential for dissolution features to form within the chalk; this may be up to 20 m clearance. The applicant would need to refer to CIRIA C574 (or published superseding guidance), and demonstrate safe clearances have been provided in relation to this.

Blanket infiltration (such as permeable paving) can be located within 5 m of a building as long as there is an impermeable barrier between the two. However, if the permeable paving is to infiltrate additional water from other surfaces (e.g., roof areas discharging directly to the permeable paving), an offset from the building foundations is needed. Further guidance can be found within the SuDS Manual and Building Regulations

Infiltration features should not be designed to infiltrate into made ground due to the variability, and consequent uncertainty of the infiltration performance. The likely minimum acceptable rate of infiltration is 1×10^{-6} m/s. Rates found to be slower than this may potentially have to deliver a hybrid drainage solution (which uses low level infiltration for smaller storm events and a piped outfall for larger events. This maximises the capacity of the attenuation storage for larger infrequent events and allows for appropriate half drain times to be met for all events).

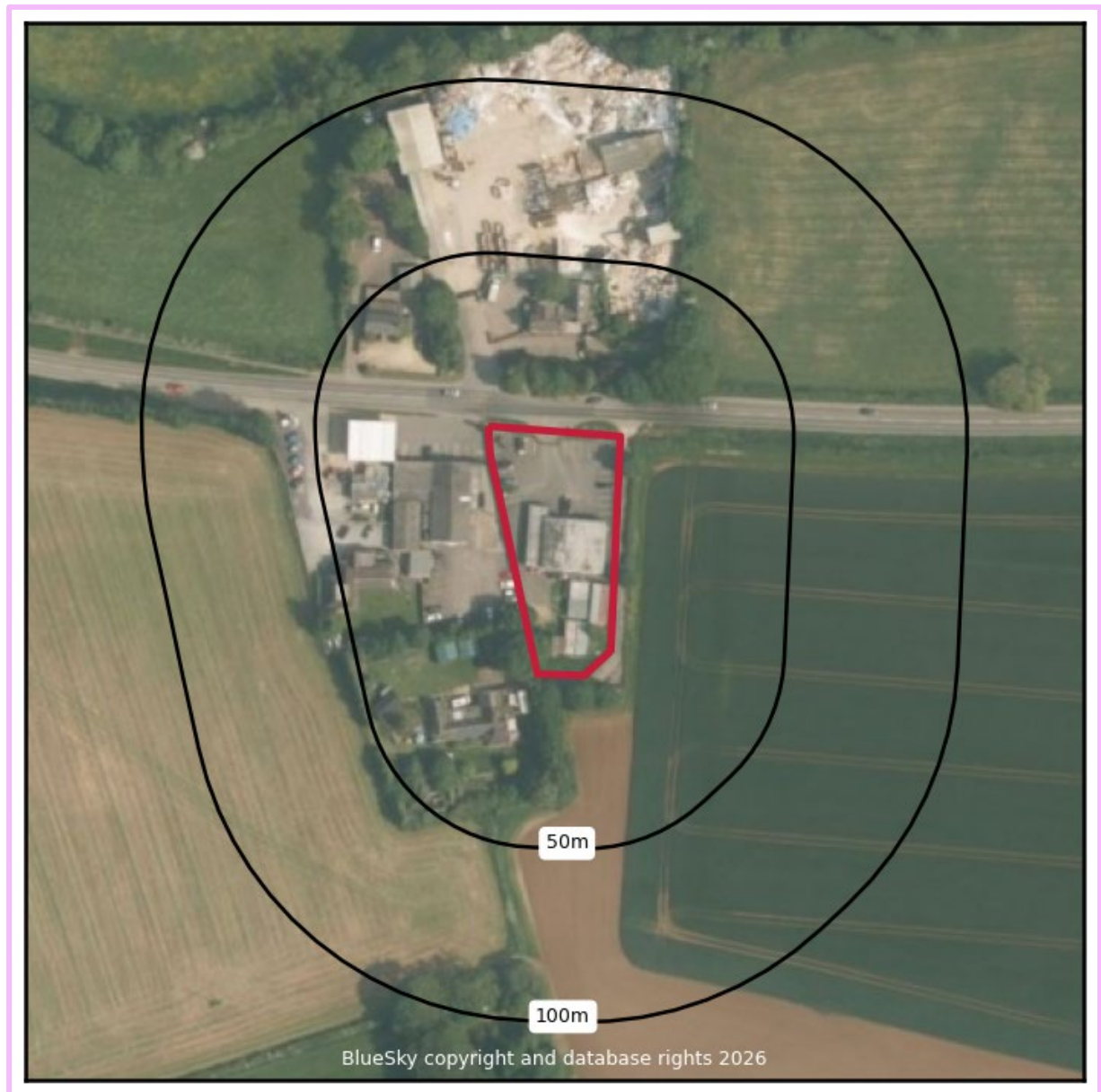
Where rates are found to be too slow for formal infiltration to take place, informal infiltration should still be encouraged where possible, e.g., through use of permeable liners and exclusion of unnecessary impermeable liners (unless there are concerns on contamination pathways / high groundwater levels / structural stability issues which need to be managed).

Whilst Wiltshire Highways will not adopt permeable paving within roads, if this option is to be used (on non-adoptable roads / on individual property plots), the features should be lined with permeable membranes in order to separate the storage medium from the formation.

4. Site analysis

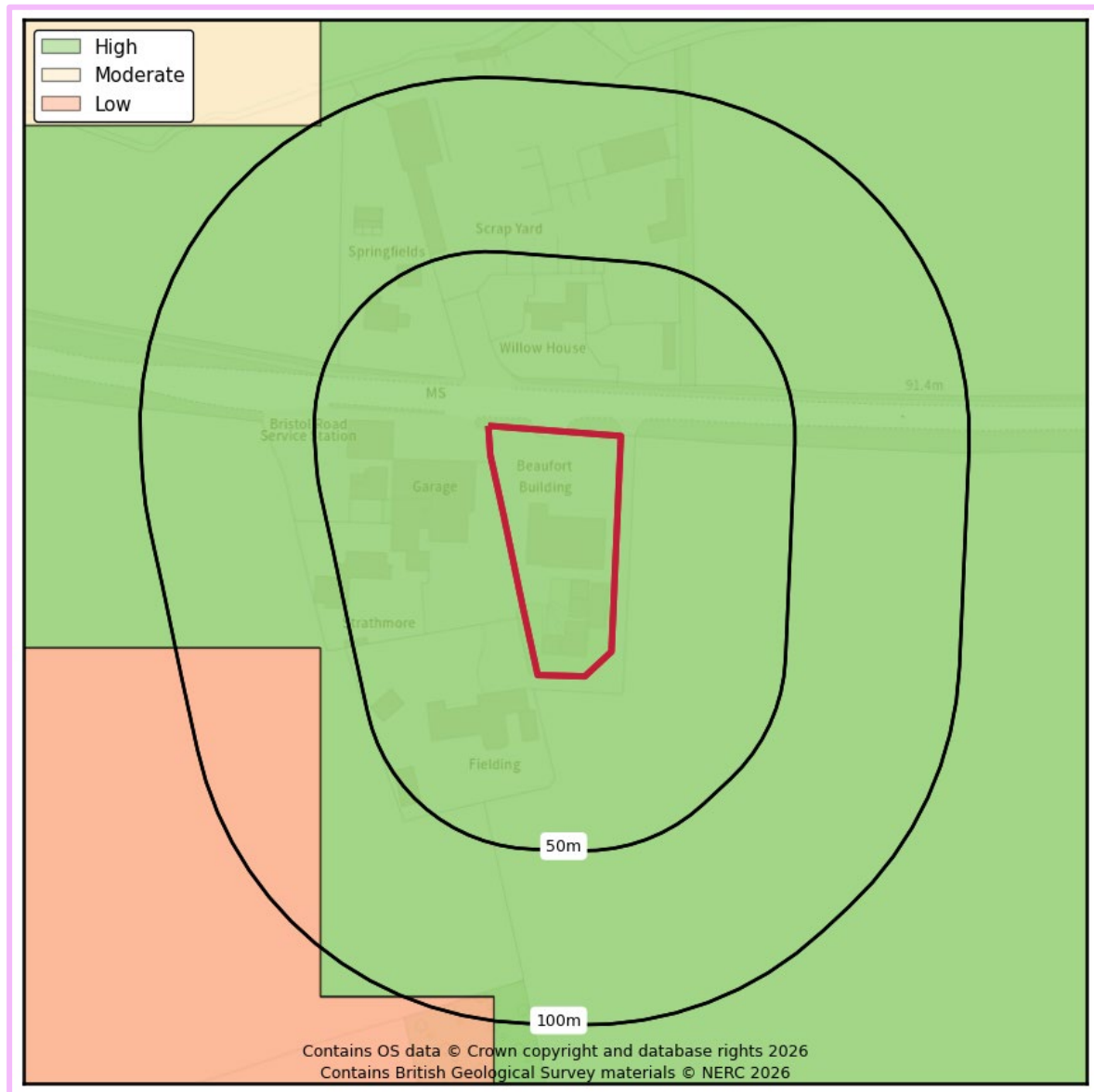
Site location

Figure 2. Aerial Imagery (Bluesky, 2026)



Infiltration suitability

Figure 3. SuDS infiltration suitability (SD50) map (GeoSmart, 2026)



According to GeoSmart's SD50 mapping, there is a High potential for infiltration SuDS across the Site. It is likely that the underlying geology at the Site has high permeability and an infiltration SuDS scheme should be possible at the Site. As such, infiltration is considered to be feasible and is proposed.

Site Investigation is recommended to confirm the infiltration capacity and the depth to groundwater.

Topography

Figure 4. Site topography (GeoSmart, 2026)



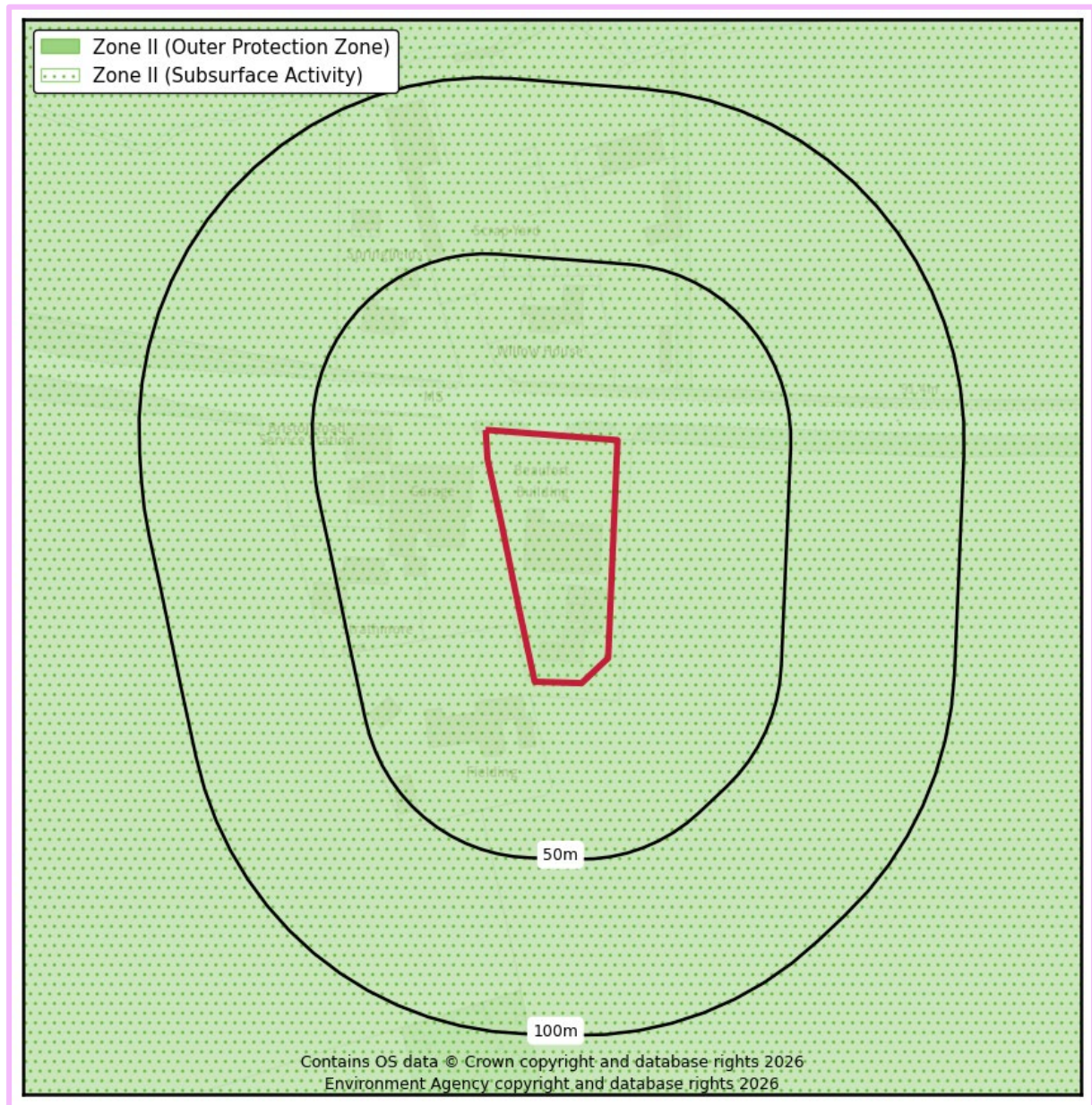
According to a review of the LiDAR DTM5 elevation data for the prevailing area, the ground levels within the vicinity of the Site typically fall to the east.

The topography on-Site is relatively level, with ground levels ranging from 92.47 and 93.70 mAOD. This is based on EA elevation data obtained for the Site to a 1 m resolution with a vertical accuracy of ± 150 mm.

Further analysis could be undertaken by visiting the Site or by collecting additional topographic survey data to provide further confirmation of ground levels.

Land designations

Figure 5. Source protection zone map (EA, 2026)

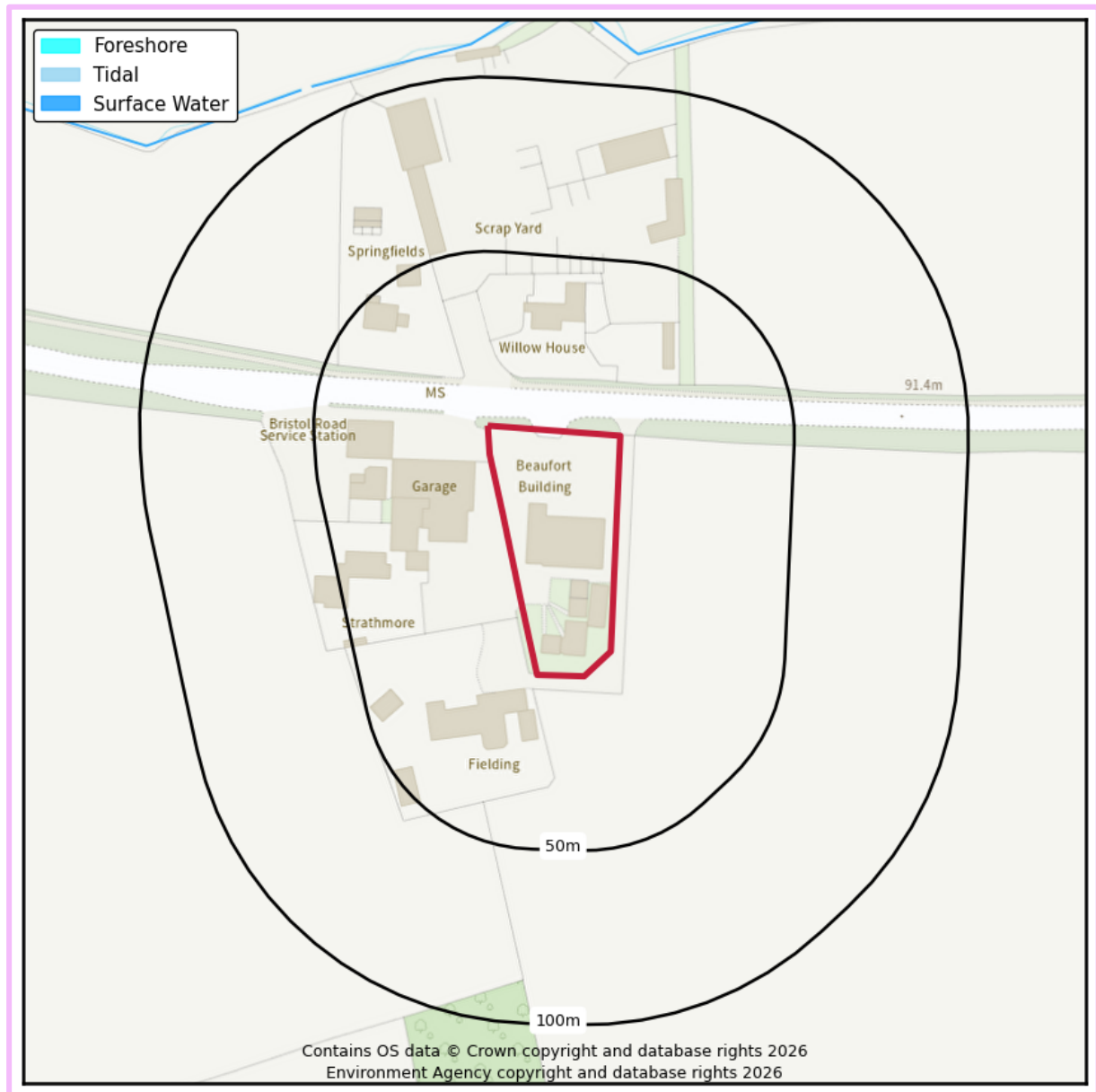


According to DEFRA's Magic Map, the Site lies within an outer groundwater Source Protection Zone (subsurface activity) (SPZ II). The mapping confirms that the Site is not within 250 m of a SSSI or SPA.

If further analysis is required, this would involve a review of Site specific contaminated land data. If hazards are identified, it is recommended that the Local Authority and the Environment Agency are contacted to confirm the susceptibility of any SPZs within the wider area.

Surface water features

Figure 6. Surface water features map (EA, 2026)



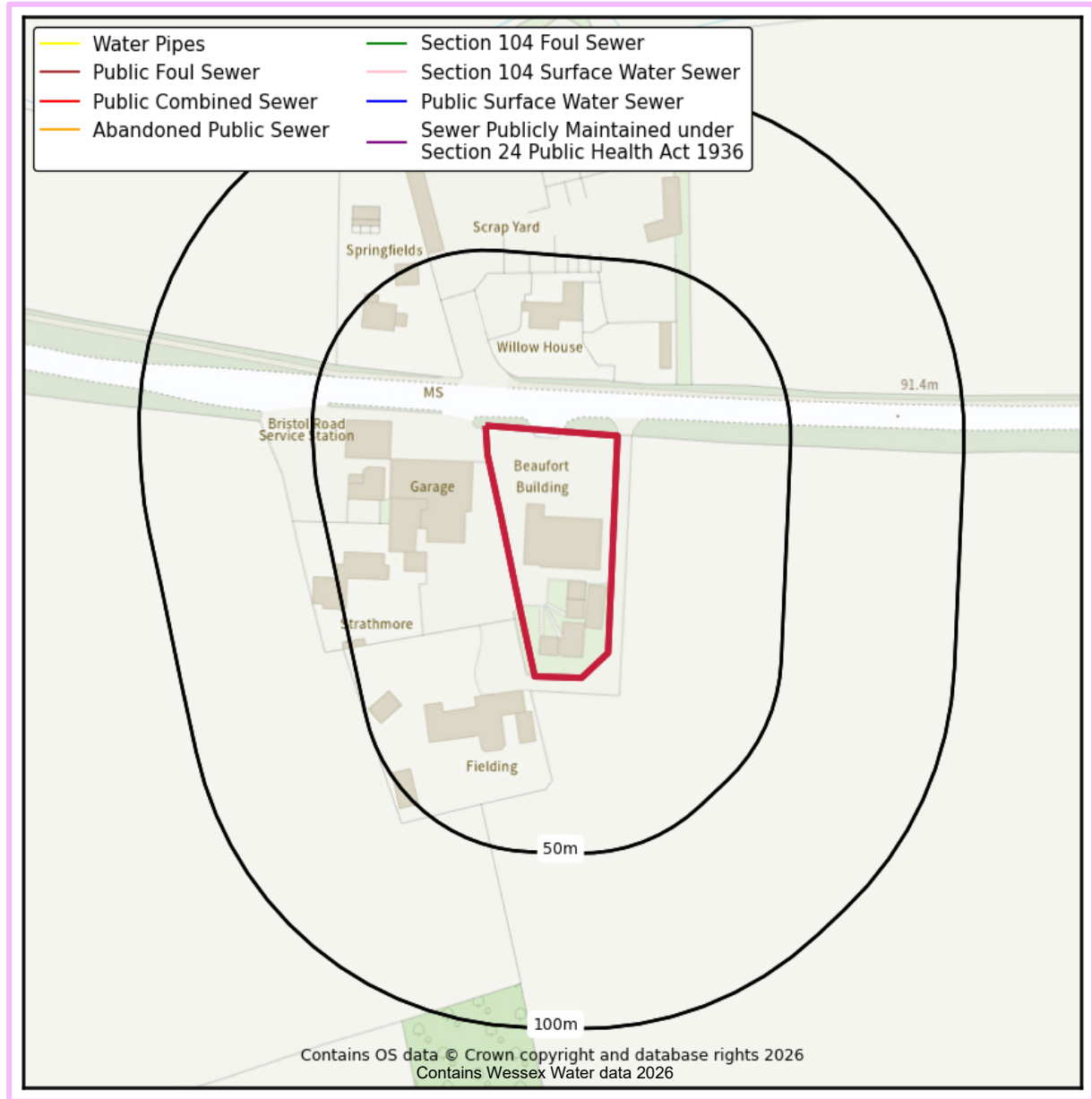
Ordnance Survey (OS) mapping indicates that there are no mapped surface water features within 100 m of the Site. However, according to the Client, an unmapped drainage ditch is located on the northern boundary of the Site, and the current Site drainage discharges to this.

As the drainage ditch is located adjacent to the Site boundary, it should be considered as a potential discharge destination, subject to further investigation of the capacity and discharge location.

Further analysis could be undertaken by visiting the Site or by contacting the Local Council and the Environment Agency (EA) to confirm the presence, location and condition of any potentially unmapped surface water features.

Sewer features

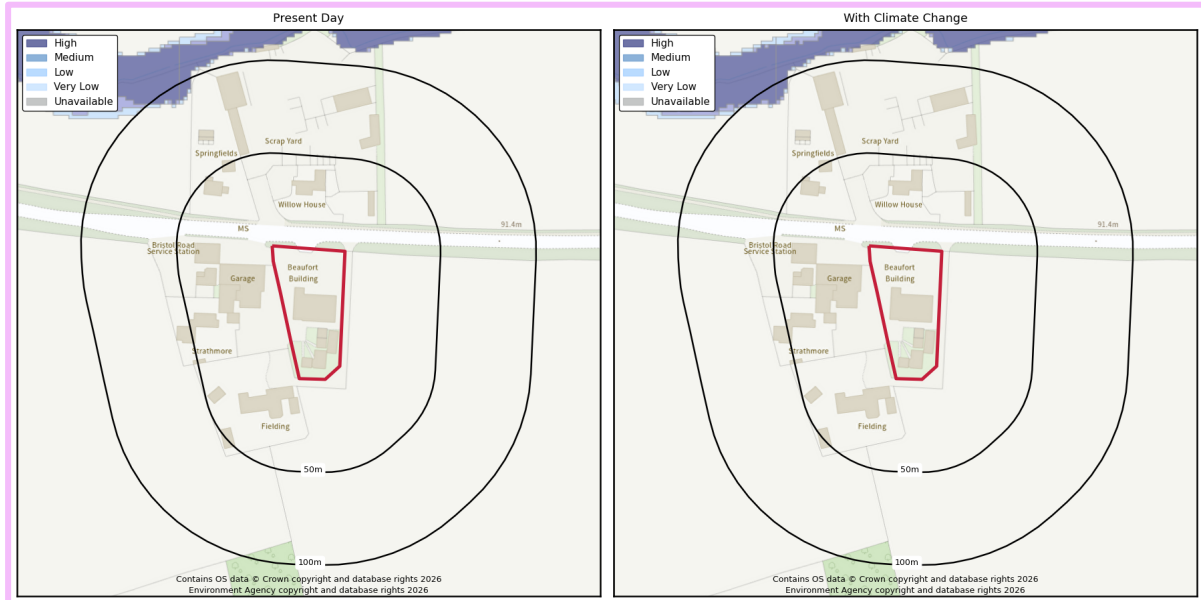
Figure 7. Sewer features map (OS & Wessex Water, 2026)



According to the Wessex Water asset location plan obtained for the Site (Appendix C), there are no public surface water sewer or combined sewers located within the vicinity of the Site. Therefore, discharging runoff into the public sewer network is not feasible.

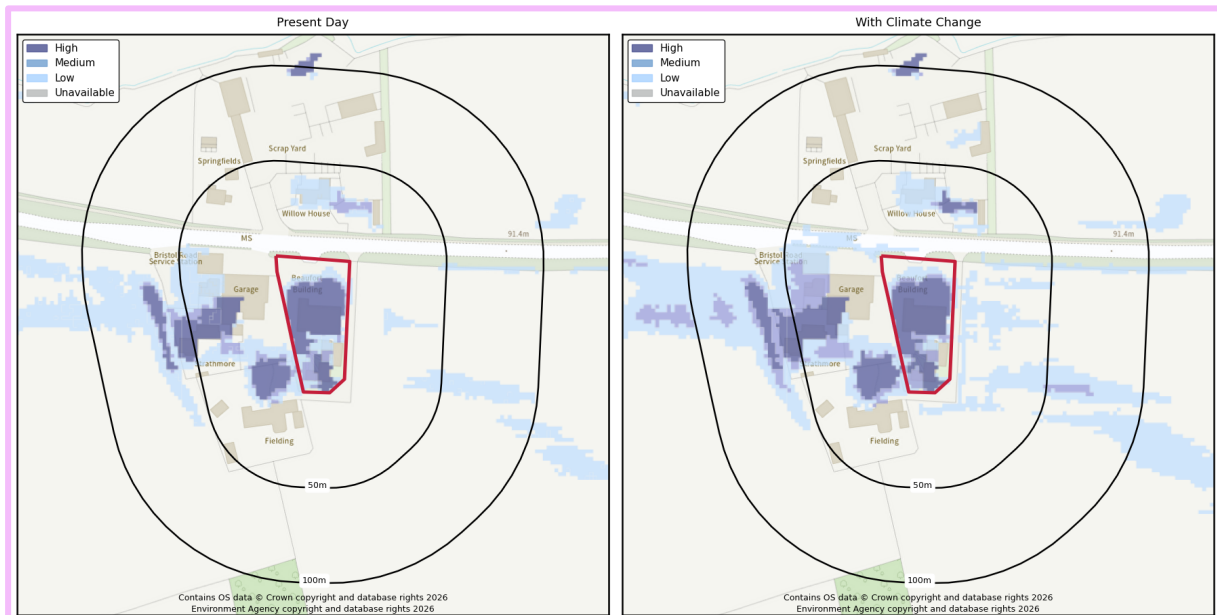
Flood risk

Figure 8. Risk of flooding from rivers & sea map (EA, 2026)



According to the EA's Risk of Flooding from Rivers and the Sea (RoFRS) map, the Site has a Very Low risk of flooding from fluvial or coastal flooding during both the present day and climate change (2036 to 2069) scenarios, with less than 0.1% annual probability of flooding. Therefore, the SuDS design is unlikely to be affected.

Figure 9. Risk of surface water flooding map (EA, 2026)



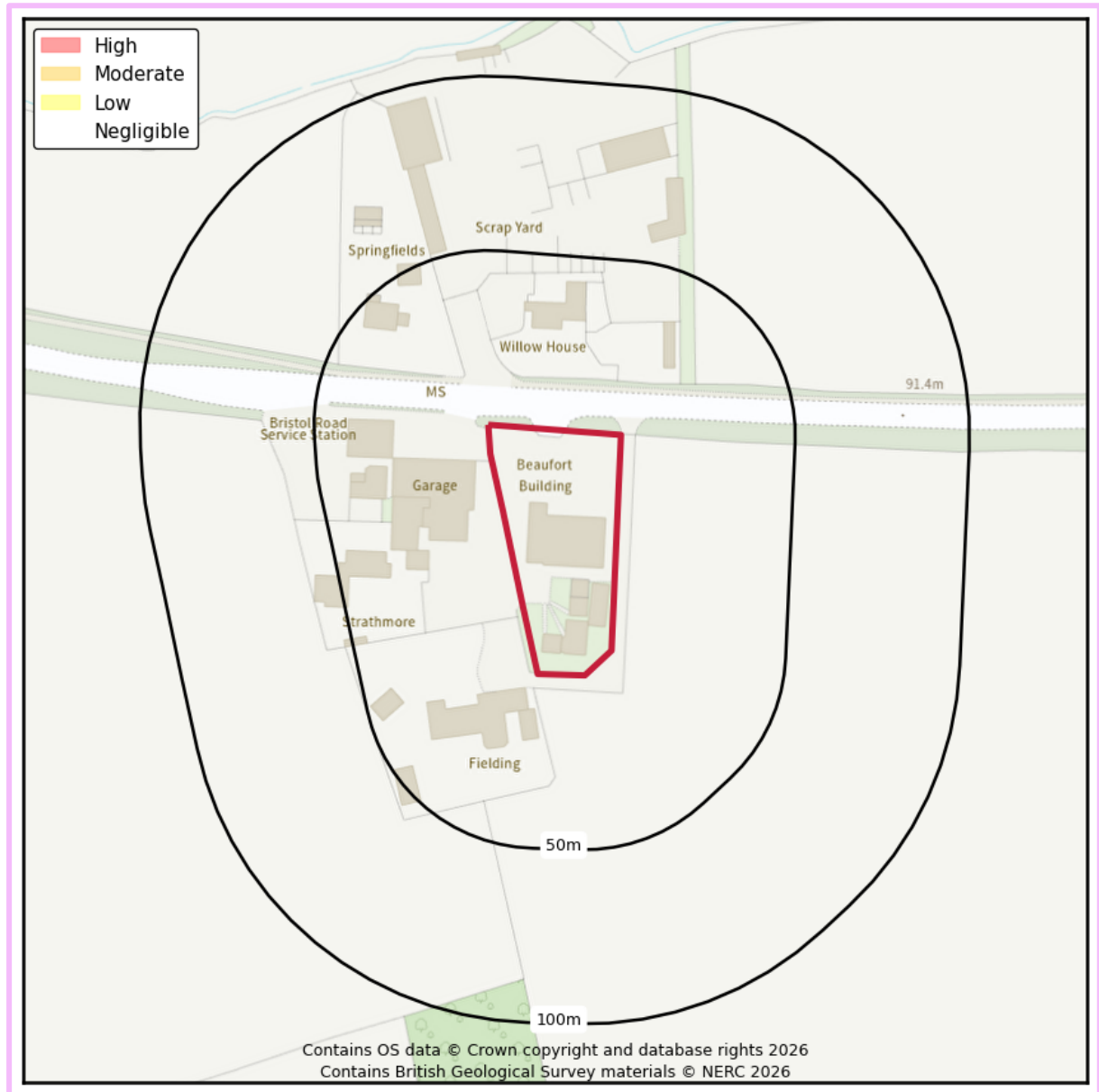
The EA's Risk of Flooding from Surface Water (RoFSW) mapping confirms the Site is considered to be at Very Low to High risk of surface water flooding during both the present day and climate change (2050s) scenarios.

The previous map shows the extent of flooding during the >3.3% annual probability (AEP) (1 in 30 year – High risk), 3.3 – 1% AEP (1 in 100 year – Medium risk) and 1 – 0.1% AEP (1 in 1000

year – Low risk) events. This confirms there are areas where flooding could occur in the 1 in 30 year, 1 in 100 year and 1 in 1000 year events during the present day and climate change scenarios. Flooding in these areas may constrain certain types of SuDS features being used.

Further analysis could be undertaken by contacting the Local Council and the Environment Agency to confirm the pluvial flood risk, flood depths and velocities where applicable.

Figure 10. Groundwater flood risk (GW5) map (GeoSmart, 2026)



GeoSmart's Groundwater Flood Risk Screening (GW5) map confirms the Site has a Negligible risk of groundwater flooding during a 1% annual probability (1 in 100 year) event.

5. Site context

Site information

The purpose of this report is to assess the potential for disposing of surface water through a Sustainable Drainage System (SuDS) for the site of Beaufort Building, Bristol Road, Allington, Chippenham, SN14 6NA ('the Site'). The Site is located within a setting of predominantly rural land use.

Development

The Site is currently used within a commercial capacity. At present there is a main building in the north with several structures used for storage to the south (including two brick buildings, two porta cabins and two containers). The remainder of the Site comprises hardstanding with car parking spaces, and landscaped areas.

Development proposals comprise the demolition and removal of the storage structures in the south of the Site, followed by the construction of a single warehouse building. The building and hardstanding in the north of the Site are to remain unchanged. Site plans and drawings are provided in Appendix A.

Geology, permeability, and thickness

British Geological Survey (BGS) national superficial and bedrock geology mapping confirms the geological formations underlying the Site; each formation may have a range of permeabilities.

Table 4. Site Geology

Geology present on-Site		Likely to be permeable?
Superficial geology (Figure 11)	No superficial geology	N/A
Bedrock geology (Figure 12)	Cornbrash Formation (CB) - limestone	✓

A review of the BGS borehole database (BGS, 2026) indicates that there are no relevant boreholes within the vicinity of the Site from which the mapped geology can be confirmed.

Figure 11. Superficial Geology (BGS, 2026)

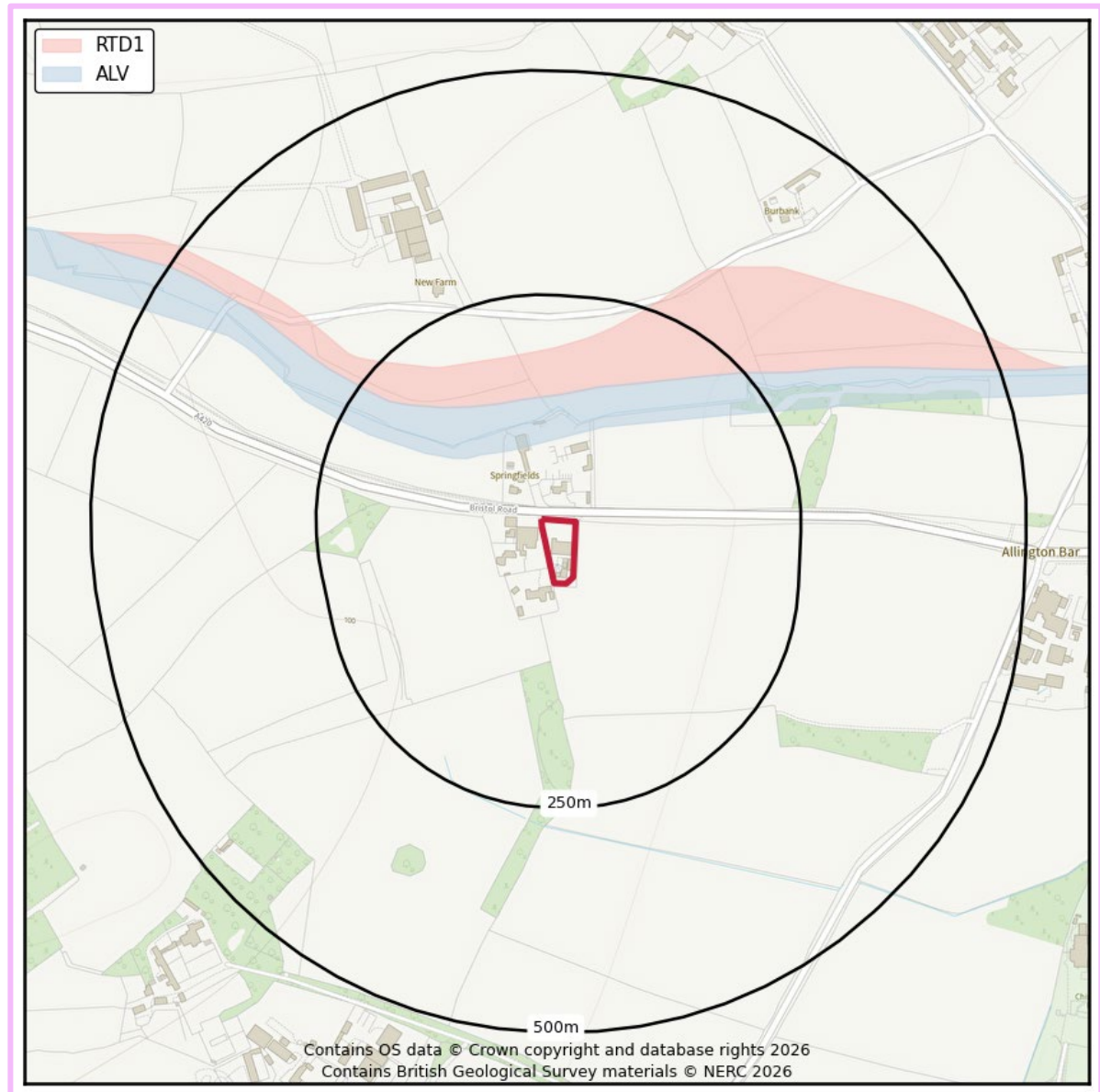
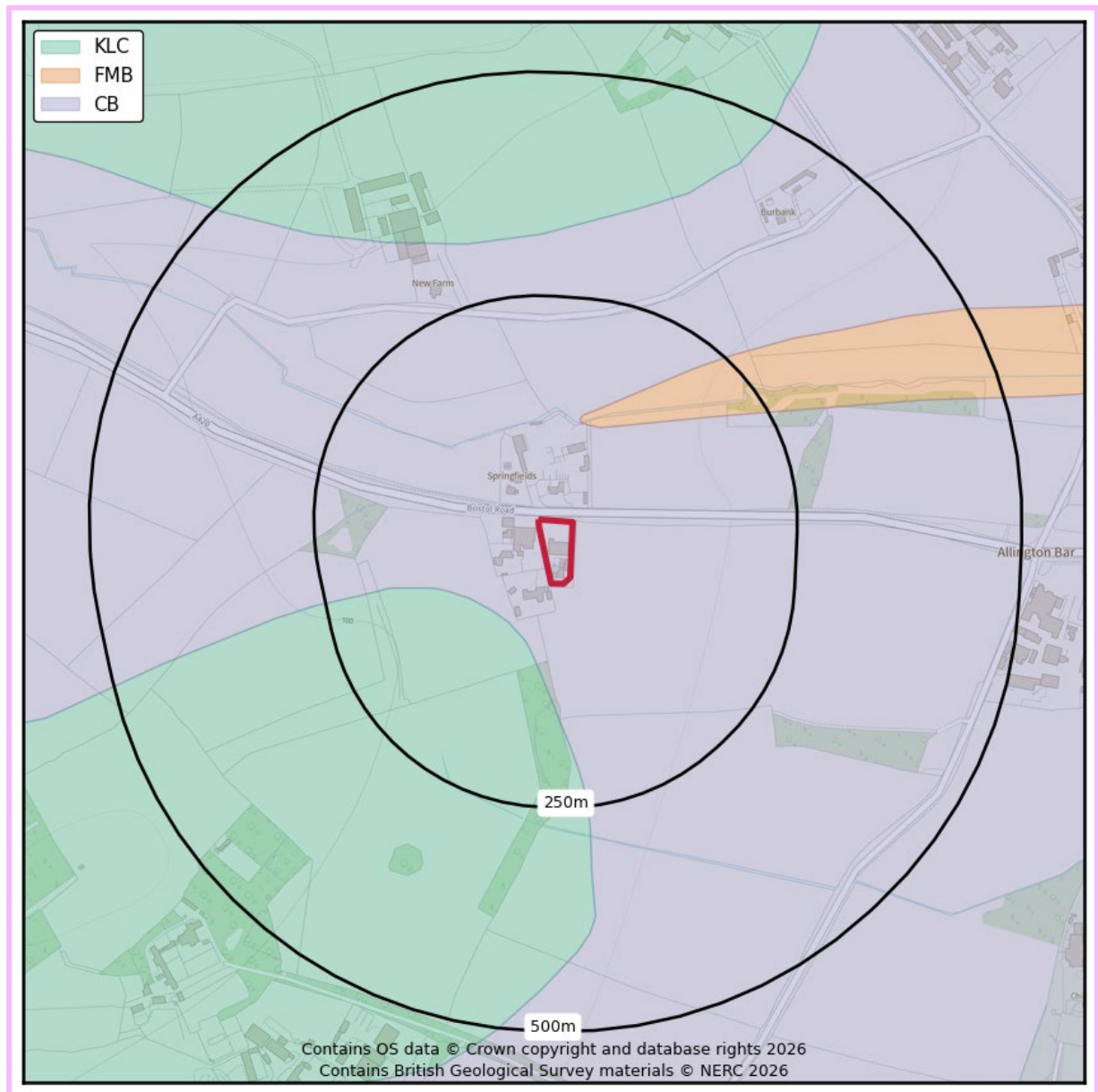


Figure 12. Bedrock Geology (BGS, 2026)



Depth to groundwater

The SuDS system should be designed to operate in periods of extreme groundwater levels.

No nearby BGS borehole records mapped within the same geological strata are available, and therefore the depth to groundwater at the Site cannot be confirmed.

According to GeoSmart's Groundwater Flood Risk (GW5) map, shallow groundwater is unlikely to be an issue at the Site.

The soil infiltration coefficient must be sufficient to accommodate the constraints on the dimensions of the soakaway and its emptying time.

Ground conditions

Infiltration SuDS are proposed within soluble chalk bedrock. A detailed review of underlying ground conditions is recommended to ensure focused infiltration does not cause ground instability as a result of landslide or collapse associated with dissolution or shallow mining.

Soakaways should be a minimum of 5 m away from the foundations of a building and local guidance may recommend a greater distance, such as 10 m on some areas of the Chalk.

Infiltration SuDS are proposed directly into a bedrock aquifer, subject to confirmation through infiltration testing.

Water quality

The Site lies within an SPZ; therefore, consultation with the Local Authority and assessment of historical land uses should be undertaken to confirm the presence of contaminated material, as this could limit the use of infiltration SuDS.

Infiltration systems should not be used where there is a risk of contaminating groundwater by infiltrating polluted runoff or where receiving groundwater is particularly sensitive.

The influence of surface runoff on water quality will depend on whether there is a source of contamination on-Site and the sensitivity of the receiving environment, either groundwater or surface water. The intervening pathway from source to receptor including mitigation and natural attenuation will determine the final impact.

The impact of contaminants on the groundwater will be reduced by travel and natural attenuation through the unsaturated soil zone. A greater depth of unsaturated zone and the presence of significant clay and organic material will provide greater protection for the underlying groundwater. Rapid flow through fractures will provide less protection than intergranular flow around soil and rock particles.

6. Runoff destination

National Standard 1: runoff destinations

Options for the destination for the runoff generated on-Site have been assessed in line with the prioritisation set out in DEFRA's national standards for sustainable drainage systems (2025).

Priority 1: Collection for non-potable use

Given the use of the Site within a light industrial capacity, with minimal proposed landscaped or vegetated areas, there is limited scope for the collection and re-use of rainwater within the proposed development. As such, rainwater harvesting is not considered to be feasible.

Priority 2: Discharge to ground

There are potential issues identified relating to Site contamination, and the Site is located within a SPZ.

According to GeoSmart's SD50 screening data, the Site has High potential for infiltration. Based on the available hydrogeological information (Section 5) the permeability of the underlying strata is likely to be sufficient to accommodate focused infiltration SuDS features, and shallow groundwater is unlikely to be a concern at the Site.

Infiltration SuDS are proposed directly into a bedrock aquifer.

A site investigation comprising trial pits is recommended to confirm the depth to groundwater and allow infiltration tests to be undertaken to confirm the feasibility of an infiltration SuDS scheme. A review of the land contamination risks at the Site should also be considered to confirm there would be no constraints associated with the use of infiltration SuDS.

Priority 3: Discharge to above ground surface water body

Ordnance Survey (OS) mapping indicates that there are no surface water features within 100 m of the Site. However, according to the Client, a surface water feature (a drainage ditch) is located adjacent to the northern boundary of the Site, and the Site currently discharges to this location; as such, discharge of runoff to this feature is considered to be feasible.

If Site investigation proves on-Site infiltration is not possible, then off-Site discharge with flow attenuation and storage may be a suitable alternative option.

Priority 4: Discharge to surface water sewer

According to the Wessex Water asset location plan obtained for the Site (Appendix C), there are no public surface water sewers within the vicinity of the Site.

Due to the significant distance to the nearest public sewer, discharge of runoff to the surface water sewer is not considered to be feasible for the Site and is not proposed.

Priority 5: Discharge to combined sewer

According to the Wessex Water asset location plan obtained for the Site (Appendix C), there are no public combined sewers within the vicinity of the Site.

Due to the significant distance to the nearest public combined sewer, discharge of runoff to the combined sewer is not considered to be feasible for the Site and is not proposed.

7. Storage, volume and peak flow rate

Urban creep

According to Paragraph 3.3 of the DEFRA National standards for SuDS, urban creep should be taken into account as part of the SuDS design. Urban creep accounts for the potential for impermeable areas to increase over the lifespan of a development, such as extensions to proposed building footprints and increases in patio areas.

As the development proposals are for a commercial building with limited landscaped areas at the Site, no Urban Creep uplift factor is required to be applied to the impermeable surface area, and as such the standard proposed impermeable area has been utilised within the calculations.

Surface water runoff

An increase in impermeable areas on-Site will result in greater rainfall runoff. A reduction in runoff will help mitigate flood risk both on and off-Site.

Table 5. Change in impermeable area associated with the development

Total Site area	2075 m ²
Impermeable area (and as a percentage of the total area of the proposed development footprint of 605 m ²)*	
Pre-development	Post-development
293 m ² (48%)	360 m ² (60%)
Impermeable land use: storage structures roofs and associated hardstanding Permeable land use: landscaped areas	New impermeable land use: warehouse roof New permeable land use: landscaped areas

*An c. 1470 m² area to the north of the Site (including the existing main building and associated parking) is understood to be unaffected by the development proposals. As such, this area is considered to drain as existing and has been excluded from the drainage calculations.

Suggested minimum and aspirational storage requirements for an infiltration or attenuation SuDS scheme for the development footprint are set out below, with more detail provided in subsequent sections.

Table 6. Primary strategy - Storage requirements for the proposed development (discharge of runoff via infiltration)

Attenuation scenario	Attenuation required (m ³)	Explanation
1 in 100 year including 45% CC	27.59*	Attenuation required to ensure surface water runoff is attenuated in all storm events up to and including the 1 in 100 year event including a 45% allowance for climate change. Calculations are based on an assumed infiltration rate of 1×10^{-5} m/s (0.036 m/hr) (the worst-case infiltration rate for 'slightly silty, slightly clayey sand' soil types, taken from Table 25.1 of the CIRIA SuDS manual (C753) (2015) – to be confirmed via infiltration testing).

*Subject to confirmation through infiltration testing.

Table 7. Secondary strategy - Storage requirements for the proposed development (discharge of runoff to watercourse)

Attenuation scenario	Attenuation required (m ³)	Explanation
Discharge runoff to watercourse	1 in 30 year	4.40 Attenuation required to ensure surface water runoff is attenuated in all storm events up to and including the 1 in 30 year (0.5 hour, Critical Storm Duration) event*. Flooding of the Site of 2.29 m³ should be contained within permeable landscaped areas within the Site to ensure no flooding of internal areas during the 1 in 100 year storm event.
	1 in 100 year	6.69 Attenuation required to ensure surface water runoff is attenuated in all storm events up to and including the 1 in 100 year (0.5 hour, Critical Storm Duration) event*.
	1 in 100 year including 45% CC	11.74 Attenuation required to ensure surface water runoff is attenuated in all storm events up to and including the 1 in 100 year (0.75 hour, Critical Storm Duration) event including a 45% allowance for climate change*.

*See Appendix B for associated runoff and discharge calculations. Subject to discharge rates being limited to 2 l/s (as close to the equivalent Greenfield 1 in 100 year rate as possible, without increasing the potential for blockages).

Peak discharge rates

The peak discharge rate is the maximum flow rate at which surface water runoff leaves the Site during a particular storm event, without considering the impact of any mitigation such as storage, infiltration or flow control. Proposed discharge rates (with mitigation) should be no greater than existing rates for all corresponding storm events. If all runoff is disposed of via infiltration, there will be no discharge off-Site.

The table below presents peak discharge rates for a range of storm events used to assess the impact of the proposed development and select the maximum permitted discharge rate.

Table 8. Peak discharge rates associated with the development

Rainfall event	Greenfield runoff rates (l/s)	Existing runoff rates ¹ (l/s)	Potential runoff rates without attenuation (l/s)	Potential minus existing (l/s)
QBAR	0.01	N/A	N/A	N/A
6 hour 1 in 1 year	0.01	0.36	0.43	0.07
6 hour 1 in 10 year	0.02	0.56	0.66	0.10
6 hour 1 in 30 year	0.02	0.74	0.87	0.14
6 hour 1 in 100 year	0.03	0.95	1.13	0.18
6 hour 1 in 100 year + 20% CC	N/A	N/A	1.36	0.40
6 hour 1 in 100 year + 45% CC	N/A	N/A	1.64	0.69

¹ Assumes 100% runoff from impermeable surfaces. Assumes Greenfield runoff from permeable surfaces calculated using the loH124 method.

Relevant national, regional and local planning policy has been consulted in Section 3 to determine restrictions on runoff from previously developed and greenfield sites. In some cases, greenfield rates may be requested, but in practice it is difficult to restrict discharge rates at any one control point to less than 2 l/s, without increasing the risk of any potential blockages occurring in the drainage network.

Total discharge volumes

The table below presents discharge volumes for a range of storm events used to assess the impact of the proposed development and calculate the required storage volumes.

Table 9. Total discharge volumes associated with the development

Rainfall event	Greenfield runoff volume (m ³)	Existing runoff volume ² (m ³)	Potential runoff volume without attenuation (m ³)	Potential minus existing (m ³)
QBAR	1.55	N/A	N/A	N/A
6 hour 1 in 1 year	1.47	7.88	9.34	1.47
6 hour 1 in 10 year	2.34	12.08	14.31	2.23
6 hour 1 in 30 year	2.97	15.93	18.89	2.96
6 hour 1 in 100 year	3.84	20.58	24.40	3.83
6 hour 1 in 100 year + 20% CC	N/A	N/A	29.29	8.71
6 hour 1 in 100 year + 45% CC	N/A	N/A	35.39	14.81

² Assumes 100% runoff from impermeable surfaces. Assumes Greenfield runoff from permeable surfaces, as calculated using the loH124 method.

Critical storm duration and volume requirements

Storage volumes for a range of return periods including the 1 in 30 year, 1 in 100 year and 1 in 100 year plus climate change (45%) events have been calculated to assess the impact of the proposed development. The required storage volumes for attenuation features have been calculated for the critical storm durations, limited to a maximum discharge rate of 2 l/s (as close to the Greenfield 1 in 1 year rate as possible, without increasing the potential for blockages).

Table 10. Critical Storm Duration and Attenuation volume requirements

Return Period	Runoff rate restriction (l/s)	Critical Storm Duration (hr)	Attenuation volume required (m ³)
1 in 30 year	2	0.50	4.40
1 in 100 year	2	0.50	6.69
1 in 100 year including a 45% climate change	2	0.75	11.74

8. Water quality

A key requirement of any SuDS system is that it protects the receiving water body from the risk of pollution. This can be effectively managed by an appropriate “train” or sequence of SuDS components that are connected in series. The frequent and short duration rainfall events are those that are most loaded with potential contaminants (silts, fines, heavy metals and various organic and inorganic contaminants). Therefore, the first 5-10 mm of rainfall (first flush) should be adequately treated with SuDS.

The minimum number of treatment stages will depend on the sensitivity of the receiving water body and the potential hazard associated with the proposed development SuDS Manual (CIRIA, 2015). The proposed development is Low (commercial roof water). The Site lies within an SPZ and therefore additional treatment stages may be required.

Table 11. Pollution hazard indices for different land use classifications

Land use	Pollution hazard level	Total suspended solids (TSS)	Metals	Hydro-carbons
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 and non-residential car parking within infrequent change (i.e. less than 300 traffic movements/day)	Low	0.5	0.4	0.4
Commercial yard and delivery areas, non-residential car parking with frequent change (e.g. hospitals, retail), all roads except low traffic roads and trunk roads/motorways	Medium	0.7	0.6	0.7
Sites with heavy pollution (e.g. 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, storage, used or manufactured: industrial sites; trunk roads and motorways	High	0.8	0.8	0.9

Table 12. Indicative SuDS mitigation indices for discharges to groundwater

Characteristics of the material overlying the proposed infiltration surface, through which the runoff percolates	TSS	Metals	Hydro-carbons
A layer of dense vegetation underlain by a soil with good contaminant attenuation potential of at least 300 mm in depth	0.6	0.5	0.6
A soil with good contaminant attenuation potential of at least 300 mm in depth	0.4	0.3	0.3
Infiltration trench (where a suitable depth of filtration material is included that provides treatment, i.e. graded gravel with sufficient smaller particles but not single size coarse aggregate such as 20 mm gravel) underlain by a soil with good contaminant attenuation potential of at least 300 mm in depth	0.4	0.4	0.4
Constructed permeable pavement (where a suitable filtration layer is included that provides treatment, and including a geotextile at the base separating the foundation from the subgrade) underlain by a soil with good contaminant attenuation potential of at least 300 mm in depth	0.7	0.6	0.7
Bioretention underlain by a soil with good contaminant attenuation potential of at least 300 mm in depth	0.8	0.8	0.8
Proprietary treatment systems	These must demonstrate that they can address each of the contaminant types to acceptable levels for inflow concentrations relevant to the contributing drainage area		

Table 13. Indicative SuDS mitigation indices for discharges to surface waters

Type of SuDS component	Mitigation indices		
	TSS	Metals	Hydrocarbons
Filter strip	0.4	0.4	0.5
Filter drain	0.4	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	0.7	0.7	0.5
Wetland	0.8	0.8	0.8
Proprietary treatment systems	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		

As indicated within Tables 11 to 13, the proposed soakaway and rain planters would provide sufficient mitigation indices to treat the Low pollution hazard associated with the Site use.

9. Proposed SuDS strategy

Sustainable drainage systems

DEFRA's national standards for SuDS require the below ground drainage systems to have the capacity to accommodate at least the 1 in 30 year event and to manage the 1 in 100 year event without flooding of on-site buildings and substations. All runoff should be managed on-Site though for the 1 in 100 year event, accounting for the maximum impacts of climate change to ensure flood risk is not increased to third-parties.

It is assumed that areas outside the development footprint, such as the existing building and car park, will continue to use the existing drainage arrangement.

A surface water drainage strategy (summarised in Section 2 of this report) includes the following SuDS features to intercept, attenuate and treat surface water runoff.

Primary SuDS Strategy:

Ground conditions at the Site are conducive to infiltration. Surface water runoff will be managed within SuDS features and infiltrated to ground.

Table 14. Proposed SuDS type, features, discharge location and rate restriction

SuDS type	Source control (interception) and infiltration SuDS.
SuDS features	Rain planters and soakaway.
Discharge location	Infiltration.
Discharge rate	$1 \times 10^{-5} \text{ m/s}^*$.

*Based upon an assumed worst-case infiltration rate for 'slightly silty, slightly clayey sand' soil types, taken from Table 25.1 of the CIRIA SuDS manual (C753) (2015) - to be confirmed via infiltration testing.

Table 15. Proposed SuDS sizing (dimensions) and attenuation volumes

Rain planters	Where feasible, rain planters should be incorporated at the base of downpipes to provide water quality, amenity and biodiversity benefits. In terms of attenuation storage within this SuDS scheme, the volume of runoff which could be attenuated by the rain planters has not been considered within the SuDS strategy.
Soakaway	A soakaway within the car park area with a length of 9 m, width of 3 m and depth of 1.2 m, comprising geocellular crates with a void ratio of 95%, would provide the required c. 27.59 m ³ of attenuation (as indicated by the calculations on Causeway Flow).
Total attenuation provided	27.59 m³
Total attenuation required	27.59 m³

Rain planters

Rain planters are proposed to collect and store surface water while providing biodiversity and amenity benefits at the Site.

An inlet allows water to evenly distribute water into the filter system. Vegetation influences the performance of the system through direct uptake of pollutants and facilitates physical and chemical processes in the soil that remove nutrients. The filter medium is normally sand based and filters out pollutants while controlling the rate at which water filters through the system. This medium is usually 750-1000 mm thick through can be reduced for smaller catchments (minimum depth – 400 mm). The transition layer is required to prevent washing of fines from the filter medium into the drainage layer and must be at least 100 mm deep. The drainage layer is used to collect water from the filter medium to allow for access into the perforated pipes.

Due to the relatively insignificant amounts of attenuation provided by rain planters in this instance, the volume of run-off which could be attenuated by rain planters has not been considered within the report.

Soakaways

Soakaways are square or circular excavations either filled with rubble or lined with brickwork, pre-cast concrete or polyethylene rings/perforated storage structures surrounded by granular backfill. The supporting structure and backfill can be substituted by modular or geocellular units. The base of the infiltration features should lie at an elevation at least 1 m above the highest winter groundwater levels, to ensure there is sufficient space for surface water to discharge. Soakaway excavation should be outside of the root zone of any protected trees and dimensions will depend on the depth to the sand layer where the soakaway is eventually situated.

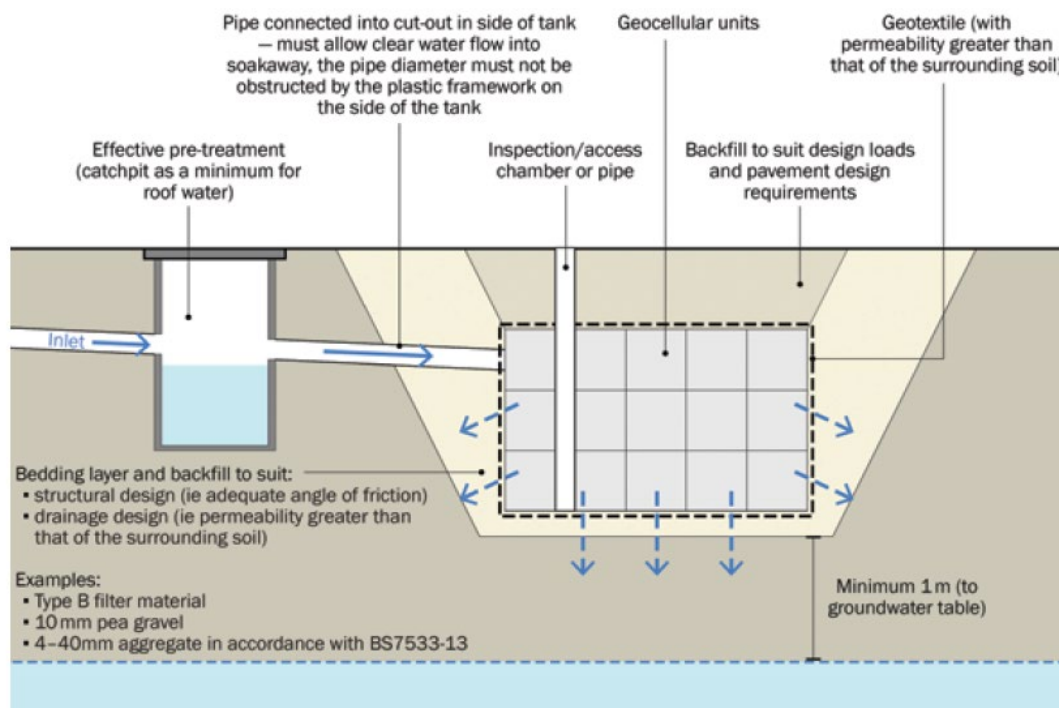


Figure 13.1 of the CIRIA SuDS Manual (C753) (2015)

Exceedance flows

Exceedance flow routes are included within the proposed SuDS drainage layout. Where possible, exceedance flows should be directed into non-essential areas of the Site such as landscaped areas. The SuDS system recommended for the Site should provide enough storage that this method would only be utilised during a worst case scenario.

Secondary SuDS strategy:

Where infiltration to ground is not achievable at the Site, runoff should be managed and attenuated on-Site and discharged at a restricted rate of 2 l/s.

Table 16. Proposed SuDS type, features, discharge location and rate restriction

SuDS type	Source control (interception) and attenuation SuDS.
SuDS features	Rain planters and attenuation tank.
Discharge location	Surface water feature.
Discharge rate	2 l/s.

*As close to the Greenfield 1 in 1 year rate as possible, without increasing the risk of blockage.

Table 17. Proposed SuDS sizing (dimensions) and attenuation volumes

Rain planters	Where feasible, rain planters should be incorporated at the base of downpipes to provide water quality, amenity and biodiversity benefits. In terms of attenuation storage within this SuDS scheme, the volume of runoff which could be attenuated by the rain planters has not been considered within the SuDS strategy.
Attenuation tank	An attenuation tank within the proposed driveway area with a length of 4 m, width of 4 m and depth of 1 m, comprising geocellular crates with a void ratio of 95%, would provide c. 15.20 m ³ of attenuation.
Total attenuation provided	15.20 m³
Total attenuation required	11.74 m³
Freeboard storage provided	3.46 m³

Attenuation tanks

Attenuation tanks provide a below-ground void space for use of temporary storage via controlled release. They can also be modified to suit specific characteristics of a site.

Drainage protection devices

A non-return flap valve is recommended for outflow pipes to reduce the risk of backflow from the channel during a large scale rainfall event.

Flow control devices and systems

Hydrobrake Flow control systems can be used to reduce the runoff rate from the Site. These are usually a device used for controlling water flow into a connecting feature, such as a sewer, to a specific attenuation performance. The design consists of an intake, a volute and an outlet and the configuration is critical to ensure discharge control. For drainage areas which are less than 3 ha, outlet throttle diameters would have to be small (<150mm diameter) to achieve outflow rates which could result in blockage. For most SuDS features, a flow control device will comprise a fixed orifice or a throttle such as a short pipe.

Amenity and biodiversity

The inclusion of rain planters will provide sufficient biodiversity and amenity benefits to the areas of proposed development. Roof runoff fed into the downpipes will be used to water vegetation within the planters and ensure their long-term viability as amenity features. Furthermore, filtration by the vegetation and soils will improve the water quality being infiltrated to ground.

10. SuDS maintenance

Regular maintenance is essential to ensure effective operation of the SuDS features over the intended lifespan of the proposed development. The SuDS Manual (C753) (CIRIA, 2015) provides a maintenance schedule for SuDS with details of the necessary required actions as shown in the Table below.

Table 18. SuDS operation and recommended maintenance requirements

Asset type	Maintenance schedule (and frequency)
Soakaways, infiltration trenches & blankets	Regular maintenance: - Remove sediment and debris from pretreatment and inspection chamber. Clean gutters, filters, downpipes. Trim roots prevent blockages (annually). - Reconstruct/ clean if performance deteriorates, replace clogged geotextile (as required) Monitoring: - Inspect inlets/outlets, silt traps – note rate of accumulation (monthly). - Check water levels and emptying time (annually).
Hydro-Brake Flow Control	Low amounts of maintenance required as there are no moving parts within the Hydro-Brake® Flow Control. Initial monthly inspection at the manhole once the construction phase is over. If blockages occur they normally do so at the intake. Hydro-Brake® Flow Controls are fitted with a pivoting by-pass door, which allows the manhole chamber to be drained down should blockages occur. Inspection should be undertaken annually or when a storm event occurs.
Underground drainage pipe network	Regular maintenance: - Remove sediment and debris from pre-treatment devices and floor of inspection tube or chamber (annually). - Cleaning of gutters and any filters on downpipes (annually). - Trimming any roots that may be causing blockages (annually or as required). Monitoring: - Inspect silt traps and note rate of sediment accumulation (monthly in the first year and then annually).
Attenuation tanks / Geo-cellular storage	Regular maintenance: - Remove litter and debris from inlets and outlets (monthly). - Trimming any roots and surrounding grass blockages (as required). Monitoring: - Inspect inlets, outlets and overflows for blockages (monthly or after a heavy storm). - Inspect inlets and outlets for silt accumulation (half yearly).

Asset type	Maintenance schedule (and frequency)
	Inspect infiltration surfaces for compaction and ponding (monthly).

Health and safety considerations for SuDS

GeoSmart reports may include outline strategies or designs to support with development plans. Any drawings or advice provided do not comprise any form of detailed design. Implementation of any conceptual scheme options may constitute 'Construction Work' as defined by CDM Regulations (2015).

The CDM Regulations place specific Health and Safety duties on those commissioning, planning and undertaking construction works. If you are uncertain what this means you should seek the advice of your architect, builder or other competent professional.

GeoSmart does not provide health and safety advisory services but we are required to advise you of your general responsibilities under CDM (visit <http://geosmartinfo.co.uk/knowledge-hub/cdm-2015/> for more information).

Please remember that detailed design work should be undertaken by a competent professional who might be your engineer, architect, builder or another competent party.

11. Background information

GeoSmart SuDS Infiltration Suitability Map (SD50)

The GeoSmart SuDS Infiltration Suitability Map (SD50) screens the suitability for infiltration drainage in different parts of the Site and indicates where further assessment is recommended. In producing the SuDS Infiltration Suitability Map (SD50), GeoSmart used data from the British Geological Survey on groundwater levels, geology and permeability to screen for areas where infiltration SuDS may be suitable. The map classifies areas into 3 categories of High, Medium and Low suitability for infiltration SuDS. This can then be used in conjunction with additional data on Site constraints to give recommendations for SuDS design and further investigation.

The primary constraint on infiltration potential is the minimum permeability of the underlying material and in some cases the range in permeability may be considerable, ranging down to low. The map classifies these areas as moderate infiltration suitability requiring further investigation. In cases where the thickness of the receiving permeable horizon is less than 1.5 meters then additional Site investigation is recommended. If the Site is at risk of groundwater flooding for up to the 1% annual occurrence the map classifies these areas as moderate infiltration suitability requiring further investigation.

The GeoSmart SuDS Infiltration Suitability Map (SD50) is a national screening tool for infiltration SuDS techniques but a Site specific assessment should be used before final detailed design is undertaken. Further information on the GeoSmart SuDS Infiltration Suitability Map (SD50) is available at geosmartinfo.co.uk.

How was surface water runoff estimated from the Site?

In accordance with the SuDS Manual (C753) (CIRIA, 2015), the Greenfield runoff from the Site has been calculated using the IoH124 method and is assumed representative of the runoff generated on the undeveloped surfaces that are affected by the proposed development. The method used for calculating the runoff complies with the NPPF (2024). For the impermeable surfaces, it has been assumed that 100% runoff will occur (calculations provided in Appendix B). Rainfall data is derived from the Flood Estimation Handbook (FEH), developed by NERC (2009). Only areas affected by the proposed development are considered in the flow and volume calculations. Permeable areas that remain unchanged are not included in the calculations as it is assumed these will not be actively drained and attenuated.

What is the peak discharge rate?

An estimation of peak runoff flow rate and volume is required to calculate infiltration, storage and discharge requirements. The peak discharge rate is the maximum flow rate at which surface water runoff leaves the Site during a particular storm event, without considering the impact of any mitigation such as storage, infiltration or flow control. Proposed discharge rates (with mitigation) should be no greater than existing rates for all corresponding storm events. If all runoff will be disposed of via infiltration there will be no discharge off-Site. Discharging all flow from Site at the existing 1 in 100 event would increase flood risk during smaller events. Flow restriction is generally required to limit the final discharge from Site during all events as a basic minimum to the green field QBAR rate. A more complex flow restriction which varies the final discharge rate from the Site depending on the storm event will reduce the volume of storage required on-Site. Drainage to infiltration SuDS is subtracted from the total discharge off-Site to achieve a beneficial net effect.

What is the total discharge volume?

The total discharge volume is calculated on the basis of the surface water runoff that has the potential to leave the Site as a result of the assumed 6 hour duration design storm event. The runoff is related to the underlying soil conditions, impermeable cover, rainfall intensity and duration of the storm event. The total volume generated by the current Site is compared to the potential total volume from the developed Site (not taking into consideration any mitigation). The difference provides the minimum total volume that will need to be stored and infiltrated on-Site or released at a controlled rate. Guidance indicates that the total discharge volume should never exceed the runoff volume from the development Site prior to redevelopment for that event and should be as close as is reasonably practicable to the Greenfield runoff volume.

12. Additional Products

The following table includes a list of additional products by GeoSmart:

Additional GeoSmart Products		
✓	Additional assessment: 	The FloodSmart Report range provides clear and pragmatic advice regarding the nature and potential significance of flood hazards which may be present at a Site. Our consultants assess available data to determine the level of risk based on professional judgement and years of experience. Please contact info@geosmartinfo.co.uk for further information.
✓	Additional assessment: 	Provides a robust desk-based assessment of potential contaminated land issues, taking into account the regulatory perspective. Our EnviroSmart reports are designed to be the most cost effective solution for planning conditions. Each report is individually prepared by a highly experienced consultant conversant with Local Authority requirements. Ideal for pre-planning or for addressing planning conditions for small developments. Can also be used for land transactions. Please contact info@geosmartinfo.co.uk for further information.

13. References and glossary

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Glossary

General terms

Attenuation	Reduction of peak flow and increased duration of a flow event.
Combined sewer	A sewer designed to carry foul sewage and surface water in the same pipe.
Detention basin	A vegetated depression, normally is dry except after storm events, constructed to store water temporarily to attenuate flows. May allow infiltration of water to the ground.
Evapotranspiration	The process by which the Earth's surface or soil loses moisture by evaporation of water and by uptake and then transpiration from plants.
FEH	Flood Estimation Handbook, produced by Centre for Ecology and Hydrology, Wallingford (formerly the Institute of Hydrology).
Filter drain or trench	A linear drain consisting of a trench filled with a permeable material, often with a perforated pipe in the base of the trench to assist drainage, to store and conduct water, but may also be designed to permit infiltration.
First flush	The initial runoff from a site or catchment following the start of a rainfall event. As runoff travels over a catchment it will collect or dissolve pollutants, and the "first flush" portion of the flow may be the most contaminated as a result. This is especially the case for intense storms and in small or more uniform catchments. In larger or more complex catchments pollution.
Flood plain	Land adjacent to a watercourse that would be subject to repeated flooding under natural conditions (see Environment Agency's Policy and practice for the protection of flood plains for a fuller definition).
Greenfield runoff	This is the surface water runoff regime from a site before development, or the existing site conditions for brownfield redevelopment sites.
Impermeable surface	An artificial non-porous surface that generates a surface water runoff after rainfall.
Permeability	A measure of the ease with which a fluid can flow through a porous medium. It depends on the physical properties of the medium, for example grain size, porosity and pore shape.
Runoff	Water flow over the ground surface to the drainage system. This occurs if the ground is impermeable, is saturated or if rainfall is particularly intense.
Sewerage undertaker	This is a collective term relating to the statutory undertaking of water companies that are responsible for sewerage and sewage disposal including surface water from roofs and yards of premises.
Soakaway	A subsurface structure into which surface water is conveyed to allow infiltration into the ground.

Source Protection Zone (SPZ) **Areas where groundwater supplies are at risk from potentially polluting activities and accidental releases of pollutants. They are a policy tool used to control activities close to water supplies intended for human consumption.**

Treatment **Improving the quality of water by physical, chemical and/or biological means.**

The terms included in this glossary have been taken from CIRIA (2015) guidance.

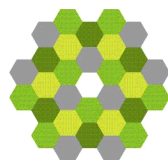
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Flood Risk (Groundwater) and SuDS infiltration suitability (SD50)	GeoSmart, BGS & OS GW5 (v2.4) Map (GeoSmart, 2026) Contains British Geological Survey materials © NERC 2026 Ordnance Survey data © Crown copyright and database right 2026
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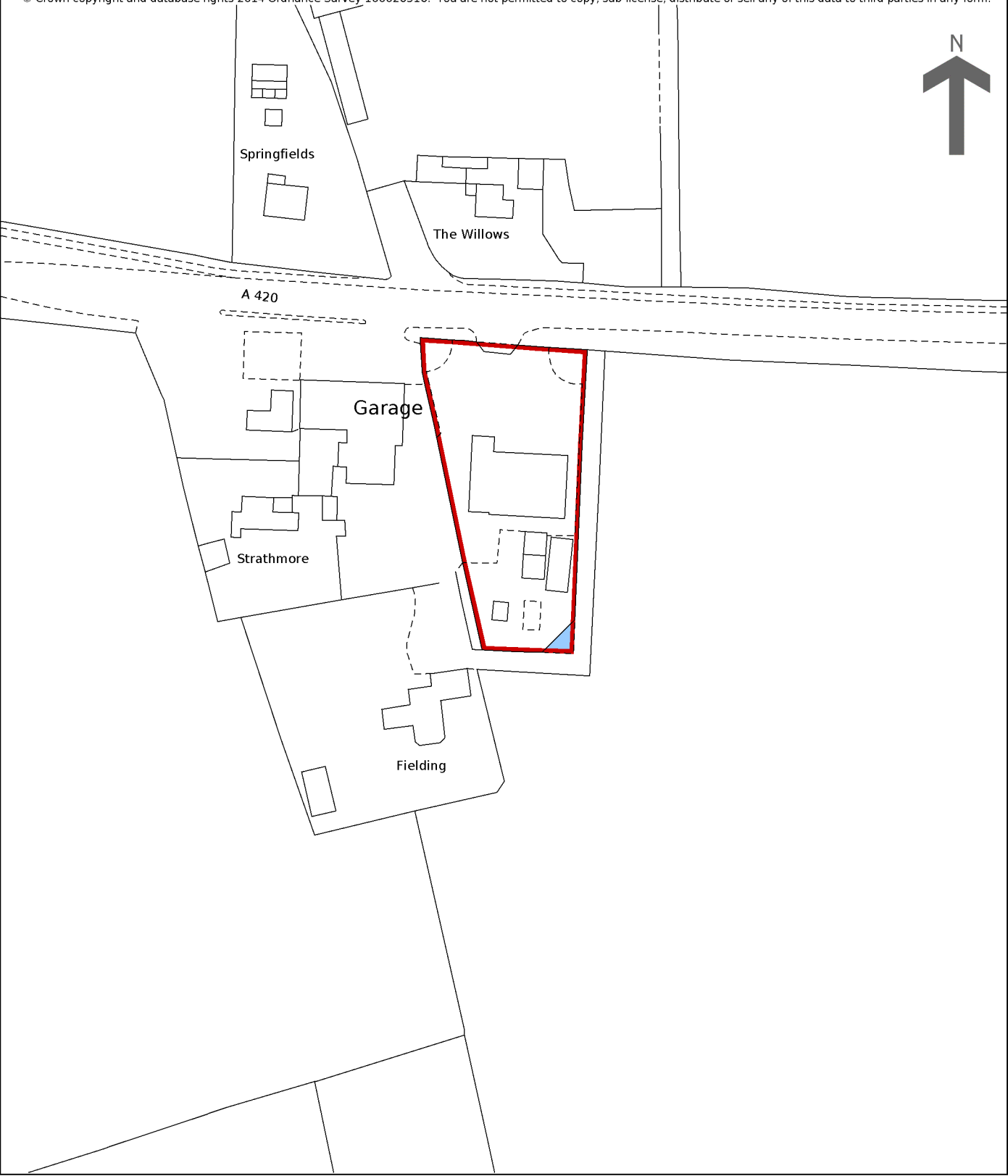
14. Appendices

Appendix A

Site plans



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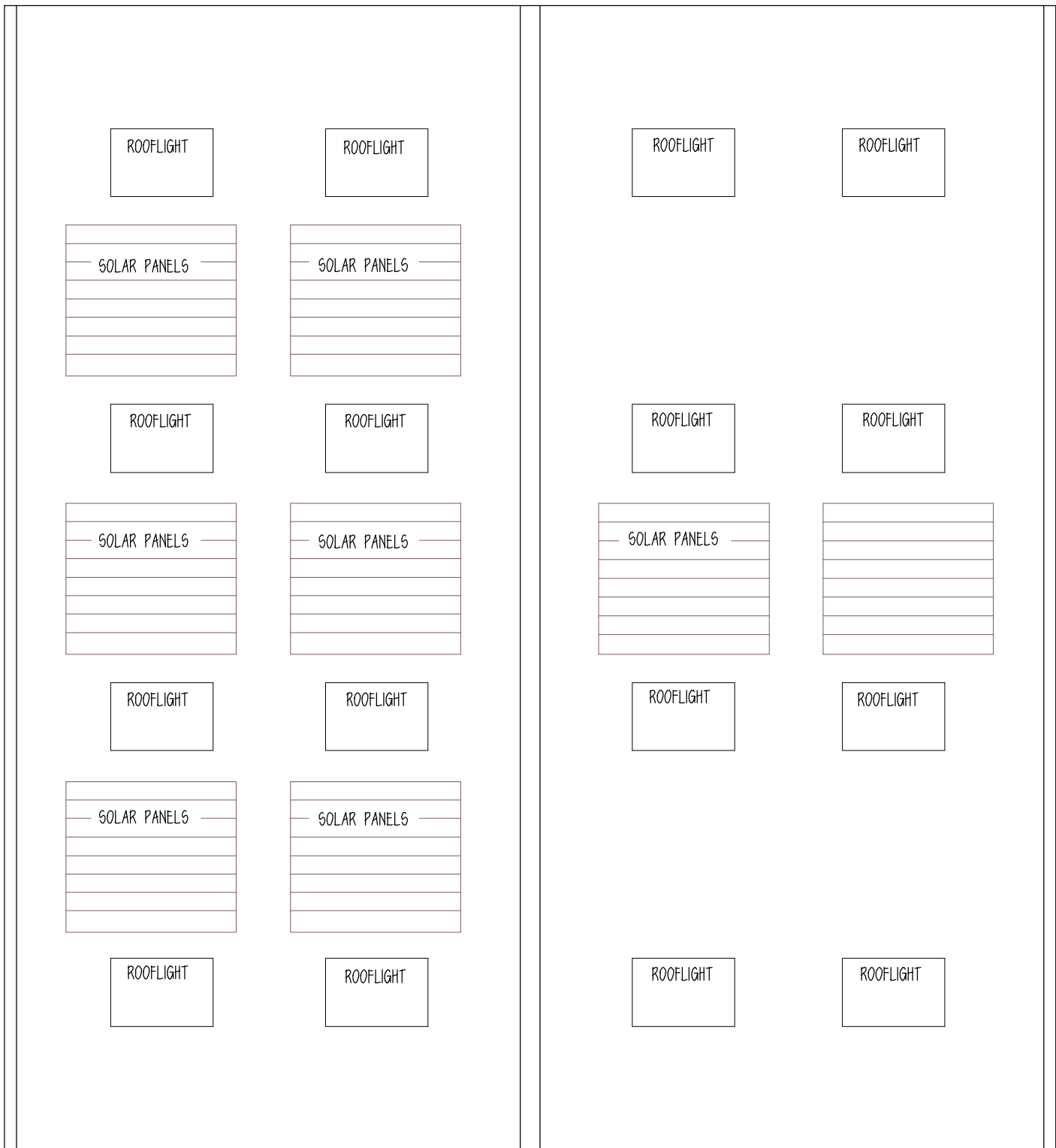


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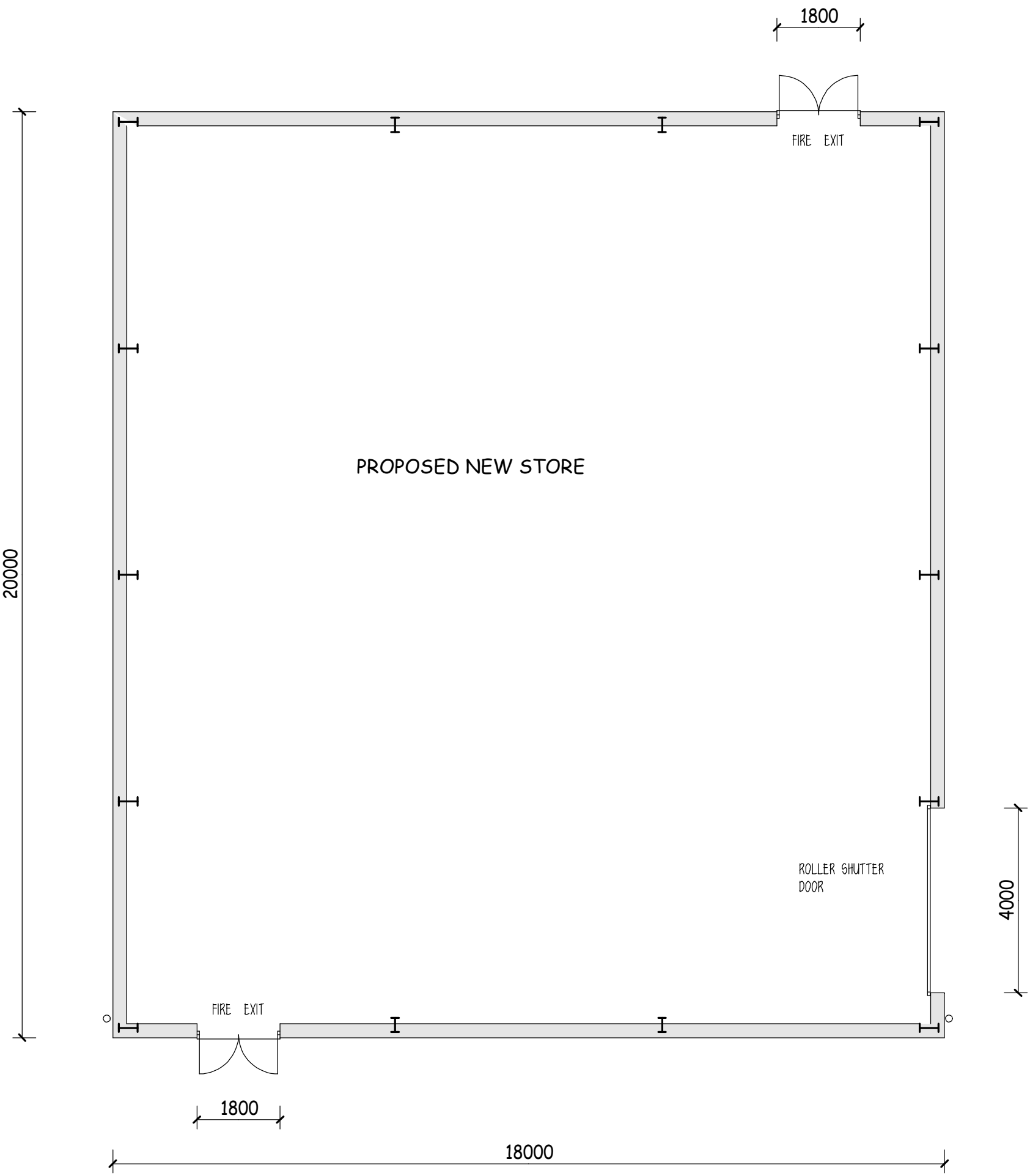
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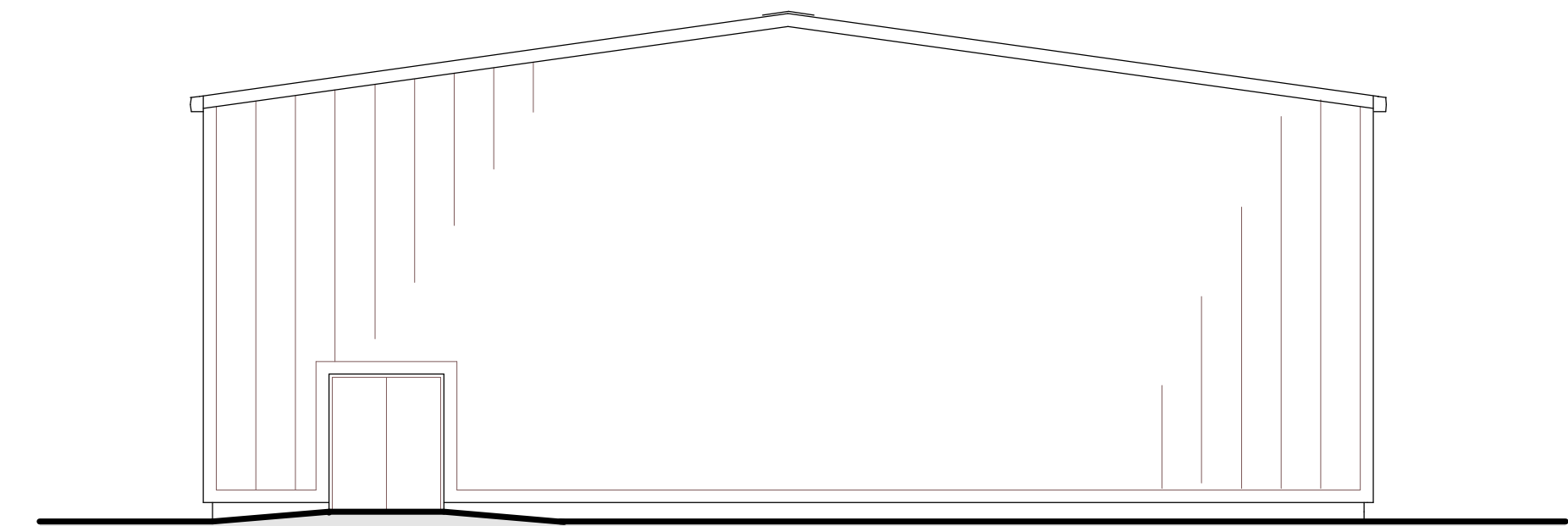
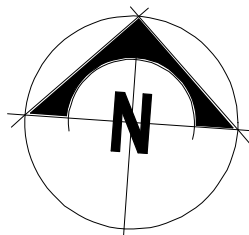
This title is dealt with by HM Land Registry, Weymouth Office.



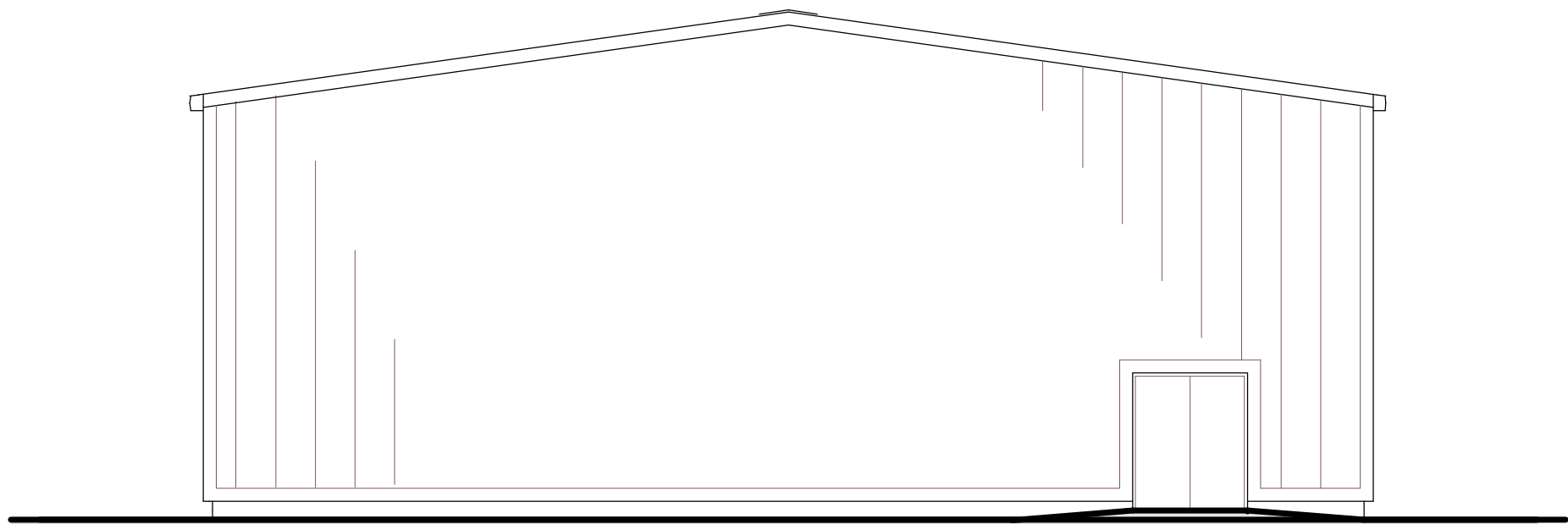
PROPOSED ROOF PLAN



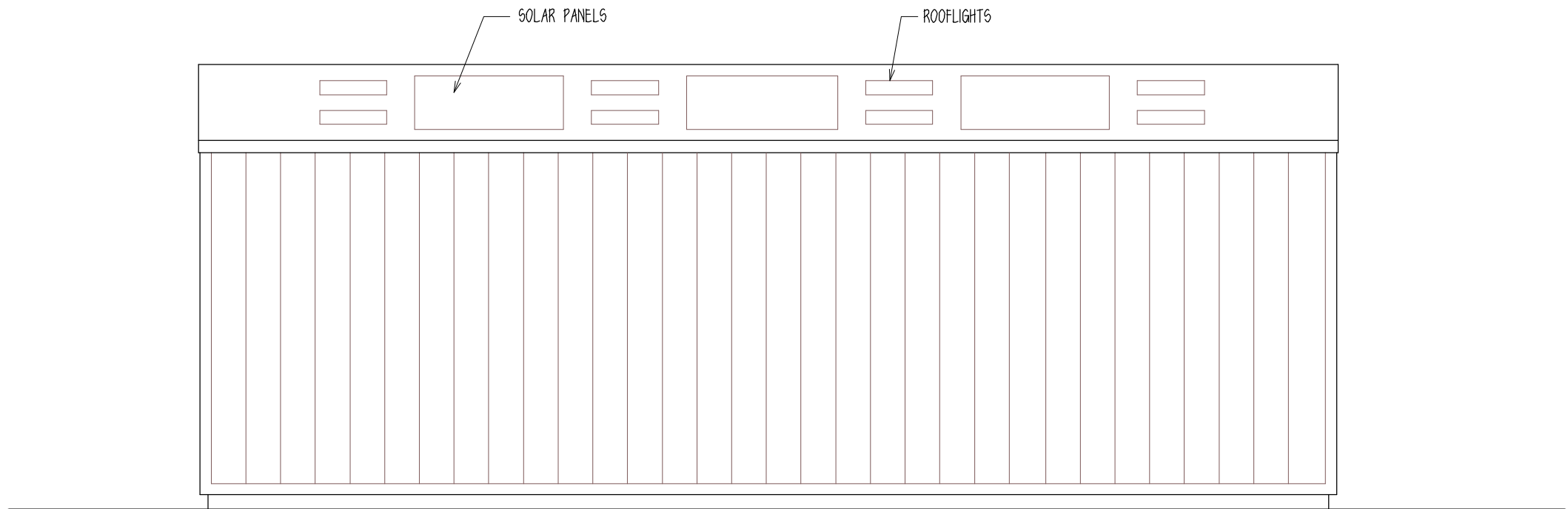
PROPOSED FLOOR PLAN



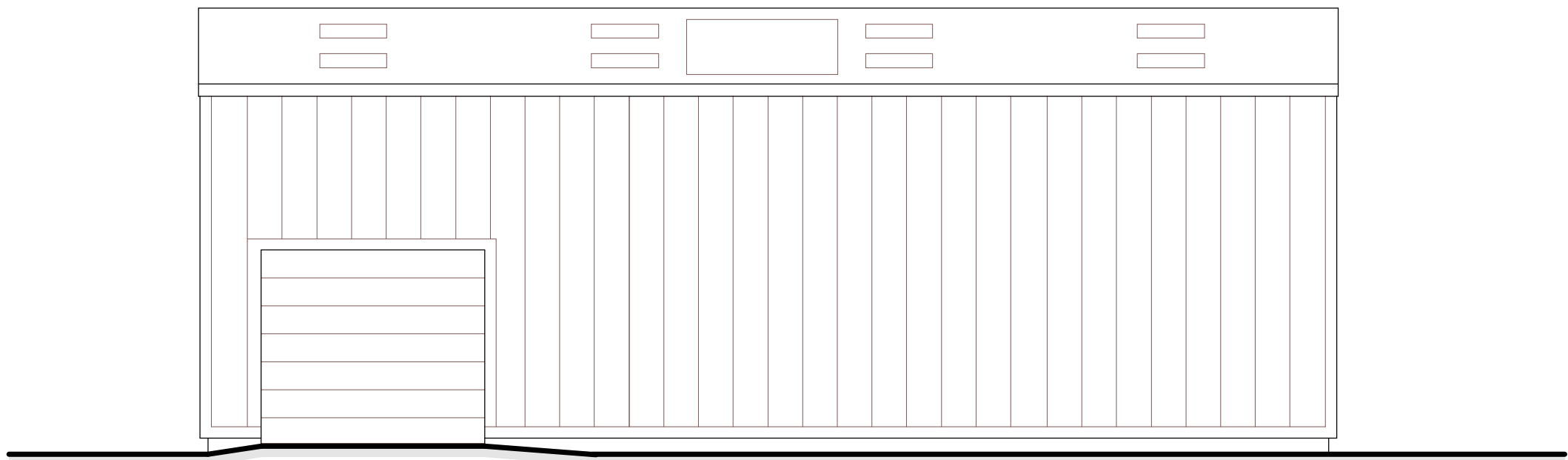
SOUTH ELEVATION



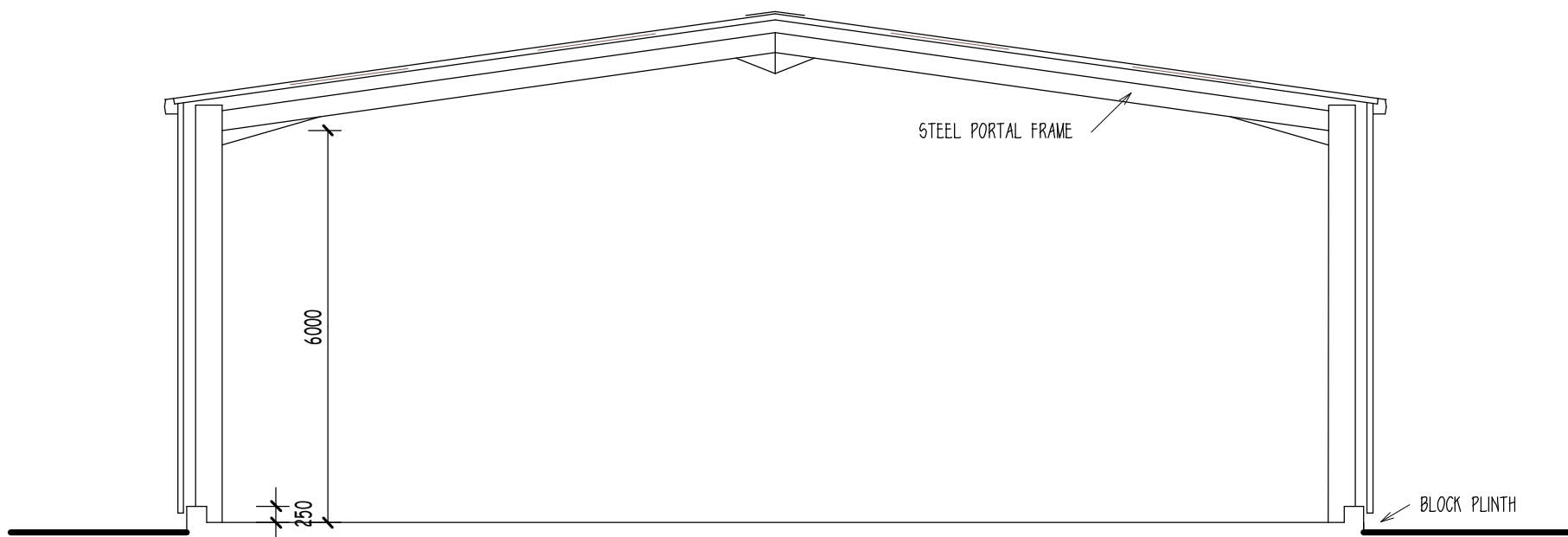
NORTH ELEVATION



EAST ELEVATION



WEST ELEVATION



TYPICAL CROSS SECTION

EXTERNAL FINISHES :	
WALL CLADDING	: COATED PROFILED STEEL SHEETS COLOUR ANTHRACITE GREY (RAL 7016)
ROOF CLADDING	: COATED PROFILED STEEL SHEETS COLOUR ANTHRACITE GREY (RAL 7016) INCORORATING ROOFLIGHTS
DOORS	: POWDER COATED M.S. (GREY)
rGUTTERS / RWPS	: POWDER COATED M.S. (GREY)

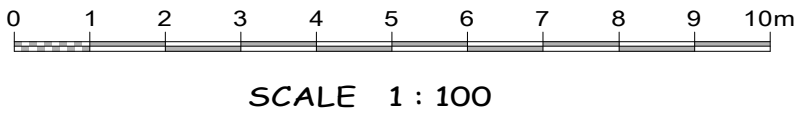
B		
A		
	Date	Revision

P J ARCHITECTURAL SERVICES 46 DRAYCOTT ROAD, CHISELDON, SWINDON SN4 0LS. E-mail : [REDACTED]
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Client BRIDGE CONTRACT INTERIORS
Project Title PROPOSED STORE BRISTOL ROAD ALLINGTON CHIPPENHAM SN14 6NA

Drawing Title PROPOSED FLOOR PLANS AND ELEVATIONS.
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Scale(s) 1:100 @ A1	
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Appendix B

Rainfall runoff calculations

Design Settings

Rainfall Methodology	FEH-22	Minimum Velocity (m/s)	1.00
Return Period (years)	2	Connection Type	Level Soffits
Additional Flow (%)	0	Minimum Backdrop Height (m)	0.200
CV	0.750	Preferred Cover Depth (m)	1.200
Time of Entry (mins)	5.00	Include Intermediate Ground	✓
Maximum Time of Concentration (mins)	30.00	Enforce best practice design rules	✓
Maximum Rainfall (mm/hr)	50.0		

Nodes

Name	Area (ha)	T of E (mins)	Cover Level (m)	Node Type	Depth (m)
impermeable	0.036	5.00	10.000	Manhole	1.800

Simulation Settings

Rainfall Methodology	FEH-22	Analysis Speed	Normal	Starting Level (m)	
Rainfall Events	Singular	Skip Steady State	x	Check Discharge Rate(s)	x
Summer CV	0.750	Drain Down Time (mins)	240	Check Discharge Volume	x
Winter CV	0.840	Additional Storage (m³/ha)	20.0		

Storm Durations

15 | 30 | 60 | 120 | 180 | 240 | 360 | 480 | 600 | 720 | 960 | 1440

Return Period (years)	Climate Change (CC %)	Additional Area (A %)	Additional Flow (Q %)
2	0	0	0
30	0	0	0
100	0	0	0
100	45	0	0

Node impermeable Soakaway Storage Structure

Base Inf Coefficient (m/hr)	0.03600	Invert Level (m)	8.200	Depth (m)	1.200
Side Inf Coefficient (m/hr)	0.03600	Time to half empty (mins)	1239	Inf Depth (m)	
Safety Factor	2.0	Pit Width (m)	9.000	Number Required	1
Porosity	0.95	Pit Length (m)	3.000		

Results for 2 year Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
360 minute winter	impermeable	320	8.396	0.196	0.9	5.1116	0.0000	OK
Link Event (Upstream Depth)	US Node	Link	Outflow (l/s)					
360 minute winter	impermeable	Infiltration	0.2					

Results for 30 year Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m ³)	Flood (m ³)	Status
960 minute winter	impermeable	870	8.682	0.482	0.9	12.5459	0.0000	OK

Link Event (Upstream Depth)	US Node	Link	Outflow (l/s)
960 minute winter	impermeable	Infiltration	0.2

Results for 100 year Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
720 minute winter	impermeable	660	8.876	0.676	1.4	17.6065	0.0000	OK
Link Event (Upstream Depth)	US Node	Link	Outflow (l/s)					
720 minute winter	impermeable	Infiltration	0.2					

Results for 100 year +45% CC Critical Storm Duration. Lowest mass balance: 100.00%

Node Event	US Node	Peak (mins)	Level (m)	Depth (m)	Inflow (l/s)	Node Vol (m³)	Flood (m³)	Status
960 minute winter	impermeable	900	9.259	1.059	1.7	27.5933	0.0000	OK
Link Event (Upstream Depth)		US Node	Link	Outflow (l/s)				
960 minute winter		impermeable	Infiltration	0.3				

Input parameters for run-off calculations		
Country	England	
Total site area	2075	m ²
Area proposed for development	605	m ²
Current permeable ground cover	312	m ²
Current impermeable ground cover	293	m ²
Proposed permeable ground cover	245	m ²
Proposed impermeable ground cover	360	m ²
Urban Creep Allowance	0%	
Final impermeable ground cover	360	m ²
SPR	0.1	
SAAR	801	mm
Region	8	
Climate change factor	45%	
Discharge Rate (l/s)	2.0	
Run-off coefficient	100%	

Current impermeable area as % of total	48%
Proposed impermeable area as % of total	60%
Change in permeable area (m2)	-67
Change in impermeable area (m2)	67
Change in impermeable area as % of total	11%

Rainfall event	Greenfield run-off rates (l/s)	Existing run-off rates(l/s)	Potential run-off rates without attenuation (l/s)	Potential minus existing (l/s)
QBAR	0.01	N/A	N/A	N/A
6 hour 1 in 1 year	0.01	0.36	0.43	0.07
6 hour 1 in 10 year	0.02	0.56	0.66	0.10
6 hour 1 in 30 year	0.02	0.74	0.87	0.14
6 hour 1 in 100 year	0.03	0.95	1.13	0.18
6 hour 1 in 100 year + 20% CC	N/A	N/A	1.36	0.40
6 hour 1 in 100 year + 45% CC	N/A	N/A	1.64	0.69

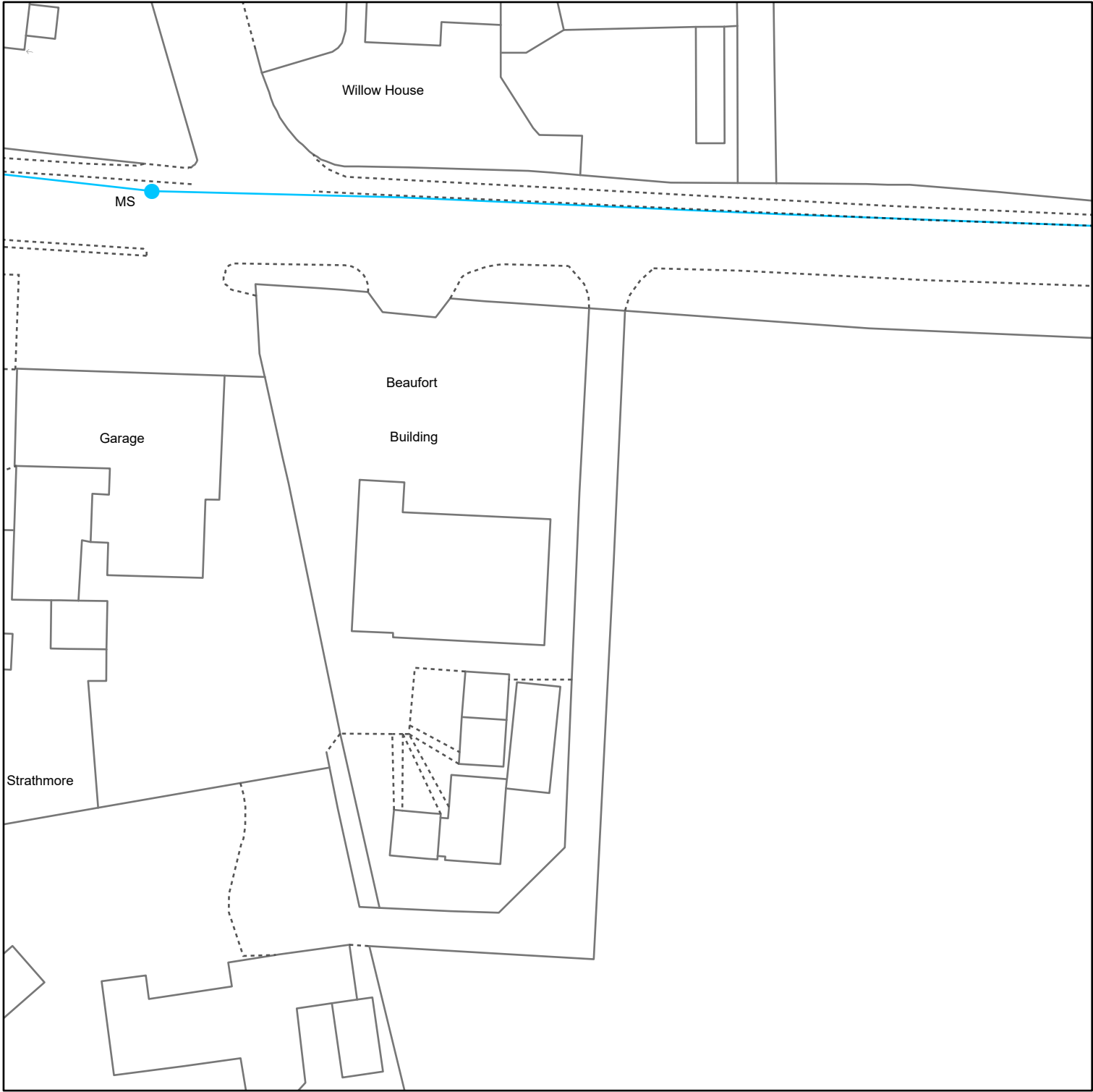
Rainfall event	Greenfield run-off volume (m ³)	Existing run-off volume (m ³)	Potential run-off volume without attenuation (m ³)	Potential minus existing (m ³)
QBAR	1.55	N/A	N/A	N/A
6 hour 1 in 1 year	1.47	7.88	9.34	1.47
6 hour 1 in 10 year	2.34	12.08	14.31	2.23
6 hour 1 in 30 year	2.97	15.93	18.89	2.96
6 hour 1 in 100 year	3.84	20.58	24.40	3.83
6 hour 1 in 100 year + 20% CC	N/A	N/A	29.29	8.71
6 hour 1 in 100 year + 45% CC	N/A	N/A	35.39	14.81

Return Period	Runoff rate restriction (l/s)	Critical Storm Duration (hr)	Attenuation Volume Required (m ³)	Volume required above previous return period
1 in 30 year	2.00	0.50	4.40	N/A
6 hour 1 in 100 year	2.00	0.50	6.69	2.29
6 hour 1 in 100 year + 45% CC	2.00	0.75	11.74	5.05

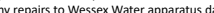
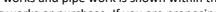
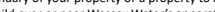
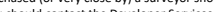
Appendix C

Wessex Water Asset Location Plan

Wessex Water Network Map



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WATER MAINS		SEWERS	STRATEGIC PUBLIC	PRIVATE	SECTION 104	OTHER WESSEX PIPES	NON-WESSEX / UNKNOWN
 Distribution	 Washout	 Foul	 Surface	 Combined	 Abandoned	 Rising Mains	 Standby Rising Mains
 Raw Water	 Abandoned	 Surface	 Combined	 Abandoned	 Private	 Culverted Watercourse	 Highway Drain
 Private	 Other	 Surface	 Combined	 Abandoned	 Private	 Highway Drain	 Use Unknown
 Hydrant	 Other	 Surface	 Combined	 Abandoned	 Private	 Highway Drain	 Status Unknown
 Hydrant	 Other	 Surface	 Combined	 Abandoned	 Private	 Highway Drain	 Status Unknown
 Hydrant	 Other	 Surface	 Combined	 Abandoned	 Private	 Highway Drain	 Status Unknown
 Hydrant	 Other	 Surface	 Combined	 Abandoned	 Private	 Highway Drain	 Status Unknown
 Hydrant	 Other	 Surface	 Combined	 Abandoned	 Private	 Highway Drain	 Status Unknown
 Hydrant	 Other	 Surface	 Combined	 Abandoned	 Private	 Highway Drain	 Status Unknown
 Hydrant	 Other	 Surface	 Combined	 Abandoned	 Private	 Highway Drain	 Status Unknown
 Hydrant	 Other	 Surface	 Combined	 Abandoned	 Private	 Highway Drain	 Status Unknown
 Hydrant	 Other	 Surface	 Combined	 Abandoned	 Private	 Highway Drain	 Status Unknown

Colours generally indicate the use of the sewer/drain (i.e Red - Foul, Dark Blue - Surface, Magenta - Combined/Dual Use, Light Green - Highway Drain, Mid Green - Overflow).

Some styles of line and symbol are shown on the key in sample/typical colours.

STRUCTURES

-  Manhole - Foul
-  Manhole - Surface
-  Manhole - Combined
-  Inlet
-  Outfall
-  Lamphole
-  Bifurcation - Foul
-  Bifurcation - Surface
- Bifurcation - Combined
- Combined Sewage Overflow

OTHER STRUCTURES

-  Pumping Station - Surface
-  Pumping Stn - Foul/Combined
-  Gully
-  Vent Column
-  Rodding Eye
-  Catchpit
-  Flushing Chamber
-  Soakaway
-  Non Return Valve
-  Air Valve
-  Hatch Box
-  Washout

OTHER WESSEX PIPES

-  Rising Mains
-  Standby Rising Mains
-  EDM
-  Effluent Disposal
-  Overflow
-  Syphon

NON-WESSEX / UNKNOWN

-  Private Rising Mains
-  Culverted Watercourse
-  Highway Drain
-  Use Unknown
-  Status Unknown

OTHER STRUCTURES

-  Attenuation Tank
-  Storage Tank
-  Chamber
-  Tunnel
-  Interceptor

Wessex Water

YTL GROUP



Date: 11/05/2026

Centre: 389082E, 174583N

Scale: 1:625
(when printed at A4 size)



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Tel: 01743 298 100

Email: info@geosmartinfo.co.uk

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The Property Ombudsman scheme

Milford House

43-55 Milford Street

Salisbury

Wiltshire SP1 2BP

Tel: 01722 333306

Fax: 01722 332296

Email: admin@tpos.co.uk

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- Liaise, at your request, with anyone acting formally on your behalf.

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Liz Lloyd

Finance Manager

GeoSmart Information Limited

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Tel: 01743 298 100

support@geosmartinfo.co.uk

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