PWA / GROUP

CONSULTING ENGINEERS

Rose Hill Farm

Drainage Strategy

Client:	Zara Moon Architects
Author:	Isaac Borcherds
Date:	17/09/2026
Reference:	26111-PWA-00-XX-RP-C-2000-P01

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Document Control

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Client: Zara Moon Architects
Project: Rose Hill Farm
Report: Drainage Strategy
Status: Preliminary
Reference: 26111-PWA-00-XX-RP-C-2000-P01

Document Production Record

Issue Details	Name	Signature
[redacted]		

Document Revision Record

Issue Number	Date	Revision Details
P01	17/09/2026	First Issue

Executive Summary

This Drainage Strategy has been prepared to support the proposed residential development at Rose Hill Farm, comprising the retention and alteration of Unit 5 and the construction of four new industrial units with associated infrastructure. The strategy has been developed in accordance with the National Planning Policy Framework (NPPF), CIRIA C753 The SuDS Manual, and local LLFA guidance.

An assessment of the drainage hierarchy has been undertaken to determine the most appropriate method of surface water disposal. Review of publicly available geological information and nearby borehole data indicates the presence of clay-rich Devensian Till overlying low permeability Bowland Shale bedrock. Consequently, infiltration drainage techniques such as soakaways are considered unlikely to be viable and have been discounted pending any future site-specific infiltration testing.

The nearest suitable receiving waterbody is an existing drainage ditch located approximately 40m west of the proposed development site and within the ownership boundary. Discharge to this watercourse is considered a sustainable and practical drainage solution in accordance with the drainage hierarchy. Surface water runoff generated by the proposed development will be attenuated on site and restricted to a maximum discharge rate of 1.2 l/s through the use of a flow control device and attenuation storage. This approach provides a controlled discharge regime whilst complying with local guidance regarding minimum flow control sizes.

Foul drainage from the proposed dwelling will be directed to a package treatment plant prior to discharge to the drainage ditch. Surface water and foul water systems will remain separate upstream of the treatment plant to ensure good drainage practice and regulatory compliance.

Subject to detailed design and the necessary consents and approvals, the proposed strategy demonstrates that the site can be drained in a sustainable manner without increasing flood risk on-site or elsewhere and therefore supports the proposed development.

Foreword

This report has been prepared for the sole use and reliance of Zara Moon Architects (the client) named above and cannot be relied upon by any other parties without the express written authorisation of Paul Waite Associates Ltd. Any unauthorized third party relies on this report at their own risk, and the authors owe them no duty of care. The report should be read in its entirety, including all associated drawings and appendices. Paul Waite Associates Ltd cannot be held responsible for any misinterpretations arising from the use of extracts that are taken out of context.

The findings and opinions conveyed in this report (including review of any third-party reports) are based on information obtained from the sources listed, which Paul Waite Associates Ltd understands are reliable. All reasonable skill, care and diligence has been applied in examining the information obtained. However, Paul Waite Associates Ltd accepts no responsibility for inaccuracies in the data supplied or for opinions based on any such inaccurate data. Paul Waite Associates Ltd reserves the right to amend their conclusions and recommendations in the light of further information that may become available.

PWA Credentials

This Drainage Strategy has been carried out by Paul Waite Associates Ltd who have over 30 years' experience of civil engineering projects. This drainage has been carried out following the general requirements of the National Planning Policy Framework (NPPF), CIRIA C753 The SuDS manual and the LLFA local guidance.

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1. Development Site Details

1.1. Site Location

Site Co-ordinates:
OS X (Eastings): 371654
OS Y (northings): 434553
National grip reference: SD 71654 43553
Nearest post code: BB6 8FG
What3Words: happily.free.photocopy

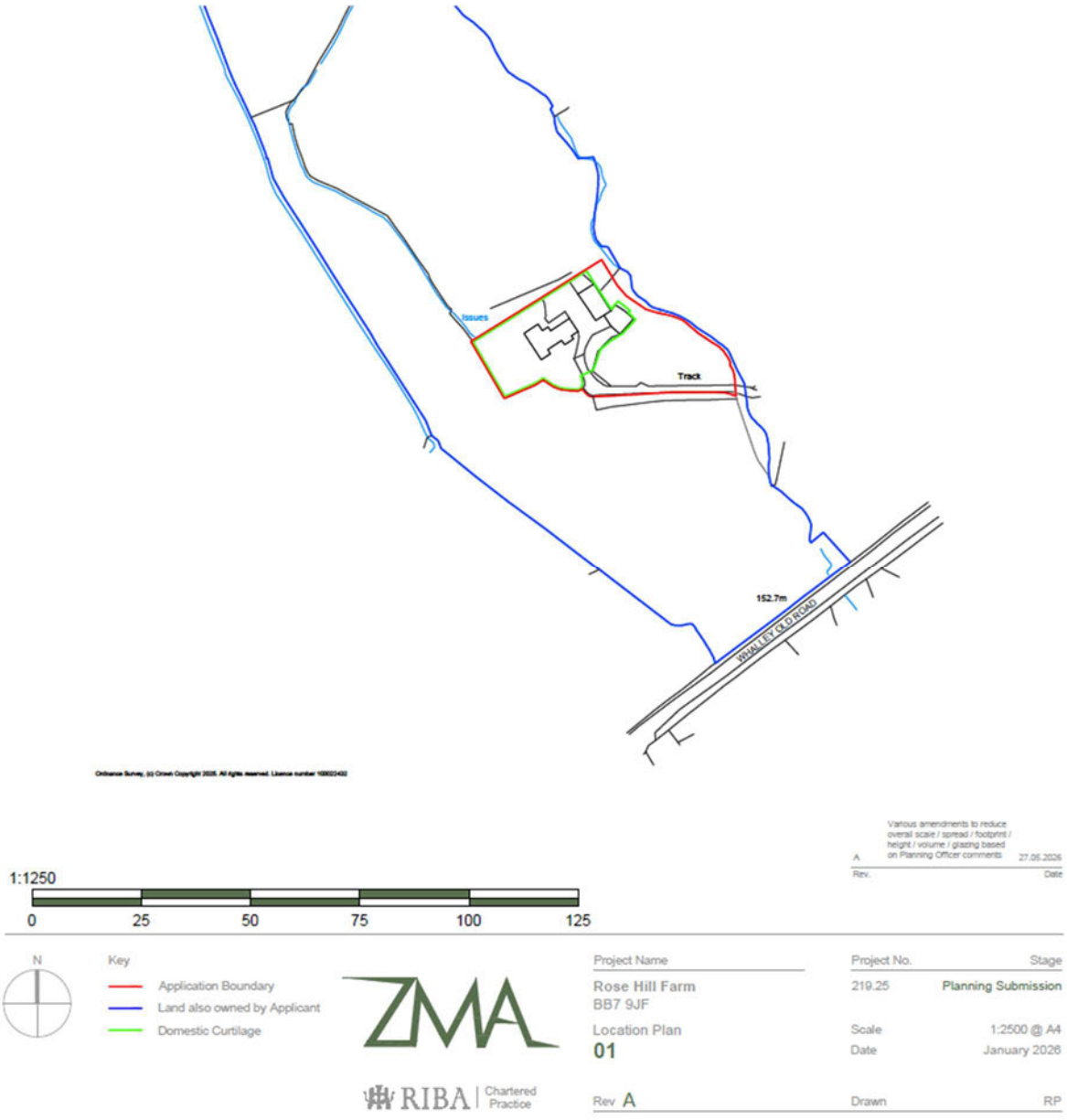


Figure 1 - Site Location Plan

Refer to Appendix A for the site location plan.

1.2. Current Land Use

Following a review of the existing site plan, it can be identified that the site is an existing residential dwelling with a large outbuilding to the northeast, including associated parking/driveways and landscaping. See Figure 2 below for existing site plan.



Figure 2 – Existing Site Plan

1.3. Topographical Review

A Topographical survey was undertaken in April 2025 by TriCAD Solutions Ltd. This survey picked up the extents of the site highlighting the building locations, site levels and extents of paved areas. Refer to Figure 3 below for an extract of this information.

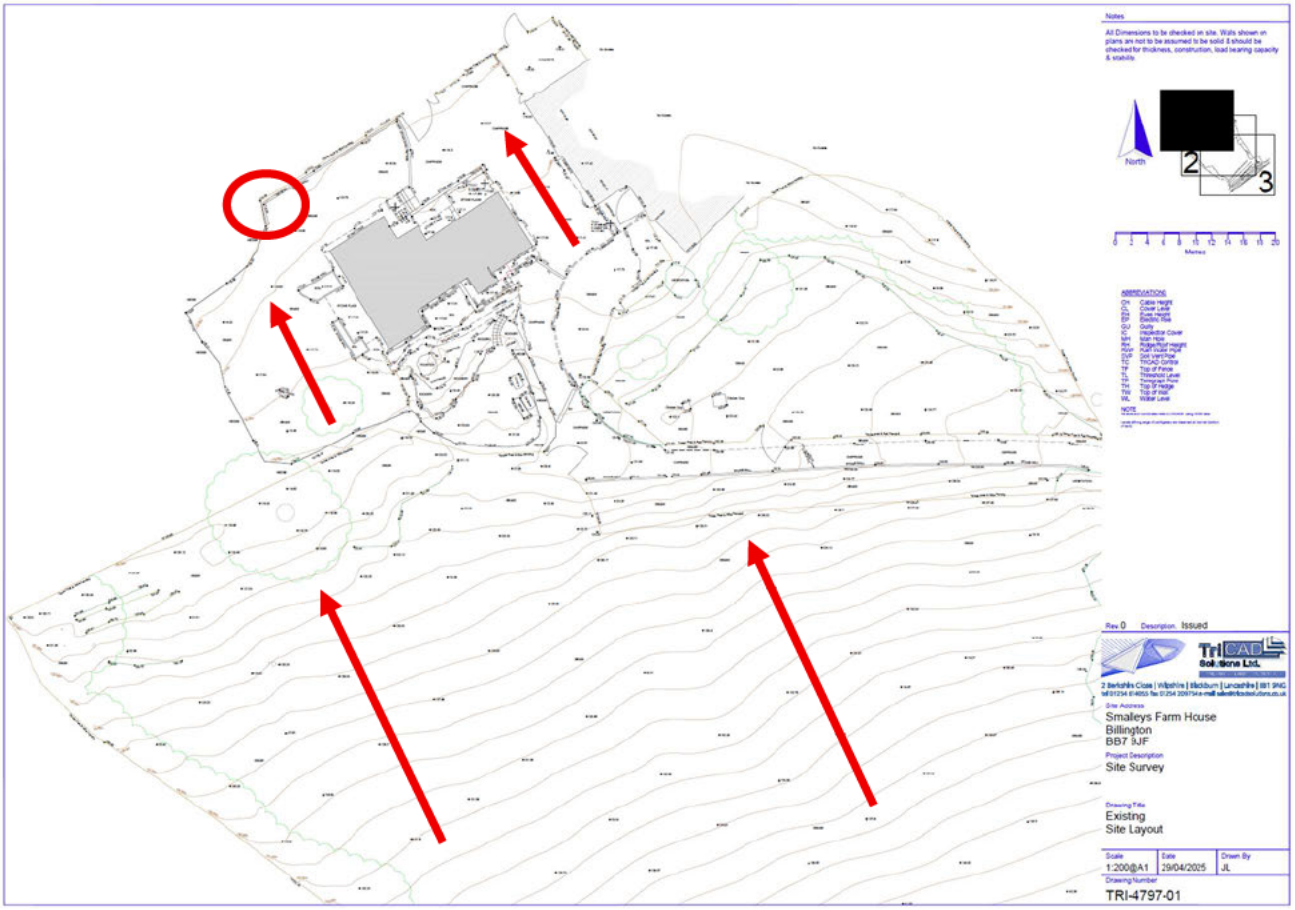


Figure 3 - Topographical Survey

The above shows the site generally falling from south to north with the lowest part of site being indicated by the red circle, the level in this area is recorded as 115.48m AOD.

Refer to Appendix B for the full topographical survey drawings.

1.4. Development Proposals

Development proposals consist of the demolition of the existing buildings onsite to replace them with a new dwelling, outbuilding and garage with associated hard and soft landscaping. Refer to Figure 4 below for the Architects 'proposed site layout.



Figure 4 - Site Layout

Refer to Appendix C for the architect's site layout.

2. Drainage Strategy

2.1. Surface Water Drainage Strategy Approach

To determine the proposed drainage strategy standards that are to be used for a development, an assessment of the development classification should be employed. Proposed developments fall into one of two categories, Previously Developed/Brownfield or, Greenfield. The descriptions of these are defined as in the North-West Suds Pro-Forma below:

2.1.1. Previously Developed / Brownfield

If you are proposing to use an existing drainage system for surface water management on your development site, your drainage system can be designed to 'previously developed' standards. For sites covered by buildings or impermeable hard surfaces this may require a reduction to existing rates to be applied to satisfy local planning policies.

For the avoidance of doubt, 'use of an existing drainage system' means utilising the entirety of the existing drainage system on site and does not refer to simply the point of discharge.

- Example: If you are proposing to demolish an existing building and replace it with a new building but will use the existing means of surface water removal in it's entirety, this would be classified as 'previously developed.'

2.1.2. Greenfield

If you are proposing to install a new drainage system for surface water management on your development site then your drainage system must be designed to 'greenfield' standards, even if the land has been previously developed. It may be worth checking your Local Planning Authority's Local Plan for a local policy position.

- Example 1: If you are proposing to construct buildings on land which has been previously developed (i.e., brownfield) but are installing a new surface water drainage system connecting to the existing outfall, this would be classified as 'greenfield.'
- Example 2: If you are proposing to construct buildings on unbuilt 'green' land and will be installing a new surface water drainage system connecting to a new or existing outfall, this would be classified as 'greenfield.'

2.1.3. Proposed Development

As we are proposing to install a new sustainable drainage system to serve the new dwelling, we will look to use greenfield rates to determine our maximum discharge rate.

Table 1 - Greenfield Rates

Storm Event	Flow Rate
1 in 1 Year	0.3 l/s
1 in 30 Years	0.6 l/s
1 in 100 Years	0.7 l/s
QBAR	0.3 l/s
Proposed Rate	1.2l/s

Following the calculation of greenfield rates above, we can determine that the restricting to the qbar value would pose as a flood risk, as the restricting orifice size would be too small and encourage blockages. To provide betterment to the system and the existing scenario, we have proposed to outfall at 1.2l/s which allows the flow control manhole to have a minimum orifice size of 50mm in line with local guidance.

2.2. Surface Water Drainage

In accordance with National Planning Policy Framework (NPPF), Building Regulations Approved Document H and the local LLFA guidance, options for disposal of surface water from new developments should follow the hierarchy below:

1. Discharge to ground via infiltration.
2. Discharge to watercourse/waterbody
3. Discharge to surface water sewer.
4. Discharge to a combined sewer.

Sustainable Drainage Systems (SuDS) should also be used wherever possible to mimic as far as practicable the natural run off regime, improve water quality, reduce run-off volume and attenuate peak flows. These should be designed in accordance with the current guidance, CIRIA C753 'The SuDS Manual'. An assessment of each method is presented below in priority order.

2.2.1. Infiltration

Based on the available geological information, soakaways are unlikely to be an effective means of surface water disposal at the site. The superficial deposits comprise Devensian Till (glacial diamicton), which is typically clay-rich and generally exhibits low permeability, restricting the infiltration of water into the ground. This is supported by a nearby borehole log which records clay strata extending to approximately 2.5 m below ground level. Beneath the superficial deposits lies the Bowland Shale Formation, consisting of mudstone and shale bedrock that is also characteristically of very low permeability due to its fine-grained nature. Together, these strata suggest that rainfall runoff discharged to a soakaway would infiltrate very slowly, resulting in prolonged storage times and an increased risk of surcharge or surface flooding during successive storm events. Consequently, unless BRE365 infiltration testing demonstrates otherwise, the ground conditions indicate that soakaways are unlikely to provide a viable drainage solution and alternative surface water management measures should be considered.

2.2.2. Watercourse

Based on the below statutory river maps published by the Environment Agency, the nearest watercourse or waterbody is a drainage ditch located approximately 40m west of the development site and within the ownership boundary.



Figure 5 - Statutory Main River Maps

As the drainage ditch is located within close proximity to the development and does not require extensive works to make the connection, we consider discharge to watercourse to be a viable outfall method.

2.2.3. Surface Water Drainage Proposals

In order to restrict the proposed surface water discharge rate to 1.2 l/s, a combination of a flow control device and surface water attenuation feature will be incorporated within the drainage strategy. These measures are required to ensure that runoff from the development is appropriately managed and discharged at a controlled rate, in accordance with the agreed drainage criteria.

Restricted surface water will then flow west across the field and outfall with the treated foul into the drainage ditch.

Refer to Figure 6 below for the proposed drainage layout.

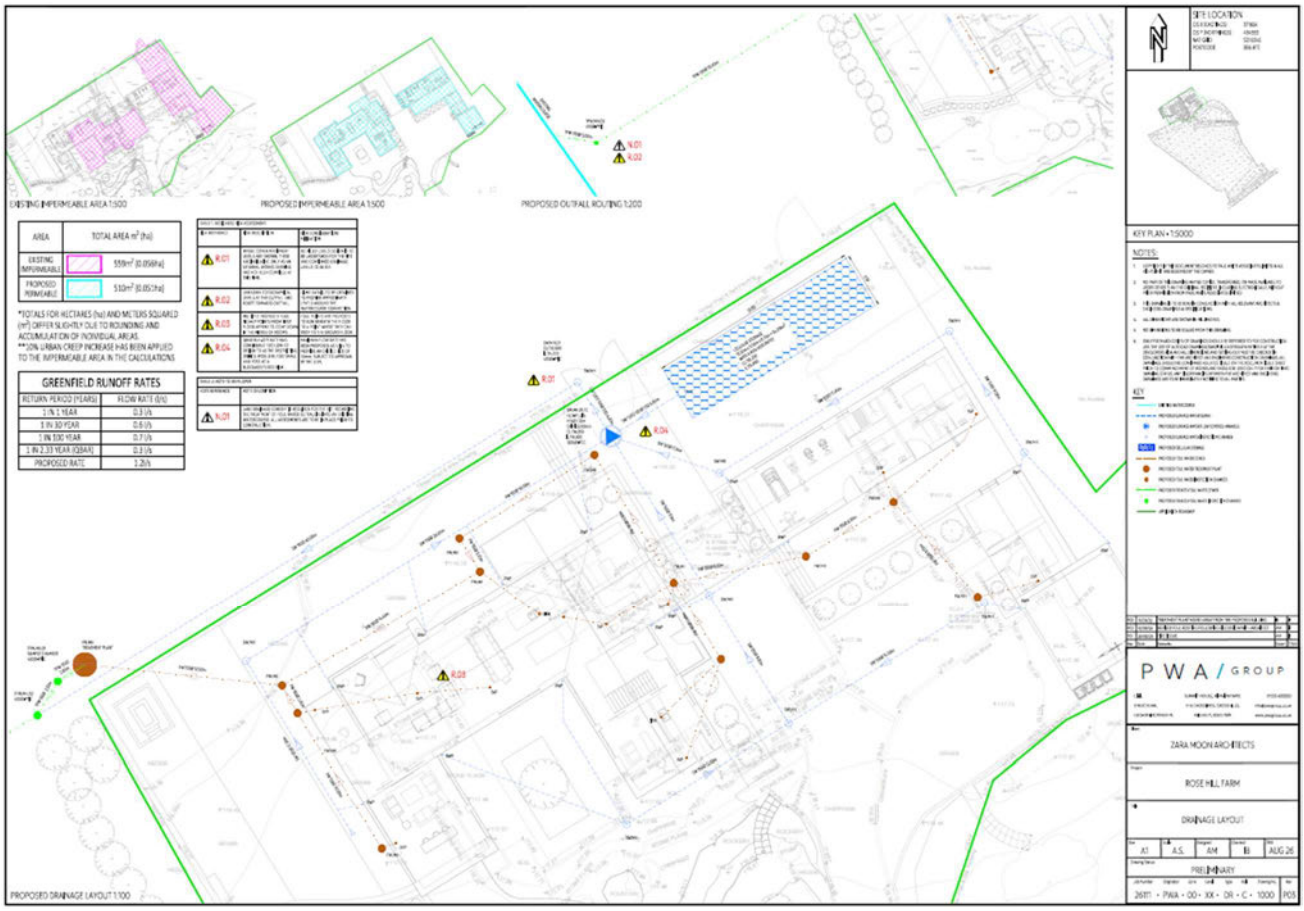


Figure 6 - Proposed Drainage Plan

Refer to Appendix D for the proposed drainage layout and Appendix E for the associated surface water calculations.

2.3. Foul Water Drainage

As mentioned within Section **Error! Reference source not found.**3, the foul water is to be treated and discharge to the drainage ditch. Foul water will be kept separate from the surface water before entering the treatment plant and sample chamber which then connects to the surface water sewer to outfall.

3. Conclusion

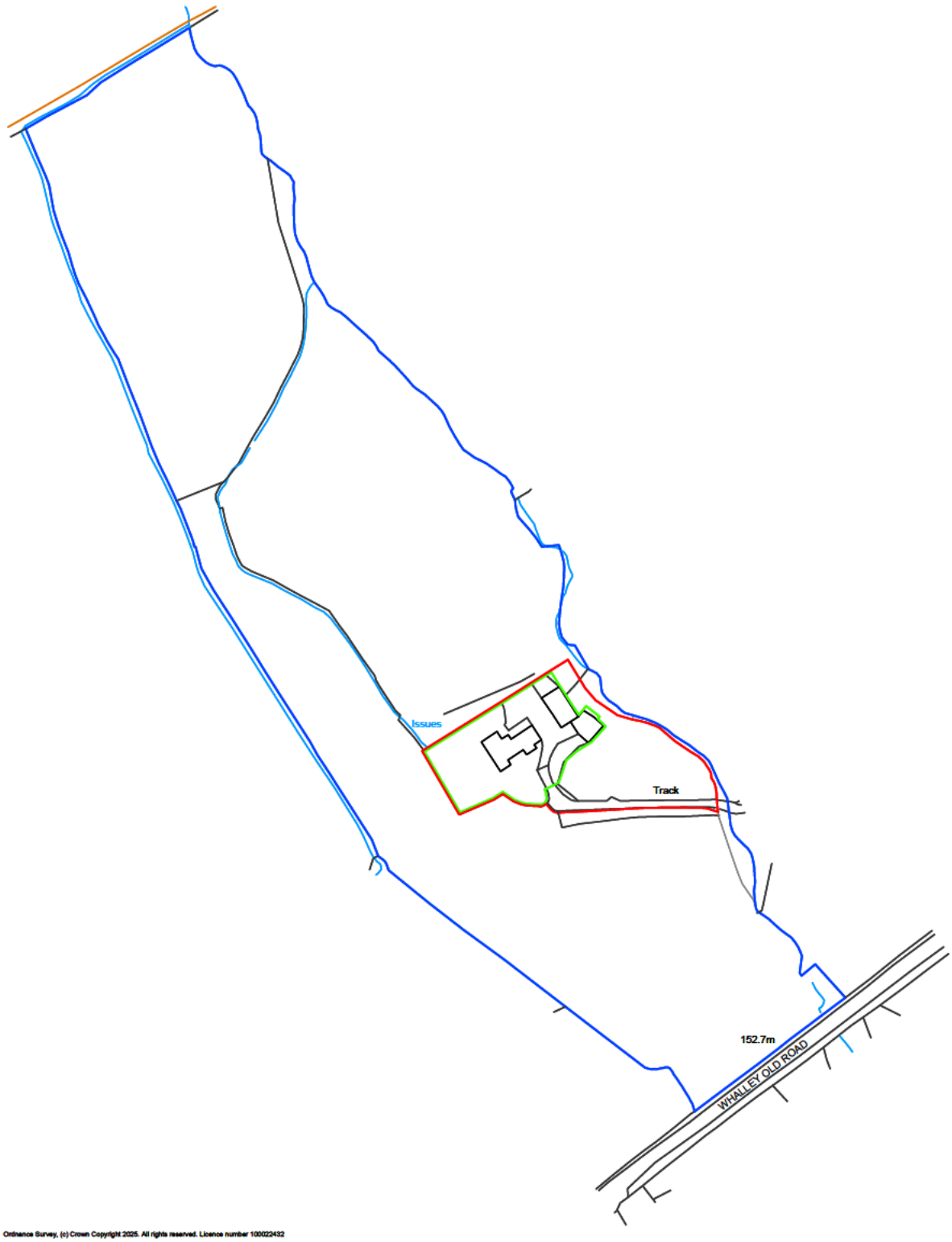
This Drainage Strategy has assessed the proposed redevelopment of Rose Hill Farm and considered the available surface water and foul water drainage options in accordance with the established drainage hierarchy. Published geological information and nearby borehole records indicate low permeability ground conditions, comprising clay-rich glacial till overlying Bowland Shale mudstone, and therefore infiltration drainage techniques are considered unlikely to be suitable at the site.

A drainage ditch located approximately 40m west of the development site has been identified as the preferred point of discharge. Surface water runoff from the development will be managed through a combination of attenuation storage and flow control measures, limiting discharge rates to 1.2 l/s prior to discharge to the ditch. This approach provides controlled runoff management and reduces the risk of flooding both on site and downstream.

Foul water drainage will be provided via a package treatment plant with treated effluent discharged to the same receiving ditch. The foul and surface water systems will be maintained as separate networks before reaching the treatment system, ensuring an appropriate and sustainable drainage arrangement.

Accordingly, the proposed drainage strategy demonstrates that both surface water and foul water arising from the development can be managed effectively within the constraints of the site. Subject to detailed design, statutory approvals and any required environmental consents, the development can be accommodated without increasing flood risk and is considered acceptable from a drainage perspective.

Appendix A – Site Location Plan



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Rev.		Date
A	Various amendments to reduce overall scale / spread / footprint / height / volume / glazing based on Planning Officer comments	27.05.2026

1:1250

0 25 50 75 100 125

N

Key

- Application Boundary
- Land also owned by Applicant
- Domestic Curtilage

ZMA

RIBA | Chartered Practice

Project Name

Rose Hill Farm
BB7 9JF

Location Plan
01

Rev A

Project No. 219.25

Stage Planning Submission

Scale 1:2500 @ A4

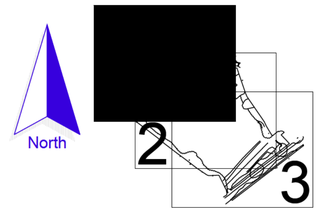
Date January 2026

Drawn RP

Appendix B – Topographical Survey

Notes

All Dimensions to be checked on site. Walls shown on plans are not to be assumed to be solid & should be checked for thickness, construction, load bearing capacity & stability.



0 2 4 6 8 10 12 14 16 18 20
Metres

ABBREVIATIONS

CH	Cable Height
CL	Cover Level
EH	Eves Height
EP	Electric Pole
GU	Gully
IC	Inspection Cover
MH	Man Hole
RH	Ridge/Roof Height
RWP	Rain Water Pipe
SVP	Soil Vent Pipe
TC	TriCAD Control
TF	Top of Fence
TL	Threshold Level
TP	Telegraph Pole
TH	Top of Hedge
TW	Top of Wall
WL	Water Level

NOTE

All levels and coordinates relate to OSGB36 using GNSS data.

Levels defining edge of carriageway are observed at channel (bottom of kerb).

Rev.0 Description. Issued

TriCAD Solutions Ltd.
BUILDING & LAND SURVEYORS
2 Berkshire Close | Wilpshire | Blackburn | Lancashire | BB1 9NG
tel 01254 614055 fax 01254 209754 e-mail sales@tricadsolutions.co.uk

Site Address
Smalleys Farm House
Billington
BB7 9JF

Project Description
Site Survey

Drawing Title
Existing
Site Layout

Scale	Date	Drawn By
1:200@A1	29/04/2025	JL

Drawing Number
TRI-4797-01

Appendix C – Architects' Site Layout



Proposed Site Plan

Scale 1:500

Notes

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Do not scale off this drawing except for determination of basic layout - only figured dimensions to be used, All dimensions to be checked on site

N

Key

- Application Boundary
- Land also owned by Applicant
- Category A Trees
- Category B Trees
- Category C Trees
- Root Protection Area
- Domestic Curtilage
- Public Right of Way
- Proposed Trees

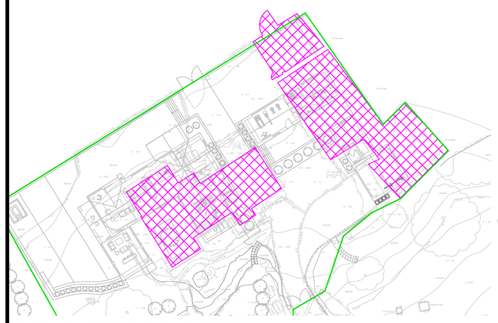
Rev	Date	
F	30.06.2026	Revisions to address Planning Officer comments
E	25.06.2026	Revisions to address Planning Officer comments
D	18.06.2026	Revisions to address Planning Officer comments
C	05.06.2026	Revisions to address Planning Officer comments
B	27.05.2026	Various amendments to reduce overall scale / spread / footprint / height / volume / glazing based on Planning Officer comments
A	20.05.2026	

ZMA

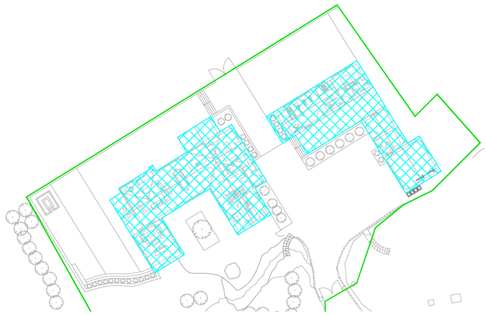
RIBA | Chartered Practice

Project Name	Rose Hill Farm
Project No.	219.25
Stage	Planning Submission
Proposed Site Plan	07
Scale	1:500 @ A1
Date	January 2026
Rev	F
Drawn	RP

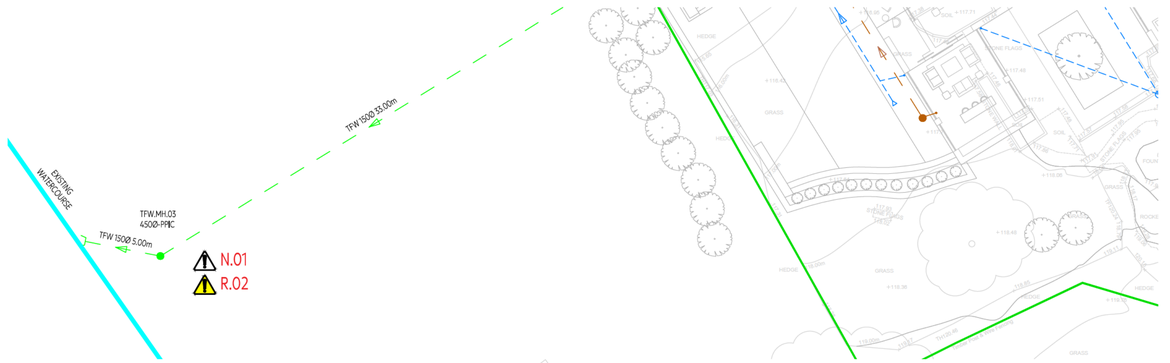
Appendix D – Proposed Drainage Layout



EXISTING IMPERMEABLE AREA 1:500



PROPOSED IMPERMEABLE AREA 1:500



PROPOSED OUTFALL ROUTING 1:200

AREA	TOTAL AREA m^2 (ha)
EXISTING IMPERMEABLE	559m^2 (0.056ha)
PROPOSED PERMEABLE	510m^2 (0.051ha)

*TOTALS FOR HECTARES (ha) AND METERS SQUARED (m^2) DIFFER SLIGHTLY DUE TO ROUNDING AND ACCUMULATION OF INDIVIDUAL AREAS.
**10% URBAN CREEP INCREASE HAS BEEN APPLIED TO THE IMPERMEABLE AREA IN THE CALCULATIONS

GREENFIELD RUNOFF RATES

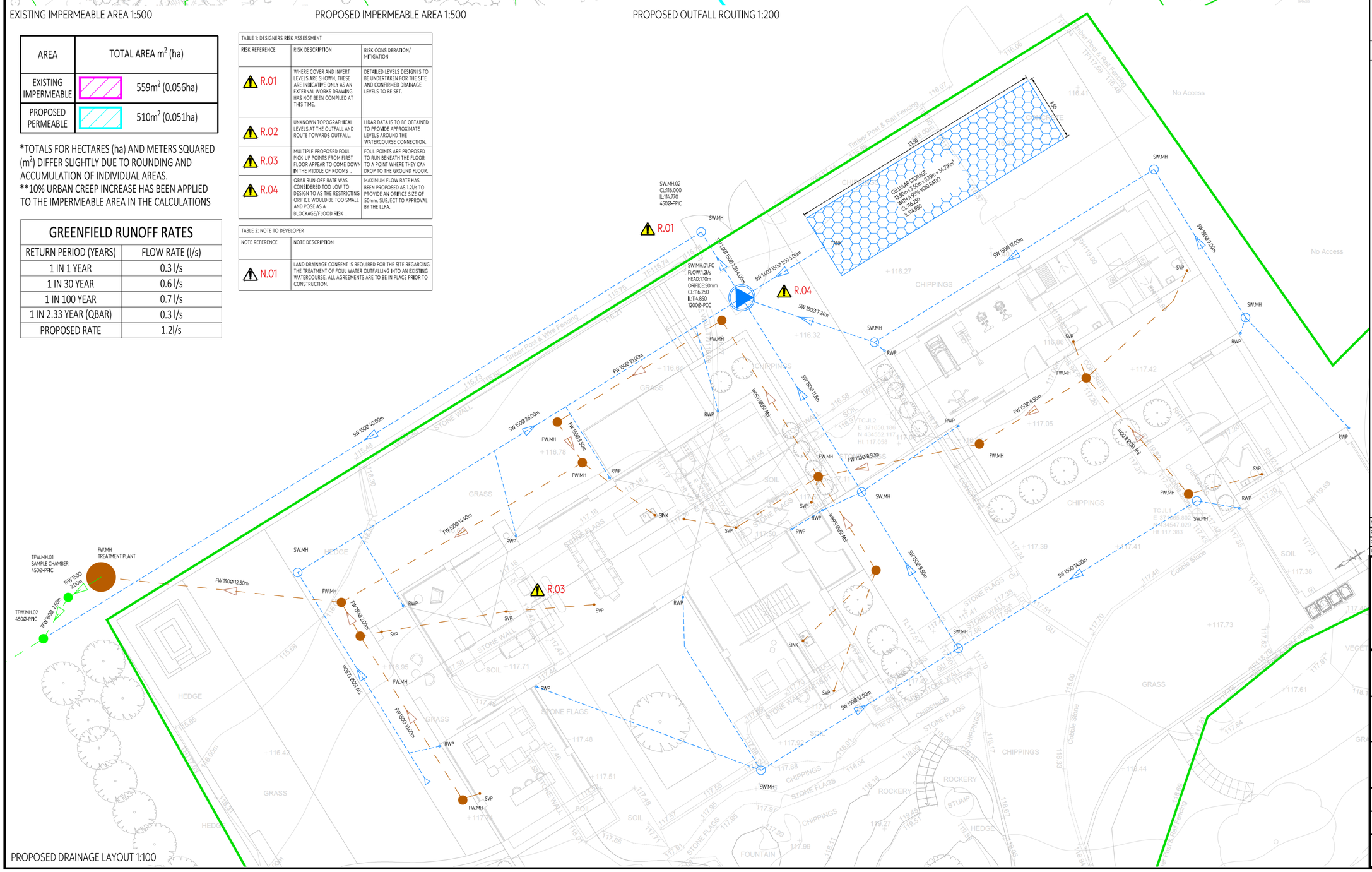
RETURN PERIOD (YEARS)	FLOW RATE (l/s)
1 IN 1 YEAR	0.3 l/s
1 IN 30 YEAR	0.6 l/s
1 IN 100 YEAR	0.7 l/s
1 IN 2.33 YEAR (QBAR)	0.3 l/s
PROPOSED RATE	1.2l/s

TABLE 1: DESIGNERS RISK ASSESSMENT

RISK REFERENCE	RISK DESCRIPTION	RISK CONSIDERATION/ MITIGATION
⚠ R.01	WHERE COVER AND INVERT LEVELS ARE SHOWN, THESE ARE INDICATIVE ONLY AS AN EXTERNAL WORKS DRAWING HAS NOT BEEN COMPILED AT THIS TIME.	DETAILED LEVELS DESIGN IS TO BE UNDERTAKEN FOR THE SITE AND CONFIRMED DRAINAGE LEVELS TO BE SET.
⚠ R.02	UNKNOWN TOPOGRAPHICAL LEVELS AT THE OUTFALL AND ROUTE TOWARDS OUTFALL.	LIDAR DATA IS TO BE OBTAINED TO PROVIDE APPROXIMATE LEVELS AROUND THE WATERCOURSE CONNECTION.
⚠ R.03	MULTIPLE PROPOSED FOUL PICK-UP POINTS FROM FIRST FLOOR APPEAR TO COME DOWN IN THE MIDDLE OF ROOMS .	FOUL POINTS ARE PROPOSED TO RUN BENEATH THE FLOOR TO A POINT WHERE THEY CAN DROP TO THE GROUND FLOOR.
⚠ R.04	QBAR RUN-OFF RATE WAS CONSIDERED TOO LOW TO DESIGN TO AS THE RESTRICTING ORIFICE WOULD BE TOO SMALL AND POSE AS A BLOCKAGE/FLOOD RISK .	MAXIMUM FLOW RATE HAS BEEN PROPOSED AS 1.2l/s TO PROVIDE AN ORIFICE SIZE OF 50mm. SUBJECT TO APPROVAL BY THE LLFA.

TABLE 2: NOTE TO DEVELOPER

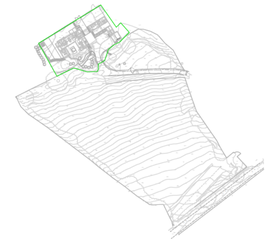
NOTE REFERENCE	NOTE DESCRIPTION
⚠ N.01	LAND DRAINAGE CONSENT IS REQUIRED FOR THE SITE REGARDING THE TREATMENT OF FOUL WATER OUTFALLING INTO AN EXISTING WATERCOURSE. ALL AGREEMENTS ARE TO BE IN PLACE PRIOR TO CONSTRUCTION.



PROPOSED DRAINAGE LAYOUT 1:100

SITE LOCATION

OS X (EASTINGS)	371654
OS Y (NORTHINGS)	434553
NAT GRID	SD16345
POSTCODE	BB6 8FE



KEY PLAN - 1:5000

NOTES:

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KEY

- EXISTING WATERCOURSE
- PROPOSED SURFACE WATER SEWER
- PROPOSED SURFACE WATER FLOW CONTROL MANHOLE
- PROPOSED SURFACE WATER INSPECTION CHAMBER
- PROPOSED CELLULAR STORAGE
- PROPOSED FOUL WATER SEWER
- PROPOSED FOUL WATER TREATMENT PLANT
- PROPOSED FOUL WATER INSPECTION CHAMBER
- PROPOSED TREATED FOUL WATER SEWER
- PROPOSED TREATED FOUL WATER INSPECTION CHAMBER
- APPLICATION BOUNDARY

Rev.	Date	Remarks	Drawn	Chk'd
P03	17/09/26	TREATMENT PLANT MOVED AWAY FROM THE PROPOSED BUILDING.	IB	IB
P02	10/09/26	REVISED FOUL ROUTING FOLLOWING DISCUSSION WITH ARCHITECT.	AM	IB
P01	28/08/26	FIRST ISSUE.	AM	IB

PWA / GROUP

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Client: ZARA MOON ARCHITECTS

Project: ROSE HILL FARM

Title: DRAINAGE LAYOUT

Size	Scale	Designed	Checked	Date
A1	A.S.	AM	IB	AUG 26

Drawing Status: PRELIMINARY

Job Number	Originator	Zone	Level	Type	Role	Drawing No.	Rev
26111	PWA	00	XX	DR	C	1000	P03

Appendix E – Surface Water Calculations

Project:	Date:		
Rose Hill Farm 26111-PWA-00-XX-CA-C-3000 P01 Preliminary Drainage Calculations	28/08/2026		
	Designed by: IB	Checked by: JLE	Approved By: JLE
Report Details: Type: Junctions Storm Phase: Phase	Company Address: PWA GROUP SUMMIT HOUSE RIPARIAN WAY		

Name	Junction Type	Easting (m)	Northing (m)	Cover Level (m)	Depth (m)	Invert Level (m)	Chamber Shape	Diameter (m)
SW.MH.01.FC	Manhole	371642.234	434558.192	116.250	1.400	114.850	Circular	1.200
SW.MH.02	Manhole	371640.131	434561.595	116.000	1.230	114.770	Circular	0.450

Name	Lock	Access Required	Intersection Easting (m)	Intersection Northing (m)
SW.MH.01.FC	None	☐		
SW.MH.02	None	☑	371640.131	434561.595

Project:	Date:		
Rose Hill Farm 26111-PWA-00-XX-CA-C-3000 P01 Preliminary Drainage Calculations	28/08/2026 Designed by: IB	Checked by: JLE	Approved By: JLE
Report Details: Type: Stormwater Controls Storm Phase: Phase	Company Address: PWA GROUP SUMMIT HOUSE RIPARIAN WAY		



Cellular Storage

Type : Cellular Storage

Dimensions

Exceedance Level (m)	116.250
Depth (m)	0.750
Base Level (m)	114.950
Number of Crates Long	27
Number of Crates Wide	7
Number of Crates High	1
Porosity (%)	95
Crate Length (m)	0.5
Crate Width (m)	0.5
Crate Height (m)	0.75
Total Volume (m^3)	34.216

Project:	Date:		
Rose Hill Farm 26111-PWA-00-XX-CA-C-3000 P01 Preliminary Drainage Calculations	28/08/2026		
	Designed by: IB	Checked by: JLE	Approved By: JLE
Report Details: Type: Manhole Schedule Storm Phase: Phase	Company Address: PWA GROUP SUMMIT HOUSE RIPARIAN WAY		

Name	Cover Level (m) Invert Level (m)	Manhole Size (m)	Connection Details				Type
Coordinates (m)	Depth (m)		Incoming Connections	Connection Type	Connection Invert (m)	Connection Size (mm)	Junction Type
			Outgoing Connections				Cover
SW.MH.01.FC	116.250 114.850	Diameter / Length: 1.200	{1} 1.000	Pipe	114.850	Diam/Width:150	Manhole
E:371642.234 N:434558.192	1.400		{a} 1.001	Pipe	114.850	Diam/Width:150	Not Applicable
SW.MH.02	116.000 114.770	Diameter / Length: 0.450	{1} 1.001	Pipe	114.770	Diam/Width:150	Manhole - Access Required
E:371640.131 N:434561.595	1.230						Not Applicable

Project:	Date:		
Rose Hill Farm 26111-PWA-00-XX-CA-C-3000 P01 Preliminary Drainage Calculations	28/08/2026		
	Designed by: IB	Checked by: JLE	Approved By: JLE
Report Details: Type: Inflow Summary Storm Phase: Phase	Company Address: PWA GROUP SUMMIT HOUSE RIPARIAN WAY		

Inflow Label	Connected To	Flow (L/s)	Runoff Method	Area (ha)	Percentage Impervious (%)	Urban Creep (%)	Adjusted Percentage Impervious (%)	Area Analysed (ha)
HOUSE	SW.MH.01.FC		Time of Concentration	0.029	100	10	110	0.032
OUTBUILDING & GARAGE	SW.MH.01.FC		Time of Concentration	0.022	100	10	110	0.024
TOTAL		**0.0**		**0.051**				**0.057**

Project:	Date:		
Rose Hill Farm 26111-PWA-00-XX-CA-C-3000 P01 Preliminary Drainage Calculations	28/08/2026		
	Designed by: IB	Checked by: JLE	Approved By: JLE
Report Title:	Company Address:		
Rainfall Analysis Criteria	PWA GROUP SUMMIT HOUSE RIPARIAN WAY		

PWA / GROUP
CONSULTING ENGINEERS

Runoff Type	Dynamic
Output Interval (mins)	5
Time Step	Default
Urban Creep	Apply Global Value
Urban Creep Global Value (%)	10
Junction Flood Risk Margin (mm)	300
Perform No Discharge Analysis	☐

Rainfall

FEH

Type: FEH

Site Location	GB 371650 434541 SD 71650 34541
Rainfall Version	2022
Summer	☑
Winter	☑

Return Period

Return Period (years)	Increase Rainfall (%)
100.0	50.000
30.0	45.000
2.0	0.000

Storm Durations

Duration (mins)	Run Time (mins)
15	30
30	60
60	120
120	240
240	480
360	720
480	960
960	1920
1440	2880

Project:	Date:		
Rose Hill Farm 26111-PWA-00-XX-CA-C-3000 P01 Preliminary Drainage Calculations	28/08/2026 Designed by: IB	Checked by: JLE	Approved By: JLE
Report Title: UK and Ireland Rural Runoff Calculator	Company Address: PWA GROUP SUMMIT HOUSE RIPARIAN WAY		

PWA / GROUP
CONSULTING ENGINEERS

ICP SUDS / IH 124

Details

Method	ICP SUDS
Area (ha)	0.046
SAAR (mm)	1000.0
Soil	0.47
Region	Region 10
Urban	0
Return Period (years)	0

Results

Region	QBAR Rural (L/s)	QBAR Urban (L/s)	Q 1 (years) (L/s)	Q 30 (years) (L/s)	Q 100 (years) (L/s)
Region 10	0.3	0.3	0.3	0.6	0.7

Project:	Date:		
Rose Hill Farm 26111-PWA-00-XX-CA-C-3000 P01 Preliminary Drainage Calculations	28/08/2026		
	Designed by: IB	Checked by: JLE	Approved By: JLE
Report Details: Type: Inflows Summary Storm Phase: Phase	Company Address: PWA GROUP SUMMIT HOUSE RIPARIAN WAY		



FEH: 100 years: Increase Rainfall (%): +50: Critical Storm Per Item: Rank By: Max. Inflow

Inflow	Storm Event	Inflow Area (ha)	Max. Inflow (L/s)	Total Inflow Volume (m^3)
HOUSE	FEH: 100 years: +50 %: 15 mins: Summer	0.03	24.0	10.495
OUTBUILDING & GARAGE	FEH: 100 years: +50 %: 15 mins: Summer	0.02	18.2	7.945

Project:	Date:		
Rose Hill Farm 26111-PWA-00-XX-CA-C-3000 P01 Preliminary Drainage Calculations	28/08/2026		
	Designed by: IB	Checked by: JLE	Approved By: JLE
Report Details: Type: Inflows Summary Storm Phase: Phase	Company Address: PWA GROUP SUMMIT HOUSE RIPARIAN WAY		



FEH: 30 years: Increase Rainfall (%): +45: Critical Storm Per Item: Rank By: Max. Inflow

Inflow	Storm Event	Inflow Area (ha)	Max. Inflow (L/s)	Total Inflow Volume (m^3)
HOUSE	FEH: 30 years: +45 %: 15 mins: Summer	0.03	18.5	8.067
OUTBUILDING & GARAGE	FEH: 30 years: +45 %: 15 mins: Summer	0.02	14.0	6.111

Project:	Date:		
Rose Hill Farm 26111-PWA-00-XX-CA-C-3000 P01 Preliminary Drainage Calculations	28/08/2026		
	Designed by: IB	Checked by: JLE	Approved By: JLE
Report Details: Type: Inflows Summary Storm Phase: Phase	Company Address: PWA GROUP SUMMIT HOUSE RIPARIAN WAY		



FEH: 2 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Inflow

Inflow	Storm Event	Inflow Area (ha)	Max. Inflow (L/s)	Total Inflow Volume (m^3)
HOUSE	FEH: 2 years: +0 %: 15 mins: Summer	0.03	5.9	2.551
OUTBUILDING & GARAGE	FEH: 2 years: +0 %: 15 mins: Summer	0.02	4.4	1.931

Project:	Date:		
Rose Hill Farm 26111-PWA-00-XX-CA-C-3000 P01 Preliminary Drainage Calculations	28/08/2026		
	Designed by: IB	Checked by: JLE	Approved By: JLE
Report Details: Type: Junctions Summary Storm Phase: Phase	Company Address: PWA GROUP SUMMIT HOUSE RIPARIAN WAY		

FEH: 100 years: Increase Rainfall (%): +50: Critical Storm Per Item: Rank By: Max. Depth

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
SW.MH.01.FC	FEH: 100 years: +50 %: 240 mins: Winter	116.250	114.850	115.817	0.967	8.4	1.093	0.000	1.1	61.119	Surcharged
SW.MH.02	FEH: 100 years: +50 %: 240 mins: Winter	116.000	114.770	114.791	0.021	1.1	0.000	0.000	1.1	27.302	OK

Project:	Date:		
Rose Hill Farm 26111-PWA-00-XX-CA-C-3000 P01 Preliminary Drainage Calculations	28/08/2026		
	Designed by: IB	Checked by: JLE	Approved By: JLE
Report Details: Type: Junctions Summary Storm Phase: Phase	Company Address: PWA GROUP SUMMIT HOUSE RIPARIAN WAY		



FEH: 30 years: Increase Rainfall (%): +45: Critical Storm Per Item: Rank By: Max. Depth

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
SW.MH.01.FC	FEH: 30 years: +45 %: 240 mins: Winter	116.250	114.850	115.504	0.654	6.6	0.739	0.000	1.0	50.038	Surcharged
SW.MH.02	FEH: 30 years: +45 %: 120 mins: Summer	116.000	114.770	114.790	0.020	1.0	0.000	0.000	1.0	12.608	OK

Project:	Date:		
Rose Hill Farm 26111-PWA-00-XX-CA-C-3000 P01 Preliminary Drainage Calculations	28/08/2026		
	Designed by: IB	Checked by: JLE	Approved By: JLE
Report Details: Type: Junctions Summary Storm Phase: Phase	Company Address: PWA GROUP SUMMIT HOUSE RIPARIAN WAY		

FEH: 2 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Depth

Junction	Storm Event	Cover Level (m)	Invert Level (m)	Max. Level (m)	Max. Depth (m)	Max. Inflow (L/s)	Max. Resident Volume (m³)	Max. Flooded Volume (m³)	Max. Outflow (L/s)	Total Discharge Volume (m³)	Status
SW.MH.01.FC	FEH: 2 years: +0 %: 15 mins: Summer	116.250	114.850	115.074	0.224	10.3	0.254	0.000	1.0	4.860	Surcharged
SW.MH.02	FEH: 2 years: +0 %: 15 mins: Summer	116.000	114.770	114.790	0.020	1.0	0.000	0.000	1.0	1.538	OK

Project:	Date:		
Rose Hill Farm 26111-PWA-00-XX-CA-C-3000 P01 Preliminary Drainage Calculations	28/08/2026		
	Designed by: IB	Checked by: JLE	Approved By: JLE
Report Details: Type: Stormwater Controls Summary Storm Phase: Phase	Company Address: PWA GROUP SUMMIT HOUSE RIPARIAN WAY		

FEH: 100 years: Increase Rainfall (%): +50: Critical Storm Per Item: Rank By: Max. Avg. Depth

Stormwater Control	Storm Event	Max. US Level (m)	Max. DS Level (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 (%)
Cellular Storage	FEH: 100 years: +50 %: 240 mins: Winter	115.817	115.817	0.867	0.867	7.4	33.793	0.000	0.000	1.0	13.538		1.235

Status
OK

Project:	Date:		
Rose Hill Farm 26111-PWA-00-XX-CA-C-3000 P01 Preliminary Drainage Calculations	28/08/2026		
	Designed by: IB	Checked by: JLE	Approved By: JLE
Report Details: Type: Stormwater Controls Summary Storm Phase: Phase	Company Address: PWA GROUP SUMMIT HOUSE RIPARIAN WAY		

FEH: 30 years: Increase Rainfall (%): +45: Critical Storm Per Item: Rank By: Max. Avg. Depth

Stormwater Control	Storm Event	Max. US Level (m)	Max. DS Level (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 (%)
Cellular Storage	FEH: 30 years: +45 %: 240 mins: Winter	115.504	115.504	0.554	0.554	5.6	24.856	0.000	0.000	0.9	12.447	155	27.355

Status
OK

Project:	Date:		
Rose Hill Farm 26111-PWA-00-XX-CA-C-3000 P01 Preliminary Drainage Calculations	28/08/2026		
	Designed by: IB	Checked by: JLE	Approved By: JLE
Report Details: Type: Stormwater Controls Summary Storm Phase: Phase	Company Address: PWA GROUP SUMMIT HOUSE RIPARIAN WAY		

FEH: 2 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Avg. Depth

Stormwater Control	Storm Event	Max. US Level (m)	Max. DS Level (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 (%)
Cellular Storage	FEH: 2 years: +0 %: 240 mins: Summer	115.071	115.071	0.121	0.121	2.8	5.435	0.000	0.000	0.9	5.364		84.117

Project:	Date:		
Rose Hill Farm 26111-PWA-00-XX-CA-C-3000 P01 Preliminary Drainage Calculations	28/08/2026		
	Designed by: IB	Checked by: JLE	Approved By: JLE
Report Details: Type: Stormwater Controls Summary Storm Phase: Phase	Company Address: PWA GROUP SUMMIT HOUSE RIPARIAN WAY		

Status
OK

Project:	Date:		
Rose Hill Farm 26111-PWA-00-XX-CA-C-3000 P01 Preliminary Drainage Calculations	28/08/2026		
	Designed by:	Checked by:	Approved By:
	IB	JLE	JLE
Report Details: Type: Connections Summary Storm Phase: Phase	Company Address: PWA GROUP SUMMIT HOUSE RIPARIAN WAY		

FEH: 100 years: Increase Rainfall (%): +50: Critical Storm Per Item: Rank By: Max. Flow

Connection	Storm Event	Connection Type	From	To	Upstream Cover Level (m)	Max. US Water Level (m)	Max. Flow Depth (m)	Discharge Volume (m³)	Max. Velocity (m/s)	Flow / Capacity	Max. Flow (L/s)	Status
1.000	FEH: 100 years: +50 %: 240 mins: Winter	Pipe	Cellular Storage	SW.MH.01.FC	116.250	115.817	0.150	0.000	0.1	0.04	1.0	Surcharged
1.001	FEH: 100 years: +50 %: 240 mins: Winter	Pipe	SW.MH.01.FC	SW.MH.02	116.250	115.817	0.022	27.302	0.7	0.04	1.1	Surcharged

Project:	Date:		
Rose Hill Farm 26111-PWA-00-XX-CA-C-3000 P01 Preliminary Drainage Calculations	28/08/2026		
	Designed by:	Checked by:	Approved By:
	IB	JLE	JLE
Report Details: Type: Connections Summary Storm Phase: Phase	Company Address: PWA GROUP SUMMIT HOUSE RIPARIAN WAY		

FEH: 30 years: Increase Rainfall (%): +45: Critical Storm Per Item: Rank By: Max. Flow

Connection	Storm Event	Connection Type	From	To	Upstream Cover Level (m)	Max. US Water Level (m)	Max. Flow Depth (m)	Discharge Volume (m³)	Max. Velocity (m/s)	Flow / Capacity	Max. Flow (L/s)	Status
1.000	FEH: 30 years: +45 %: 480 mins: Summer	Pipe	Cellular Storage	SW.MH.01.FC	116.250	115.480	0.150	0.000	0.1	0.04	1.0	Surcharged
1.001	FEH: 30 years: +45 %: 120 mins: Summer	Pipe	SW.MH.01.FC	SW.MH.02	116.250	115.475	0.021	12.608	0.7	0.04	1.0	Surcharged

Project:	Date:		
Rose Hill Farm 26111-PWA-00-XX-CA-C-3000 P01 Preliminary Drainage Calculations	28/08/2026		
	Designed by:	Checked by:	Approved By:
	IB	JLE	JLE
Report Details: Type: Connections Summary Storm Phase: Phase	Company Address: PWA GROUP SUMMIT HOUSE RIPARIAN WAY		

FEH: 2 years: Increase Rainfall (%): +0: Critical Storm Per Item: Rank By: Max. Flow

Connection	Storm Event	Connection Type	From	To	Upstream Cover Level (m)	Max. US Water Level (m)	Max. Flow Depth (m)	Discharge Volume (m^3)	Max. Velocity (m/s)	Flow / Capacity	Max. Flow (L/s)	Status
1.000	FEH: 2 years: +0 %: 120 mins: Summer	Pipe	Cellular Storage	SW.MH.01.FC	116.250	115.064	0.150	0.000	0.1	0.04	0.9	OK
1.001	FEH: 2 years: +0 %: 15 mins: Summer	Pipe	SW.MH.01.FC	SW.MH.02	116.250	115.074	0.021	1.538	0.7	0.04	1.0	Surcharged

End of Report