

**KNOLL FARM, NORTON FERRIS,
WARMINSTER**

**FLOOD RISK REVIEW & DRAINAGE
STRATEGY**

Westcorn Environ Waste Ltd c/o Willis & Co

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1. INTRODUCTION

Introduction

- 1.1. SDS Consulting has been commissioned by the client to provide a Drainage Strategy report to support a planning application relating to a new storage and light industrial unit. This report has been prepared in accordance with the requirements set out in the National Planning Policy Framework (NPPF), the associated Planning Policy Guidelines (PPG) and local policy requirements.
- 1.2. This Drainage Strategy is intended to support a planning application and as such the level of detail included is commensurate and subject to the nature of the proposals.

Planning

- 1.3. Planning application PL/2025/07191 with Wiltshire Council is currently under consultation. Drainage comments have been received and state –
- 1.4.

1. Surface water drainage strategy:

- *The applicant must submit a surface water drainage strategy for the site. Any proposals should be designed in accordance with the Non-statutory Technical Standards for Sustainable Drainage Systems and the latest SuDS Manual (C753). The applicant is referred to the informatives for further details on the information required.*
- *It is noted the applicant is proposing, or has installed, a bund on the boundary of the highway and Knoll Farm. The applicant must provide the following information related to the bund:*
 - *The materials used to construct the bund*
 - *Pre and post-development overland exceedance drawings for the 1 in 100+CC year event. The drawing must include flows from the highway, adjacent land and the farm itself.*

Reason: to demonstrate there is no increased surface water flood risk to adjacent property or the highway.

Mitigating pollution / contamination to groundwater & watercourses:

- *The applicant must outline the mitigation measures proposed to prevent hazardous materials polluting groundwater or adjacent watercourses.*
- *The applicant is proposing, or has installed, a drainage run off for wheel wash area that is directed offsite and discharges into the adjacent land. The applicant must outline the treatment proposed to prevent polluting the adjacent land.*
- *The applicant must outline how pollution will be mitigated in the event of a 'spill incident'.*

Reason: to demonstrate there is no increase pollution risk to groundwater or watercourses.

Objectives & Scope

1.5. The objective of this report is:

- Review all sources of flood risk and the sequential location of the site.
- Determine the pre and post development conditions for surface water runoff.
- Detail a drainage strategy for the management and maintenance of the surface water generated from the proposed development.

1.6. The scope of this Drainage Strategy to support a planning application.

Limitations

1.7. The general limitations of this report are that:

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2. SITE CONTEXT

Development Proposals

- 2.1. The development proposals, in which this Drainage Strategy is written for, comprises a change of use of land and building for storage and light Industrial (Retrospective) including excavation works, an on-site bund, parking, landscaping and external storage AT Knoll Farm, Norton Ferris, Warminster, BA12 7FG.
- 2.2. Refer to the proposed site layout in **Appendix A** for the development proposals.

Site Location

- 2.3. The site is a brownfield site and is located as per **Figure 1 & 2** below.

Figure 1 : Site Location Plan



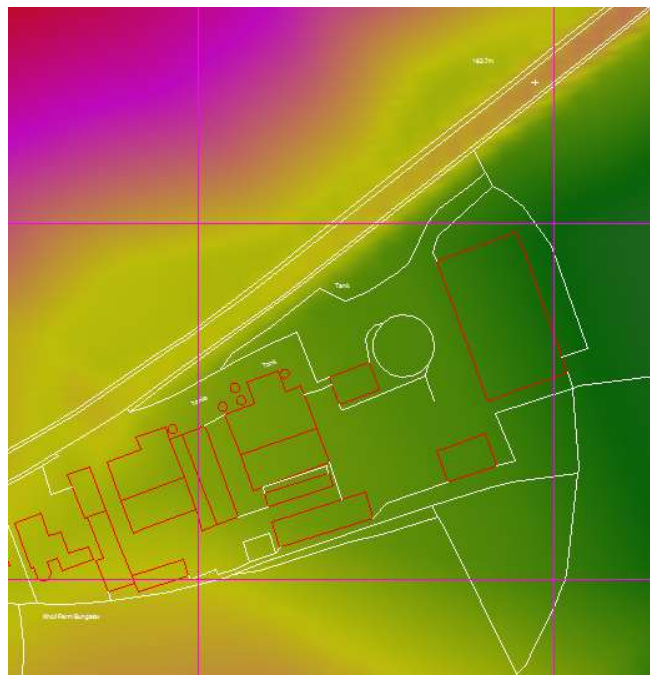
Figure 2: Approximate site boundary



Topography

- 2.4. A site specific topographical survey has not been undertaken to inform the site.
- 2.5. The general topography of the area is a fall from the north west to the east / south east. **Figure 3** identifies a height map based upon Digital Terrain Model (DTM) information. Higher ground is shown in pink and lower ground in green (dark green being the lowest)

Figure 3: DTM heat map



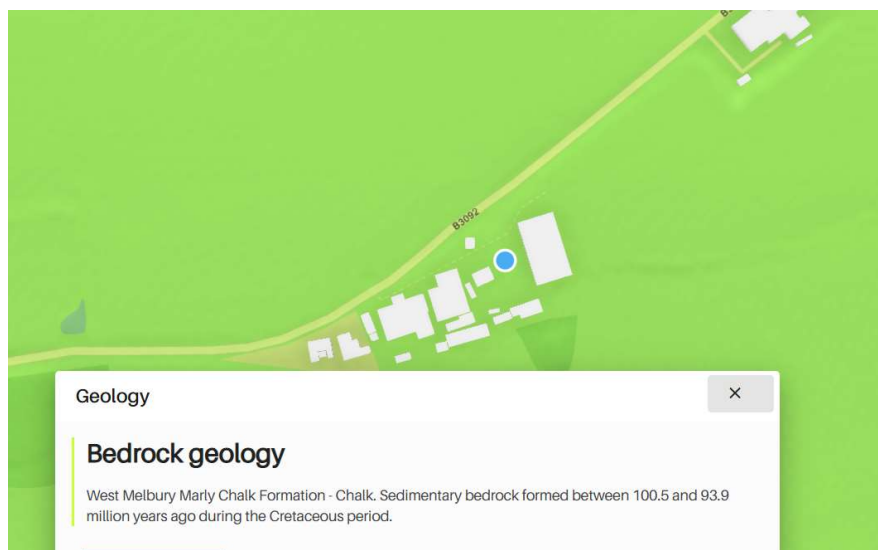
Hydrology

- 2.6. The site falls within the catchment of the River Wylfe located approximately 1800m to the south east of the site. The River Wylfe flows in a easterly direction where it has confluence with the River Nadder (which becomes the River Avon) in Salisbury.
- 2.7. Ditch networks are located within the site area, a ditch is located to the south east of the site which receives development discharge and flows in a easterly direction

Geology

- 2.8. The British Geological Survey (BGS) mapping indicates the site to be underlain by solid geology of the West Melbury Marly Chalk Formation. The site is not underlain by superficial deposits.

Figure 4: BGS Bedrock Geology



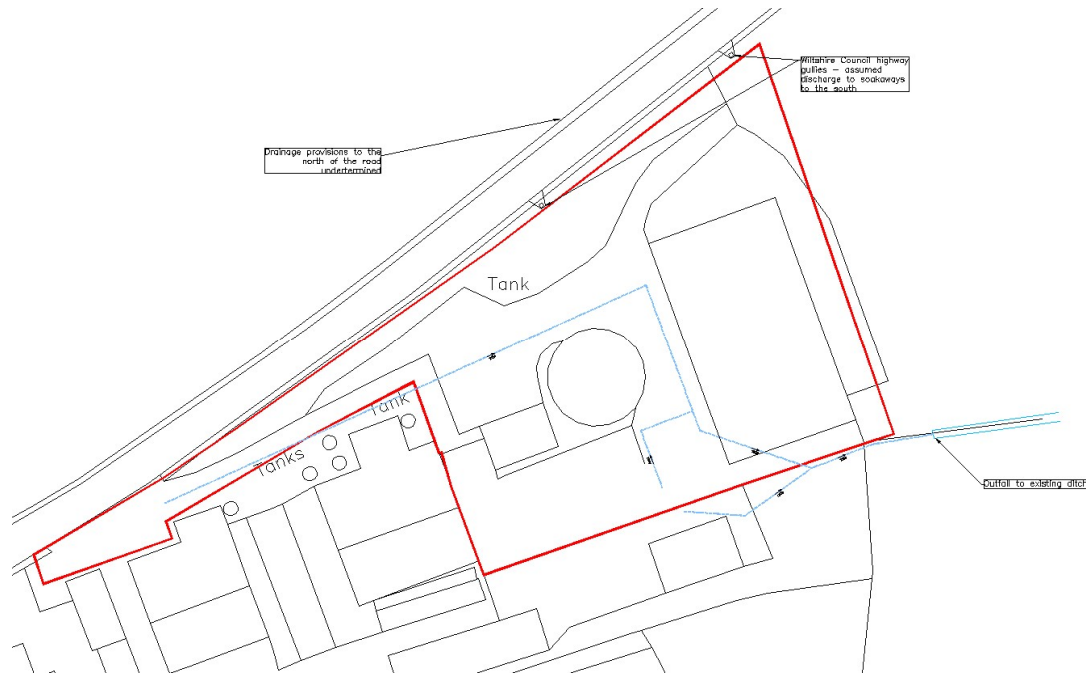
Site Investigation

- 2.9. A site specific ground investigation has not been undertaken.
- 2.10. A review of BGS borehole records confirms chalk is located but there are no details in relation to depth or soil types from ground level to the chalks.

Existing Drainage

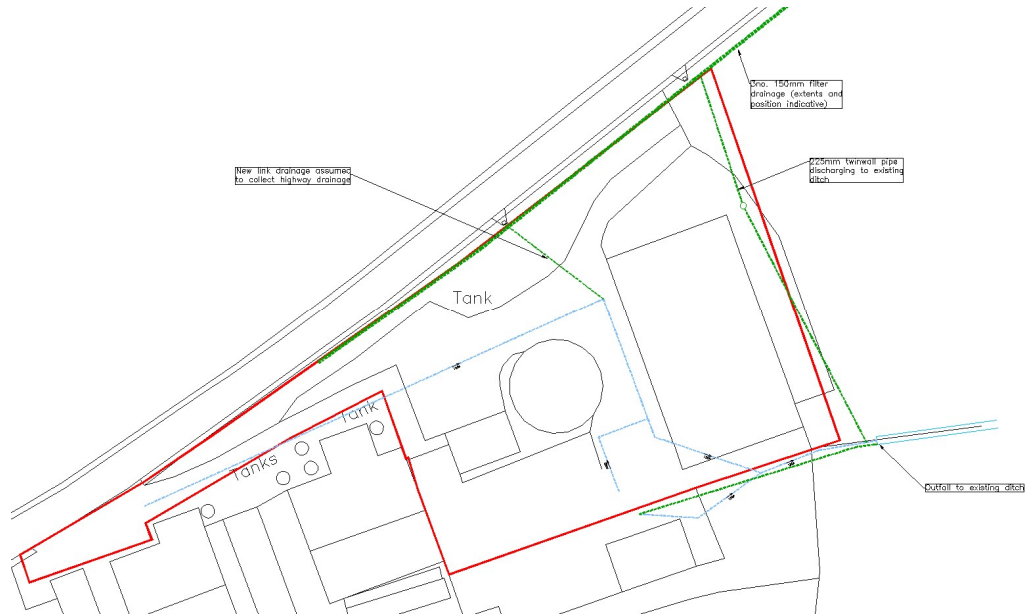
- 2.11. The site is remote and not served by mains drainage.
- 2.12. All drainage serving the site is self-sufficient with local discharge points to adjacent ditch networks, refer to **Figure 5**

Figure 5: Indicative existing drainage



- 2.13. It is noted that Wiltshire Council had removed roadside hedging and installed gabion baskets to reinforce the road edge and also installed road side gullies (as indicated in **Figure 5**) with outfall to assumed soakaways to the south of the highway.
- 2.14. A number of drainage improvements were proposed by MJ Abbott in December 2024 as instructed by the client noting that the Risk of Flooding from Surface Water (RoFSW) extents caused highway flooding that overtopped the kerbs and affected the site. The proposals of MJ Abbott are included in **Appendix B** for reference.
- 2.15. It was proposed that a bund and ditch is provided to the north of the site. The ditch is to have outfall to the existing ditch south of the site via a 225mm diameter twinwall pipe. It is understood from the marked up plan that the ditch to the north of the site was installed as 3 no. 150mm pipes assumed to be a filter carrier drain. Refer to **Figure 6** that shows the proposed drainage works as described / drawn by MJ Abbott in green.

Figure 6: Drainage improvement works (current drainage extents)



- 2.16. Further improvements works are suggested by MJ Abott in relation to the yard or to additional outfalls. It is understood that these drainage provisions have not been installed.

3. FLOOD RISK

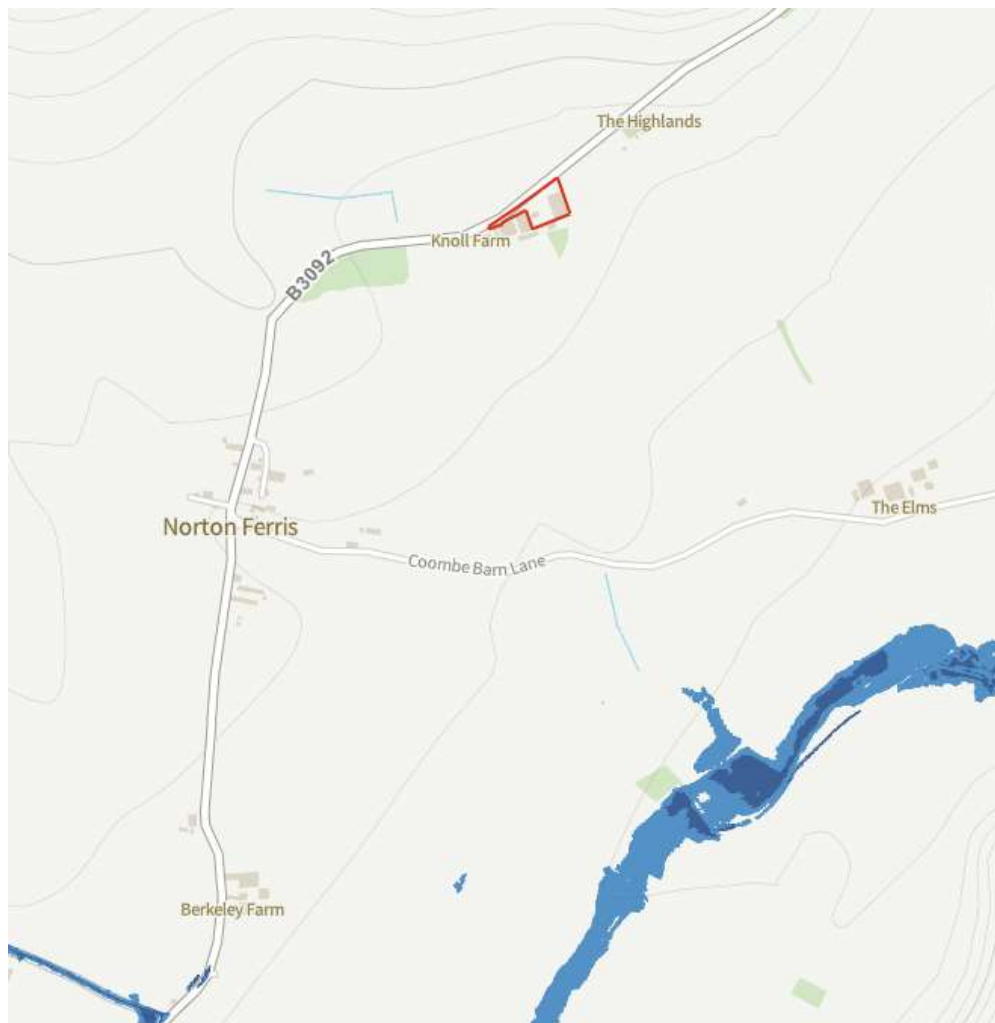
- 3.1. Inappropriate development in flood risk areas could pose significant risks in terms of personal safety and damage to the property for the occupiers of the development or for people elsewhere. The approach taken in the assessment of flood risk at the planning stage is set out in national, regional and local planning policy and associated guidance. This section summarises the key policies and guidance relevant to the proposed development.

Sources of Flood Risk

Fluvial Flooding

- 3.2. **Figure 7** provides an extract of the Flood Risk Map for planning which identifies that the site is located in Flood Zone 1.

Figure 7: Environment Agency's Flood Map for Planning



Pluvial Flooding

- 3.3. The Environment Agency's Risk of Flooding from Surface Water Map indicates where surface water may be expected to flood or pond. Surface water flooding happens when rainwater does not drain

away through the normal drainage systems or soak into the ground but lies on or flows over the ground instead.

- 3.4. **Figure 8** shows the extent of surface water flood risk as per the Environment Agency mapping. The mapping identifies ponding to the north of the site in adjacent fields and ponding centrally within the site. Refer to Section 4 of this report for a review of surface water flood risk.

Figure 8: Environment Agency - Risk of Flooding from Surface Water Map



Flooding from Groundwater

- 3.5. There are no records of groundwater flooding in the site or the surrounding area.

Flooding from Overwhelmed Sewers and Drainage Systems

- 3.6. There are no recorded flooding incidents of sewer flooding within the Wiltshire SFRA.

- 3.7. The highway floods regularly and affects the site when the flows overtop the southern kerb line

Flooding from Artificial Sources

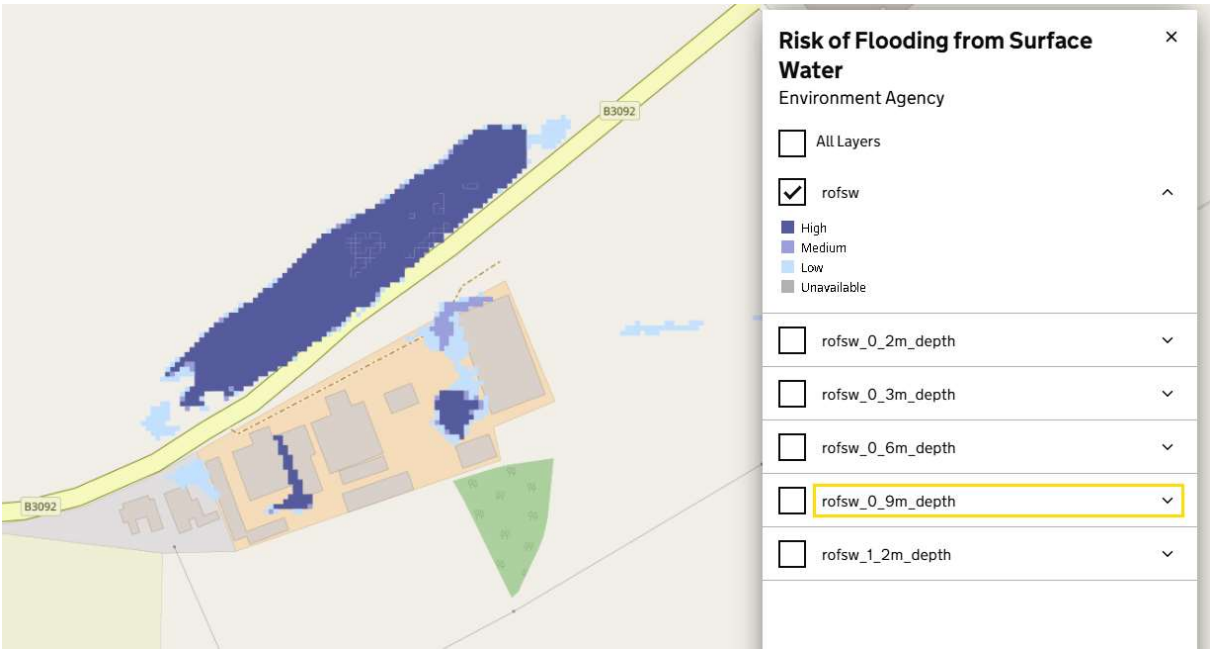
- 3.8. The Environment Agency's Risk of Flooding from Reservoirs Map indicates the site is unaffected by flooding from any reservoirs.

4. PLUVIAL FLOOD RISK REVIEW

RoFSW Extents

- 4.1. **Figure 9** identifies the extent of the mapped RoFSW in the vicinity of the site. A large area of ponding is located immediately north of the site and discharges through the site where water discharges over the carriageway. Within the site ponding is shown to the west of the barn indicating a low point in the site

Figure 9 – RoFSW extents



- 4.2. **Figure 10** identifies the ponding to the north of site as captured on Google Street view – it is noted that the Wiltshire Council SFRA explorer does not indicate any historic records of flooding in the vicinity of the site. The highway is known to flood during periods of heavy and sustained rainfall due to the extent of ponding to the north of the B3092.

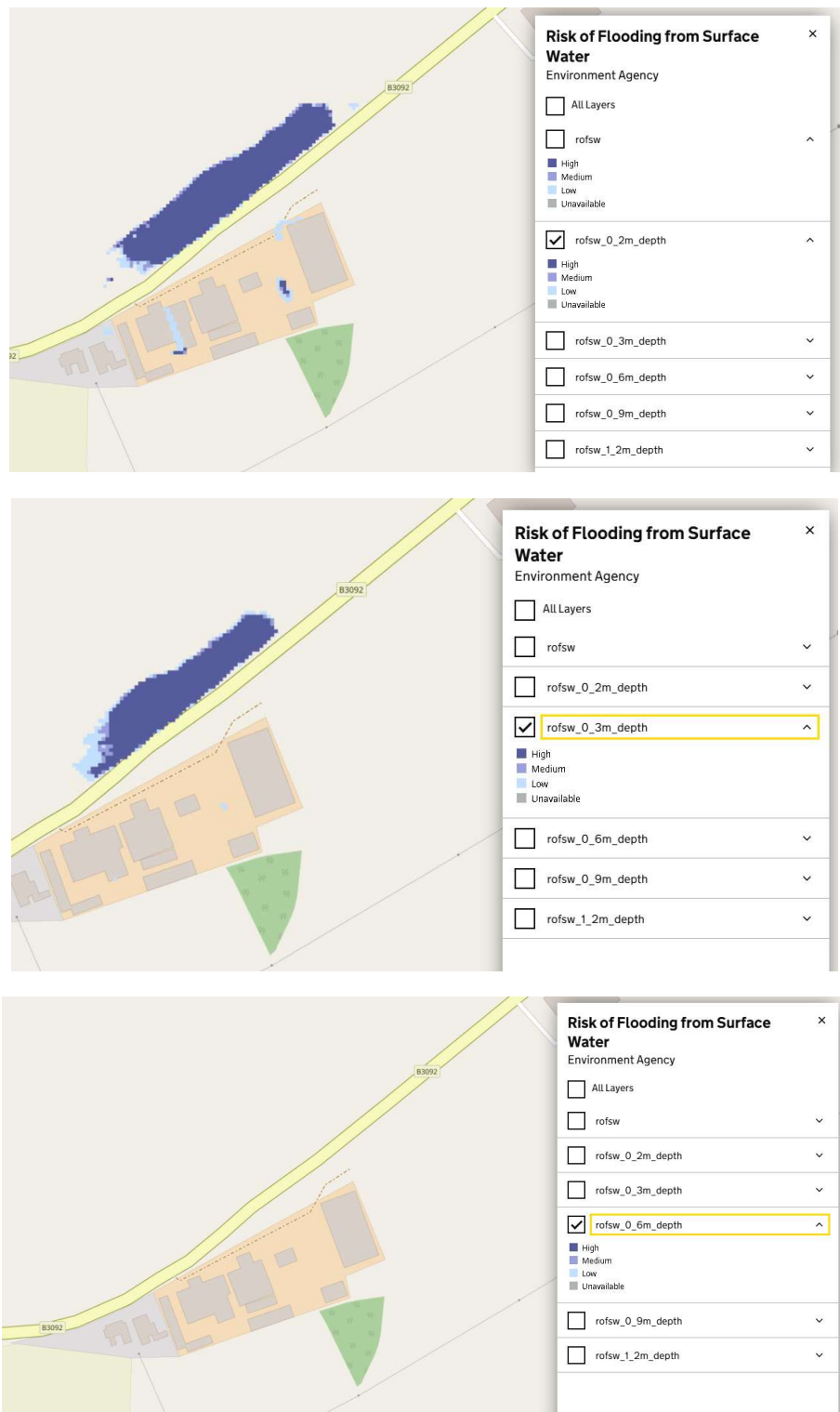
Figure 10 – RoFSW event



Mapped ROFSW Depths

4.3. Environment Agency RoFSW predicted flood depths are shown in **Figure 11**

Figure 11 – RoFSW Depths



- 4.4. Environment Agency RoFSW predicted flood depths indicate flood depths of 0.2m depth within the site and a small area of 0.3m flood depth. There are no flood depths indicated at 0.6m depth.
- 4.5. The flooding to the north of the highway is shown to be to a depth between 0.3 and 0.6m depth.

ROFSW flooding mechanism and associated works

- 4.6. The flood extents to the north of the B3092 are mapped based upon the low points of the surrounding land where natural flow is impeded with no 'mapped' discharge location. The frequency and extent of the RoFSW is exacerbated by adjacent ditch network issues.
- 4.7. The first paragraph of the MJ Abbott letter, in **Appendix B**, identifies ditch works on land to the north west of the site. The existing condition, prior to the works, was that the pond and ditch network overtopped with discharge directed towards Knoll Farm and contributing to the extent of the mapped RoFSW.
- 4.8. Details in **Appendix C** identify, and referenced in **Appendix B**, the extent of ditch works undertaken in which the channel was cleared and a bund was located to prevent overspill towards Knoll Farm. This entails that a significant portion of the surface water flows in this ditch network discharges to the pond and then further to the south and away from Knoll Farm. It is noted that the culvert from the pond and discharging south under the B3029 needs to be cleared but it is unconfirmed whether this has been undertaken. Furthermore, the farming practices within the field (that shows the RoFSW ponding) has been amended to allow for winter wheat which will aid in the retention of flows within the catchment.
- 4.9. In respects to the RoFSW to the highway, Wiltshire Council had removed roadside hedging and installed gabion baskets to reinforce the road edge and also installed road side gullies (as indicated in **Figure 5**) with outfall to assumed soakaways to the south of the site.
- 4.10. The mechanism of drain down to the north of the B3092 is assumed to be via infiltration

DTM Levels and RoFSW

- 4.11. A review of LiDAR DTM levels and the RoFSW extents has been undertaken to review flow paths and areas of ponding within the site. **Figure 12** identifies the flow routes as per the DTM data. The area of RoFSW ponding within the site is shown to have a flow path to the east and **Figure 12** identifies that the levels in the area of RoFSW within the site do not show a low point.

RoFSW Conclusion

- 4.12. The LiDAR DTM used in the production of the RoFSW maps is representative only and as such indicates areas in which surface water ponding can occur.
- 4.13. The extent of the RoFSW to land north of the B3092 only affects the site where the southern highway kerb level is exceeded and where vehicle movements causes flows to discharge into the site.
- 4.14. Mitigation works have been undertaken to manage the RoFSW flows to the north of the B3092 and as such reduced flood occurrence and impact to the site via suitable outfall provisions (from gullies and within the site specific network).
- 4.15. The RoFSW extents within the site are minimal and do not account for the site levels. As such surface water within the development site is unlikely to be realised noting flow paths and DTM levels.
- 4.16. It is noted that since the offsite drainage improvement works and change in farming practices since December 2024 has entailed that there is no surface water ponding in the field to the north of the site.

5. SURFACE WATER MANAGEMENT

Design Principles

- 5.1. Key design principles in the following guidance documents steer the approach to managing surface water runoff at sites:
- Building Regulations hierarchy of drainage (H3);
 - Interim Code of Practice for SuDS; and
 - CIRIA best practice guidance, including the use of the 'SUDS management train'
- 5.2. Building Regulations hierarchy of drainage outlines the preferred methods for the disposal of surface water with infiltration methods being the preferred option. If this is not possible the next favoured option is to drain to an existing watercourse. If neither of these options are feasible, the regulations state that rainwater discharge should be directed to a sewer.
- 5.3. The Interim Code of Practice for SUDS provides guidance about the hydraulic design criteria for Sustainable drainage systems. This in general refers to both peak rate of runoff and the volume of runoff, post development. Prior to mitigation measures such as the use of SuDS attenuation features, both the volume and peak rate of runoff may increase post development.
- 5.4. The design principles for surface water management extend beyond simple hydraulic criteria. CIRIA guidance promotes the use of the SUDS management train, a concept where SUDS techniques are used to treat, convey and store surface water runoff. This approach is considered as part of the SUDS selection methodology.

National Standards for Sustainable Drainage Systems (SuDS)

- 5.5. The new 2025 SuDS standards replace the narrower, hydraulics-focused 2015 guidance with a broader, multifunctional framework. The updated approach introduces seven national standards that give greater weight to water quality, amenity, biodiversity, and long-term maintenance, reflecting SuDS' wider role in shaping sustainable, resilient places.
- 5.6. The seven new National SuDS Standards are summarised as –

1. Runoff destinations

Discharge must follow the discharge 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.

Evidence is required to justify use of lower priority discharge locations.

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.

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*

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.

5. Amenity

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

6. Biodiversity

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

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.

Wiltshire Council Betterment Strategy (2024)

- 5.7. Table 2.2 of the Wiltshire Council Betterment Strategy (June 2024) identifies the requirements for brownfield sites and states –

For brownfield sites, the peak runoff rate from the development to any drain, sewer or surface water body for all return period between the 1 in 1 year rainfall event and the 1 in 100 year rainfall event must be as close as reasonably practicable to the greenfield runoff rate from the development for the same rainfall event.

At all stages of the planning process, when developing a brownfield site and once it has been proven that discharging to the Greenfield rate (or matched rates) or as close as feasibly possible is not possible, discharge rates should be restricted to provide a minimum 30% betterment over existing discharge rates for the brownfield site.

National Standards for SuDS

Standard 1 - Runoff destinations

- 5.8. In accordance with the National Standards for SuDS, the following priority discharge hierarchy is to be reviewed -

- 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.

Collected for non potable use

- 5.9. The site is a predominantly impermeable site being utilised as a commercial premise. The use of rainwater harvesting is not applicable or suitable to the site.

Infiltrated to ground

- 5.10. Infiltration rates are undetermined. The existing development site discharges to local ditch networks which are to be replicated and retained in the proposed development works.

Discharges to an above ground surface water body

- 5.11. The site is to utilise and replicate existing site conditions with discharge to the local ditch network.

Discharged to a surface water sewer, or another piped surface water drainage system

- 5.12. The existing network is to be retained and utilised

Discharged to a combined sewer

- 5.13. Not considered

Standard 2 -Management of everyday rainfall (interception)

- 5.14. Guidance requires that the first 5mm of rainfall does not result in discharge from the site. Guidance advises the use of rainwater harvesting or infiltration and the retention of water in SuDS which is to be 'lost to soils or the atmosphere'.

- 5.15. The implementation of SuDS will be specific to the requirements of the site noting that there is no change in the runoff designations of the site. Furthermore the suds to be implemented are to be specific to the use of the site in which at surface SuDS for water retention may not be achievable.

Standard 3 - Management of extreme rainfall and flooding

- 5.16. The following text reviews the requirement of the design to meet standard 3.

Climate Change

- 5.17. The NPPF requires development to take account of the impacts of climate change. The allowances to be made for climate change effects when assessing flood risk are related to the lifetime of the development.

- 5.18. The peak rainfall intensity allowances to be used when designing urban drainage systems have been obtained from the environment agencies web based resource tool 'Climate change allowances for peak rainfall' by searching the development management catchment for the surrounding area.

- 5.19. The site is located in the Avon Hampshire Management Catchment, the catchment allowances have reproduced in **Table A**. Both the central and upper end allowances need to be assessed to understand the range of impact.

Table A: Peak rainfall intensity allowance

Avon Hampshire Management Catchment peak rainfall allowances	3.3% Annual exceedance		1% Annual exceedance	
	'2050s' (up to 2060)	'2070s' (2061 to 2125)	'2050s' (up to 2060)	'2070s' (2061 to 2125)
Central	20%	25%	25%	25%
Upper End	35%	40%	40%	45%

- 5.20. Surface water drainage design will allow for 40% climate change within the 30 year return period storms and 45% for the 100 year return period storms.

Surface Water Flow Balancing

Catchment Areas

- 5.21. The building measures 1000m² with external areas remaining unchanged and utilised as perking. No additional built form or structure is added through the change of use application.

Greenfield Runoff Rate

- 5.22. Greenfield runoff rates have been calculated as represented in **Table B** – calculations can be found in **Appendix D**. Greenfield runoff rates are very low due to the development size and the geology of the site showing as chalks.

Table B: Greenfield Runoff Rates

Return Period (Years)	1	2	30	100
Greenfield Runoff Rates (l/s)	0.02	0.02	0.05	0.1

Pre Development Peak Runoff Rate

- 5.23. The Modified Rational Method has been used to determine the runoff from the impermeable areas of the existing site (refer to **Table C**)–

$$Q=2.78CiA$$

Where

Q= flow (l/s), I = rainfall intensity (mm/hr), A = Impermeable Area (ha), C = runoff coefficient

Table C: Pre development site Modified Rational Method permeable runoff

Return Period	C	I	A	Flow (l/s)
1:1 year	0.95	28.809	0.1	7.608
1:30 year	0.95	70.680	0.1	18.666
1:100 year	0.95	91.443	0.1	24.150

Post development unattenuated Peak Runoff Rate

- 5.24. Where assessing the redeveloped sites peak runoff rate, including allowance for climate change and changes in impermeable areas, the unattenuated peak runoff rate is as presented in **Table D** (calculated utilising the Modified Rational Method).

Table D: Post development site Modified Rational Method impermeable runoff.

Return Period	C	I	A	Flow (l/s)
1:1 year	0.95	28.809	0.1	7.608
1:30 year (+30%cc)	0.95	77.748	0.1	20.533
1:100 year (+40%cc)	0.95	132.593	0.1	35.071

- 5.25. If the site were to discharge at unattenuated rates, the post development site would increase flows due to the allowance for climate change.

Discharge rate

- 5.26. The development is a small brownfield site. Greenfield runoff rates are very low and can not be replicated in mechanical flow control devices.
- 5.27. It is proposed that all surface water discharge from the barn is limited to 1.0l/s for all storm events.
- 5.28. The proposed discharge rate of 3l/s would represent a betterment of 61%, 85% & 91% for the 1:1, 1:30 and 1:100 year storm events respectively and as such is in accordance with the National Standards for SuDS and the Wiltshire Council betterment policy

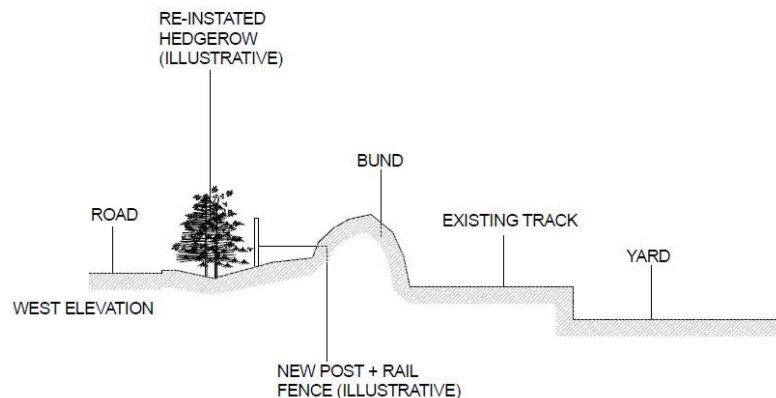
Surface Water Drainage Strategy

- 5.29. In view of the requirements of the NPPF, PPG, and design parameters and constraints associated with redeveloping this site, a surface water drainage strategy design has been devised and hydraulically modelled to demonstrate that the scheme can be suitably implemented without increasing the level of flood risk, when the surface water drainage system experiences a 1:100-year rainfall event (including 45% allowance for climate change).
- 5.30. The surface water drainage scheme has been designed to ensure:
- Sustainable Urban Drainage systems are wholly incorporated within the scheme.
 - Consideration is given for the improvement of water quality within the design.
 - The designed drainage scheme can satisfactorily retain a critical 1 in 100 Year storm event with climate change.
- 5.31. The existing building is served by rainwater pipes to the eastern and western elevations. These rainwater points are assumed to discharge to the ground surface with drainage collected by the existing drainage provisions.
- 5.32. For the development proposal and to be in accordance with the requirements of the LPA, the surface water drainage from the building is to be collected and conveyed via a filter carrier drainage network and crated attenuation with discharge to the existing drainage network and ditch. The discharge rate for the connection to the existing network is to be limited to 3l/s for all storm events.
- 5.33. Refer to drawing 7136-C-SK01. 'Drainage Strategy' in **Appendix E** for the layout of the surface water network.
- 5.34. The hydraulic assessment provides various scenarios up to and included the critical 1 in 100 Year storm event with additional 45% allowance for climate change. The simulations confirm that the storm can be managed and maintained within the site without flooding. The hydraulic models of the proposed surface water network and SuDS devices can be found in **Appendix F**.

Exceedance

- 5.35. Exceedance flows will follow the natural topography of the site and discharge is an easterly direction as represented in **Figure 12**.
- 5.36. All flow paths are retained noting that there is no change in the external built form.
- 5.37. The development includes the installation of a earth bund to the north of the site to protect the development from the RoFSW and highway flooding. **Figure 13** indicates a section of the bund. The bund is to be constructed from existing site won material and landscaped accordingly – the client is to provide specific details where requested. Drawing 7136-C-SK01 'Drainage Strategy' in **Appendix E** identifies the post development exceedance flow paths where allowing for the bund.

Figure 13 Site bund section



Standard 4 - Water quality

- 5.38. In terms of water quality, the proposed surface water system offers a suitable level of mitigation in accordance with Environment Agency, DEFRA and CIRIA guidance.
- 5.39. The CIRIA SuDS Manual C753, 2015 details an approach for establishing the hazard posed by the intended land use activities and the extent to which the proposed SuDS components can reduce and mitigate the contamination risk to the receiving waterbody. Referring to Table 26.2 – 'Pollution hazard indices for different land use classifications' (CIRIA C753, 2015) the proposed development and land use results in a low pollution hazard, therefore a 'simple index' method can be used to make a qualitative assessment of the proposed SuDS management.
- 5.40. To ensure that there is adequate treatment, all SuDS components utilised should have a pollution mitigation index that equals or exceeds the pollution hazard index. In reference to Table 26.2, the pollution hazard index for the commercial roof area is -

$$TSS = 0.3,$$

$$Metals = 0.2,$$

$$Hydrocarbons = 0.05.$$

Figure 14: CIRIA C753, 2015. Table 26.2 – ‘Pollution hazard indices for different land use classifications’

TABLE 26.2 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 (eg cul de sacs, homezones and general access roads) and non-residential car parking with infrequent change (eg schools, offices) ie < 300 traffic movements/day	Low	0.5	0.4	0.4
Commercial yard and delivery areas, non-residential car parking with frequent change (eg hospitals, retail), all roads except low traffic roads and trunk roads/motorways ¹	Medium	0.7	0.6	0.7
Sites with heavy pollution (eg haulage yards, lorry parks, highly frequented lorry approaches to industrial estates, waste sites), sites where chemicals and fuels (other than domestic fuel oil) are to be delivered, handled, stored, used or manufactured; industrial sites; trunk roads and motorways ¹	High	0.8 ²	0.8 ²	0.9 ²

Notes

- 1 Motorways and trunk roads should follow the guidance and risk assessment process set out in Highways Agency (2009).
- 2 These should only be used if considered appropriate as part of a detailed risk assessment – required for all these land use types (Table 4.3). When dealing with high hazard sites, the environmental regulator should first be consulted for pre-permitting advice. This will help determine the most appropriate approach to the development of a design solution.

5.41. In reference to Table 26.3 – ‘Indicative SuDS mitigation indices for discharges to surface waters’ (CIRIA C753, 2015) the inclusion of a filter strip provides mitigation totalling:

TSS = 0.4

Metals = 0.4

Hydrocarbons = 0.5

Figure 15: CIRIA C753, 2015. Table 26.3 – ‘Indicative SuDS mitigation indices for discharges to surface waters’

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

Notes

- 1 SuDS components only deliver these indices if they follow design guidance with respect to hydraulics and treatment set out in the relevant technical component chapters.
- 2 Filter drains can remove coarse sediments, but their use for this purpose will have significant implications with respect to maintenance requirements, and this should be taken into account in the design and Maintenance Plan.
- 3 Ponds and wetlands can remove coarse sediments, but their use for this purpose will have significant implications with respect to the maintenance requirements and amenity value of the system. Sediment should normally be removed upstream, unless they are specifically designed to retain sediment in a separate part of the component, where it cannot easily migrate to the main body of water.
- 4 Where a wetland is not specifically designed to provide significantly enhanced treatment, it should be considered as having the same mitigation indices as a pond.
- 5 See Chapter 14 for approaches to demonstrate product performance. A British Water/Environment Agency assessment code of practice is currently under development that will allow manufacturers to complete an agreed test protocol for systems intended to treat contaminated surface water runoff. Full details can be found at: <http://tinyurl.com/qf7yuj7>
- 6 SEPA only considers proprietary treatment systems as appropriate in exceptional circumstances where other types of SuDS component are not practicable. Proprietary treatment systems may also be considered appropriate for existing sites that are causing pollution where there is a requirement to retrofit treatment. SEPA (2014) also provides a flowchart with a summary of checks on suitability of a proprietary system.

Wheel Wash

- 5.42. The LPA have noted the inclusion of a wheel washing facility as part of the works. It should be noted that the wheel wash area has been removed from the proposals.
- 5.43. Should a wheel washing facility be proposed in the future, all surface water from this facility is to be bunded through the use of channel drainage with discharge to pass through a wheel washing separator or bypass separator to ensure that all contaminants or pollution risks are to be contained.

Blockages & Spillages

Blockage

- 5.44. In the event of a blockage within the drainage network, the key risk is that of flooding to the surrounding area. The extent and location of flooding is dependent upon the location of the blockage and the associated storm event.
- 5.45. In the event of a blockage within the network, the network is to be drained down by use of suction equipment and the blockage removed.
- 5.46. If a blockage does occur and results in flooding, the exceedance flow routes are anticipated to flow in a northerly direction.

Spillages

- 5.47. Due to the nature of the development, the likelihood of a spillage is minimal.

- 5.48. Most spillages on development sites are of compounds that do not pose a serious risk to the environment if they enter the drainage in a slow and controlled manner with time available for natural breakdown in a treatment system. Therefore, small spillages of oil, milk or other known organic substances should be removed where possible using soak mats as recommended by the Environment Agency with residual spillage allowed to bio-remediate in the drainage system.
- 5.49. In the event of a serious spillage, either by volume or of unknown or toxic compounds, then isolate the spillage with soil, turf or fabric and block outlet pipes from chamber(s) downstream of the spillage with a bung. Contact the Environment Agency immediately.

Standard 5 – Amenity

- 5.50. Filter drains can be installed with rock / stone at the surface to create boundary or edging to areas. Alternatively they can be wrapped in geotextile and have landscaping above.

Standard 6 – Biodiversity

- 5.51. The gravel medium of filter drains can host microorganisms and provide breeding grounds for insects and amphibians. Adjacent or overlying biodiverse planting can deliver biodiversity options.

Standard 7 - Design of drainage for construction, operation, maintenance, decommissioning and structural integrity.

Construction

- 5.52. The planning application is a change of use therefore works are minimal and a filter carrier drain and flow control is to be installed as the only drainage works.

Management & Maintenance

- 5.53. Maintenance refers to the inspections required to identify performance issues and plan maintenance as required, operation and maintenance of the drainage system, landscape management and waste management associated with contaminated silt and other waste materials resulting from maintenance.
- 5.54. CIRIA C753 The SuDS Manual provides information in Chapter 32 for the operation and maintenance of SuDS. The maintenance activities are broadly defined as regular, occasional and remedial maintenance. It is noted that some scenarios may require one-off maintenance activities. The SuDS Manual defines maintenance as –
- Regular Maintenance: consists of basic tasks carried out to a frequent and predictable schedule, including inspections/monitoring, silt or oil removal if required more frequently than once a year, vegetation management, sweeping or surfaces and litter / debris removal.
 - Occasional maintenance: comprises tasks that are likely to be required periodically, but on a much less frequent and predictable basis than the regular tasks.
 - Remedial maintenance: describes the intermittent tasks that may be required to rectify faults associated with the system, although the likelihood of faults can be minimised with good design, constructions and regular maintenance activities.
- 5.55. Maintenance regimes are to be reviewed on an annual basis to ensure that the approach adopted is meeting its objectives.
- 5.56. All those responsible for the maintenance operations should adhere to the relevant health and safety legislation for the activities listed within this report (including lone working, if relevant).

Method statements and risk assessments should always be completed prior to the undertaking of any works.

Indicative Maintenance & Management Plan

Gravity Drains & Catchpits

- 5.57. Maintenance will usually be carried out manually, although a suction tanker can be used for sediment/debris removal. If maintenance is not undertaken for long periods, deposits can become hard-packed and require more effort to remove.

Filter Carrier Drain

- 5.58. Filter carrier drains are shallow trenches filled with stone / gravel that create temporary subsurface storage for the attenuation, conveyance and filtration of surface water runoff.
- 5.59. Filter carrier drains require regular maintenance to ensure continuing operation, refer to **Figure 16** for the operational requirements.

Figure 16: CiRIA C753, 2015. Table 16.1

Maintenance schedule	Required action	Typical frequency
Regular maintenance	Remove litter (including leaf litter) and debris from filter drain surface, access chambers and pre-treatment devices	Monthly (or as required)
	Inspect filter drain surface, inlet/outlet pipework and control systems for blockages, clogging, standing water and structural damage	Monthly
	Inspect pre-treatment systems, inlets and perforated pipework for silt accumulation, and establish appropriate silt removal frequencies	Six monthly
	Remove sediment from pre-treatment devices	Six monthly, or as required
Occasional maintenance	Remove or control tree roots where they are encroaching the sides of the filter drain, using recommended methods (eg NJUG, 2007 or BS 3998:2010)	As required
	At locations with high pollution loads, remove surface geotextile and replace, and wash or replace overlying filter medium	Five yearly, or as required
	Clear perforated pipework of blockages	As required

Flow Control Chambers

- 5.60. The flow control chamber proposed for this site is a Hydro Brake which has no moving parts and are self-activating requiring minimal maintenance. The bypass disc is the only manually operated element and is applicable for use in the event of a blockage or issue with the drainage network. It is recommended that the chamber is inspected monthly for three months after installation and bi-annually thereafter to verify the condition and operation of the unit and check for blockages within the chamber or flow control device.
- 5.61. Any silt or debris found during inspections should be removed and cleaned out with the use of a sump vacuum cleaner.
- 5.62. The table below gives a summary of the operation and maintenance requirements for flow control devices –

CONTROL CHAMBERS	
Regular Maintenance	Frequency
Check there is no physical damage and that control is functioning. Ensure bypass arrangements are functional. Remove Debris and silt. Undertake inspection after autumnal leaf fall to ensure functionality of control and that there are no blockages	Monthly
Remedial Works	Frequency
Repair physical damage if required / replace unit is damaged	As required
Monitoring	Frequency
Inspect chamber and flow control units to ensure that they are in good condition and operating as designed.	Annually and after large storms

Maintenance Responsibility

- 5.63. The definition of responsibility is determined by adoptions, private responsibility and shared responsibility typically determined within a management company. The extent of the responsibilities is assumed to be fully private or under a private management company.
- 5.64. The site owners will have the responsibility for some or all of the following (subject to detailed design):
- Filter carrier drains
 - Private drainage networks

6. CONCLUSIONS

- 6.1. The development proposals, in which this Drainage Strategy is written for, comprises a change of use of land and building for storage and light Industrial (Retrospective) including excavation works, an on-site bund, parking, landscaping and external storage AT Knoll Farm, Norton Ferris, Warminster, BA12 7FG.
- 6.2. The key conclusions are:
- The site is located in Flood Zone 1
 - Surface water flood risk is shown within the site and to the north
 - Various works have been undertaken to limit the impact of RoFSW from the north through land management, drainage upgrades and additional drainage provisions. Surface water ponding has not been observed since December 2024 when the measures were implemented.
 - The site is a brownfield site served by private drainage networks.
 - There is no additional impermeable area or built form
 - Surface water flows are limited to 1l/s in accordance with national and local standards
 - Surface water drainage is to discharge to the existing private surface water drains as per existing site conditions.
 - SuDS are implemented to the site in accordance with the national standards for SuDS and the site specific conditions. Filter carrier drains are proposed to serve the site and provide water quality and attenuation requirements.
 - This report provides sufficient information to prove a viable means of surface water management. Surface water drainage has been developed in line with local and national policy requirements.
- 6.3. This report provides the drainage strategy and review of flood risk with consideration of the pre and post development conditions to satisfy and address the LLFA comments relating to the planning application.
- 6.4. This report provides sufficient information in relation to the application of SuDS and proprietary devices for water quality.
- 6.5. The overall conclusions drawn from this report is that the development would be appropriately safe for its lifetime taking account of the flood risk vulnerability of the site and its users and the development would not increase flood risk elsewhere through the implementation of an effectivity drainage strategy.

APPENDICES

APPENDIX A

Willis & Co.

Chartered Town Planners
30 The Causeway, Chippenham, Wiltshire, SN15 3DB.
Telephone: 01249 444975 Facsimile: 01249 655556
Email: Willisplan@aol.com

Client; Mr R. Cornish.
Title; Knoll Farm, Norton Ferris, Warminster BA12 7HT.
Site Plan.

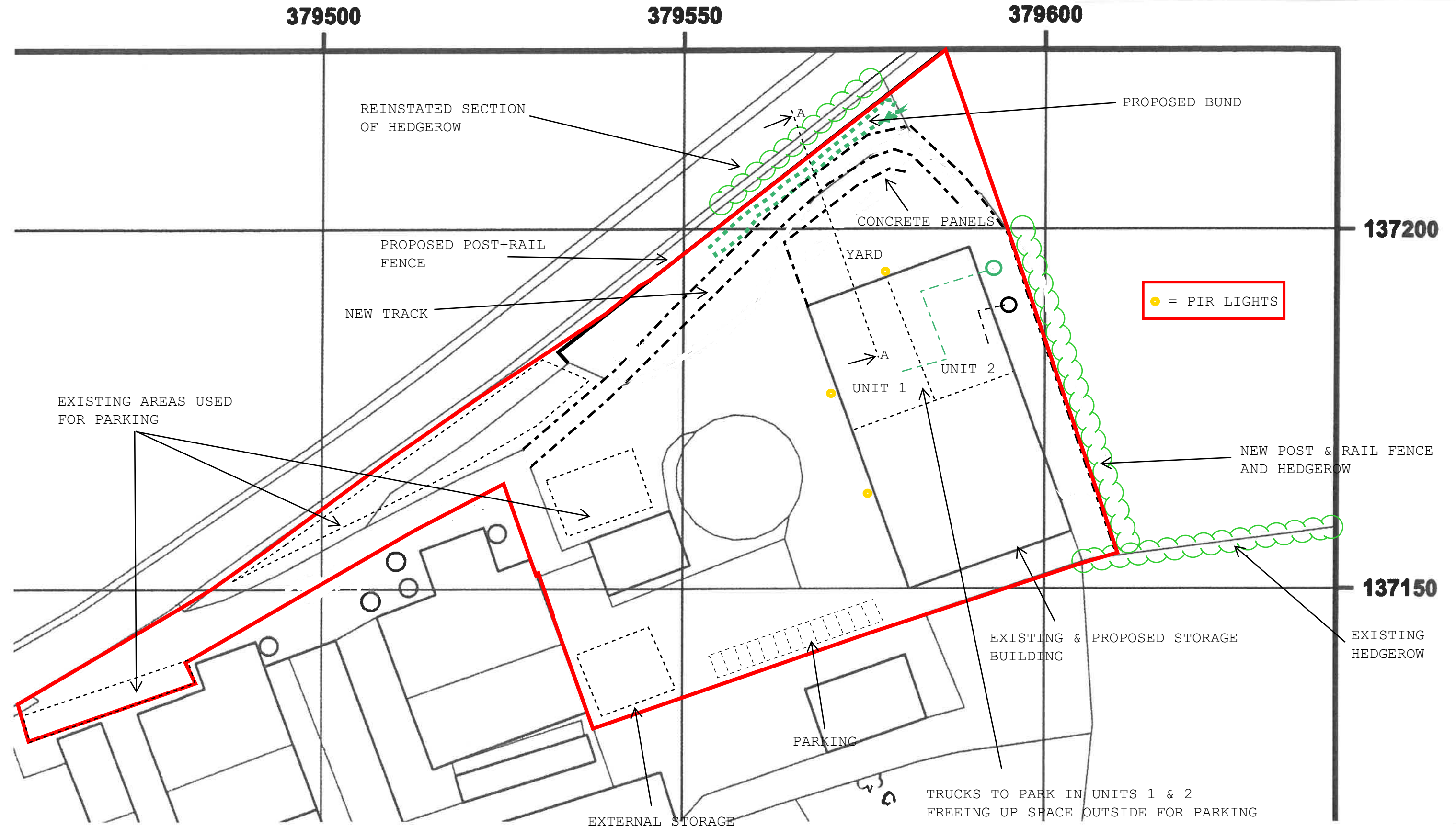
Scale; 1:500@A3 Date; OCT. 2025 Drawing no; RC-JH-02

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NOTE : GREEN & BLACK CIRCLES
ADJACENT TO UNIT 2 INDICATE
DRAINAGE CHAMBERS/CHANNELS FOR
EACH UNIT

0 12.5 25 37.5 50
SCALE - 1:500 @A3



APPENDIX B

MJ ABBOTT

Russell Cornish
Knoll Farm
Norton Ferris
Nr Mere
Salisbury
Wiltshire
BA12 7HT

Dear Russell,

Ref: Meeting at 2pm on 3 December 2024. Present: Russell Cornish (owner), Ben Cornish (son), Marcus Randall, Project Manager MJ Abbott Ltd and Mike Abbott, Director (Rtd) MJ Abbott Ltd.

Since our recently carried out ditching scheme for Jonathan Hames a large portion of the surface water has been redirected into Angus Neishes' pond and once the WCC have jetted/cleaned the culvert pipe under the road, as we believe has been proposed, the only run off into the grass field will only be that which actually falls on the land. Jonathan Hames plans to crop it with winter wheat and not maize, so reducing the runoff.

Suggestions for Knoll Farm to complete earthworks/drainage items to safeguard premises should any further over topping of road with surface water from fields mentioned above.

WCC removed roadside hedge and installed rock filled gabion baskets to reinforce road edge (unseen) to receive road surface water 3 No drain gullies with kerbed directions were installed with outlets or porous rings. (assumed-as unseen). The spoils from the recent work have screened these baskets, placed by yourselves at the farm.

This spoil needs to be shaped and compacted to form a permanent bund with any loose concrete lumps buried underneath. Compaction wheels are available from BPH to fit onto

Our Ref: MJ/A/12.12.24
Date: 12 December 2024


MJ ABBOTT Limited
Bratch Lane • Dinton • Salisbury • Wiltshire • SP3 5EB • Telephone: 01722 716361 • Fax: 01722 716 828
E-mail: enquires@mjabott.co.uk • Website: www.mjabott.co.uk
Registered in England No. 1930335

MJ ABBOTT

13 ton excavators. BPH south West (01761 239 213) MJA Ltd also run 13 ton excavators with wheels in house should you wish us to help.

A low spot should also be created in the bund (Approx at point B) to make sure any over topping of the bund happens where it is controlled. It can then be funnelled into the prosed ditch at the base.

A new V ditch approx. top width, 1.0m depth and 400mm bottom width be dug on your field side of the embankment C – D approx. 130lm with a separate 225mm twin wall outlet to your new ditch E – F 82lm. Point E to have inlet headwall Point F will also need a GRP outlet headwall with vermin trap. This ditch would then isolate any overtopping of field or road water effecting your existing drainage system. Your existing drain (located at Point G) at present blowing up in your yard needs a clay potchamber and to be piped to the head of your 225mm twin wall Point H. This pot can probably be 150mm ID twin wall, perforated, with trench filled with 20/40 clean stone to prevent any seepage entering ramp with lorry park. Another 150mm perforated Twinwall can also be used to cut off water from running in the barn, this could be connected at Point H too. We would suggest a trench filled with 40mm to act as French drain. Dimension 450 x 600mm by appropriate length. Positioned at the barn entrance and perhaps at the top of the slope. This will need maintaining to stop silting up over time. Raking the surface of it through with excavator bucket teeth would usually be sufficient.

If you find the very deep ditch you have dug becomes dangerous/difficult to maintain then this could be piped using say a 400/450mm ID pipe along at least the first field and filled in again. Our surveyor could carry out a level survey for you should you wish.

I understand further rain on 4 December 2024 caused Angus Neishe's pond to overflow and fill the field to capacity again and over top the main road into your property. If this was cleared and the 9" pipe completely cleared, the pond could be further improved to increase capacity with a better embankment.


MJ ABBOTT Limited
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MJ ABBOTT

Ideally the council should provide a new culvert at the lowest point to direct this water direct to your field, you can then install separate pipe to your ditch. This could be oversized and used as an additional drain for future works.

I hope you find the above is of interest to you and please don't hesitate to contact Marcus or me if you wish another visit etc. Should the council wish to install an outlet pipe the chambers then a link pipe can be brought to the new V ditch and through to your new outlet pipe. Should you require more pipe, chambers, headwalls etc. please don't hesitate to contact M J Abbott Ltd Sales division.

Yours faithfully

Michael Abbott

Michael Abbott
Director (Retired)


MJ ABBOTT Limited
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Registered in England No. 1930335



LEGEND

PROPOSED DITCH

PROPOSED 225MM TWINWALL

PROPOSED FRENCH DRAIN

Revision Notes

MJ ABBOTT

T: +44 (0) 1722 716361 W: mjabott.co.uk

PROJECT:

NORTON FERRIS

CLIENT:

KNOLL FARM

TITLE:

PROPOSED DRAINAGE

SCALE:

2:1 @ A2

DATE:

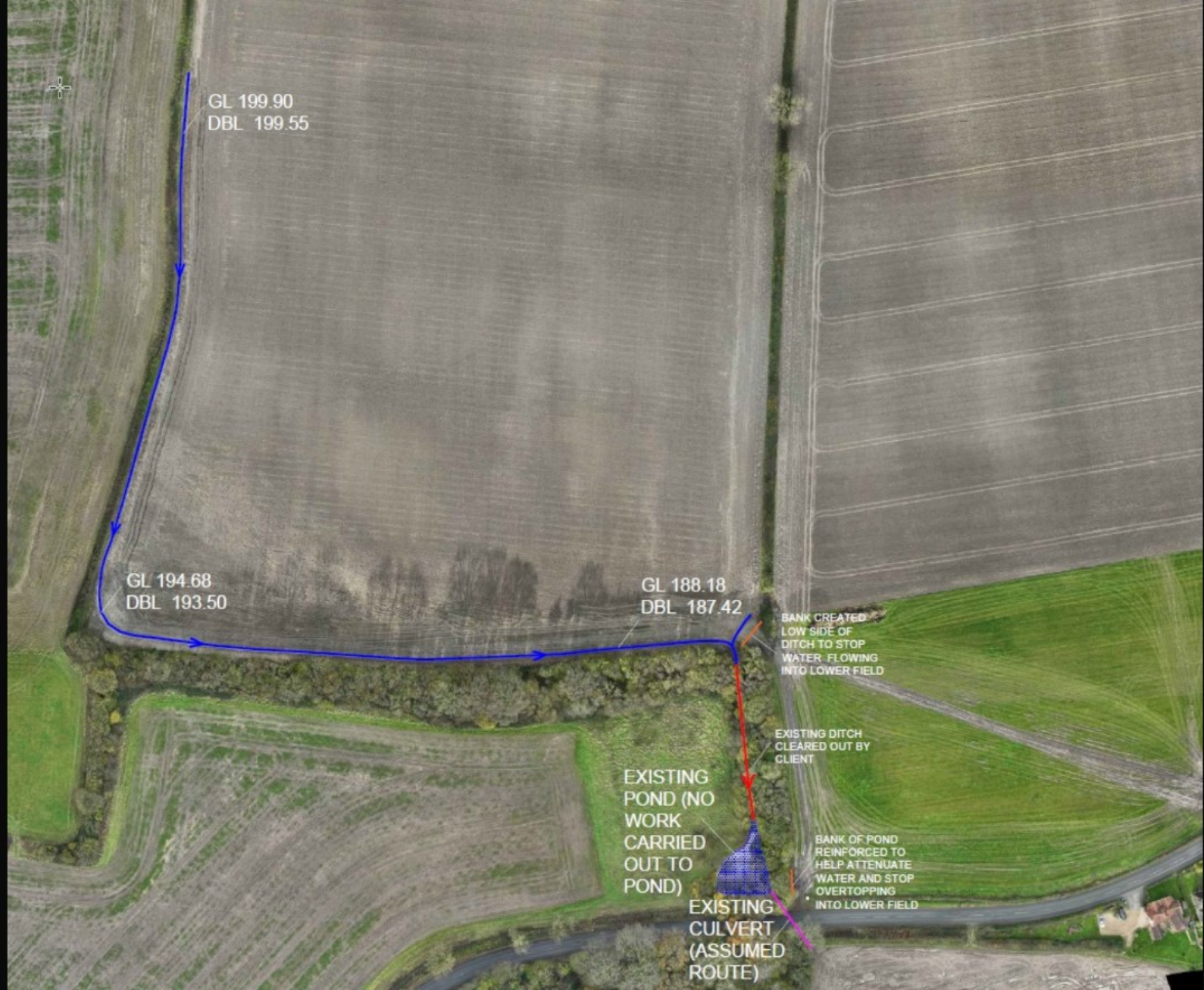
04/12/2024

REVISION

DRAWING N°:

NOR016-DA-SU-001

APPENDIX C



APPENDIX D

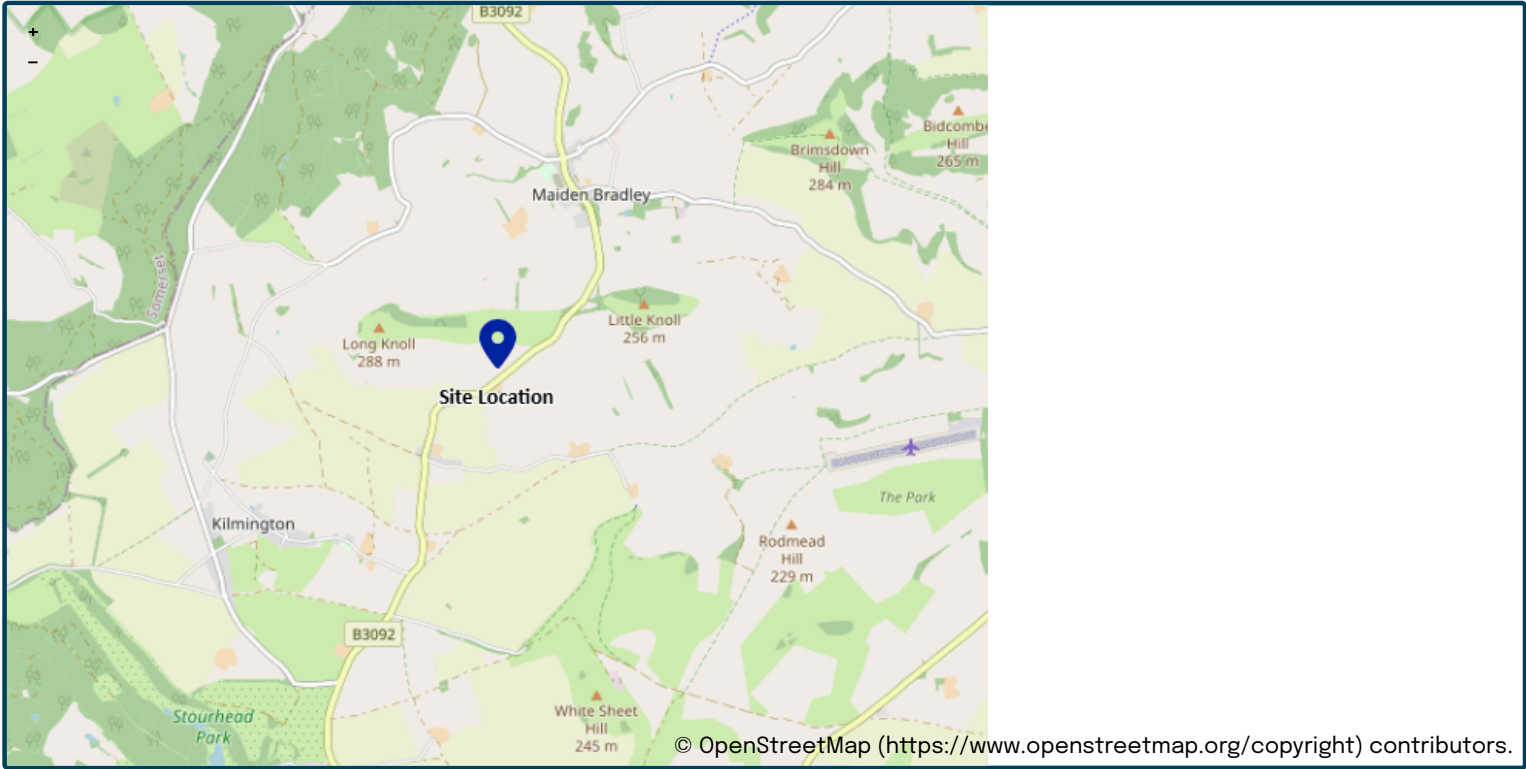
This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance “Rainfall runoff management for developments”, SC030219 (2013), the SuDS Manual C753 (CIRIA, 2015) and the non-statutory standards for SuDS (Defra, 2015).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

Project details

Date	08/12/2025
Calculated by	MTD
Reference	7136
Model version	2.2.2

Location

Site name	Knoll Farm
Site location	Norton Ferris



Site easting (British National Grid)	379553
Site northing (British National Grid)	137138

Site details

Total site area (ha)	0.1	ha
----------------------	----------------------------------	----

Greenfield runoff

Method

Method	IH124
--------	-------

IH124

	<u>My value</u>		<u>Map value</u>
SAAR (mm)	980	mm	980
How should SPR be derived?	WRAP soil type		
WRAP soil type	1		1
SPR	0.1		
QBar (IH124) (l/s)	0.02	l/s	

Growth curve factors

	<u>My value</u>		<u>Map value</u>
Hydrological region	8		8
1 year growth factor	0.78		
2 year growth factor	0.93		
10 year growth factor	1.49		
30 year growth factor	1.95		
100 year growth factor	2.43		
200 year growth factor	2.78		

Results

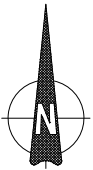
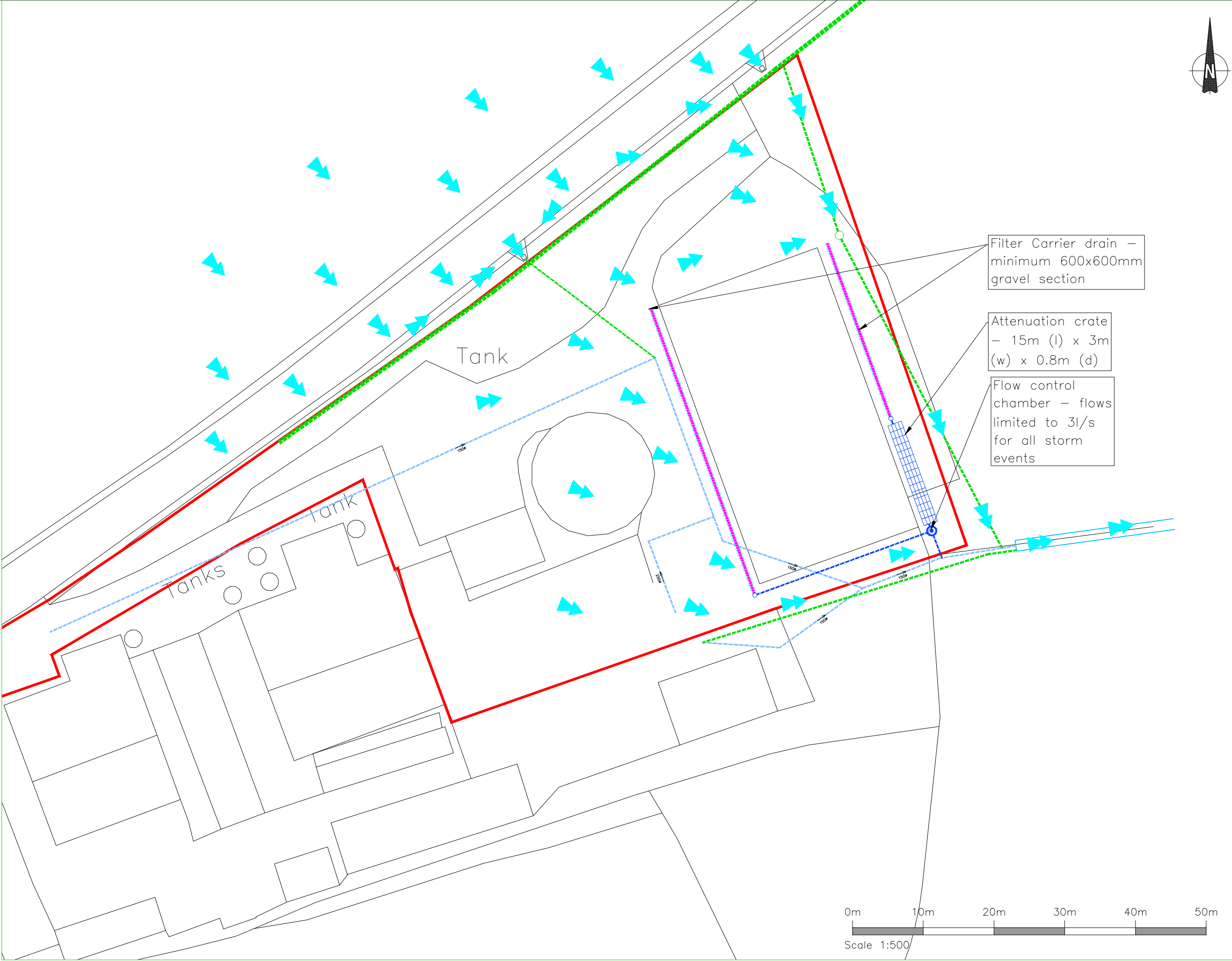
Method	IH124	
Flow rate 1 year (l/s)	0.02	l/s
Flow rate 2 year (l/s)	0.02	l/s
Flow rate 10 years (l/s)	0.04	l/s
Flow rate 30 years (l/s)	0.05	l/s
Flow rate 100 years (l/s)	0.1	l/s
Flow rate 200 years (l/s)	0.1	l/s

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

Disclaimer

This report was produced using the Greenfield runoff rate estimation tool (2.2.2) developed by HR Wallingford and available at [uksuds.com](https://www.uksuds.com/) (<https://www.uksuds.com/>). The use of this tool is subject to the UK SuDS terms and conditions and licence agreement, which can both be found at [uksuds.com/terms-conditions](https://www.uksuds.com/terms-conditions) (<https://www.uksuds.com/terms-conditions>). The outputs from this tool have been used to estimate Greenfield runoff rates. The use of these results is the responsibility of the users of this tool. No liability will be accepted by HR Wallingford, the Environment Agency, Centre for Ecology and Hydrology, Wallingford Hydrosolutions or any other organisation for the use of these data in the design or operational characteristics of any drainage scheme.

APPENDIX E



Exceedance Route Arrow

Filter Carrier drain –
minimum 600x600mm
gravel section

Attenuation crate
– 15m (l) x 3m
(w) x 0.8m (d)

Flow control
chamber – flows
limited to 3l/s
for all storm
events

Tank

Tank

Tanks



SDS
consulting
civil & structural engineers

E: enquiries@sds-consulting.co.uk W: www.sds-consulting.co.uk

CLIENT:
**WESTCORN ENVIRON
WASTE LTD
c/o WILLIS & CO**

PROJECT
**KNOLL FARM,
NORTON FERRIS**

DRAWING
DRAINAGE STRATEGY

Drawing No. **7136-C-SK01**

Status	For Planning		
	Not for Construction		
Job Number	7136	Date	DEC 2025
Scale	1:200 @ A3		
Drawn By	MTD	Checked By	LB

APPENDIX F

SDS Consulting		Page 2
Spittleborough Farmhouse Old Swindon Road Royal Wootton Bassett, SN4 8ET		
Date 08/12/2025 16:11 File 7136 sw rev 1.0.MDX		
Designed by MarkDyer Checked by		
Innovyze		Network 2020.1.3

Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	User	-	100	0.050	0.050	0.050
1.001	-	-	100	0.000	0.000	0.000
2.000	User	-	100	0.050	0.050	0.050
1.002	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				0.100	0.100	0.100

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.002		182.116	180.900	0.000	0	0

Simulation Criteria for Storm

Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m³/ha Storage	2.000
Hot Start (mins)	0	Inlet Coefficient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1

Number of Input Hydrographs	0	Number of Offline Controls	0	Number of Time/Area Diagrams	0
Number of Online Controls	1	Number of Storage Structures	3	Number of Real Time Controls	0

Synthetic Rainfall Details

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	30	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	20.000	Storm Duration (mins)	30
Ratio R	0.400		

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SDS Consulting		Page 3
Spittleborough Farmhouse Old Swindon Road Royal Wootton Bassett, SN4 8ET		
Date 08/12/2025 16:11 File 7136 sw rev 1.0.MDX		
Designed by MarkDyer Checked by		
Innovyze		Network 2020.1.3

Online Controls for Storm

Hydro-Brake® Optimum Manhole: S2-HB, DS/PN: 1.002, Volume (m³): 5.5

Unit Reference	MD-SHE-0079-3000-1200-3000
Design Head (m)	1.200
Design Flow (l/s)	3.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	79
Invert Level	181.200
Minimum Outlet Pipe Diameter (mm)	100
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.200	3.0	Kick-Flo®	0.707	2.4
Flush-Flo™	0.348	2.9	Mean Flow over Head Range	-	2.6

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	2.3	1.200	3.0	3.000	4.6	7.000	6.8
0.200	2.8	1.400	3.2	3.500	4.9	7.500	7.0
0.300	2.9	1.600	3.4	4.000	5.2	8.000	7.3
0.400	2.9	1.800	3.6	4.500	5.5	8.500	7.5
0.500	2.8	2.000	3.8	5.000	5.8	9.000	7.7
0.600	2.7	2.200	4.0	5.500	6.1	9.500	7.9
0.800	2.5	2.400	4.1	6.000	6.3		
1.000	2.8	2.600	4.3	6.500	6.6		

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SDS Consulting		Page 4
Spittleborough Farmhouse Old Swindon Road Royal Wootton Bassett, SN4 8ET		
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Designed by MarkDyer Checked by		
Innovyze		Network 2020.1.3

Storage Structures for Storm

Filter Drain Manhole: FD1, DS/PN: 1.000

Infiltration Coefficient Base (m/hr)	0.00000	Pipe Diameter (m)	0.150
Infiltration Coefficient Side (m/hr)	0.00000	Pipe Depth above Invert (m)	0.000
Safety Factor	2.0	Number of Pipes	1
Porosity	0.30	Slope (1:X)	0.0
Invert Level (m)	182.000	Cap Volume Depth (m)	0.600
Trench Width (m)	0.6	Cap Infiltration Depth (m)	0.000
Trench Length (m)	43.0		

Filter Drain Manhole: FD2, DS/PN: 2.000

Infiltration Coefficient Base (m/hr)	0.00000	Pipe Diameter (m)	0.150
Infiltration Coefficient Side (m/hr)	0.00000	Pipe Depth above Invert (m)	0.000
Safety Factor	2.0	Number of Pipes	1
Porosity	0.30	Slope (1:X)	0.0
Invert Level (m)	181.400	Cap Volume Depth (m)	0.600
Trench Width (m)	0.6	Cap Infiltration Depth (m)	0.000
Trench Length (m)	25.0		

Cellular Storage Manhole: S2-HB, DS/PN: 1.002

Invert Level (m)	181.200	Safety Factor	2.0
Infiltration Coefficient Base (m/hr)	0.00000	Porosity	0.95
Infiltration Coefficient Side (m/hr)	0.00000		

Depth (m)	Area (m ²)	Inf. Area (m ²)	Depth (m)	Area (m ²)	Inf. Area (m ²)
0.000	30.0	30.0	0.801	0.0	38.8
0.800	30.0	38.8			

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