



WOODSIDE FARM, HEATH ROAD LE67 1DD

Drainage Strategy – Dated February 2026

ABSTRACT

SJM26-007-DR-001 Rev P01

Dated 13/02/26

Scott Mills IEng M.I.C.E

Consulting Civil Engineer

Contents

- 1.0 Introduction
 - 1.1 National, Regional & Local Flood Policy
 - 1.1.1 National Policy
 - 1.1.2 Local Policy
- 2.0 Existing site and existing means of foul and surface water discharge
 - 2.1 Existing Site
 - 2.2 Existing Means of Drainage
 - 2.3 Photographic evidence of existing drainage
- 3.0 Proposed Development
 - 3.1 SUDs Strategy
- 4.0 Foul Drainage Provision
- 5.0 Flood Risk
- 6.0 Conclusions

Appendix A – Drainage Strategy

Appendix B – Rainwater Gardens Data Sheet.

1.0 Introduction

SJM Solutions Ltd have been appointed to provide a drainage strategy, in connection with land off Heath Road, Bagworth Heath LE67 1DD. The project involves the conversion of redundant rural building to dwellinghouse (Use Class C3) and associated works. This document will identify the existing drainage provision and provide the drainage solutions to drain the surface water and foul water for the development. There is no existing public surface water drainage within the vicinity of the site.

Condition 6 applies to the drainage provision, and this document will set out to address this condition.

6. Prior to the commencement of development, drainage plans for the disposal of foul and surface water flows shall be submitted to, and approved in writing by, the Local Planning Authority. The scheme shall be implemented in accordance with the approved details before the development is first occupied.

Reason: To ensure that the development is provided with a satisfactory means of drainage as well as reduce the risk of creating or exacerbating a flooding problem and to minimise the risk of pollution in accordance with Policy DM7 of the adopted Site Allocations and Development Management Policies Development Plan Document (2016).

National, Regional and Local Flood Policy

1.1.1 Attention is drawn to National Planning Policy Framework, in particular the following paragraphs are noted –

159. Inappropriate development in areas at risk of flooding should be avoided by directing development away from areas at highest risk (whether existing or future). Where development is necessary in such areas, the development should be made safe for its lifetime without increasing flood risk elsewhere.

Response- Flood maps indicate that the development is in a low-risk flood area, and the measures that will be taken ensure flood risk is not increased elsewhere.

161. All plans should apply a sequential, risk-based approach to the location of development – considering all sources of flood risk and the current and future impacts of climate change – so as to avoid, where possible, flood risk to people and property.

Response – The development is proved to be adequate for the flood risk zone. The site is in Flood Zone 1.

169. Major developments should incorporate sustainable drainage systems unless there is clear evidence that this would be inappropriate. The systems used should:

(a) take account of advice from the lead local flood authority.

(b) have appropriate proposed minimum operational standards.

(c) have maintenance arrangements in place to ensure an acceptable standard of operation for the lifetime of the development; and

(d) where possible, provide multifunctional benefits.

Response – a maintenance schedule will be provided at the later stage of the planning process, this is outline.

167. When determining any planning applications, local planning authorities should ensure that flood risk is not increased elsewhere. Where appropriate, applications should be supported by a site-specific flood-risk

assessment ⁵⁵. Development should only be allowed in areas at risk of flooding where, in the light of this assessment (and the sequential and exception tests, as applicable) it can be demonstrated that:

(a) within the site, the most vulnerable development is located in areas of lowest flood risk, unless there are overriding reasons to prefer a different location.

(b) the development is appropriately flood resistant and resilient such that, in the event of a flood, it could be quickly brought back into use without significant refurbishment.

(c) it incorporates sustainable drainage systems, unless there is clear evidence that this would be inappropriate.

(d) any residual risk can be safely managed; and

(e) safe access and escape routes are included where appropriate, as part of an agreed emergency plan.

Response- sustainable drainage systems are incorporated as a means of attenuation and providing water quality benefits, all subject to final design. Access to the site is not impacted by any risk of flooding to the site.

1.1.2 Reference to Local and Regional Planning policies suggests the following should be considered-

- SUDs should be promoted. New or re-development should adopt source control SuDS techniques to reduce the risk of frequent low impact flooding due to post-development runoff.
- Developers need to ensure that new development does not increase the surface water runoff rate from the site and should therefore contact the LLFA and other key stakeholders at an early stage to ensure surface water management is undertaken and that SuDS are promoted and implemented, designed in response to site characteristics and policy factors.
- It should be demonstrated that a proposed drainage scheme, site layout and design will prevent properties from flooding from surface water, allowing for climate change effects. Onsite attenuation schemes would need to be tested to ensure flows are not exacerbated downstream within the catchments.
- SuDS proposals should contain an adequate number of treatments stages to ensure any pollutants are dealt with on site and do not have a detrimental impact on receiving waterbodies.

Response- This document will outline provisional evidence that the policies indicated could be incorporated into the scheme, where feasible.

2.0 Existing Site and Existing means of Foul and Surface Water Drainage

2.1 Existing Site

The existing site is located at Heath Road, Bagworth Heath LE67 1DD as shown in the map below.



Fig 1 – Site Location

The existing site comprises an existing agricultural building, associated hardstanding and localised landscaping.



Fig 2 – Existing site outline

2.2 Existing Means of Drainage

There is no existing means of public drainage on or near to the site, but existing drainage does exist on site as indicated in fig 3. The existing agricultural building is drained by a surface water drain that discharges to an existing ditch along the western boundary. There are a number of existing historic outlets into the existing ditch. Refer to photographic evidence provided below.

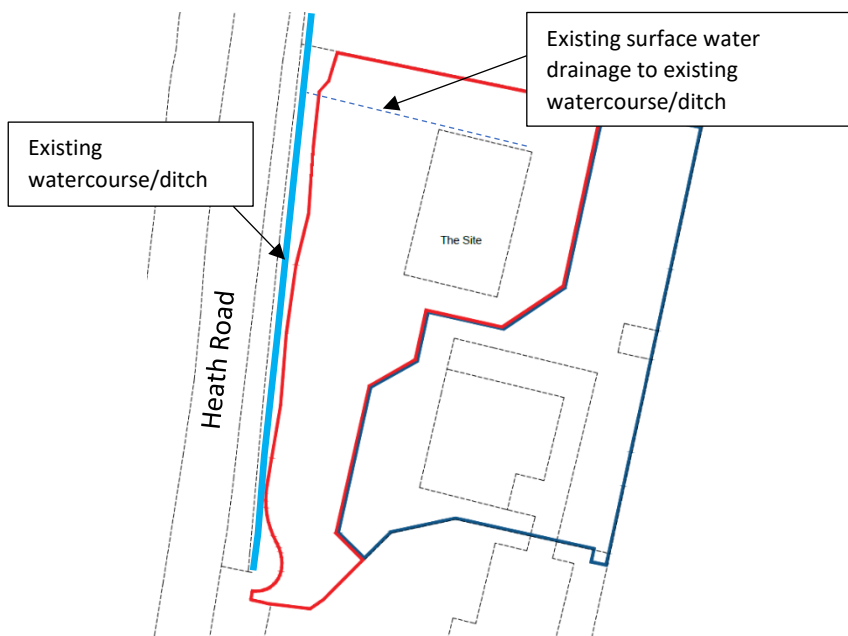


Fig 3 – Existing agricultural building rwp run-off to existing ditch.

Existing foul drainage from adjacent properties, via a treatment works, is discharged into the existing watercourse/ditch. These have not been recorded but have been subject to previous applications.

2.3 Photographic evidence of existing drainage



Photo 1 – existing rainwater pipes from existing agricultural building



Photo 2 – existing agricultural building outfall to ditch.



Photo 3 – existing agricultural building, showing existing rwp.



Photo 4 – existing outfall to ditch



Photo 5 – another existing outfall to ditch



Photo 6 – existing ditch that existing agricultural building discharges into along Heath Road.

3.0 Disposal Options to comply with Disposal Hierarchy.

The drainage strategy for the site is determined in conjunction with the Disposal Hierarchy, as set out below.

- 1) Discharge to Ground via soakaways and drainage field.

The existing site and previous developments have a history of discharging to the ditch along Heath Road as infiltration is impractical. A greenfield run-off calculation has been undertaken to help determine the soil type. The WRAP soil type is 4, indicating a heavy clay. This would suggest infiltration is not practical. Historical discharges would also suggest infiltration is not practical.

Greenfield runoff

Method

Method

IH124

IH124

SAAR (mm)

My value

671

Map value

671

How should SPR be derived?

WRAP soil type

WRAP soil type

4

4

SPR

0.47

QBar (IH124) (l/s)

0.8

l/s

- 2) Discharge to existing watercourse/ditch, if infiltration is not feasible then discharge may be to the nearest watercourse.

Figure 3 indicates the location of an existing watercourse that is already utilised for surface water discharge from the existing agricultural building and other existing dwellings. The wider site has a history of discharging to the watercourse/ditch.

There are no other watercourses present within the vicinity of the site that can be accessed without prior permission of third parties.

- 3) Discharge of surface water to public foul system. There is no local public sewer drainage within the vicinity of the site.

Given the hierarchy appraisal above, it is considered appropriate the discharge from the existing building should continue into the existing watercourse. The building area is not proposed to increase so the same impermeable area will discharge into it as previous. A SUDs appraisal has been carried out below to determine any methods that could be applied to the site to help promote cleansing and means of controlling discharge rate to the watercourse/ditch.

3.1 SUDs Strategy

The following SUDs methods have been investigated and their viability to be implemented into the scheme are as follows:

SUDs Technique	Suitable	Comments
Basins and Ponds - Constructed Wetlands - Balancing Ponds - Detention Basins - Retention Ponds	No	There is insufficient space within the site area to create basins and ponds. Ground levels fall north to south and there is insufficient space to provide a full pond with freeboard and batters. It is not proposed to amend the discharge rate from the existing building, so no attenuation is to be proposed..

Filter Drains	Yes	Given the layout of the site the use of filter drains is not overly beneficial, but where porous paving is provided these can act as small additional pre-treatment trains for surface water run-off.
Green/Brown roofs	No	These roofs have their advantages and disadvantages. Whilst the advantages are well known, they do require the roof to be designed for the loading aspect, and this could be considerable if maintenance of them is considered. Additionally, the storage benefits are very limited and only aid storms up to 1 in 2 years, so don't add much in terms of attenuation. Therefore, green roofs do not appear overly beneficial for the roofs of this size given that landscaping proposals at ground level are considered already.
Permeable Paving	Yes	It is possible to install permeable paving systems within the car parking spaces, access road and other hardscaped areas. Porous paving systems provide and mimic greenfield run-off rates, so will be provided for all external accesses, patio and car parking areas.
Infiltration Devices	Not practical	Infiltration appears impractical on this site, due to the historic use of the existing watercourse.
Rain Garden/water butts	Yes	There is an opportunity to provide rain gardens and water butts as part of the proposals and these have been indicated on the plan. These will help mimic greenfield run-off rates and are proposed to be retrospectively added to the existing drainage system, as shown on the plans.
Tanked Systems	No	It is not proposed to attenuation flows from the existing agricultural building apart from the retro fit of rainwater gardens, porous patios and water butts to help natural cleanse discharge water and provide some form of natural attenuation.

The conclusion of the SUDs appraisal is that soakaways/infiltration are not feasible on this site. The strategy should therefore comprise a strategy that incorporates porous paving systems (to provide interception) and a rainwater garden arrangement to best suit the proposed site layout, alongside the use of porous paving systems for access and car parking.

Water butts are also provided at rwp locations, and can be utilised for irrigation of the garden.



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Litres

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Fig 4 – typical example of rainwater butts.

Retrofit raingardens are also available as a method of natural attenuation and cleansing, as indicated below. These are proposed as a retro-fit to the existing surface water drainage system.

HydroPlanter™
'Plug & Play' Stormwater Raingarden System

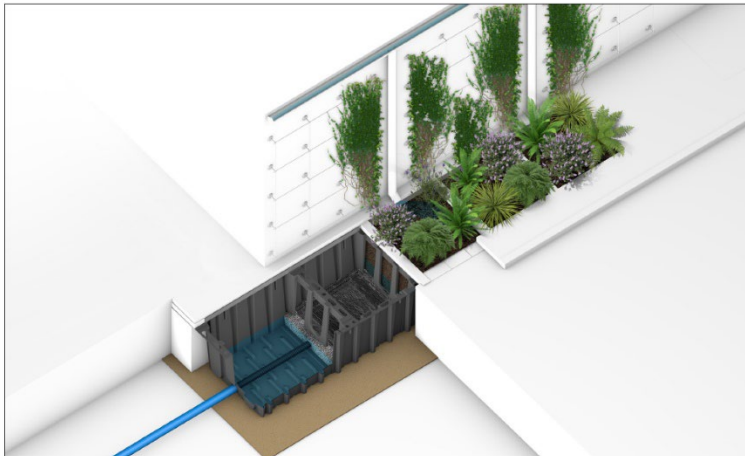


Fig 5 – typical example of a retro fit raingarden system.

System sizing:-

Roof Area = 180m²

Assume 1 in 1 yr storm event = 50mm/hr

Therefore discharge = $180 \times 50 / 3600 = 2.5$ lts/sec.



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Consulting Civil Engineers

Hour throughflow = 2.5 lts/sec x 60 x 60 = 9000 lts/hour.

Table 1 - Maximum catchment area (m2) draining to one HydroPlanter unit (1m2)

M5-60	r		Return period (annual probability of occurrence)						
			1 in 1 (100%)	1 in 10 (10%)	1 in 30 (3.3%)	1 in 100 (1%)	1 in 100 + 20% (0.5%)	1 in 100 + 30% (0.25%)	1 in 100 + 40% (0.125%)
20	0.4		27.5	15	12.5	7.5	7.5	5	5
	0.3		25	15	10	7.5	7.5	5	5
	0.2		22.5	12.5	10	7.5	5	5	5
17	0.4		35	17.5	12.5	10	7.5	7.5	7.5
	0.3		32.5	17.5	12.5	10	7.5	7.5	7.5
	0.2		27.5	15	12.5	7.5	7.5	5	5
14	0.4		40	20	17.5	12.5	10	10	7.5
	0.3		40	20	15	12.5	10	7.5	7.5
	0.2		32.5	17.5	15	10	7.5	7.5	7.5

To provide sufficient protection for a 1 in 30 yr storm, then approx 15 number units would be required, approximating to 18m2 of area. Specialist details and installatio should be sought, but the detail below indicates how these can be linked. Other systems are available. This will offer improvement over the existing drainage system despite no overall increase in impermeable area.

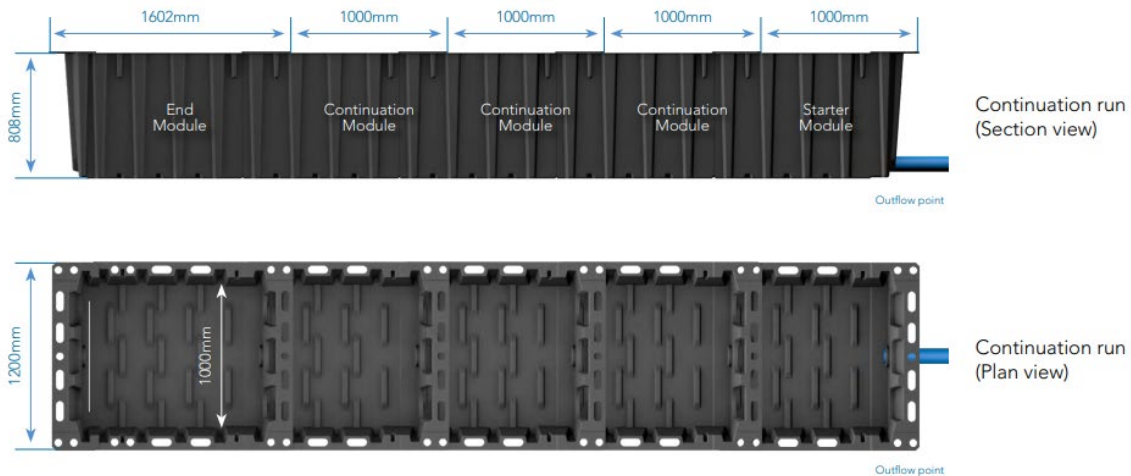


Fig 6 – typical elevation of raingarden modules

Code	Description	Nominal size	Water storage	Flow rate
GBUHPSM1A	HydroPlanter Starter Module	0.8 cubic metre	202 ltrs	10,000 ltrs/hr
GBUHPCM1A	HydroPlanter Continuation Module	0.8 cubic metre	293 ltrs	15,000 ltrs/hr
GBUHPEM1A	HydroPlanter End Module	1.12 cubic metres	384 ltrs	19,000 ltrs/hr
GBUHPEM1A	HydroPlanter Individual Module	1.12 cubic metres	384 ltrs	19,000 ltrs/hr

Fig 7 – Sizing of module

These methods, along with the porous paving methods indicated are likely to deal with the first 5mm of rainfall.

4.0 Foul drainage provision

The foul drainage from the new refurbished building will discharge to the existing watercourse/ditch via an appropriately sized treatment works. Details of the sizing calculation are provided in Appenidx A on the layout drawing. Details proposed treatment works is as shown in Figure 8.



7 Person GRAF One2Clean Sewage Treatment Plant

GRA1105G50002 GRAF G50002

5-7 Working Days

£2,659.46
£2,216.22 ex. VAT

-
1
+

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Product Details

Specifications

Volume: 4800 litres
Inhabitants: Up to 7 people
Max daily flow: 1050 litres
Length: 2280mm
Width: 1985mm
Height: 2110mm (+140-340mm cover)
Depth to inlet invert level: 535mm (+140-340mm cover)
Fall between inlet & outlet: 0mm (same level)
Pipe & Fittings: 100/110mm

Effluent Quality

BOD₅: 7 mg/l
NH₄-N: 0.5 mg/l
SS: 14 mg/l

 This item is supplied to order and additional [refund & returns terms](#) apply.

The GRAF One2Clean simplifies the technical processes involved in treating sewage. All within a single chamber, there are no mechanical or pumping apparatus in the wastewater, this tank only uses the necessary technology keeping everything simpler, easier and cheaper to maintain.

Fig 8 – Proposed treatment works for foul drainage. Other systems are available.

No discharge consent is envisaged for the proposed daily quality of 1050 litres.

5.0 Flood Risk

The following sources of flood risk have been assessed, even though a Site Specific Flood Risk Assessment is not required for sites less than 1 Ha. However, they will help inform the drainage strategy of the scheme and indicate if flooding to the site and areas is likely from these sources.

Source	Outcome
Flood Risk - Fluvial	Flood Zone 1, however it is noted as an area of critical drainage issues.
Pluvial	None evident.
Reservoir	No risk from nearby water storage features.
Groundwater Risk	Groundwater risk is considered low.

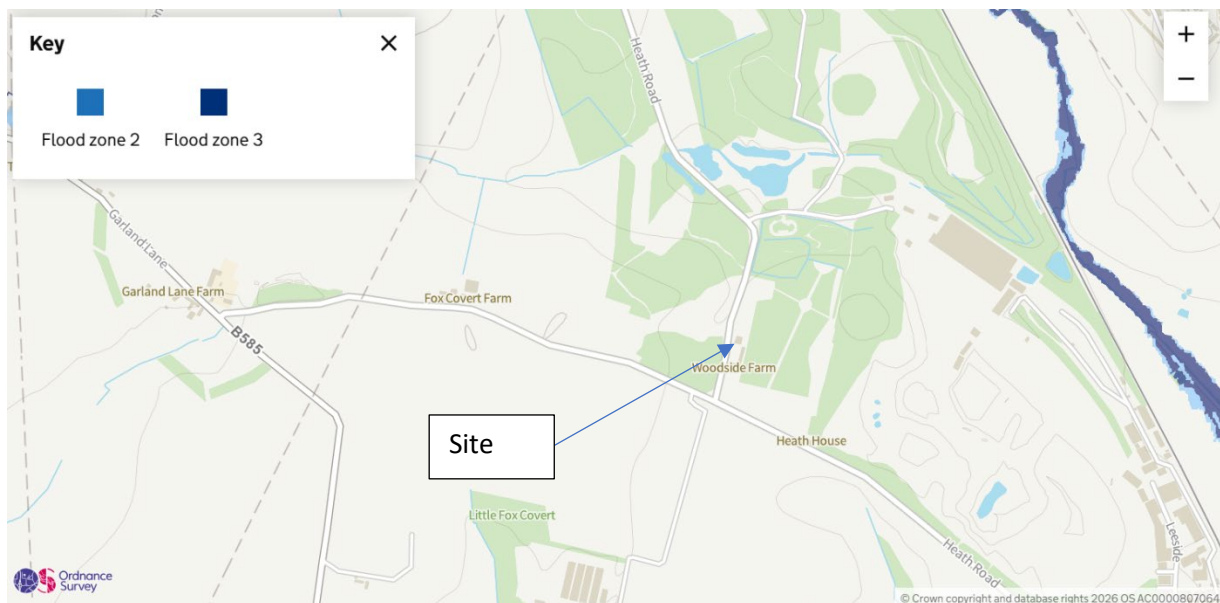


Fig 9 - Current Flood Map – Fluvial – Flood Zone – no risks as proposal is Flood Zone 1.

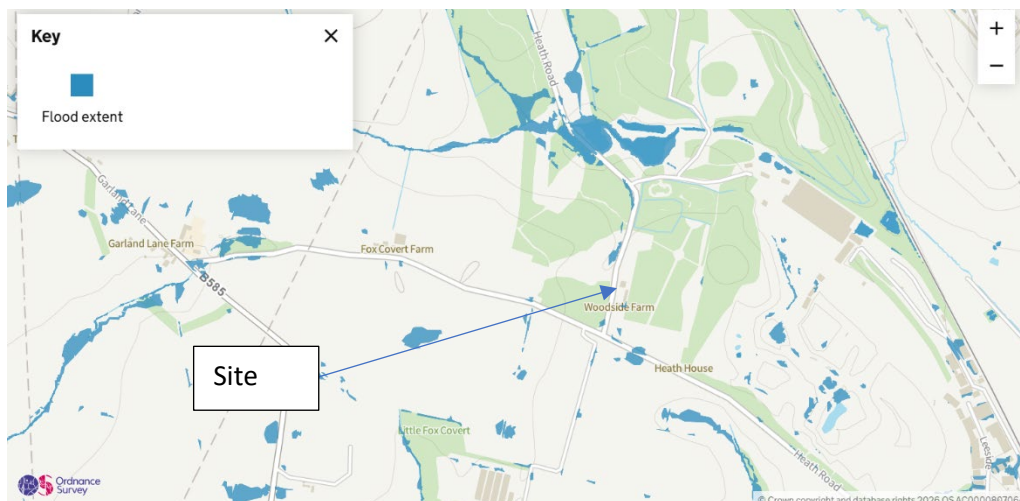


Fig 10 – Flooding from Pluvial Sources 1 in 30yr

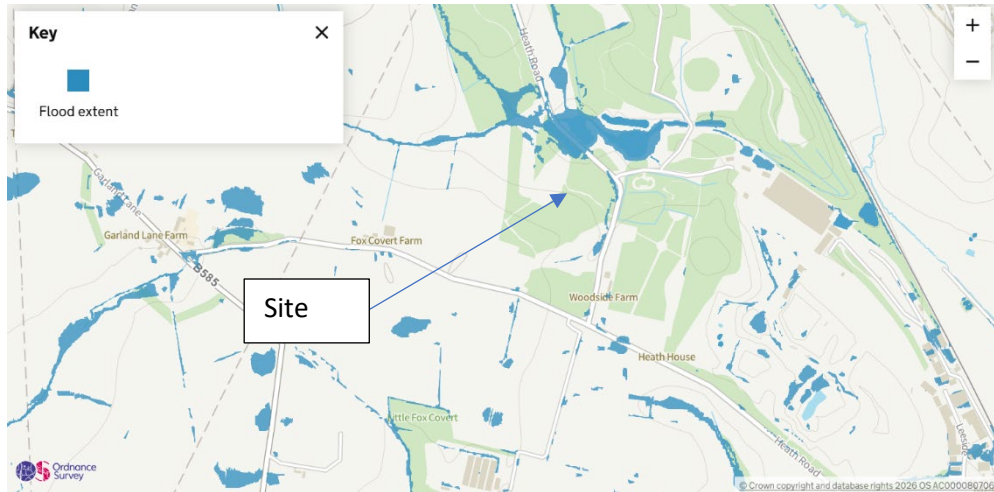


Fig 11 – Flooding from Pluvial Sources 1 in 100yr

No pluvial flooding is indicated within the site. As the site is Flood Zone 1, the development is deemed appropriate.

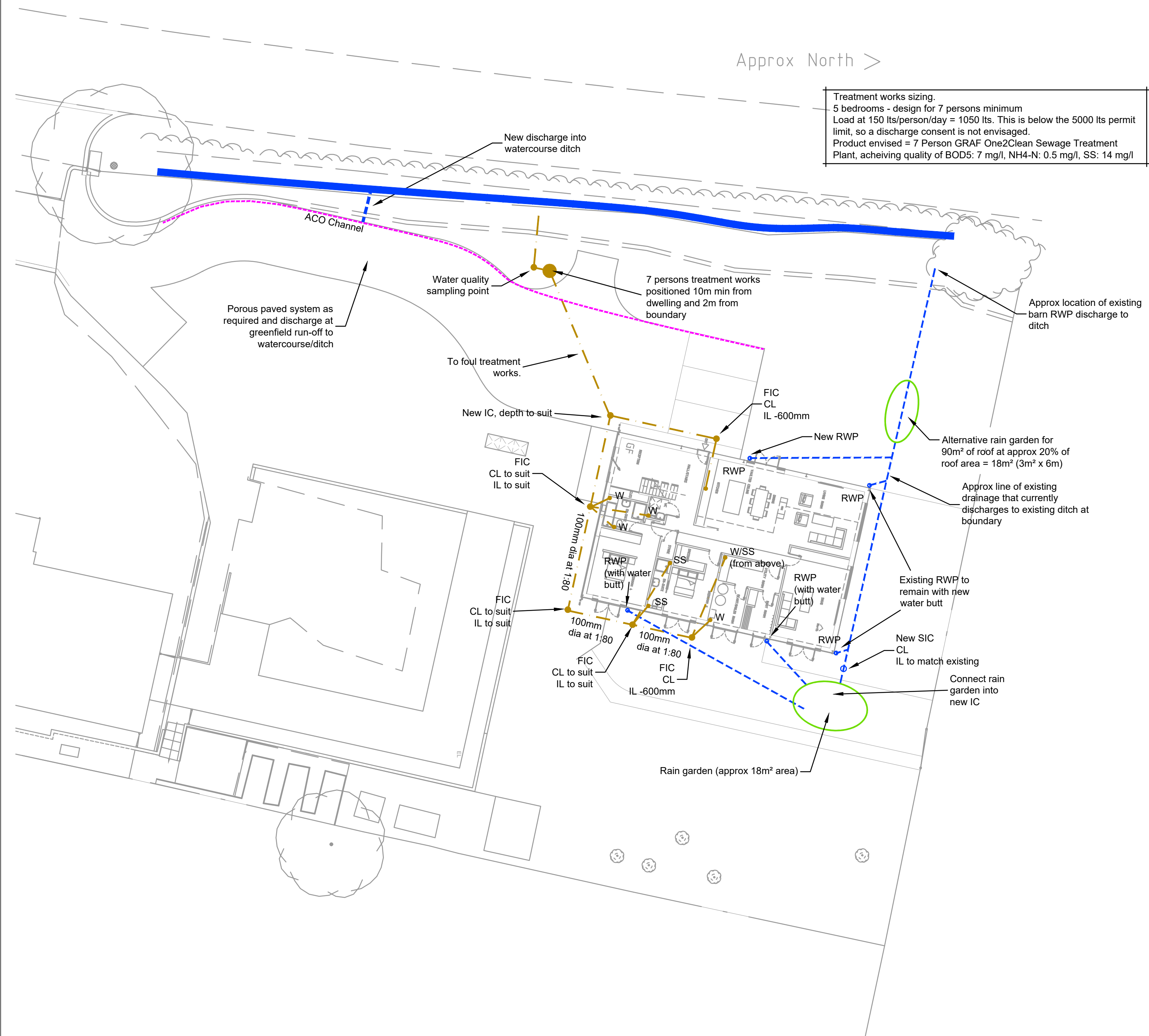
6.0 Conclusions

The following conclusions are made:

- There is a disposal hierarchy to be followed. Infiltration is demonstrated as impractical.
- The existing agricultural building discharges to the existing watercourse/ditch running alongside Heath Road
- The site falls within Flood Zone 1 and is deemed appropriate.
- The discharge rate is proposed to be un-restricted, but since it is a refit of an existing building, it is proposed to utilise appropriate SUDs measures. These measures comprise porous paving (type C), rainwater harvesting tanks/butts, and rainwater gardens. A calculation for the size of the raingarden has been demonstrated but will be subject to specialist installation.
- First 5mm of rainfall can be dealt with by rainwater harvesting systems, rainwater gardens and porous paving proposals. This is in accordance with National Standards and meets the desired threshold for this type of development.
- Foul drainage will be via a suitably sized treatment works that will discharge to the watercourse at the quality as outlined in figure 8.

Appendix A – Drainage Strategy

DO NOT SCALE FROM THIS DRAWING.
ALL DIMENSIONS MUST BE CHECKED PRIOR TO CONSTRUCTION.



This drawing is to be read in conjunction with all relevant architects, engineers and specialists drawings and specifications.

The contractor is to check all dimensions on site prior to commencing work.

The contractor shall check all tie-ins for line and level with existing before commencing any works, the engineer shall be notified immediately, in writing, should any errors be found.

Any discrepancies, of whatever nature, must be reported to the engineer prior to the commencement or continuance of any further works.

It is the responsibility of the contractor to execute the works at all times in strict accordance with the requirements of the health and safety at work act 1974, and cdm regulations 1994. the contractor will be deemed to have allowed for full compliance, including full liaison with the planning supervisor, within his rates.

All private drainage works to be in accordance with the requirements of building regulations 2000, part h, "drainage and waste disposal". pipes with less than 600mm cover to be protected in accordance with part h, diagram 11.

All pipes to be 100 or 110mm dia. and laid at 1 in 80 unless stated otherwise.

All pipes, chambers and fittings to be installed, bedded and backfilled in accordance with the manufacturers instructions.

Pipes which run adjacent to buildings shall be installed in strict accordance with part h, clauses 2.23 to 2.25.

All manholes and inspection chambers situated in areas subject to vehicular loading to have class C250 covers and frames to bs en124 and those not subject to vehicular loading to have class B125 covers and frames.

All drains in the vicinity of existing or proposed trees to be constructed in accordance with the requirements of nhbc practice note 3.

Private drainage frames must be tied to manhole risers by use of manufacturers ties (eg. polypipe ref frk500 fixing kit and frk501 black ties.) the ground works contractor will be held fully responsible for any accidents due to incorrect fitting or failure to use the correct manufacturers fixing equipment.

All existing land drains encountered on site during construction to be re-connected.

Should any departure from the slab level be considered, agreement shall be sought from the engineer immediately and prior to commencement or continuance of any works, and should take full account of all restrictions to the slab level.

Cover and invert of existing sewers should be checked on site prior to construction

P1	Preliminary	PM	SJM	13-02-26
REV	DESCRIPTION	BY	CHKD	DATE

Woodside Farm, Heath Road
Bagworth, LE67 1DG

Drainage Plan



SJM Solutions
Consulting Civil Engineers
6 Harvesters Close, Aldridge, Walsall, WS9 0YU

Drawn by PM	Date 09-02-26	Plot Date 11-02-26	Scale 1: 200@A2
Checked by SJM	Project No 26-007	Dwg No 01	P1

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 GRA1105G50002

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 5-7 Working Days

£2,659.46

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Product Details

Specifications

Volume: 4800 litres**Inhabitants:** Up to 7 people**Max daily flow:** 1050 litres**Length:** 2280mm**Width:** 1985mm**Height:** 2110mm (+140-340mm cover)**Depth to inlet invert level:** 535mm (+140-340mm cover)**Fall between inlet & outlet:** 0mm (same level)**Pipe & Fittings:** 100/110mm

Effluent Quality

BOD₅: 7 mg/l**NH₄-N:** 0.5 mg/l**SS:** 14 mg/l
 This item is supplied to order and additional [refund & returns terms](#) apply.

The GRAF One2Clean simplifies the technical processes involved in treating sewage. All within a single chamber, there are no mechanical or pumping apparatus in the wastewater, this tank only uses the necessary technology keeping everything simpler, easier and cheaper to maintain.

A sewage treatment plant does what it says on the tin; it treats sewage to make the discharge cleaner than the effluent that comes out of a septic tank. This means it can be discharged straight into a local watercourse or soakaway (subject to site conditions). With the new legislations being put in place for septic tank discharge in 2020, choosing a sewage treatment plant is a positive forethought to future legalities. GRAF One2Clean tanks offer one of the cleanest effluent levels on the market.

- Extremely strong, and requires no concrete surround (just a gravel base and backfill)
- SBR wastewater treatment technology
- Groundwater stable up to the centre line
- CE certified to EN 12566-3

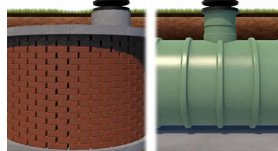
- 15-year warranty on sewage reservoirs
- 2-year warranty on compressor and parts
- Low energy consumption of just 75 kWh per person/per year
- Silent operation
- Programmable holiday mode

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Free Delivery	Free Delivery	Free Delivery	Free Delivery	Free Delivery
				
GRAF	GRAF	GRAF	GRAF	GRAF
9 Person One2Clean Sewage Treatment Plant	18 Person One2Clean Sewage Treatment Plant	10 Person One2Clean Sewage Treatment Plant	14 Person One2Clean Sewage Treatment Plant	5 Person One2Clean Sewage Treatment Plant
£2,898.07 £2,415.06 ex. VAT	£4,291.63 £3,576.36 ex. VAT	£3,295.20 £2,746.00 ex. VAT	£4,056.71 £3,380.59 ex. VAT	£2,339.23 £1,949.36 ex. VAT
ADD TO BASKET	ADD TO BASKET	ADD TO BASKET	ADD TO BASKET	ADD TO BASKET



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Are you moving to a house serviced by an off-mains domestic sewage treatment plant? Are you concerned about how difficult they are to maintain? Then this guide to operating and maintaining a sewage treatment plant can help.



HOW TO INSTALL A SEWAGE TREATMENT PLANT

Does your property need a new sewage treatment plant? Are you considering whether it's possible to install one yourself? Then, this overview of how to install a sewage treatment plant could be just what you need.



HOW TO PLAN AND DESIGN A NEW SEWAGE TREATMENT

Does your property need a new sewage treatment plant? Are you considering whether it's possible to install one yourself? Then this overview of all the things you'll need to consider could be just what you need.

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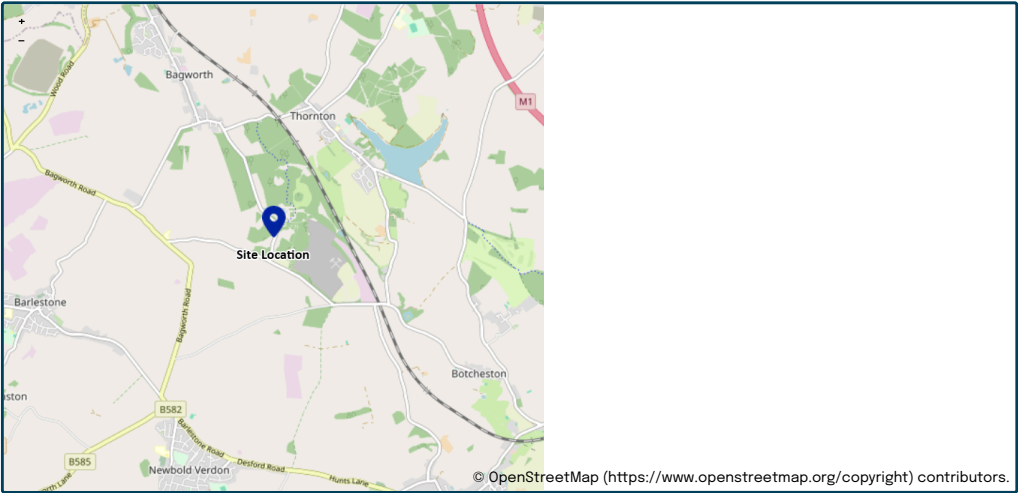
This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance “Rainfall runoff management for developments”, SC030219 (2013), the SuDS Manual C753 (CIRIA, 2015) and the non-statutory standards for SuDS (Defra, 2015). 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	10/02/2026
Calculated by	Scott Mills
Reference	Woodside Farm
Model version	2.2.2

Location

Site name	Extg Building
Site location	Woodside Farm



Site easting (British National Grid)	445676
Site northing (British National Grid)	306445

Site details

Total site area (ha)	.1710	ha
----------------------	-------	----

Greenfield runoff

Method

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

IH124

My value	Map value			
SAAR (mm)	671	mm	☐	671
How should SPR be derived?	WRAP soil type			
WRAP soil type	4	☐		4
SPR	0.47			
QBar (IH124) (l/s)	0.8	l/s		

Growth curve factors

Hydrological region	My value	Map value	
	4	☐	4
1 year growth factor	0.83		
2 year growth factor	0.89		
10 year growth factor	1.49		
30 year growth factor	2		
100 year growth factor	2.57		
200 year growth factor	3.04		

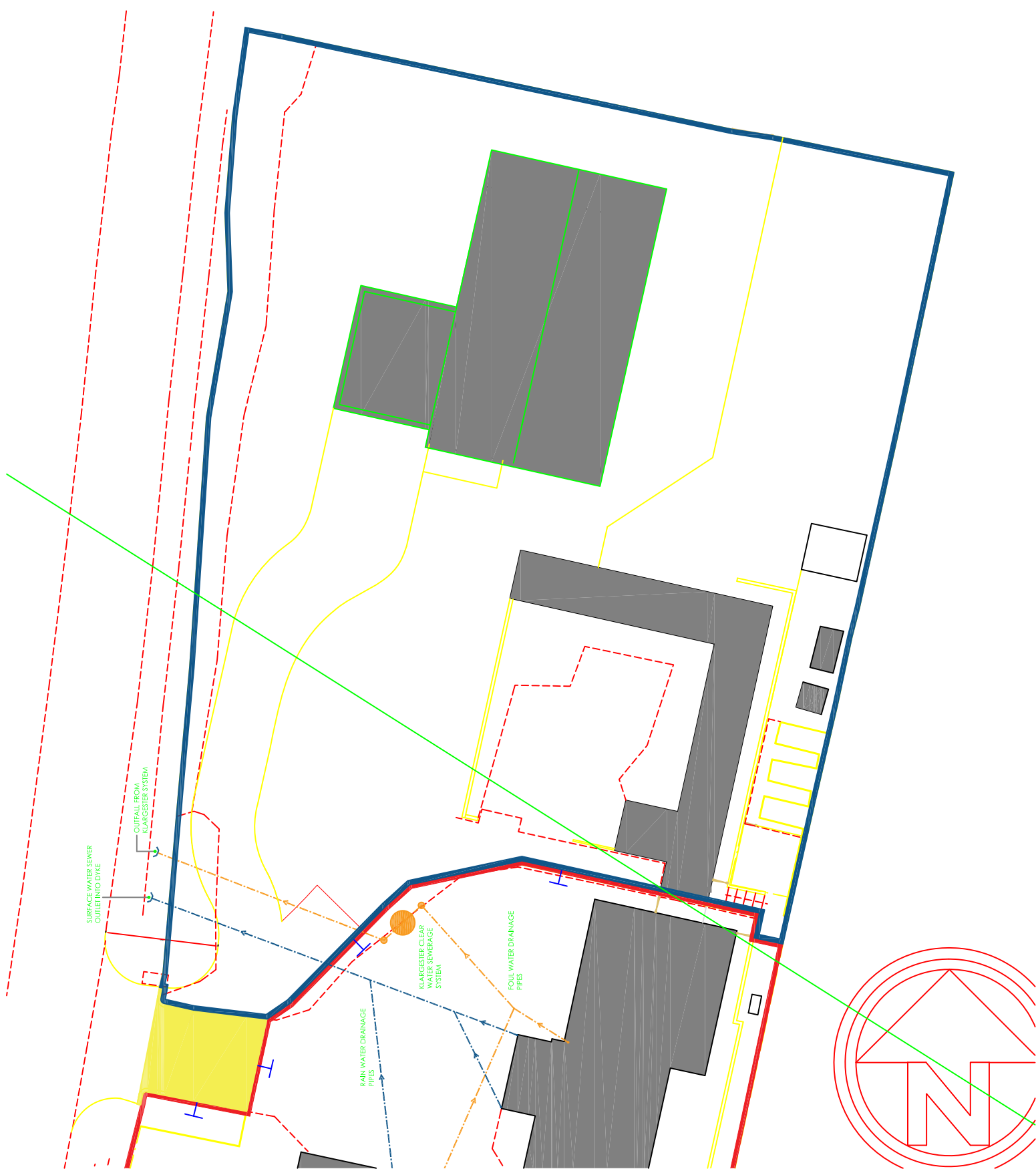
Results

Method	IH124	
Flow rate 1 year (l/s)	0.7	l/s
Flow rate 2 year (l/s)	0.7	l/s
Flow rate 10 years (l/s)	1.2	l/s
Flow rate 30 years (l/s)	1.6	l/s
Flow rate 100 years (l/s)	2.0	l/s
Flow rate 200 years (l/s)	2.4	l/s

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

Disclaimer

This report was produced using the Greenfield runoff rate estimation tool (2.2.2) developed by HR Wallingford and available at uksuds.com (<https://www.uksuds.com/>). The use of this tool is subject to the UK SuDS terms and conditions and licence agreement, which can both be found at [uksuds.com/terms-conditions](https://www.uksuds.com/terms-conditions) (<https://www.uksuds.com/terms-conditions>). The outputs from this tool have been used to estimate 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.



Sustainable Drainage Systems (SUDs)

The following devices should be maintained by the land/property owner as outlined in the schedules below.

Typical Maintenance Schedules

Permeable Paving

Regular Maintenance	
Monthly	• Refer to manufacturer specifications • For sealed systems, inspection of outfalls should be undertaken
Six Monthly	• Brushing and vacuuming to manufacturer requirements. Re-grit where necessary after brushing
Annually	• Not Applicable
As Required	• Inspect/check all inlets, outlets, surface and overflows (where required) to ensure that they are in good condition, free from blockages and operating as designed. Take action where required (for 3 months following installation) • Removal of weeds where required • Stabilizing and mowing of contributing areas where required
Remedial Actions: Significant storms may cause a significant damage to SUDs. As such, a number of actions may be required following such events	
Following all significant storm events	• Inspect and carry out essential recovery works to return the feature to full working order

Rain Garden/Stormwater Planter

-Regular Maintenance	
Monthly	• Litter and debris removal • Mulching (where required) • Inspect/check all inlets, outlets, surface and overflows (where required) to ensure that they are in good condition, free from blockages and operating as designed. Take action where required
Six Monthly	• Remove nuisance and invasive vegetation
Annually	• Removing and pruning of trees • Check for poor vegetation growth due to lack of sunlight or dropping of leaf litter, and cut back adjacent vegetation where required • Inspect and document the presence of wildlife
As Required	• Repair erosion or other damage by re-mulching, or reseeding • Re-seed areas of poor vegetation growth. Alter plant types to better suit conditions, if required • Scarify and spike topsoil later to improve infiltration performance, break up silt deposit and prevent compaction of the soil surface (typically every 60 months) • Remove build-up of sediment, reinstate design levels (typically every 60 months) • Remove and dispose of oils or petrol residues using safe standard practices
Remedial Actions: Significant storms may cause a significant damage to SUDs. As such, a number of actions may be required following such events	
Following all significant storm events	• Inspect and carry out essential recovery works to return the feature to full working order

A GUIDE FOR USERS OF PACKAGED WASTEWATER TREATMENT PLANTS

BRITISH WATER WWTP FG GU-V 1.1-2020

BWX

CONTENTS

01. Scope	3
02. Introduction	3
03. Safety First	3
04. Understanding Your Packaged Wastewater Treatment Plant	4
05. Protecting Your Packaged Wastewater Treatment Plant	4
06. Regulatory Responsibility	5
07. Maintenance and Servicing	5
08. Daily Do's and Don'ts	6
09. Hard Water, Soft Water and Salt	7
10. Regulator Checks	9
Other Sources of Information	9
Glossary	9

THIS GUIDE HAS BEEN PRODUCED BY
THE BRITISH WATER **WASTEWATER TREATMENT PLANT FOCUS GROUP**

01. SCOPE



To **explain** to owners and users how Packaged Wastewater Treatment Plants work and why it is important they operate correctly.



To **outline** how to use them (Do's and Don'ts) and how to maintain them properly (Servicing and Emptying) to avoid polluting the environment.



To **help** owners understand the duty they have under environmental regulatory standards and the regulatory landscape.

02. INTRODUCTION

Few people stop to consider what happens to the wastewater/grey water and sewage that goes down the drain every time they take a shower/bath, do the washing up, use the washing machine or flush the toilet. In most households or commercial premises the sewage flows away through the sewers and is treated at a large-scale sewage treatment works. But if the premises/property is off mains, the drains often lead instead to a Packaged Wastewater Treatment Plant usually located underground within the property's boundary.

03 SAFETY FIRST

Coming into direct contact with sewage may pose a serious risk to health so you should engage the services of a suitably trained British Water Accredited Service Technician to maintain and repair your system. Keep pets and children away from the area particularly when maintenance work or emptying is being undertaken.

► Use the services of a suitably trained British Water Accredited Service Technician to maintain and repair your system.



04. UNDERSTANDING YOUR PACKAGED WASTEWATER TREATMENT PLANT

Sewage is made up of the organic waste from toilets and the chemicals and wastewater and grey water from everyday activities such as washing, cleaning, cooking, clothes-washing and dishwashers. Packaged Wastewater Treatment Plants that are CE certified generally work along similar principles with primary, secondary and even tertiary treatment stages that produce a high quality (low/no pollution) effluent. In simple terms sewage enters the chamber underground where it is acted upon by naturally occurring bacteria which break down the sewage into a non-polluting output or discharge.

The key point to understand is that in order for the bacteria to grow and do its job, the environment in which it lives inside the treatment system needs to be 'friendly'. As that environment is made up of whatever you put down the toilet, sink or drains, if you overload it - say with too much water in one go or with too many chemicals or harsh detergents - then the bacteria can suffer or even die.

This means the system will not be treating the effluent effectively, and consequently the discharge is unlikely to be meeting its required environmentally protective performance, and could be polluting the environment. Furthermore if the bacteria die, you will need to pay for the system to be reseeded. If the bacteria survive but are negatively impacted it can take days or even weeks for it to recover and function properly.

However, be assured that normal day-to-day cleaning – provided dosage

recommendations are followed and only small quantities are used at a time – should not have any adverse effect on the treatment system.

Follow the helpful guidance in this publication to help you avoid or at least minimise the introduction of 'un-friendly' products into the environment of your sewage treatment plant.

 This guide does not cover septic tanks, cesspools or cesspits.

05. PROTECTING YOUR **SEWAGE** TREATMENT PLANT

Follow these simple precautions to avoid damage that can lead to costly repairs:

DON'TS

-  **Don't** plant trees near your treatment system as overtime the roots can penetrate the holding chamber causing sewage to leak out (pollution) and water to seep in (flood the system).
-  **Don't** drive over sewage treatment plant covers or put heavy objects on top of them. They are not designed to bear weight.
-  **Don't** park or drive over a drainage field as compacted ground will not drain effectively.
-  **Don't** allow hot tubs, swimming pools or storm water from rainwater downpipes or gulleys to discharge into your treatment system as this will overload it.

06. REGULATORY RESPONSIBILITY

Owners have a duty to ensure their Packaged Wastewater Treatment Plant has been correctly installed and complies with building regulations and the environmental regulator's authorisations. The environmental regulators are the Environment Agency (EA) for England, the Scottish Environment Protection Agency (SEPA) for Scotland, Natural Resources Wales (NRW) for Wales and Northern Ireland Environment Agency (NIEA) for Northern Ireland.

Once installed and commissioned, owners have an ongoing duty to ensure treated effluent from the Packaged Wastewater Treatment Plant meets environmental regulatory standards (i.e. a specified

discharge quality) and does not pollute the surrounding surface and groundwater. This is not an onerous duty as a correctly designed, installed and properly maintained system will help to provide a final effluent for discharging that meets these regulatory standards.

07. MAINTENANCE AND SERVICING

Packaged Wastewater Treatment Plants use electricity to power pumps or a motor which artificially introduce air into the treatment plant. This approach promotes the growth of aerobic bacteria which are more effective in breaking down the sewage and produce a higher quality effluent.

You will understand from this that a Packaged Wastewater Treatment Plant has both mechanical and electrical components that need to be checked, serviced and properly maintained to ensure optimum operation and longevity.

It is therefore essential to regularly maintain and service the plant. British Water and the environmental regulators recommend using companies with British Water Accredited Service Technicians as they have been trained and assessed to be competent in this specialist occupation.

SUMMARY

- // Keep the system properly maintained with a service contract with a British Water Accredited Service Technician.
- // Provide clear access to the treatment plant for ease of maintenance.
- // Only flush the three P's down the toilet (paper, pee, poo) – nothing else!
- // Tell children, visitors and guests about the 3 Ps.

08. DAILY DO'S AND DON'TS

A Packaged Wastewater Treatment Plant is not designed to cope with the following products and you should avoid putting these down your drains, sinks or toilets (this list is not exhaustive). It can have detrimental implications for the effectiveness of the treatment system and its discharge into the environment resulting in a potential pollution risk.

DO'S

-  Washing machines produce the largest amount of wastewater that the treatment system has to deal with in a short space of time. Therefore, spread machine washes across the week.
-  For similar reasons opt for daily showers rather than daily baths for your household.
-  Use the most bio-degradable products you can find for house/ car cleaning, clothes washing or washing up. Fortunately, these products are now offered in high street shops and supermarkets.
-  Avoid overdosing of chemicals. Read every product label and follow the manufacturer's dosage instructions for the water type in your area and cleaning.
-  Spread household chores involving detergents/chemicals across the week so the plant is not overloaded with chemicals on any particular day.
-  Avoid chopping and changing cleaning products – given time the bacteria in the treatment system can learn to 'live with' a chemical product but this is less likely if products are frequently changed.

DON'TS

-  All non-biodegradable products including sanitary towels, tampons, disposable nappies, incontinence pads, baby wipes, wet wipes, face wipes, cotton wool, cotton pads and condoms.
-  Medicines (liquid or tablet)
-  Mouthwash
-  Fat, grease and oil from cooking.
-  Garden chemicals, fertilisers or weed/pest killers.
-  Motor engine oils, anti-freeze, car cleaning liquids.
-  DIY products including solvents, paints, glue, white spirit, paint thinners.
-  Dairy waste, general food waste even if put through a waste disposal unit.

TIP

Opt for products which are more environmentally friendly and follow the manufacturer's instructions on how to dispose of it responsibly.



Even products labelled as flushable will not break-down (bio-degrade) and over time the buildup will clog up the system and even cause damage within the treatment plant.

09. HARD WATER, SOFT WATER AND SALT

Your local water authority can tell you if you are in a hard or soft water area. If you don't know who supplies your water, go to: <https://www.ofwat.gov.uk/households/your-water-company/map> for England and Wales. Scottish Water for Scotland and Northern Ireland Water for Northern Ireland.

Hardness is determined by the level of naturally occurring calcium and magnesium compounds in your water. High content means your water is hard, whereas low compound content indicates your water is soft. Salt can be used to soften water.

Detergents of all types work more effectively in soft water so less detergent is needed. Check laundry detergent and chemical product labels and stick to the correct dosage specified for the water type in your area so you are not loading

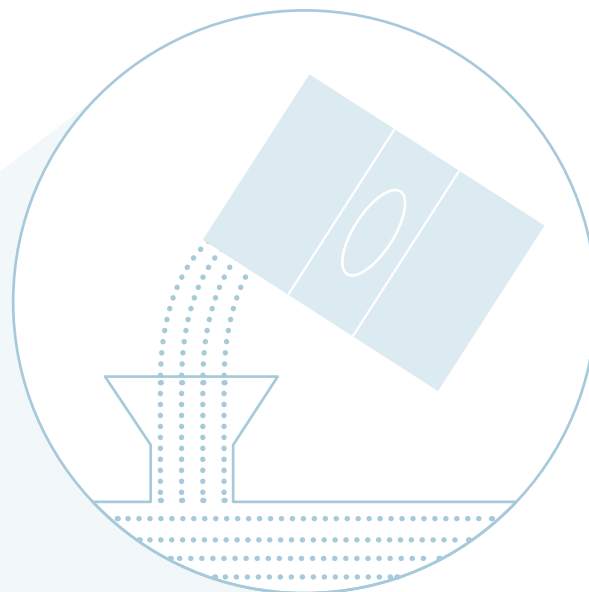
the sewage treatment plant more than is necessary.

DISHWASHER PRODUCTS

If using a dishwasher, keep the salt dispenser topped up as it softens the water reducing the amount of dishwasher detergent needed to clean effectively. Opt for a liquid or loose powder option so you can more easily adjust the dosage to the water hardness/softness of your area. Use only the amount specified by the manufacturer.

WATER SOFTENING UNITS

If water softening equipment is correctly sized and installed and the treatment system is designed and sized correctly, with the knowledge that a water softener will discharge into it, then there should not be a problem. If you want to install a new plant, do be aware that domestic and commercial water softeners involve a salt regeneration process and salt in high concentrations can be harmful to biological treatment systems.



▲ Keep your dishwasher salt dispenser topped with a liquid or loose powder to soften the water. Only use the amount specified by the manufacturer.

TIPS

LAUNDRY WASHING

- // Opt for bio-degradable/low phosphate products. For normal "coloured" washes use a washing product without added bleach. For white washes add a separate bleach formulated to minimise its environmental impact. Use of water softeners can reduce the amount of detergent required.



- // Only wash when you have a full load and/or make use of eco options on your machine. Normal wash temperatures, with the occasional very hot or "boil" wash, are fine but repeated boil washes will raise the plant temperature and adversely affect the bacterial process.

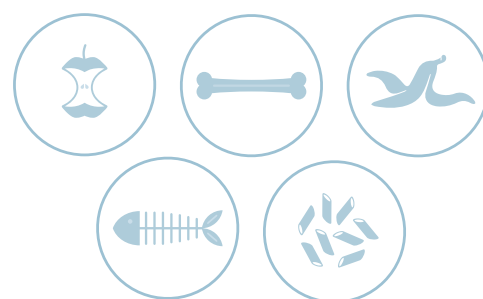


- // In some larger specialist applications such as nursing homes or stables you should obtain expert advice from your installer and/or maintenance provider on the do's and don'ts to follow to maintain the proper functioning of your sewage treatment system.



WASTE DISPOSAL UNITS

You are advised against using waste disposal units because the macerated vegetable waste and other degradable organic material can add a considerable extra load to the treatment system. Opt instead for garden composting vegetable peelings (it is cheaper and more environmentally friendly). Dispose of cooked food waste and non-vegetable waste via your local council's food waste collection service where available.



SUMMARY

- // Use bio-degradable or low phosphate products.
- // Use only as much product as you really need.
- // Spread washing/cleaning chores across the week.
- // Keep food waste out of your plant.



▲ The environmental regulator may sample the discharge from the system to check that it meets the required standards.

10. REGULATOR CHECKS

Be aware that once your Packaged Wastewater Treatment Plant has been commissioned and is in operation, the environmental regulator may at any time and without notice sample the discharge from the system to check that it meets the required standards. The environmental regulator also has the right to review and vary the discharge requirements that it sets.

A correctly designed and installed Packaged Wastewater Treatment Plant will be able to meet the stringent standards set by the regulator. If your system is being maintained by a qualified British Water Accredited Service Technician then it is unlikely to fail its consents as the discharge will be sampled periodically so that any issues are picked early and quickly addressed. If your system does fail to meet the required discharge standard then you should act promptly. Contact a British Water Accredited Service

Technician to remedy the problem so you avoid polluting and the associated enforcement actions.

OTHER SOURCES OF INFORMATION

1. British Water's list of Accredited Service Technicians can be viewed at:
<https://www.britishwater.co.uk/directory/findengineer.aspx>
2. Other British Water publications available at www.britishwater.co.uk are:
 - A. Code of Practice: Guide to the Installation of Sewage Treatment Systems
 - B. Code of Practice: Guide to Desludging Sewage Treatment Systems
 - C. Code of Practice: Flows and Loads 4
 - D. Code of Practice: Maintenance and Servicing by British Water Accredited Technicians

GLOSSARY:

Greywater: Water coming from your bathroom sinks, showers, tubs, and washing machines. It is not water that has come into contact with faeces, either from the toilet or from washing diapers.

CE marking: The letters 'CE' appear on many products traded on the extended Single Market in the European Economic Area (EEA). They signify that products sold in the EEA have been assessed to meet high safety, health, and environmental protection requirements.

Primary, secondary and even tertiary treatment: There are three main stages of the wastewater treatment process, known as primary (sedimentation), secondary (biological) and tertiary water treatment (mostly comprised of removing phosphates and nitrate).

Septic tanks: Septic tanks are chambers in the ground divided into smaller chambers. The compartments sort solid waste from liquid. The liquid is then allowed to enter the ground via a drainage field. They should not receive surfacewater or rainwater runoff. These are not the same as soakaways which may be used for clean rainfall runoff. Septic tanks need to be emptied occasionally, about once a year depending upon usage, to remove sludge but not as often as cesspools.

Cesspools/cesspits: A cesspool/cesspit is a single chamber in the ground storing sewage and wastewater until full. Once full, a contractor is employed to empty it. Cesspools must not discharge to the environment.

THE ENVIRONMENTAL REGULATORS ARE:



Environment Agency
(EA) in England



Cyfoeth Naturiol Cymru
Natural Resources Wales



Scottish Environment
Protection Agency (SEPA)



Northern Ireland
Environment Agency (NIEA)

Users can access the websites by clicking on the logos above.

Anyone who makes discharges to the environment, including sewage effluent, has a responsibility to ensure their discharge is not polluting and meets the regulatory requirements that apply to their discharge and location. You should ensure your treatment system is well operated and maintained, and that a new or replacement system is correctly sited and installed.

Further information can be found by clicking on the environmental regulator logos, above, to access their websites.

Note: The Environment Agency, Natural Resources Wales, the Scottish Environment Protection Agency and the Environment and Heritage Service (Northern Ireland) support the use of this code of practice, but the Agencies do not specifically endorse any particular manufacturer's product.

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**British Water would like to thank the following people
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Appendix B – Rain Garden Data sheet

HydroPlanter™

'Plug and Play' Raingarden





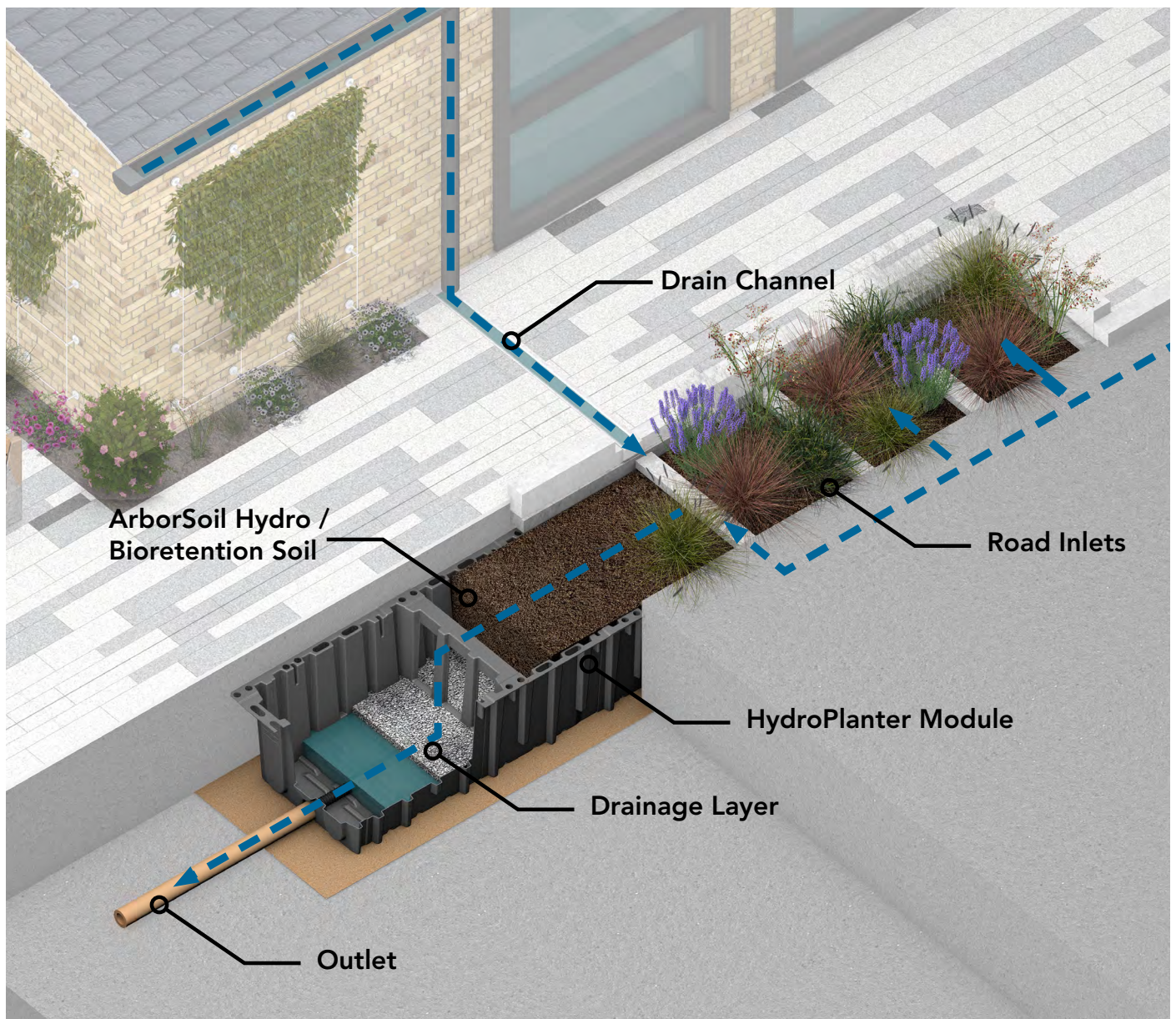
Introducing the **HydroPlanter**

A modular bioretention raingarden system, the HydroPlanter, that can be retrofitted into highways schemes and on new developments of any size.

This is a 'plug and play' sustainable urban drainage solution that can attenuate and cleanse storm water and provide amenity and biodiversity to new and existing spaces. The modules will be filled with a particular soil specification and planted wildflowers and biodiverse grasses.

The concept is flexible, scalable and each unit stacks together to be a convenient solution that any subcontractor can work with and install. Installation is fast, simple and offers significant savings to alternative methods.

The modular characteristics with pre-calculated hydrological performance statistics mean that specification and design is very simple for any given catchment area.



Manufactured in the UK from 100% recycled material



Modular, stackable 'plug and play' system makes for economic freight



Highly effective filtration & flow control



Provides amenity and biodiversity

HydroPlanter

SuDS Made Simple

Cost Effectiveness & Rapid Install

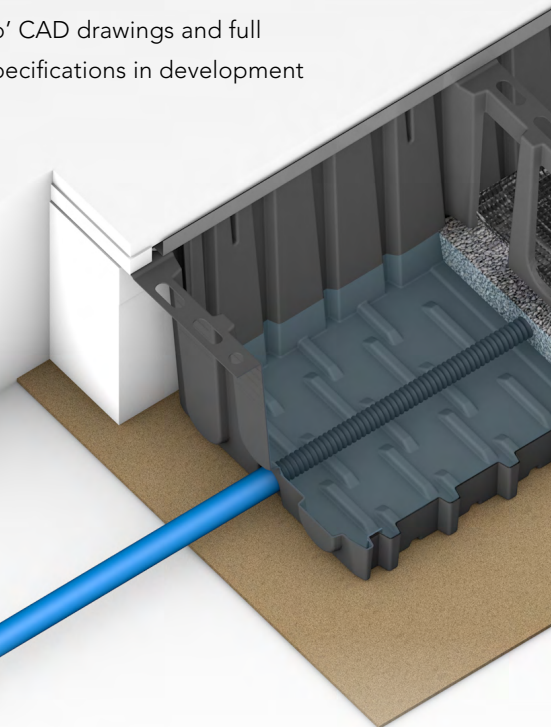
- Very simple and fast installation process
- Simple, off-the-shelf solution more cost-effective method than over-engineered hybrid geocellular/raingarden approaches
- Low weight units do not require machine handling. Transport efficient product design
- Complete package available: soil, drainage stone, planting schemes

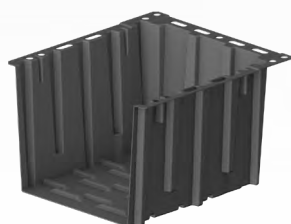
Modularity & Simplicity

- Scalable from stand-alone applications to large civic schemes
- Ease of calculation using off the shelf system including the potential to integrate into modelling software
- 'Plug and play' system eliminates detailed bespoke design work
- 'Drag and drop' CAD drawings and full construction specifications in development

Environmental Credentials

- Stackable design for transport and carbon efficiency
- Uses 100% recycled materials to reduce landfill and boost health of the environment
- Fully meets all requirements of the 4 Pillars of SuDS outlined in the CIRIA SuDS Manual





GBUHPSM1A
HydroPlanter Starter
Module



GBUHPCM1A
HydroPlanter Continuation
Module



GBUHPEM1A
HydroPlanter End
Module



GBUHPIM1A
HydroPlanter Individual
Module

Hydraulic Performance

Design Tables

Catchment area and interception for HydroPlanter schemes can be simply calculated using the UK M5-60 Rainfall map and design tables.

These tables provide the maximum catchment that can drain to a HydroPlanter in order to achieve the required attenuation storage for a given return period. Maximum catchments are provided for 1m² surface area within the HydroPlanter (a single unit).

It is often beneficial to use the HydroPlanter to provide attenuation storage for low return period events (which allows a greater catchment area to drain to it) and pass forward excess flows to the following parts of the management train via an overflow.

Step 1 M5-60 Rainfall Map

Identify your location on the map, and the correct reference colour

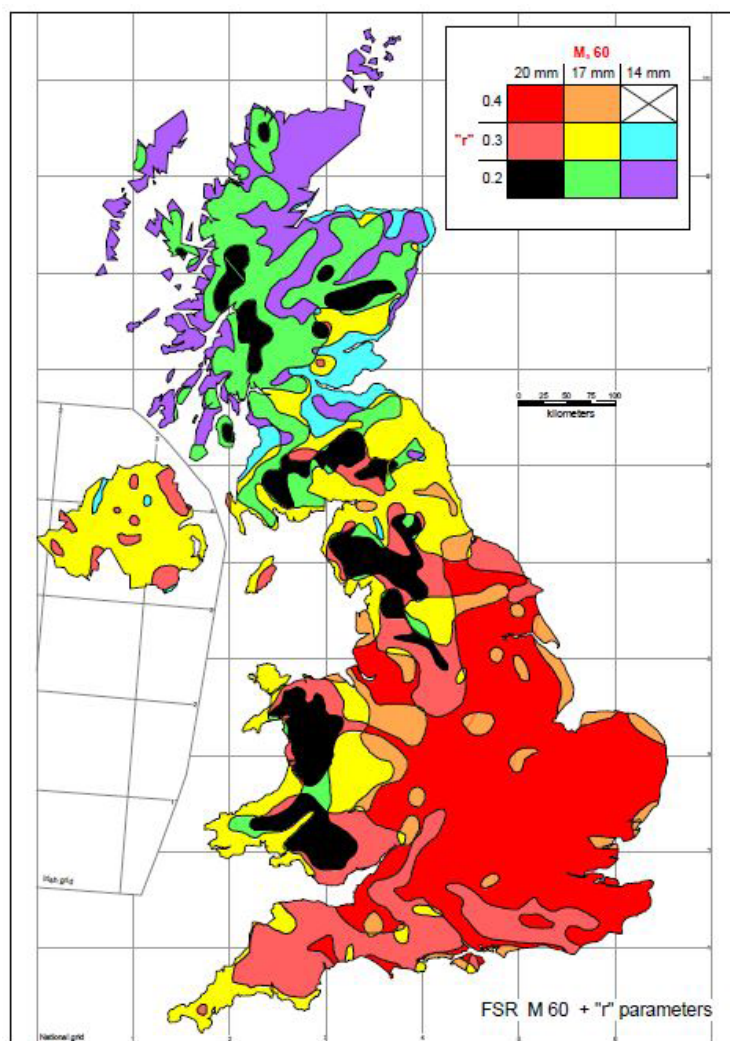
Step 2 Table 1 - Catchment area

Refer to the corresponding line on Table 1 and find the appropriate catchment area for a range of return periods and climate change factors

Step 3 Calculate number of HydroPlanter units required

Divide the scheme catchment area by the catchment area from Table 1 to find the total number of HydroPlanter units required

M5-60 Rainfall Map



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Table 1 - Maximum catchment area (m2) draining to one HydroPlanter unit (1m2)

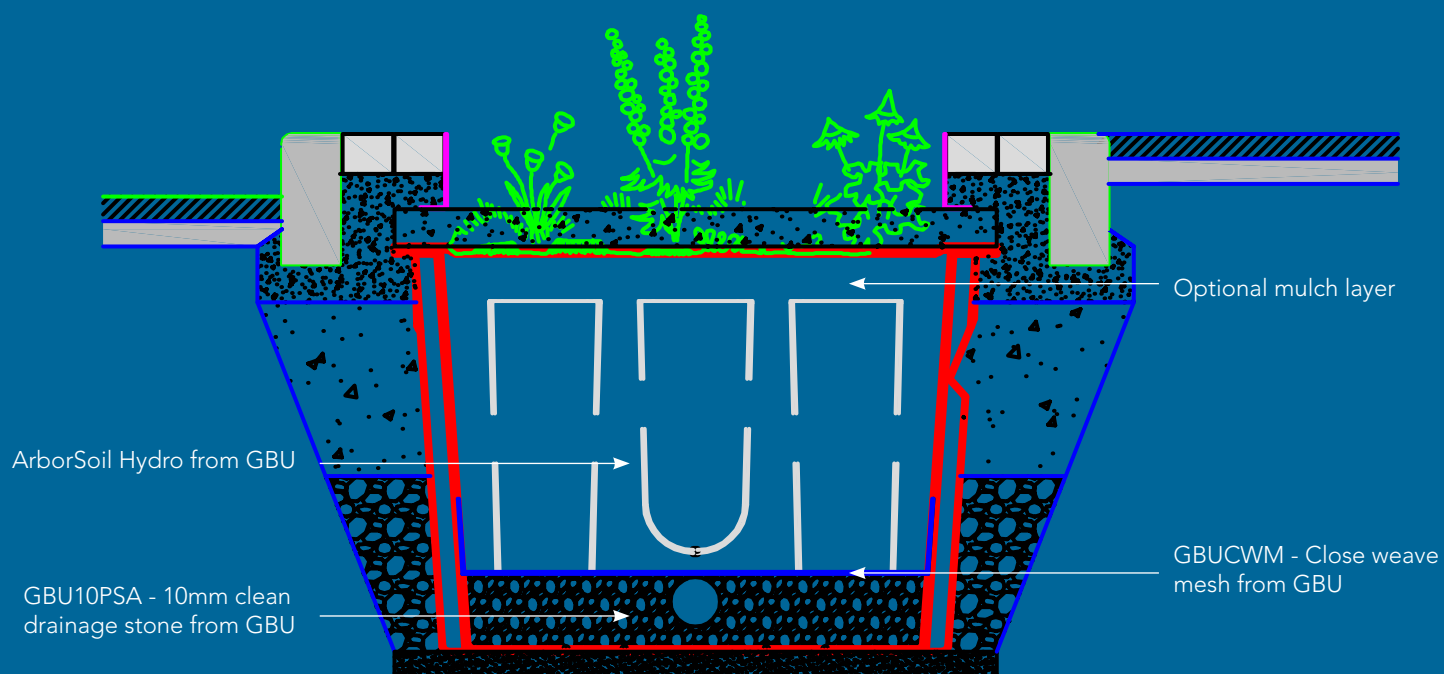
M5-60	r	Return period (annual probability of occurrence)						
		1 in 1 (100%)	1 in 10 (10%)	1 in 30 (3.3%)	1 in 100 (1%)	1 in 100 + 20% (0.5%)	1 in 100 + 30% (0.25%)	1 in 100 + 40% (0.125%)
20	0.4		27.5	15	12.5	7.5	7.5	5
	0.3		25	15	10	7.5	7.5	5
	0.2		22.5	12.5	10	7.5	5	5
17	0.4		35	17.5	12.5	10	7.5	7.5
	0.3		32.5	17.5	12.5	10	7.5	7.5
	0.2		27.5	15	12.5	7.5	7.5	5
14	0.4		40	20	17.5	12.5	10	10
	0.3		40	20	15	12.5	10	7.5
	0.2		32.5	17.5	15	10	7.5	7.5

Water Quality Data

The HydroPlanter complies with the CIRIA SuDS Manual specification Table 26.4 'Indicative SuDS mitigation indices for discharges to groundwater' (Refer Bioretention system)

- TSS - 0.8
- Metals - 0.8
- Hydrocarbons - 0.8

Internal Build-up



ArborSoil Hydro Parameters	Unit	Typical Test Results
Texture:		
Clay (<0.002mm)	%	9
Silt (0.002 - 0.63mm)		
Very Fine Sand (0.05 - 0.15mm)	%	21
Fine Sand (0.15 - 0.25mm)		
Medium Sand (0.25 - 0.50mm)	%	45
Coarse Sand (0.50 - 1.0mm)	%	25
Very Coarse Sand (1.0 - 2.0mm)		
Stones (2 - 6mm)	%	1.6
Organic Matter (LOI)	% w/w	2.7
Ph (1:2.5 water extract)	units	8.4
Exchangeable Sodium Percentage	%	3.6

Phytotoxic Contaminants:		
Total Zinc	mg/kg	40.2
Total Copper	mg/kg	10.0
Total Nickel	mg/kg	13.1

Available Nutrients:		
Nitrogen	mg/l	0.11
Phosphorus	mg/l	43
Potassium	mg/l	651
Magnesium	mg/l	77
Carbon:Nitrogen Ratio	:1	14.55
Calcium Carbonate	% m/m	1.4

Additional Analysis:		
Electrical Conductivity (1:25 water extract)	µS/cm	808
Electrical Conductivity (1:2 CaSO4 extract)	µS/cm	2908

Additional Criteria:		
Saturated Hydraulic Conductivity	mm/h	90
Total Porosity	%	46.5
Air-filled Porosity	%	21.0
Capillary Porosity	%	25.5
Bulk Density	g/cc	1.42
Particle Density	g/cc	2.66