

SuDS (Sustainable Drainage Systems) Strategy for Planning Application

Condition Discharge ref: DISC\2026\0003

1. Introduction

This Sustainable Drainage Systems (SuDS) Strategy has been prepared to support planning application for the proposed development at Trickles Barn Farm, Ashington, RH20 3DE. In relation to application DC/25/1205

The purpose of the document is to demonstrate that surface water arising from the development will be managed sustainably, following CIRIA SuDS Manual, NPPF, LLFA guidance, and Building Regulations Part H.

2. Site Description

The site is located at co-ordinates 513630,115287 easterly,northly sloping gently east to west. The development encompasses the brown field site of an ancient (over 100 years old) barn known as “Trickles Wood Barn”

Topography ranges from the western border Wiston Trickles Wood approx. i.e. highest point 30m AOD sloping down the eastern border at 25m AOD.

Based on desktop study taking reference from local environment studies commissioned by Ashington Parish Council, the soil type is best characterized as Soilscape 18, slowly permeable clay-based soils (1–5 mm/hr infiltration).

A trial excavation to depth 0.8 m supports the desktop study as shown in Fig 1.



Fig 1

As a consequence, there is little or no evidence of flooding (see flood risk assessment document). Being on a slope there is a natural flow of surface water downward across the site toward the western boundary watercourse.

3. Proposed Development

The drainage design consists of three systems.

- 1) A sealed effluent tank for managing foul/grey water.
- 2) Rainwater harvesting from roofs.
- 3) Surface water run-off from land and stable impermeable area.

1 Foul and Grey Waste:

Waste from toilet, shower, washing machine and sinks will be piped to an effluent tank. The proposed tank as supplied by Tanks Direct, 2500 Litre Cabin Waste Water/ Effluent tank CET2500. The tank is a self-contained unit i.e. no outflow. The tank will be emptied under contract to local service providers as required. To monitor the levels inside tank is fitted an ultrasonic blue tooth level measuring device.

Based on national average statistics expected waste volumes would be 276ltrs/day. A weekly emptying service will be planned.

Note: Planning Application DC/25/1205 is granted for a “temporary dwelling”. Should permanent permission be granted the effluent tank will be replaced by a professionally designed and installed “klargesten” sewerage treatment system.

2) Rainwater harvesting:

Collection :

Included in the calculation - dwelling roof (79.88m^2), western half barn roof (81.17m^2), and stable block roof (84.24m^2)

Total impermeable roof area: 245.29m^2 .

3) Surface water runoff:

Collection:

Included in the calculation is the concrete hard standing stable block area (64.8m^2)

4. Surface Water Management Strategy

SuDS hierarchy applied: infiltration, rainwater harvesting, and engineered soakaway

SuDS Decision Table

Decision Area	Available Information	Assessment / Outcome
Site Soil Permeability	Soilscape 18 – slowly permeable clay ($\approx 1\text{--}5\text{ mm/hr}$).	Low infiltration capacity; direct infiltration limited; engineered solutions preferred.
Ground Conditions / Trial Pit	Trial excavation to 0.8 m confirms clay profile.	Supports engineered soakaway versus simple soak-pits.
Slope / Topography	30 m AOD (west) down to 25 m AOD (east); westward overland flow.	Manage directional runoff and attenuate before discharge to ground.
Flood Risk Context	Little or no evidence of on-site flooding (per FRA).	SuDS required for compliance and betterment, not due to existing flood risk.
Foul / Grey Water	Sealed 2,500 L effluent tank; no outflow.	Outside SuDS scope; managed separately under foul drainage.
Rainwater Harvesting	Total roof area $\approx 245.29\text{ m}^2$; annual roof runoff $\approx 267.7\text{ m}^3$; storage 4,600 L.	Rainwater harvesting implemented to reduce potable demand and runoff.
Surface Water Runoff Sources	Hardstanding 64.8 m^2 + permeable yard 108 m^2 .	Requires attenuation and controlled infiltration.
SuDS Hierarchy – Infiltration	Clay soils restrict infiltration rates.	Full infiltration alone not viable; proceed to attenuation + controlled infiltration.
SuDS Hierarchy – Attenuation	10-year storm runoff $\approx 8.58\text{ m}^3$.	Provide storage to limit peak flow and volume.
Selected Structure	Proposed soakaway $3.0\text{ m} \times 2.0\text{ m} \times 0.8\text{ m}$ (voided crate or rubble filled).	Primary attenuation/infiltration feature sized for design events.
Maintenance	Gutters twice yearly or as required; filters annually; monitor soakaway for ponding. Weekly contracted foul waste emptying.	Owner-managed maintenance regime keeps system effective. Septic tank levels monitored electronically.

Rainwater harvesting calculations and sizing:

Collection (liters)=Roof Area (m²)×Annual Rainfall (mm)×Efficiency Factor

Roof area: East Barn roof = 81.17m²

Total for harvesting = 245.29m²

Useage non potable:

Based on national water average 276 lts/day for 2 persons

Horses 20 ltrs per day per horse 180 ltrs per day

Garden irrigation : peak summer months 1000ltrs/day

Washing farm machinery: peak winter months 50ltrs per day

Totals for 2 persons: 72 ltrs per day plus winter peak 230 ltrs per day other useage

302 ltrs per day non potable per day winter useage

1232 ltrs per day summer useage.

*Annual rainfall -RH20 district = 908 mm (*Source FEH22 1991-2020 for RH20 3DE*)

Efficiency factor = 0.85

Aqua Harvester Collection = (81.17+84.24+79.88) × 0.908×0.85 = 189 m³/year

Monthly Water Balance based on proposed AquaHarvester Tank 4600ltr (scaled to 908 mm/year*; tank starts full at 4,600 L)

Inflow is computed as 245.29 m² × (scaled monthly mm) × 0.85.

Demand = 302 L/day (Oct–Apr) or 1232 L/day (May–Sep) × days in month.

Month	Rainfall (mm, scaled)	Inflow (L)	Demand (L)	Net (L)	End Storage @ 4.6 m ³ (L)
Jan	93.9	19,575	9,362	+10,213	4,600
Feb	79.5	16,575	8,758	+7,817	4,600
Mar	57.6	12,018	9,362	+2,656	4,600

Apr	46.3	9,654	9,060	+594	4,600
May	60.1	12,528	38,192	-25,664	0
Jun	66.6	13,884	36,960	-23,076	0
Jul	62.2	12,974	38,192	-25,218	0
Aug	72.5	15,122	38,192	-23,070	0
Sep	63.8	13,299	36,960	-23,661	0
Oct	102.9	21,459	9,362	+12,097	4,600
Nov	100.4	20,941	9,060	+11,881	4,600
Dec	102.1	21,287	9,362	+11,925	4,600

Annual totals:

- **Inflow:** 189,316 L
- **Demand:** 252,822 L
- **Net: -63,506 L (deficit)**

302 L/day in winter; 1,232 L/day in summer with the 1,000 L/day garden irrigation during "peak summer months".

- The **tank stays full** through late winter/spring, **empties in May**, and stays empty through **September**, then **refills by October** under typical averages.
- The **summer irrigation load dominates** the balance; even with healthy rainfall, **May-Sep demand far exceeds inflow**. This will be partially mitigated by including water collected in a second rainwater tank on western side of barn i.e. 3000 ltr storage. The amount of irrigation used during summer will be adjusted inline with expected rainfall.
- On these assumptions the site shows a **~63 m³ annual shortfall** for non-potable uses unless you trim summer irrigation, add catchment, or bring in mains/top-up.

A 4,600-litre rainwater tank provides storage autonomy 15 days during winter months and 4 days during summer months.

Based on above figures the tank has winter autonomy 15 days . This is in line with UK average equine useage.

And 4 days summer autonomy. Will require attenuation by drawing from alternative 3000ltr storage tank and potable water source.

Surface water runoff:

Area for consideration is the development of impermeable concrete hard standing in front of stables.

Total for development area for calculation of surface water run off = 7.2mx9m = 64.8 m2 (appendix 1 see site plan)

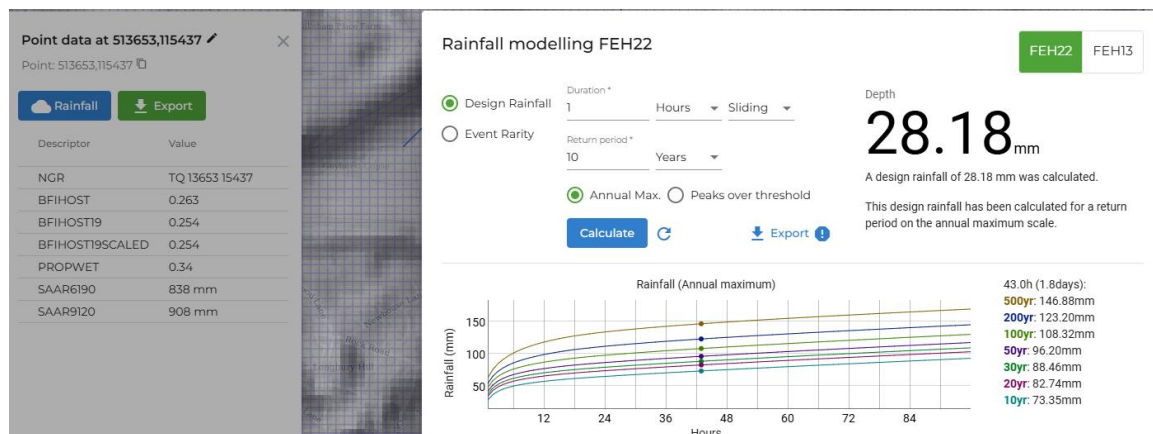


Fig2

Storm rainfall (10 year) 28.18 mm as modelled in FEH22 see fig 2

Typical site infiltration rates : Calculation based on 7mm/hr

Soilscape 18 Characteristic	Expected Infiltration Rate
Slowly permeable clayey/loamy soil	5-10mm/hr

Design Storm Comparison with 45% Climate Change Uplift (1-hour duration, Hardstanding 64.8 m²)

Assumptions: impermeable surface (runoff coefficient ≈ 1.0); FEH22 PointDDF2022 rainfall depths at project location; +45% climate-change uplift applied to rainfall depth.

AEP (%)	Return Period (years)	Baseline FEH22 Rainfall (mm)	+45% CC Rainfall (mm)	Baseline Runoff Volume (m ³)	+45% CC Runoff Volume (m ³)
10%	10	28.18	40.87	1.826	2.648
3.33%	30	37.61	54.53	2.437	3.533
1%	100	47.57	68.98	3.083	4.470

Notes for planners:

- **Source of rainfall:** FEH22 DDF (PointDDF2022) for the site; 1-hour duration selected to align with the 10-year depth previously cited and for consistent comparison across AEPs.
- **Scope:** Volumes relate to the **64.8 m²** concrete stable yard only; roof runoff is addressed separately via rainwater harvesting/soakaway in the Strategy.
- **Critical duration:** Storage design should be checked across multiple durations to ensure the critical duration is captured.
- **Updated Soakaway Design Volumes (1-hour duration, 64.8 m², +45% CC, +0.016 m³ overflow)**

Assumptions: impermeable surface (runoff coefficient ≈ 1.0); FEH22 PointDDF2022 rainfall depths at project location; volumes relate to the concrete stable yard only.

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AEP (%)	Baseline FEH22 Rainfall (mm)	+45% CC Rainfall (mm)	Baseline Runoff (m ³)	+45% CC Runoff (m ³)	Added Overflow (m ³)	Total Runoff (m ³)
10% (1-in-10)	28.18	40.87	1.826	2.648	0.016	2.664
3.33% (1-in-30)	37.61	54.53	2.437	3.533	0.016	3.549

1% (1-in-100)	47.57	68.98	3.083	4.470	0.016	4.486
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- **Notes for planners:** Rainfall depths sourced from FEH22 (PointDDF2022) at the project point; results apply to the 64.8 m² concrete yard only; roof runoff is managed separately via rainwater harvesting/soakaway; storage design should still be checked for **critical duration** across multiple storms.

1. DESIGN STORAGE VOLUME (Maximum AEP)

AEP	Total Runoff (m ³) incl. +45% CC + 0.016 m ³ overflow
10% (1-in-10)	2.664 m ³
3.33% (1-in-30)	3.549 m ³
1% (1-in-100)	4.486 m³

→ Design must use the 1% AEP + CC + tank overflow = 4.486 m³.

REQUIRED GROSS SOAKAWAY VOLUME FOR DIFFERENT VOID RATIOS

Crates only store water in their void space. Gross volume must account for void ratio:

Void Ratio	Required Gross Volume (m ³)
30%	14.95
40%	11.21
50%	8.97
60%	7.48
70%	6.41
80%	5.61
95%	4.72

CRATE VOLUME & COUNT

Each crate: $1.0 \times 0.5 \times 0.4 = 0.20 \text{ m}^3$ gross

Crates required: $N = \frac{V_{\text{gross}}}{0.20}$

Void Ratio	Gross Vol (m ³)	Crates Required
30%	14.95	75 crates
40%	11.21	57 crates
50%	8.97	45 crates
60%	7.48	38 crates
70%	6.41	33 crates
80%	5.61	29 crates
95%	4.72	24 crates

Most commercially available attenuation crates fall in the **95% void ratio range**, so **24 crates** is the realistic requirement.

FOOTPRINT & STACKING OPTIONS

Crate footprint (each): $1.0 \text{ m} \times 0.5 \text{ m}$

Crate height: 0.4 m

Option A — Single layer

- Height = 0.4 m
- 24 crates = footprint **12.0 m × 1.0 m** (linear) or more compact e.g.:
 - **6 m × 2 m**
 - **4 m × 3 m**
 - **3 m × 4 m**

Option B — Two-layer stack (0.8 m deep)

Total depth = **0.8 m** (matches your existing proposal)

Crates required per layer: $24 \text{ crates} \div 2 = 12 \text{ crates per layer}$

Footprint examples for 12 crates:

- **6 m × 1 m**
- **3 m × 2 m**
- **2 m × 3 m**

Soakaway (3 m × 2 m × 0.8 m) = 4.8 m³ gross, and with 95% voids:

$$4.8 \times 0.95 = 4.56 \text{ m}^3 \text{ storage}$$

Required storage is 4.486 m³ → Your proposed design is adequate.

FINAL ENGINEERED RECOMMENDATION

Use a 3.0 m × 2.0 m × 0.8 m two-layer crate soakaway

- 24 crates total (12 per layer)
- Gross volume = **4.8 m³**
- Net void volume @95% = **4.56 m³**
- Exceeds required storage (**4.486 m³**)
- Matches site constraints and existing design concept
- Soilscape 18 (slowly permeable clay, 1–5 mm/hr infiltration) means soakaway must be **attenuation-dominant**, which your crate system allows.

5. Maintenance Plan

Maintenance by property owner:

Daily monitor of ultrasonic level gauge in septic tank. Tank to be emptied under contract most probably weekly basis.

Tasks include clearing gutters twice yearly or as required, cleaning filters annually, and inspecting soakaway for ponding.

6. Conclusion

The SuDS strategy demonstrates that runoff will be attenuated and infiltrated onsite, reducing flood risk and complying with SuDS best practices.

SITE PLAN VIEW
SCALE 1:200

WEST BOUNDARY FENCE

EAST BOUNDARY 30M ROB

DWELLING

STABLE BLOCK

BARN

DATUM 27M ROB

WESTERN LOWEST BOUNDARY 25M

TOPOLOGY VIEWED EASTERLY
SCALE 1:200

LEGEND	DESCRIPTION	COVER HEIGHT	INVERT HEIGHT	COMMENT
S1	430mm I.C.	28400	27965	TYPICAL CLASS 5 (SEE SURROUND)
S2	" "	28400	27982	" "
S3	" "	27000	26500	" "
S4	" "	27000	26500	" "
S5	450mm I.C.	27000	26150	" "
RHT	150mm RAINWATER	26500	25750	4500 LTR RAINWATER TANK
SA	12 POLYSTYRENE CHAMBERS	26500	25700	12 POLYSTYRENE SOAKAWAY CHAMBERS
LD	400mm DRAIN	27000	26500	04 x 0.4m GERTEL CHAMBER
G.W	530mm I.C.	28400	26900	TYPICAL CLASS 5 (SEE SURROUND)
FIC	430mm I.C.	28400	28150	" "
ET	EFFLUENT TANK	27450	27450	2500 LTR CABIN WASTE TANK
LDP	LAND DRAIN PIPE	26200	26200	PERFORATED 100mm P.I.P.E

PIPEWORK: LAND DRAIN 100mm
BURNING OIL LINE
DRAIN - FIVE LITERS 100mm PVC
STABLE + DWELLING DOWNPIPE 68mm PVC
BARN DOWNPIPE 160mm PVC

GLOSSARY

- RG RAIN WATER CUTTER INLET
- SW SHOWER WASTE
- T TOILET
- SK SINK WASTE
- WM WASHING MACHINE

SUSTAINABLE DRAINAGE DESIGN
TO SUPPORT DISCHARGE CONDITION 3 OF DISC/26/0003
DATE: 17TH FEBRUARY 2026 VERSION: 1.0