



WATER DESIGN ENGINEERS

————— Pioneering —————

DRAINAGE STRATEGY REPORT

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1 Introduction

The client, Mr Sam Ripley, intends to construct a new Gypsy/Traveller site comprising 2 pitches with the siting of a mobile home and dayroom per pitch on Bramblefield at Crays Lane, Thakeham, West Sussex (RH20 3DZ). Water Design Engineers (WDE) has been appointed to undertake a comprehensive drainage strategy to support the planning application.

The drainage strategy addresses both surface water and foul water for the entire site:

- **Foul Water:** Discharges via gravity to a Klargest BioDisc Package Treatment Plant (PTP) and a dedicated subsurface drainage field.
- **Surface Water:** Collected by gravel channels and conveyed into an interconnected swale network, discharging following natural site falls via Hydro-Brake flow controls.

1.1 Purpose

The principal objective of this report is to evaluate the existing hydrological characteristics of the site and specify a foul and surface water drainage framework that prevents any increase in off-site flood risk, safeguards local water resources from pollution, and fully complies with CIRIA C753 guidelines, Local Authority constraints, and national SuDS standards.

1.2 Scope & Limitations

This strategy report is formulated using site-specific topography, architectural layouts, and desktop environmental data available at the time of writing. Should structural layouts or supplementary ground investigative data become available during detailed design, amendments to the strategy may be required and resubmitted to the Local Planning Authority.

Information sourced from external bodies (such as the Environment Agency, UKSUDS, and Cranfield Soilscales) has been utilized in good faith. While WDE considers these sources authoritative and reliable, absolute accuracy cannot be guaranteed.

2 Site Location

The development site is located at Plot 4 Bramblefield, Crays Lane, Thakeham, West Sussex, RH20 3DZ (National Grid Reference approx. TQ 117 812).

2.1 Local Authorities

The Local Planning Authority (LPA) is Horsham District Council

The Lead Local Flood Authority (LLFA) is West Sussex County Council

3 Site Description

The overall site encompasses an area of approximately 0.296 ha (2,966 sq.m) It currently comprises an undeveloped Greenfield parcel set within a rural agricultural landscape, bounded by hedgerows along three boundaries and interspersed with mature trees.



3.1 Topography

The general ground level sits at approximately 70.00m Above Ordnance Datum (AOD). The site exhibits a gentle natural gradient falling from West to East, with the localized low point situated towards the northwestern boundary corner. Spot elevations and slope profiles were extracted using Geographic Information Systems (GIS) terrain modeling and cross-verified against detailed site surveys.

3.2 Ground Investigation

A intrusive site investigation and percolation testing to BRE Digest 365 standards have not yet been executed. Soil permeability across the site area was evaluated using the Cranfield University Soilscales database (see APPENDIX E), which classifies the local strata under **Soilscape 18**: *Slowly permeable seasonally wet slightly acid but base-rich loamy and clayey soils*, characterized by impeded natural drainage.

For conservative preliminary design purposes, an infiltration rate of $k = 5 \times 10^{-7} \text{m/s}$ has been adopted. Prior to construction works commencing on site, a formal geotechnical investigation including trial pits and BRE 365 soakage testing will be undertaken to confirm design permeability and establish seasonal high groundwater table levels

3.3 Flood Risk Assessment

According to official Environment Agency (EA) flood mapping (see APPENDIX B), the site is situated entirely within **Flood Zone 1** (Low Probability of Fluvial/Tidal Flooding, <0.1% annual probability). Because the site area is under 1.0ha, a standalone formal Flood Risk Assessment (FRA) is not required under national planning policy.

- **Surface Water (Pluvial) Flooding:** The EA surface water map indicates the site sits within a Very Low risk area.
- **Reservoir Flooding:** The site is outside any risk zones associated with reservoir breach.
- **Sewer Flooding:** No public sewers exist within 30m of the boundaries; risk from public sewer surcharging is considered negligible.

3.4 Existing Surface Water Drainage & Greenfield Runoff

The site presently lacks formal drainage infrastructure and drains naturally via overland sheet flow and localized soakage. Greenfield runoff rates were calculated using the UKSUDS (HR Wallingford) IH24 methodology for the 0.296ha baseline site area (see APPENDIX C):

Return Period	Runoff Rate
Q_{BAR}	1.8 l/s
1 in 1 year	1.5 l/s
1 in 30 years	4.1 l/s
1 in 100 years	5.7 l/s
1 in 200 years	6.7 l/s

3.5 Existing Foul Water Drainage

No public foul main sewers are located within a feasible connection distance (>30m). Consequently, foul water generated by the proposed development will be managed via a dedicated private treatment facility engineered in accordance with BS EN 12566-3 and Building Regulations Approved Document H (see **Drawing ENV24587-00-DR-3000**):

- **Package Treatment Plant (PTP):** A Klargestar BioDisc BA-X Domestic Sewage Treatment Plant installed at Cover Level (CL) 70.00m and Invert Level (IL) 68.68m.
- **Inspection Chambers:** Type-5 fabricated plastic inspection chambers encased in a 150mm x 150mm concrete collar over a 100mm lean mix concrete base, with granular surround.
- **Subsurface Drainage Field:** Effluent is conveyed from the treatment plant via gravity to an inspection/distribution chamber feeding a network of 110mm diameter perforated distribution pipes. Pipes are laid on a 300mm graded gravel bed and lined with a geotextile filter fabric 200mm overlap) to prevent soil migration into the drainage bed.

4 Proposed Development

The proposed scheme involves the construction of a 2-pitch Gypsy/Traveller residential facility. Each pitch will host 1 mobile home, 1 single-storey dayroom, dedicated parking bays, and permeable access driveways. The hardstanding breakdown comprises approximately 154 m² of building roof structures, 931 m² of driveway and hardstanding areas, with the remaining area landscaped as soft lawn/planted gardens.

To determine design runoff volumes, weighting factors prescribed by Building Regulations Approved Document H (for pitch angles) and UKSUDS guidelines (for surface permeability) were applied.

Factored Drained Area Calculation Table

Area Breakdown	Gross Area (m ²)	Area Factor / Weighting	Effective Drained Area, AD (m ²)
Building Roofs: Flat	77.00	1.00 (Doc H)	77.00 m ²
Building Roofs: 30° Pitch	77.00	1.29 (Doc H)	99.33 m ²
Building Roofs: 45° Pitch	0.00	1.50 (Doc H)	0.00 m ²
Building Roofs: 60° Pitch	0.00	1.87 (Doc H)	0.00 m ²
Building Roofs: >70° Pitch	0.00	0.50 (Doc H)	0.00 m ²
Impermeable Paved Areas	931.00	1.00 (100% Runoff)	931.00 m ²
Permeable Paved Areas	1,881.00	0.30 (30% Contribution)	564.30 m ²
TOTAL POSITIVELY DRAINED AREA (Ad)	2,889.00 m²	—	1,671.63 m² (0.167 ha)

5 Proposed Surface Drainage

5.1 Impermeable Area

Please refer to APPENDIX D for the proposed drainage layout plan. As explained in section 4, the total positively drained area which will generate additional runoff = 1671.63 m² (0.019 ha). No formal drainage tests have been carried out.

5.2 Runoff Disposal

Given the low natural soil infiltration rate 5×10^{-7} m/s, primary surface water management relies on above-ground SuDS conveyance and storage systems. Roof downpipes and surface runoff direct water through **gravel-filled channels** into four interconnected swales.

As detailed in cross-sectional drawing **ENV24587-00-DR-2000**:

- **Section A-A:** Runoff from permeable driveway margins discharges into parallel **gravel-filled channels** and passes across vegetated buffer strips before entering the main swale basins.
- **Section B-B:** Subsurface conveyance between swales across internal access roads is facilitated via **buried carrier pipes** underlying the driveways.
- **Section C-C:** Outfall flows from the swales pass through an integrated **Sand and Leaf Trap** before discharging into concrete manholes equipped with **Hydro-Brake Flow Control devices**.

5.3 Attenuation Storage

The preferred method of runoff disposal is always by infiltration. The second option in the runoff disposal hierarchy is to a surface water body. The nearest surface water body is a drainage ditch diagonal to the north of the site entrance and is not a feasible option due to the area's topography.

The proposed surface water strategy will therefore dispose of rainwater to a swale on site.

The additional volume of runoff generated by the impermeable areas of the proposed development will have to be released at a very low rate so as not to increase flood risk off-site.

In accordance with CIRIA C753, the approach to managing this additional runoff volume is to limit the release of all runoff to a maximum rate of 2l/s/ha or QBAR, whichever is greater. We have already established that QBAR is (1.8 l/s), which is the greater of the two. (If we consider 2l/s/ha ÷ 10,000 x 2966m² (total site area) = 0.593l/s for the site).

Attenuation storage will therefore be required to accommodate the excess volume of stormwater resulting from all events above QBAR up to the 1 in 100-year event, plus 45% allowance for climate change.

The attenuation storage volume provided by the UKSUDS storage estimation tool has been calculated as 5m³ (please see APPENDIX F).

The proposed strategy includes a swale to attenuate excess water and Hydrobrake BD216 blocks to restrict flow to a maximum flow of 1 l/s using the Hydro-brake in outlet chamber of swale 2 and swale 4 as a flow control device. Excess water is discharged via natural fall to adjacent stream.

Swale Volumetric Capacity Matrix

Swale Unit	Depth (m)	Base Width (m)	Top Width (m)	Side Slope	Length (m)	Provided Storage Volume (m ³)
Swale 1	0.50	5.00	7.00	1:2	39.44	91.52 m³
Swale 2	0.60	3.60	6.00	1:2	25.14	57.82 m³
Swale 3	0.50	4.00	6.00	1:2	15.23	29.23 m³
Swale 4	0.60	2.92	5.32	1:2	35.00	68.64 m³
TOTALS	—	—	—	—	—	247.21 m³

5.4 Exceedance Flow

During extreme storm events exceeding the 1-in-100 Year + 45% climate change design baseline, excess stormwater will pool safely within the top freeboard of the swale system. Should swale capacity be exceeded, overland flows will follow the natural topographic slope toward the south eastern corner of the site. Finished floor levels of dayrooms and mobile home pads will be elevated above surrounding ground levels to guarantee zero structural flood risk during exceedance events.

5.5 SuDS Techniques

The purpose of sustainable drainage systems (SuDS) is not just to attenuate and infiltrate stormwater, but also the following:

- Source control - reduction of runoff at source using permeable surfaces such as gravel and reinforced grass.
- Conveyance - The flow of runoff should be conducted as near to ground level as possible, using gravel channels, French drains, swales, ditches etc and buried pipes as a last resort.
- Filtration - This is an important part of the 'treatment train' when looking at the improvements to water quality. Grassed swales, biofiltration basins / raised beds and tree pits will all provide filtration.
- Retention - This provides storage volume, allowing water to 'pond' in certain areas before discharging from the site. We have considered attenuation storage in the form of a swale and Hydro-brake as flow control device.
- Infiltration - Providing the opportunity for water to infiltrate into the soil through the swale design.

5.5.1 Source Control

Using permeable paving for driveway and parking areas greatly reduces the amount of runoff generated by using impermeable concrete or tarmac surfaces.

Rainwater butts could be installed at the dwelling. This could be of a slim line design, and we would recommend a 500-litre in capacity (as pictured below or similar). This would provide an additional 500 litres of capacity within the drainage system. However, it should be noted that it has not been considered as part of the attenuation storage as the butts may be full during a design storm event.

6 Management & Maintenance

The ongoing management and maintenance of the drainage system are essential in minimising flood risk both on and off-site for the lifetime of the development.

6.1 Obligations

The responsibility for maintaining the proposed drainage system will remain with the property's freeholder (s) for the development's lifetime.

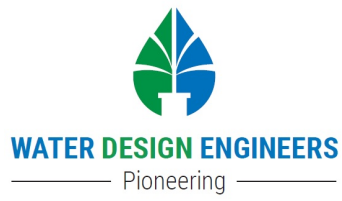
6.2 SuDS Maintenance Plan

The majority of work required to maintain the system will require basic gardening skills, mowing the grass and ensuring that any build-up of leaf litter / debris around the Swale overflow is removed. Ensuring the outlet onto the road is kept clear of debris / plant matter.

Item	Frequency	Time of Year
Swale Lawn	Weekly	Variable
Swale Outlet	Monthly	All Year

Operational Maintenance Schedule Table

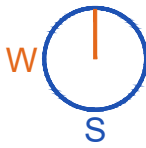
System Component	Required Maintenance Task	Task Frequency	Recommended Season
Swale Lawns (1–4)	Mow grassed side slopes (50mm min height), inspect banks for erosion, remove silt/litter.	Monthly / Bi-weekly	Growing Season
Sand & Leaf Traps	Inspect trap chambers, clear accumulated leaf litter, sand, and organic debris.	Monthly & after major storms	All Year
Hydro-Brake Chambers	Inspect manhole interiors, remove sediment from sumps, check orifice clarity.	Quarterly	All Year
Klargester BioDisc PTP	Mechanical inspection of drive motor, disc alignment, blower checks, and professional desludging.	Annually	All Year
Inspection Chambers	Lift covers, inspect foul and surface channels for standing water or blockages.	Bi-annually	All Year



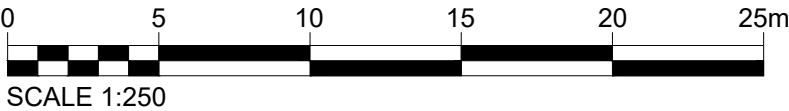
Appendix A

Site Location Plan

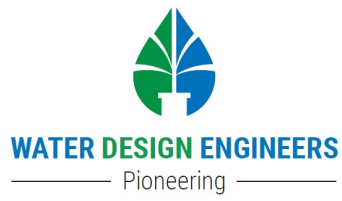
Drawings may be scaled for planning purposes only.
Any discrepancies are to be reported to WS Planning & Architecture.
Refer to Structural Engineers details for structural design criteria.
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As Proposed Site Plan



Rev	Date	Description
WS PLANNING & ARCHITECTURE Surrey Office 5 Pool House Bancroft Rd Reigate RH2 7RP London Office TBKH Sunley House 4 Bedford Park Croydon CR0 2AP T: 01737 225711 T: 020 3628 1180 www.wspa.co.uk admin@wspa.co.uk		
Date		Drawn By
February 2026		KA
Scale		Checked
1:250@A3		BW
Client		
Ripley, Sam		
Project		
Plot 4, Bramblefield Crays Lane, Thakeham West Sussex, RH20 3DZ		
Title		
As Proposed Site Plan		
Drawing No.		Rev.
J005516-DD-13		A



Appendix B

Environment Agency Flood Risk Maps

Flood map for planning

Your reference
Unspecified

Location (easting/northing)
510933/117482

Created
17 July 2026 07:51

Your selected location is in flood zone 1, an area with a low probability of flooding.

You will need to do a flood risk assessment if your site is **any of the following**:

- bigger than 1 hectare (ha)
- in an area with critical drainage problems as notified by the Environment Agency
- identified as being at increased flood risk in future by the local authority's strategic flood risk assessment
- at risk from other sources of flooding (such as surface water or reservoirs) and its development would increase the vulnerability of its use (such as constructing an office on an undeveloped site or converting a shop to a dwelling)

Notes

The flood map for planning shows river and sea flooding data only. It doesn't include other sources of flooding. It is for use in development planning and flood risk assessments.

This information relates to the selected location and is not specific to any property within it. The map is updated regularly and is correct at the time of printing.

Flood risk data is covered by the Open Government Licence which sets out the terms and conditions for using government data. <https://www.nationalarchives.gov.uk/doc/open-government-licence/version/3>

Use of the address and mapping data is subject to Ordnance Survey public viewing terms under Crown copyright and database rights 2026 AC0000807064. <https://flood-map-for-planning.service.gov.uk/os-terms>



Flood map for planning

Your reference

Unspecified

Location (easting/northing)
510933/117482

Scale
1:2,500

Created
17 Jul 2026 07:52

-  Selected area
-  Flood zone 3
-  Flood zone 2
-  Flood zone 1
-  Flood defence
-  Main river
-  Water storage area



0 20 40 60m

Appendix C

UKSUDS Greenfield Runoff Calculation

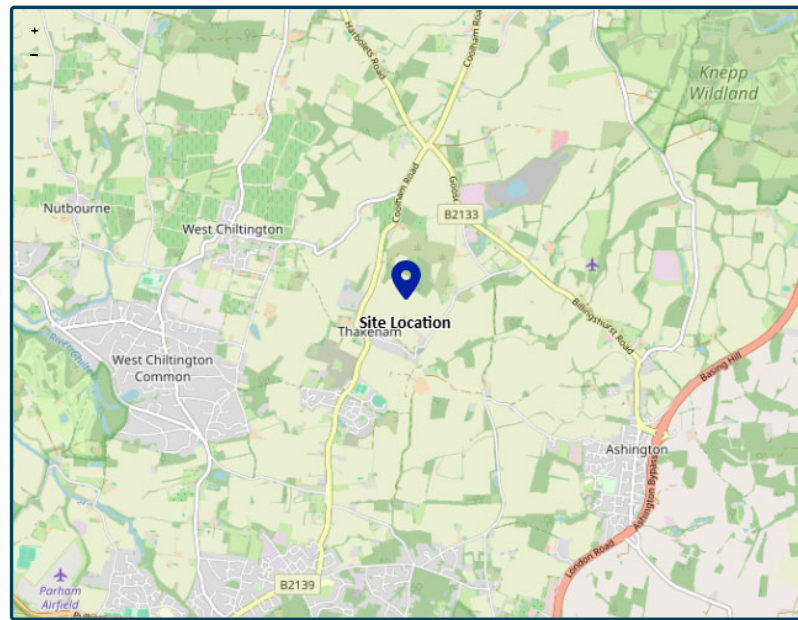
This is an estimation of the greenfield runoff rates that are used to meet normal best practice criteria in line with Environment Agency guidance “Rainfall runoff management for developments”, SC030219 (2013), the SuDS Manual C753 (CIRIA, 2015) and the non-statutory standards for SuDS (Defra, 2015). 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	16/07/2026
Calculated by	D.O
Reference	Bramblefield
Model version	2.2.3

Location

Site name	Plot 4 Bramblefield
Site location	Crays Lane, Thakeham West Sussex



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Site easting (British National Grid)	510853
Site northing (British National Grid)	117662

Site details

Total site area (ha)	.296	ha
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Greenfield runoff

Method

Method	IH124		
IH124			
	<u>My value</u>	☐	<u>Map value</u>
SAAR (mm)	850 mm		850
How should SPR be derived?	WRAP soil type		
WRAP soil type	4	☐	4
SPR	0.47		
QBar (IH124) (l/s)	1.8 l/s		

Growth curve factors

	<u>My value</u>	☐	<u>Map value</u>
Hydrological region	7		7
1 year growth factor	0.85		
2 year growth factor	0.88		
10 year growth factor	1.62		
30 year growth factor	2.3		
100 year growth factor	3.19		
200 year growth factor	3.74		

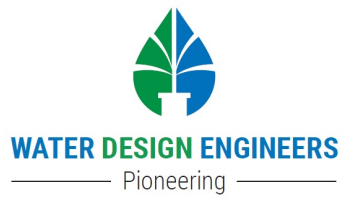
Results

Method	IH124	
Flow rate 1 year (l/s)	1.5 l/s	
Flow rate 2 year (l/s)	1.6 l/s	
Flow rate 10 years (l/s)	2.9 l/s	
Flow rate 30 years (l/s)	4.1 l/s	
Flow rate 100 years (l/s)	5.7 l/s	
Flow rate 200 years (l/s)	6.7 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.

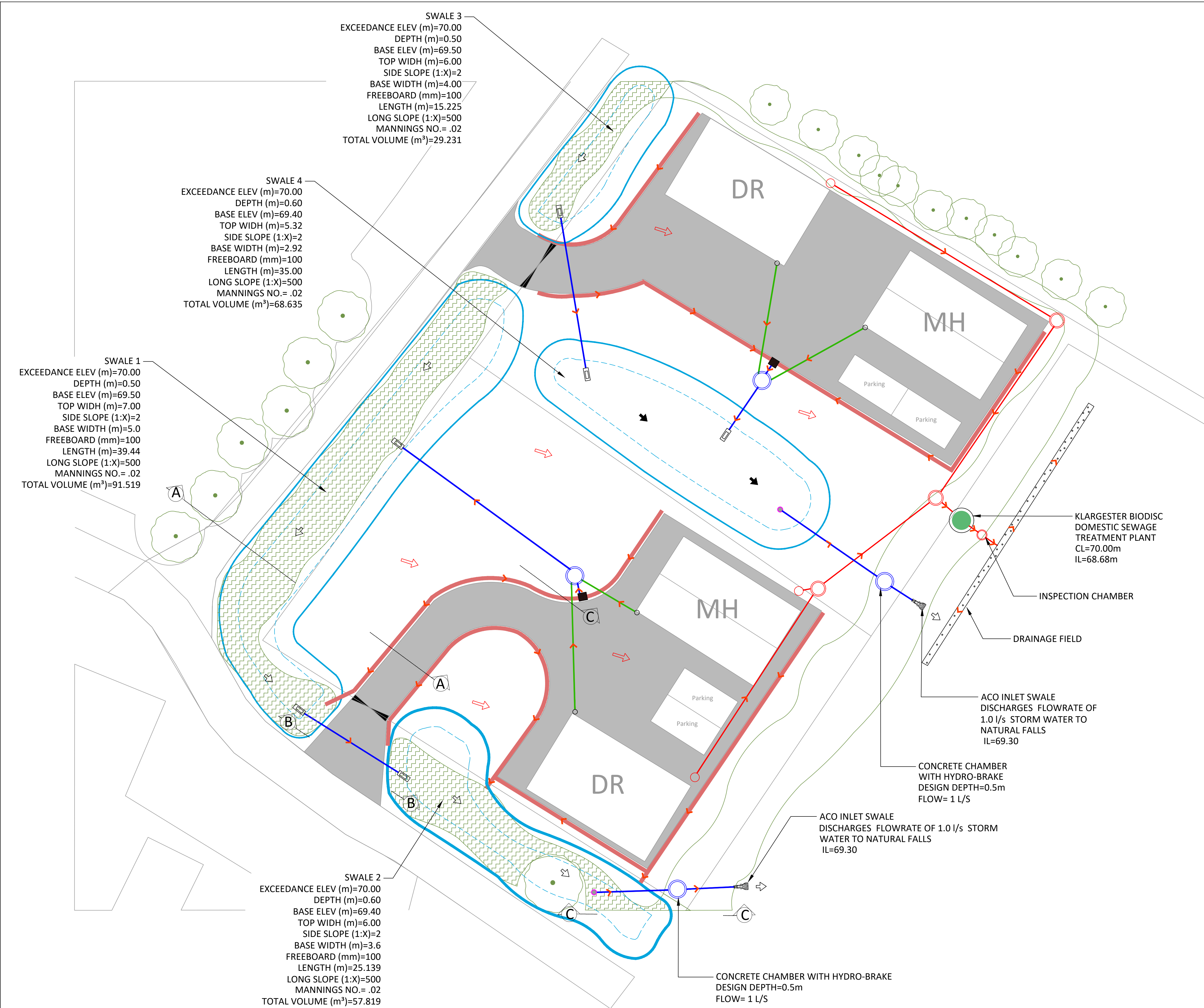
Disclaimer

This report was produced using the Greenfield runoff rate estimation tool (2.2.3) 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>). 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.

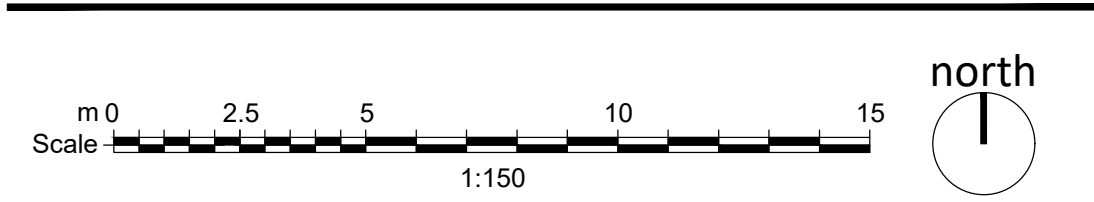


Appendix D

Drainage Layout Plan



- LEGEND:**
- BURIED SURFACE WATER PIPE
 - BURIED SEWER PIPE
 - GRAVEL FILLED CHANNEL
 - SURFACE WATER MANHOLE
 - SEWER INSPECTION CHAMBER
 - KLARGESTER BIODISC DOMESTIC SEWAGE TREATMENT PLAT
 - DOWN PIPE CONNECTION TO SURFACE WATER MANHOLE
 - SEWER PIPE CONNECTION FROM CARAVAN
 - CATCH BASIN CONNECTION TO SURFACE WATER MANHOLE
 - ACO SWALE INLET
 - SWALE INLET / OUTLET
 - LEAF AND SAND TRAP AS SWALE OUTLET
 - SWALE
 - SWALE WATER FLOW DIRECTION
 - EXCEEDANCE FLOW DIRECTION



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Project
BRAMBLEFIELD

Drawing
DRAINAGE GENERAL STRATEGY

Scale
1:150 @ A1

Date
JUL '25

Drawn
DO

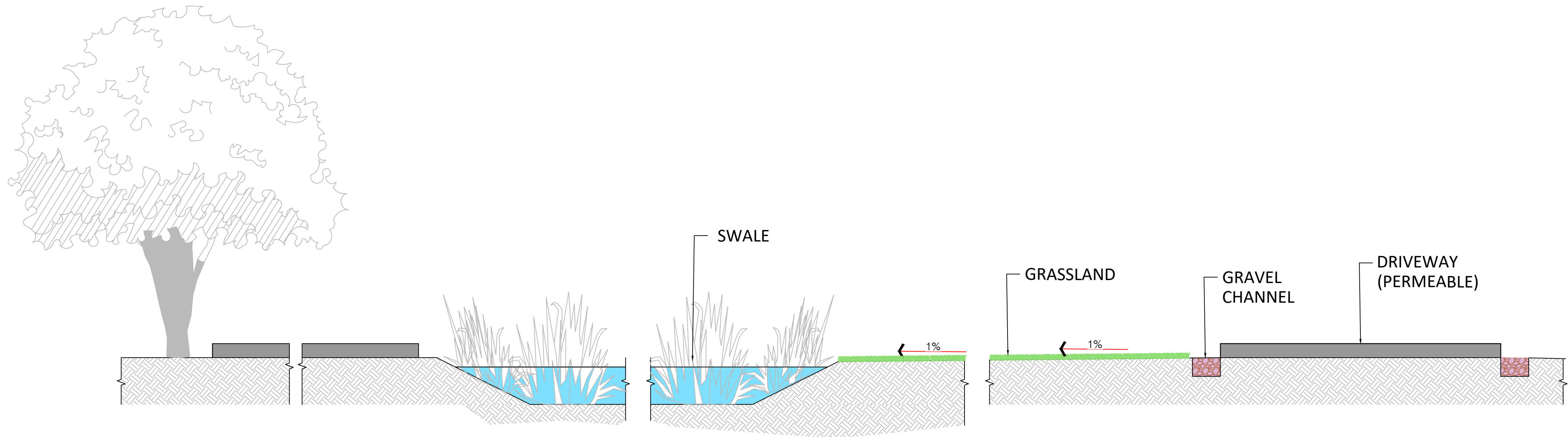
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ENV24587-00-DR-1000

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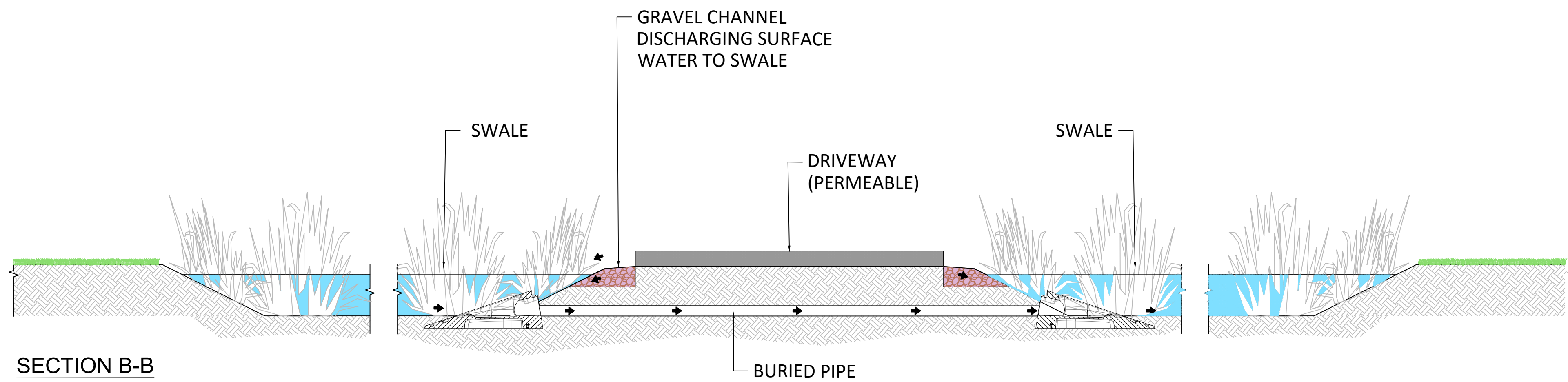
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☒ Issued for Planning Approval
☐ Issued for Construction

☐ Detailed Design
☐ Issued for Tender
☐ As Built

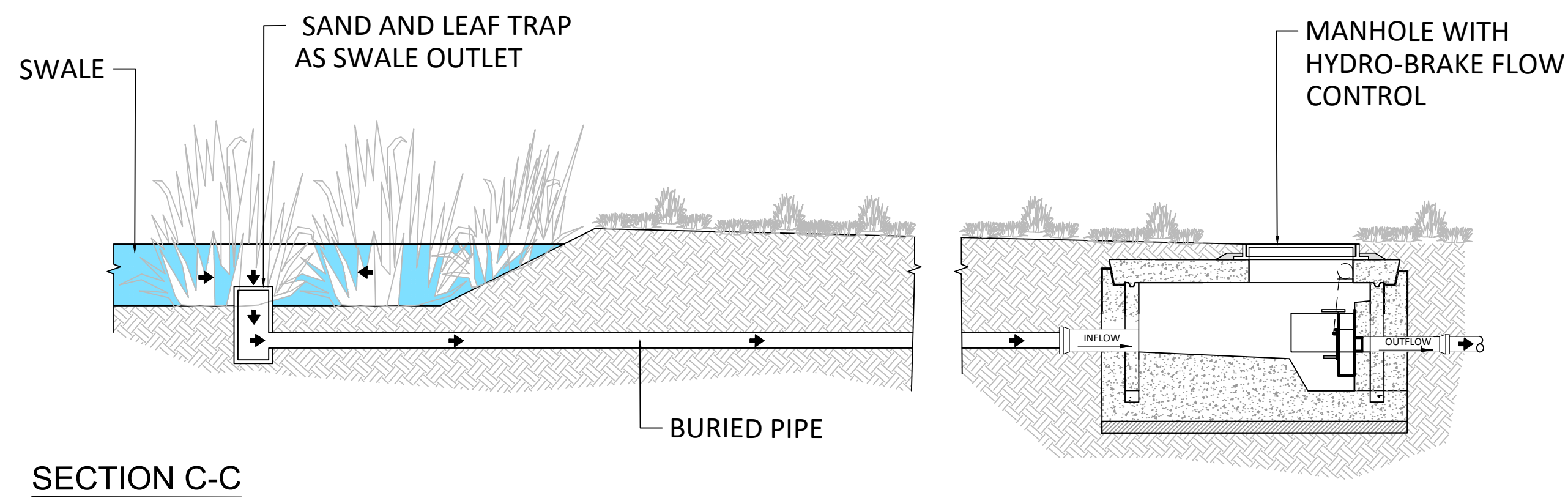
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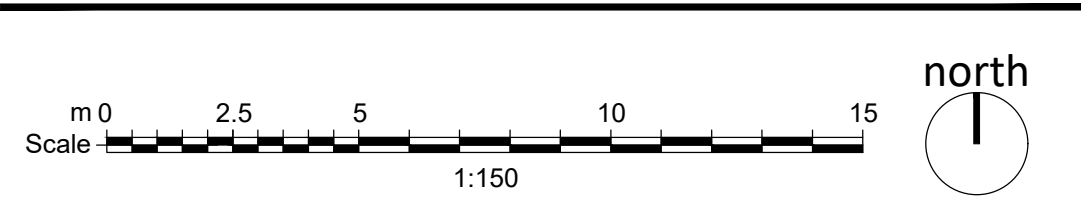
SECTION A-A



SECTION B-B



SECTION C-C



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Project

BRAMBLEFIELD

Drawing

DRAINAGE STRATEGY SECTION 1

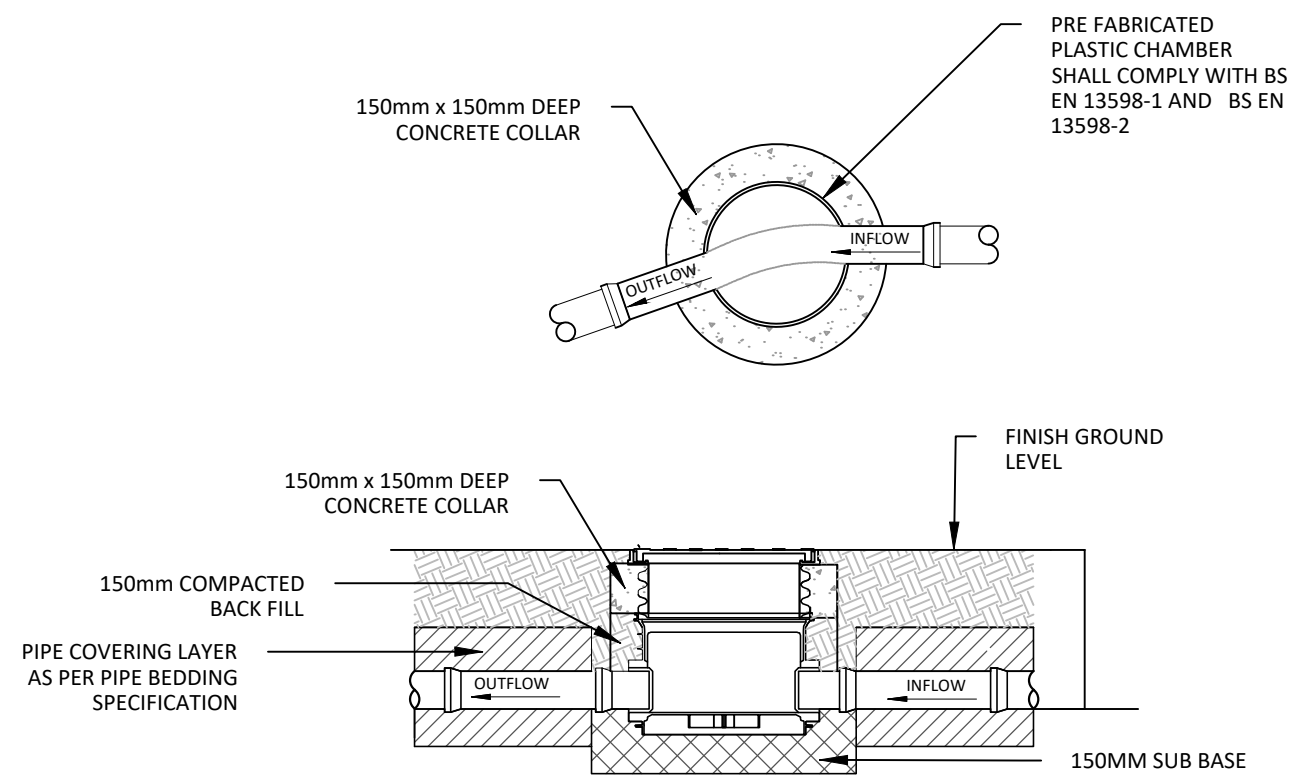
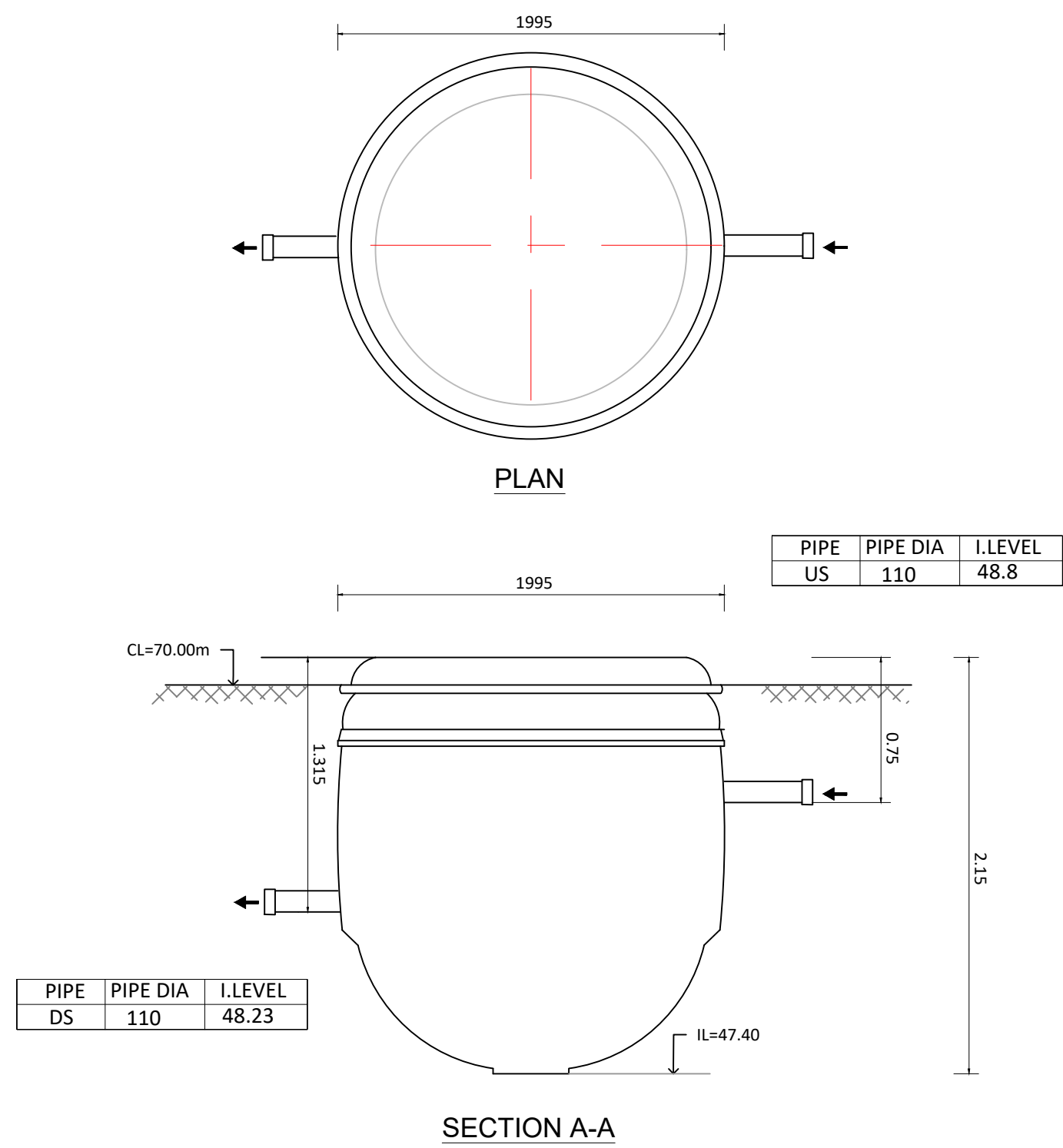
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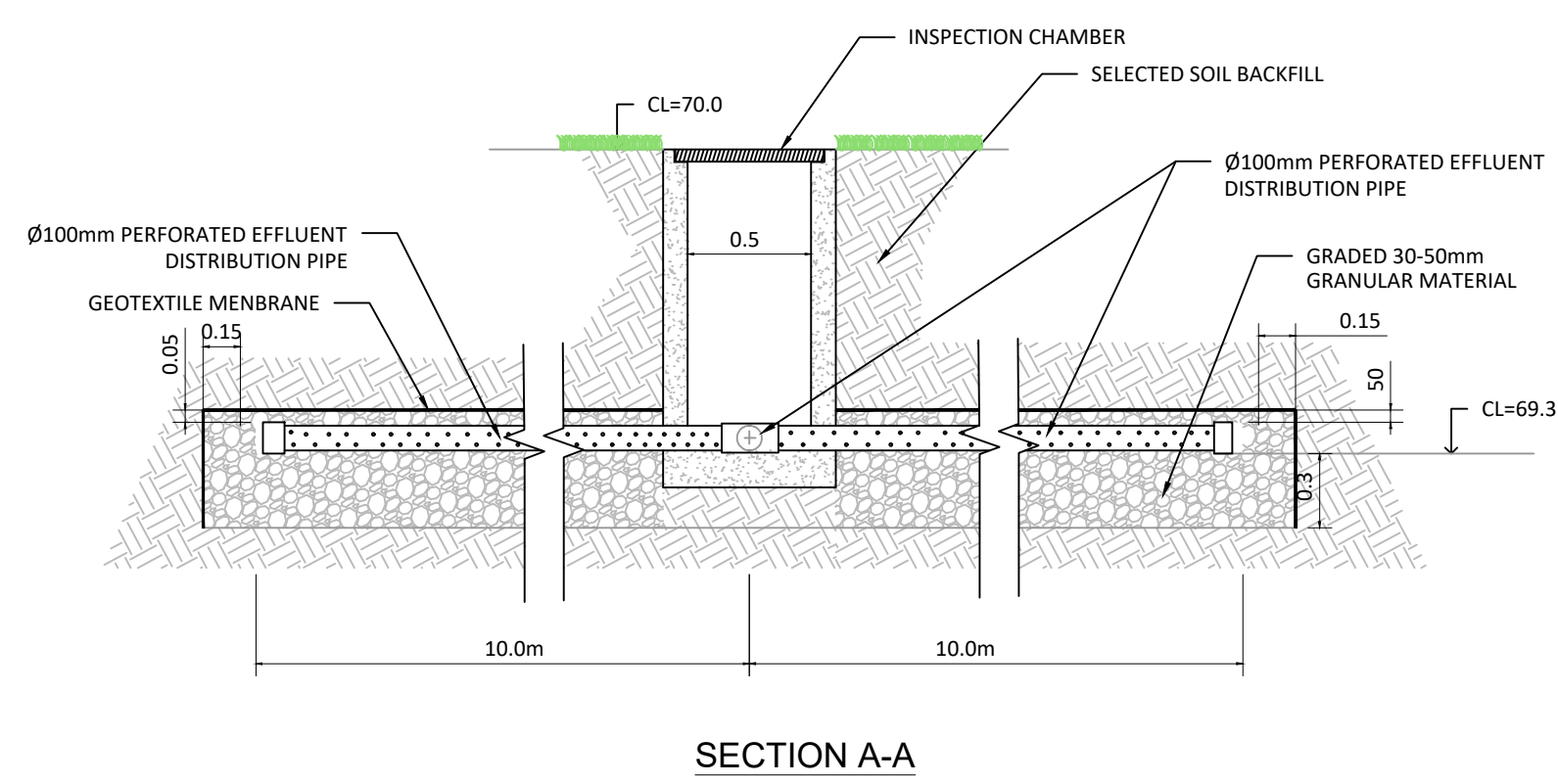
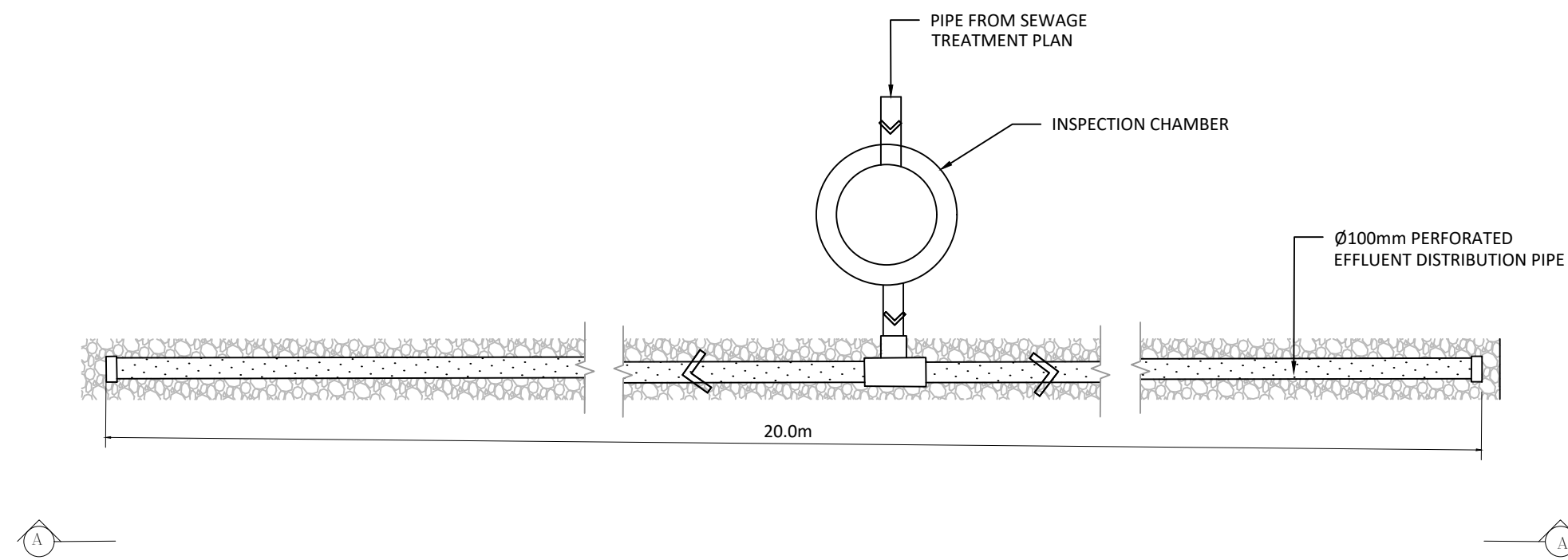
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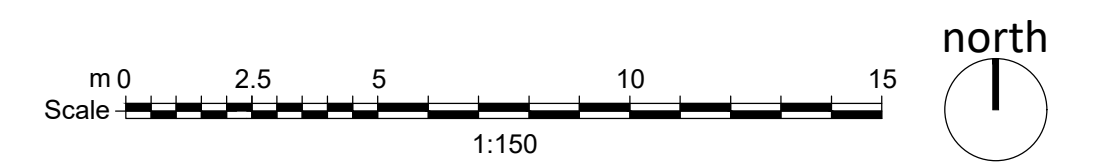


PROPOSED TYPICAL TYPE-5 INSPECTION CHAMBER

2 BA-X KLARGESTER BIODISC SEWAGE TREATMENT PLANT
SCALE: NTS



3 DRAINAGE FIELD INSTALLATION DETAILS
SCALE: NTS



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REVISIONS					



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Project

BRAMBLEFIELD

Drawing

DRAINAGE STRATEGY SECTION 2

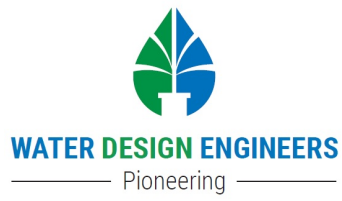
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NTS @ A1	JUL '25	DO

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Appendix E

Soilscapes Map

Soilscape Viewer

[Soil Descriptions](#)[Contact](#)[About](#)[Help](#)[Previous Version](#)

Search

Current location:

[Get my current location](#)

Search by:

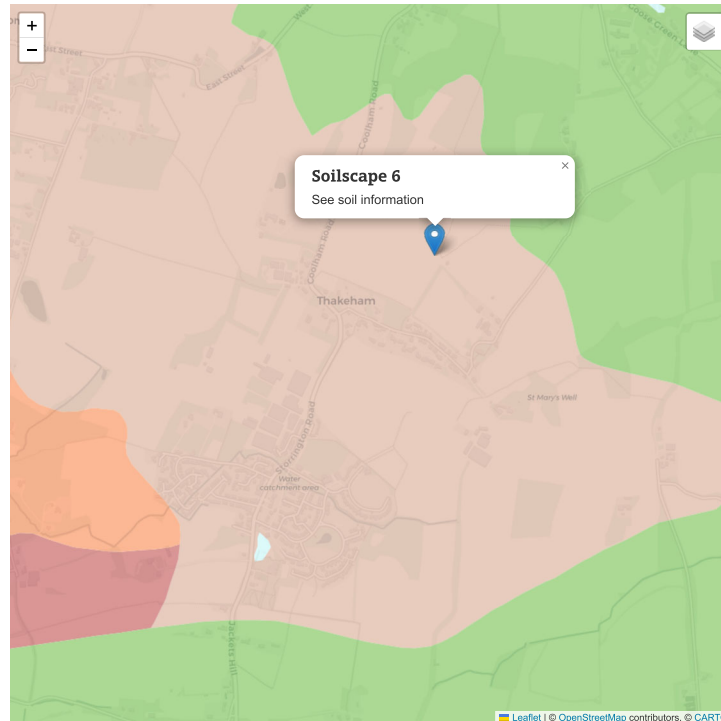
Postcode:

[Go](#)

Adjust Transparency



Legend

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Soil Information

Soilscape 6:

Freely draining slightly acid loamy soils

Texture:

Loamy

Coverage:

England: 15.5%, Wales: 24.4%, England & Wales: 16.7%

Drainage:

Freely draining



Fertility:

Low



Landcover:

Arable and grassland

Habitats:

Neutral and acid pastures and deciduous woodlands; acid communities such as bracken and gorse in the uplands

Carbon:

Low

Drains to:

Local groundwater and rivers

Water protection:

Groundwater contamination with nitrate; siltation and nutrient enrichment of streams from soil erosion on certain of these soils

General cropping:

Suitable for range of spring and autumn sown crops; under grass the soils have a long grazing season. Free drainage reduces the risk of soil damage from grazing animals or farm machinery. Shortage of soil moisture most likely limiting factor on yields, particularly where stony or shallow

About Us

LandIS[®], or the Land Information System is one of the offerings of the Cranfield Environment Centre (CEC). Incorporating the National Soil Resources Institute, we are the largest UK national and international centre for research and development, consultancy and training in soils and their interaction with the atmosphere, land use, geology and water resources.

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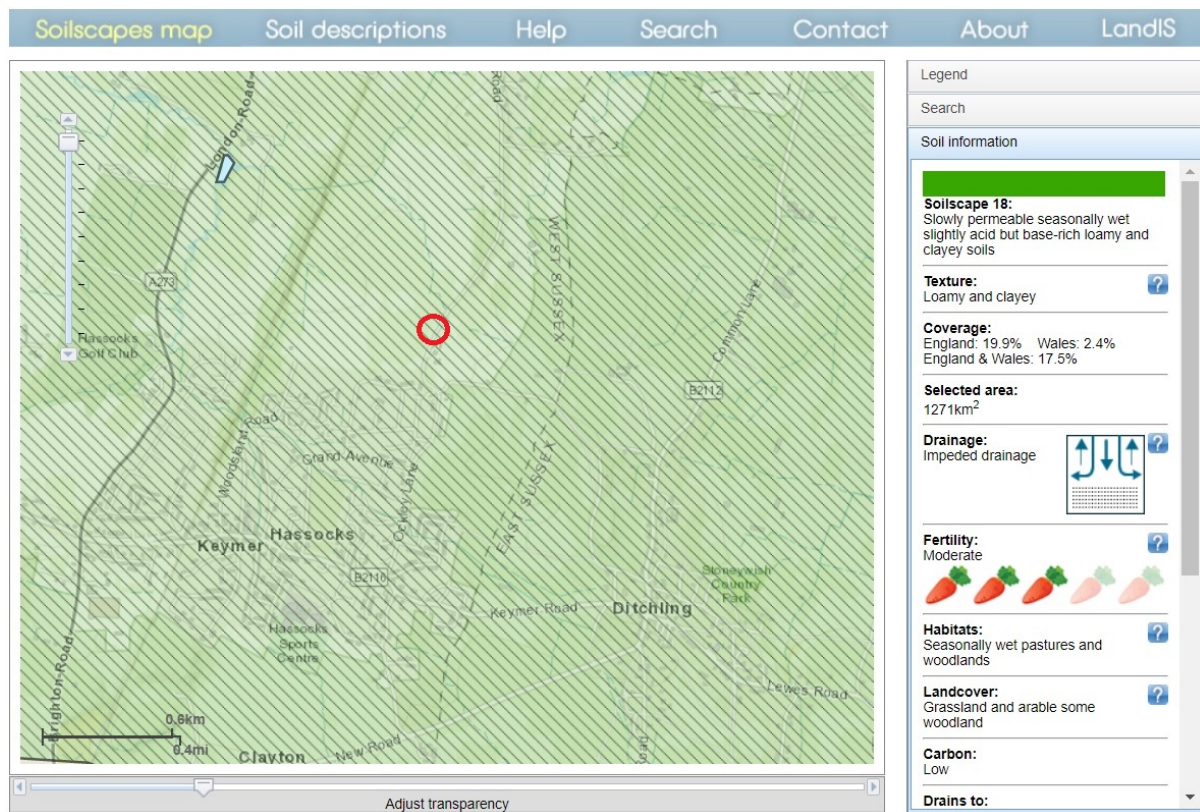


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Appendix F

Surface Water Storage Requirements

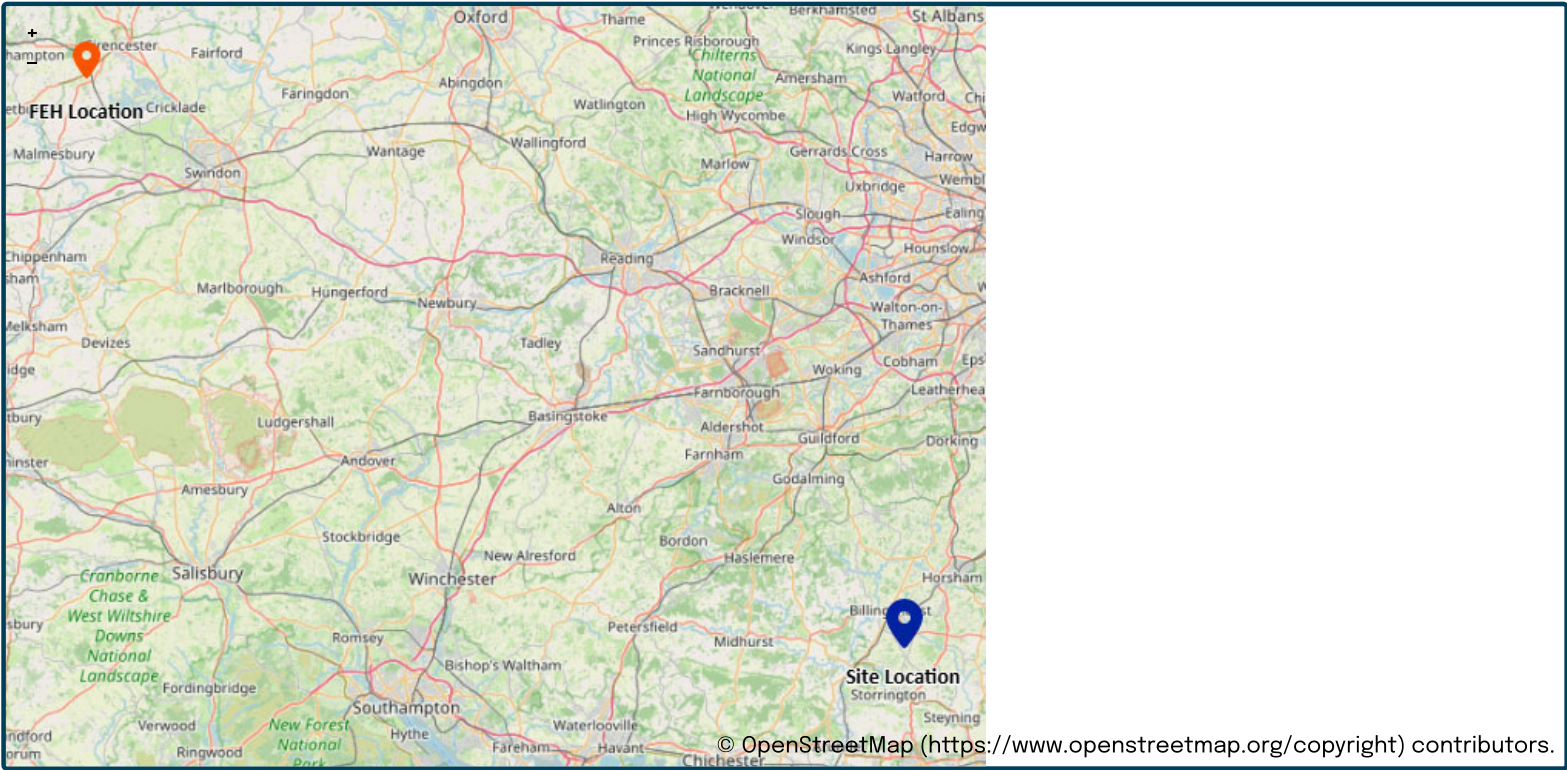
This is an estimation of the storage volume requirements that are needed to meet normal best practice criteria in line with Environment Agency guidance “Rainfall runoff management for developments”, SC030219 (2013), the SuDS Manual C753 (CIRIA, 2015) and the non-statutory standards for SuDS (Defra, 2015). It is recommended that the total storage volume for the site is distributed across the site using multiple SuDS and that hydraulic modelling software is used to undertake and finalise the detailed design of the drainage system.

Project details

Date	16/07/2026
Calculated by	D.O
Reference	Bramblefield
Model version	2.2.3

Location

Site name	Plot 4 Bramblefield
Site location	Crays Lane, Thakeham West Sussex



Site easting (British National Grid)	510849
Site northing (British National Grid)	117656

Site areas

Total site area (ha)	.296 ha
----------------------	---

Roof area

Total roof area (ha)	.015 ha
Contributing roof area (ha)	.015 ha
Non-contributing roof area (ha)	0 ha

Paved area

Total paved area (ha)	.093 ha
Contributing paved area (ha)	.093 ha
Non-contributing paved area (ha)	0 ha

Grass / vegetated area

Total grass / vegetated area (ha)	.188 ha
Contributing grass / vegetated area (ha)	.188 ha
Non-contributing grass / vegetated area (ha)	0 ha

Total area

Total contributing area (ha)	0.296 ha
------------------------------	--

Contributing areas with urban creep allowance

Urban creep allowance factor	+5%
Contributing roof area (adjusted for urban creep) (ha)	0.01575 ha
Contributing paved area (adjusted for urban creep) (ha)	0.09765 ha
Contributing grass / vegetated area (adjusted for urban creep) (ha)	0.1826 ha

Storage design parameters

Storage base shape	Rectangular / square
Storage base length to width ratio	3:1
Storage design depth (m)	.5 m
Storage side slope (1 in x)	1 in 3
Storage voids ratio (%)	100% (all voids)
Storage volume design return period (years)	1:100 years

Discharge flow rate from the site

Method

Type of site	Greenfield
Specify the method	IH124

IH124

	<u>My value</u>		<u>Map/default value</u>
SAAR (mm)	850mm	☐	850
How should SPR be derived?	WRAP soil type		
WRAP soil type	4	☐	4
SPR	0.47		
Total area for greenfield runoff calculation (ha)	0.296ha	☐	0.296
QBar (l/s)	1.8l/s		
Hydrological region	7	☐	7
Return period (years)	1:100 years		
Growth curve factor	3.19		
Flow rate (IH124) (l/s)	5.7l/s		

Final discharge rate

Runoff calculation method	IH124
Design flow rate (l/s)	5.7l/s

Blockage risk

Specify the method	Flow rate		
Minimum discharge flow rate to prevent blockage	1l/s		
	<u>My value</u>		<u>Calculated value</u>
Design orifice diameter (mm)	63mm	☐	63
Flow rate of orifice (l/s)	5.68l/s		

Rainfall and runoff

Rainfall input type	FEH22 CSV file		
	FEH_Point_Rainfall_FEH22_AM_397829_192951.csv		
Distance from FEH location to site (km)	135.8km		
Climate change allowance factor	145%		
Specify the runoff method from grass / vegetated areas	Fixed percentage - based on rainfall event depth and SPR		
	<u>My value</u>		<u>Map value</u>

How should SPR be derived?

WRAP soil type

4

4

SPR

0.47

Model results

- **Maximum discharge flow rate:** 5.7 (l/s)
- **Outflow orifice diameter:** 63 (mm)
- **Storage base length:** 24 (m)
- **Storage base width:** 8.1 (m)
- **Storage base area:** 195 (m²)
- **Storage total volume:** 123 (m³)
- **Storage total water volume:** 123 (m³)
- **Storm return periods run:** 1, 2, 10, 30, 100, 200 (years)
- **Storm durations run:** 15, 30, 60, 120, 180, 240, 360, 540, 720, 900, 1080, 1440, 1800, 2160, 2880, 3600, 4320, 5040, 5760 (minutes)

Return Period (years)	Critical Duration (minutes)	Peak Flow Rate (l/s)	Max Depth (m)	Max water volume (m ³)	Max storage volume (m ³)
1	720	2.7	0.14	28	28
2	540	3.1	0.17	36	36
10	360	4.3	0.30	67	67
30	360	5.0	0.39	91	91
<u>100</u>	<u>540</u>	<u>5.7</u>	<u>0.50</u>	<u>123</u>	<u>123</u>
200	540	6.1	0.58	148	148

Please note runoff estimation and storage volume estimation are subject to uncertainty. Storage volume results are therefore reported to the nearest 1 m³ value, unless storage volumes are less than 10 m³, in which case, storage volumes are provided to 1 decimal place.

Disclaimer

This report was produced using the surface water storage volume design tool (2.2.3) 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 surface water storage volumes for the whole site based on a limiting discharge rate from the site. 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.

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Appendix G

InfoDrain Modelling Report

Plot 4 Bramblefield: Cray's Lane, Thakeham, West Sussex	Date: 17/07/2026		
	Designed by: DO	Checked by: JR	Approved By:
Report Details: Type: Inflows Storm Phase: SuDS	Water Design Engineers (WDE):		





Catchment Area 1

Type : Catchment Area

Area (ha)	0.09
-----------	------

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	0.750
Winter Volumetric Runoff	0.840
Time of Concentration (mins)	5
Percentage Impervious (%)	100



Catchment Area 2

Type : Catchment Area

Area (ha)	0.085
-----------	-------

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	0.750
Winter Volumetric Runoff	0.840
Time of Concentration (mins)	5
Percentage Impervious (%)	100



Catchment Area 3

Type : Catchment Area

Area (ha)	0.04
-----------	------

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	0.750
Winter Volumetric Runoff	0.840
Time of Concentration (mins)	5
Percentage Impervious (%)	100

Plot 4 Bramblefield: Cray's Lane, Thakeham, West Sussex	Date: 17/07/2026			
	Designed by: DO	Checked by: JR	Approved By:	
Report Details: Type: Inflows Storm Phase: SuDS	Water Design Engineers (WDE):			



Catchment Area 4

Type : Catchment Area

Area (ha)	0.082
-----------	-------

Dynamic Sizing

Runoff Method	Time of Concentration
Summer Volumetric Runoff	0.750
Winter Volumetric Runoff	0.840
Time of Concentration (mins)	5
Percentage Impervious (%)	100

Plot 4 Bramblefield: Cray's Lane, Thakeham, West Sussex	Date: 17/07/2026		
	Designed by: DO	Checked by: JR	Approved By:
Report Details: Type: Stormwater Controls Storm Phase: SuDS	Water Design Engineers (WDE):		





Swale 1

Type : Swale

Swale

Exceedance Elevation (m)	70.000
Depth (m)	0.500
Base Elevation (m)	69.500
Top Width (m)	7.000
Side Slope (1:x)	2.00
Base Width (m)	5.000
Freeboard (mm)	100
Length (m)	39.448
Long. Slope (1:x)	500.00
Filtration Rate (m/hr)	0.0
Friction Scheme	Manning's n
n	0.02
Total Volume (m³)	91.519

Inlets

Inlet

Inlet Type	Point Inflow
Incoming Item(s)	Catchment Area 1
Bypass Destination	(None)
Inlet Destination	Ponding Area
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	Pipe 2
Outlet Type	Free Discharge

Advanced

Safety Factor	2.0
---------------	-----

Swale

Base Infiltration Rate (m/hr)	0.0
Side Infiltration Rate (m/hr)	0.0
Porosity (%)	100



Swale 2

Type : Swale

Plot 4 Bramblefield: Cray's Lane, Thakeham, West Sussex	Date: 17/07/2026		
	Designed by: DO	Checked by: JR	Approved By:
Report Details: Type: Stormwater Controls Storm Phase: SuDS	Water Design Engineers (WDE):		



Swale

Exceedance Elevation (m)	70.000
Depth (m)	0.600
Base Elevation (m)	69.400
Top Width (m)	6.000
Side Slope (1:x)	2.00
Base Width (m)	3.600
Freeboard (mm)	100
Length (m)	25.139
Long. Slope (1:x)	500.00
Filtration Rate (m/hr)	0.0
Friction Scheme	Manning's n
n	0.05
Total Volume (m³)	57.819

Inlets

Inlet

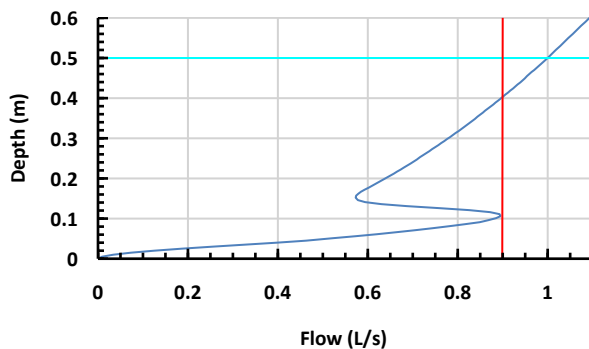
Inlet Type	Point Inflow
Incoming Item(s)	Catchment Area 2
	Pipe 2
Bypass Destination	(None)
Inlet Destination	Ponding Area
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	(None)
Outlet Type	Hydro-Brake®
Invert Elevation (m)	69.400
Design Depth (m)	0.500
Design Flow (L/s)	1.0
Objective	Minimize Upstream Storage Requirements
Application	Surface Water Only
Sump Available	☐
Flush Flow (L/s)	0.9

Unit Reference	CFF-0052-1000-0500-9000
----------------	-------------------------



Plot 4 Bramblefield: Cray's Lane, Thakeham, West Sussex	Date: 17/07/2026		
	Designed by: DO	Checked by: JR	Approved By:
Report Details: Type: Stormwater Controls Storm Phase: SuDS	Water Design Engineers (WDE):		



Advanced

Safety Factor	2.0
---------------	-----

Swale

Base Infiltration Rate (m/hr)	0.0
Side Infiltration Rate (m/hr)	0.0
Porosity (%)	100



Swale 4

Type : Swale

Swale

Exceedance Elevation (m)	70.000
Depth (m)	0.600
Base Elevation (m)	69.400
Top Width (m)	5.322
Side Slope (1:x)	2.00
Base Width (m)	2.922
Freeboard (mm)	100
Length (m)	35.000
Long. Slope (1:x)	500.00
Filtration Rate (m/hr)	0.0
Friction Scheme	Manning's n
n	0.02
Total Volume (m³)	68.635

Inlets

Inlet

Inlet Type	Point Inflow
Incoming Item(s)	Catchment Area 4 Pipe 1
Bypass Destination	(None)
Inlet Destination	Ponding Area
Capacity Type	No Restriction

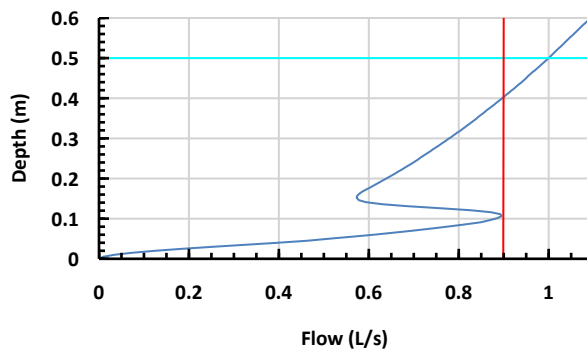
Plot 4 Bramblefield: Cray's Lane, Thakeham, West Sussex	Date: 17/07/2026		
	Designed by: DO	Checked by: JR	Approved By:
Report Details: Type: Stormwater Controls Storm Phase: SuDS	Water Design Engineers (WDE):		



Outlets

Outlet

Outgoing Connection	(None)
Outlet Type	Hydro-Brake®
Invert Elevation (m)	69.400
Design Depth (m)	0.500
Design Flow (L/s)	1.0
Objective	Minimize Upstream Storage Requirements
Application	Surface Water Only
Sump Available	☐
Flush Flow (L/s)	0.9
Unit Reference	CFF-0052-1000-0500-9000



Advanced

Safety Factor	2.0
Swale	
Base Infiltration Rate (m/hr)	0.0
Side Infiltration Rate (m/hr)	0.0
Porosity (%)	100

Plot 4 Bramblefield: Cray's Lane, Thakeham, West Sussex	Date: 17/07/2026		
	Designed by: DO	Checked by: JR	Approved By:
Report Details: Type: Stormwater Controls Storm Phase: SuDS	Water Design Engineers (WDE):		





Swale 3

Type : Swale

Swale

Exceedance Elevation (m)	70.000
Depth (m)	0.500
Base Elevation (m)	69.500
Top Width (m)	6.000
Side Slope (1:x)	2.00
Base Width (m)	4.000
Freeboard (mm)	100
Length (m)	15.225
Long. Slope (1:x)	500.00
Filtration Rate (m/hr)	0.0
Friction Scheme	Manning's n
n	0.02
Total Volume (m³)	29.231

Inlets

Inlet

Inlet Type	Point Inflow
Incoming Item(s)	Catchment Area 3
Bypass Destination	(None)
Inlet Destination	Ponding Area
Capacity Type	No Restriction

Outlets

Outlet

Outgoing Connection	Pipe 1
Outlet Type	Free Discharge

Advanced

Safety Factor	2.0
---------------	-----

Swale

Base Infiltration Rate (m/hr)	0.0
Side Infiltration Rate (m/hr)	0.0
Porosity (%)	100

Plot 4 Bramblefield: Cray's Lane, Thakeham, West Sussex	Date: 17/07/2026		
	Designed by: DO	Checked by: JR	Approved By:
Report Details: Type: Inflows Summary Storm Phase: SuDS	Water Design Engineers (WDE):		





Critical Storm Per Item: Rank By: Max. Inflow

Inflow	Storm Event	Inflow Area (ha)	Max. Inflow (L/s)	Total Inflow Volume (m³)
Catchment Area 1	FSR: 100 years: +45 %: 15 mins: Winter	0.09	54.5	25.375
Catchment Area 2	FSR: 100 years: +45 %: 15 mins: Winter	0.09	51.6	24.052
Catchment Area 3	FSR: 100 years: +45 %: 15 mins: Winter	0.04	24.0	11.168
Catchment Area 4	FSR: 100 years: +45 %: 15 mins: Winter	0.08	50.0	23.302

Plot 4 Bramblefield: Cray's Lane, Thakeham, West Sussex		Date: 17/07/2026		
		Designed by: DO	Checked by: JR	
Report Details: Type: Stormwater Controls Summary Storm Phase: SuDS		Water Design Engineers (WDE):		



Critical Storm Per Item: Rank By: Max. US Depth

Stormwater Control	Storm Event	Max. US Elevation (m)	Max. DS Elevation (m)	Max. US Depth (m)	Max. DS Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Total Lost Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Half Drain Down Time (mins)	Percentage Available (%)
Swale 1	FSR: 100 years: +45 %: 960 mins: Winter	69.888	69.888	0.310	0.388	4.5	78.544	0.000	0.000	0.9	52.071	940	14.177
Swale 2	FSR: 100 years: +45 %: 960 mins: Winter	69.889	69.889	0.438	0.489	3.7	52.730	0.000	0.000	1.0	103.143		8.801
Swale 4	FSR: 100 years: +45 %: 480 mins: Winter	69.868	69.867	0.398	0.467	6.2	57.320	0.000	0.000	1.0	47.843		16.485
Swale 3	FSR: 100 years: +45 %: 480 mins: Winter	69.868	69.867	0.337	0.367	3.0	25.245	0.000	0.000	1.0	17.451		13.636

Plot 4 Bramblefield: Cray's Lane, Thakeham, West Sussex	Date: 17/07/2026			
	Designed by:	Checked by:	Approved By:	
	DO	JR		
Report Details: Type: Stormwater Controls Summary Storm Phase: SuDS	Water Design Engineers (WDE):			

Status
OK
OK
OK
OK

Plot 4 Bramblefield: Cray's Lane, Thakeham, West Sussex	Date: 17/07/2026		
	Designed by: DO	Checked by: JR	Approved By:
Report Details: Type: Connections Summary Storm Phase: SuDS	Water Design Engineers (WDE):		





Critical Storm Per Item: Rank By: Max. Flow

Connection	Storm Event	Connection Type	From	To	Upstream Cover Elevation (m)	Max. US Water Elevation (m)	Max. Flow Depth (m)	Discharge Volume (m³)	Max. Velocity (m/s)	Flow / Capacity	Max. Flow (L/s)	Status
Pipe 2	FSR: 100 years: +45 %: 15 mins: Winter	Pipe	Swale 1	Swale 2	70.079	69.620	0.183	1.785	0.4	0.32	6.8	OK
Pipe 1	FSR: 100 years: +45 %: 30 mins: Summer	Pipe	Swale 3	Swale 4	70.030	69.665	0.195	2.874	0.4	0.34	5.4	OK

Plot 4 Bramblefield: Cray's Lane, Thakeham, West Sussex	Date: 17/07/2026		
	Designed by: DO	Checked by: JR	Approved By:
Report Details: Type: Phase Management Storm Phase: SuDS	Water Design Engineers (WDE):		



SuDS
FSR: 100 years: Increase Rainfall (%): +45: 480 mins: Winter

Tables

Name	Max. Inflow (L/s)	Total Inflow Volume (m³)	Max. Outflow (L/s)	Total Outflow Volume (m³)
Swale 2			1.0	48.753
Swale 4			1.0	47.743
TOTAL	22.2	252.883	1.9	96.496