TN02 - Basis for Foul Flow Calculation

Site: Lower Perrylands Farm
Prepared by: Phil Allen MCIWEM C.WEM
Approved by: Neil Jaques
Date: 2nd December 2025

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1.0 Introduction

1.1 This Technical Note (TN02) has been prepared by Motion to provide further information on the Flood Risk Assessment (FRA) and Drainage Strategy, as requested by Horsham District Council (HDC).

1.2 HDC have commented the following:

The applicant must demonstrate beyond all reasonable doubt, that the proposals have considered flood risk in reference to Section 5.0 of the FRA and the supporting plan 'Appendix O: NaFRA2 Future Surface Water Flood Extents and Development Layout'.

The Design and Access Statement notes:

*"*Avoidance of built form within areas of potential flood risk*".*

*The FRA has stated: "*only the car ports that have been located within areas of 'Low' (1 in 1,000-year) surface water flood risk*" and "*All thresholds will be raised to 150mm above ground levels and safe access and egress is achievable to the south of the dwellings into the open land, which leads back to the access road without having to cross the watercourse or the areas of surface water flood risk.*"*

*It is understood that "*the flood depth mapping for the climate change scenario outlines that flooding of 200mm is present in a small area and in the 'Low' risk event*", but it is unclear where this value came from or which area(s) this is isolated to on site. The applicant should confirm if raising levels of all thresholds 150mm above ground levels, as opposed to 200mm, is still considered appropriate in light of this information.*

- *HDC Drainage note the Drainage Strategy Layout Plan in the FRA. The applicant should provide a detailed Drainage Strategy Plan, identifying all elements of the foul and surface water drainage strategy, showing levels and exceedance routes.*
- *Supporting foul flow calculations, in line with Sewerage Sector Guidance and/or Building Regulations Part H, is to be provided. It should be noted that any proposed foul water system and foul water treatment unit should be in line with current legislation and best practice for the management of domestic waste, with any method for disposal justified and appropriate permits sought.*
- *HDC Drainage note that a drainage Maintenance and Management Plan has been provided. The applicant should provide any proprietary device manuals, for all drainage features and SuDS devices.*

1.3 HDC's full communication can be seen in Appendix A of this technical note.

1.4 This technical note will focus on the questions raised above, which can be summarised as follows:

- Provide clarification on where the assessment of flood depths in the future (climate change) surface water flood scenario was obtained.
- Whether 150mm is still considered an appropriate raising of threshold levels.
- The provision of a detailed drainage strategy plan.
- Supporting foul flow calculations should be provided in line with sewerage sector guidance.
- Justification for the method of disposal used and appropriate permits sought.
- The provision of proprietary device manuals for all drainage and SuDS features.

1.5 Each of the above six points are discussed in Section 2.0, below.

2.0 Discussion

Provide clarification on where the assessment of flood depths in the future (climate change) surface water flood scenario was obtained

2.1 The RoFSW data and flood depth assessment has been obtained from the .gov.uk data portal, which includes future surface water flood risk extents and depths[1]. Maximum flood depth estimations of 0.2m, 0.3m, 0.6m and 0.9m are provided, and it is shown in which return period these flood depths are expected.

2.2 We have produced a map of the future surface water flood extents for a maximum flood depth of 0.2m in Appendix B and this has overlain proposed the site layout for an accurate comparison of the location of units against flood risk.

2.3 The map in Appendix B shows that a maximum depth of 0.2m of surface water flooding is only expected in the 1 in 1,000-year (0.1% AEP) 'Low Risk' event in the location of the development.

Can 150mm still be considered an appropriate raising of threshold levels.

2.4 The flood depth mapping shows that 0.2m is the maximum modelled flood depth, and the modelled flood depths within this category can be between 0.01m and 0.2m. This means that flood depths could be significantly less than 0.2m are not necessarily going to reach 0.2m.

2.5 Because of this, and because any future surface water flooding has been modelled as only being present in the 1 in 1,000-year 'Low Risk' return period event, it is felt that 150mm threshold for the dwellings remains suitable.

The provision of a detailed drainage strategy plan.

2.6 The Drainage Strategy Plan submitted with the Drainage Strategy report (and included in Appendix C of this report for ease of reference) shows all the infrastructure levels, pipe diameters/lengths/gradients, provides flow control specifications, and gives full details of the composite permeable paviours. We consider this to be a sufficient level of detail information for planning, and it is important that it is presented as it has been because it allows a correlative review with the MicroDrainage hydraulic model. Therefore, if any further information is required by HDC on the drainage strategy layout (sections, etc.) we kindly request that this be a pre-commencement condition.

Supporting foul flow calculations should be provided in line with sewerage sector guidance

2.7 The foul flow calculations for the three-unit development we determined using Southern Water's foul sewerage modelling criteria, and the calculated design foul flow from the three-unit proposed residential development is 0.02 l/s.

2.8 Details of Southern Water's foul sewerage modelling criteria can be found in Appendix D. In summary, the calculation is based on the foul flow element, plus an allowance for misconnected surface water (which would not be possible on this site).

Justification for the method of disposal used and appropriate permits sought

2.9 As discussed in the drainage strategy, the proposal to use a packaged sewage treatment plant to manage foul waste from the development are the most appropriate because there is no public foul sewerage in this location.

[1] https://environment.data.gov.uk/explore/e5b38de2-99b3-44ee-b10c-b244926878ef?download=true

The packaged sewage treatment plant will be in full compliance with the General Binding Rules, which means no environmental permits from the Environment Agency will be required.

The provision of proprietary device manuals for all drainage and SuDS features

2.10 The Drainage Management and Maintenance manual notes that it should be a 'living document' and regularly updated, as required. We agree that device manuals and manufacturers own guidance should compliment the Drainage Management and Maintenance manual and be an addition once construction has been completed. With that in mind, if this a planning requirement, we request that this be a condition on the planning consent.

3.0 Summary

3.1 We trust that the above information suitably provides the requisite information to allow HDC to sign off the drainage strategy and consent the proposed planning application, and that further information that is more appropriate to supply at a later stage be provided through suitable planning conditions.

Appendix A

Horsham District Council Information Request Letter

TO:	Horsham District Council – Planning Dept
LOCATION:	Lower Perryland Farm, Basing Hill Access Road, Dial Post, West Sussex
DESCRIPTION:	Demolition of existing agricultural barns and erection of 3no. residential dwellings, with associated car ports, landscaping and parking.
REFERENCE:	DC/25/1439
RECOMMENDATION:	More Information – **Conditions**

SUMMARY OF COMMENTS & RECOMMENDATION:

The following documents have been reviewed:

- Design and Access Statement. Drawing No: P034, Rev: P1. Dated: 27-05-2025. Fresh Architects.
- Flood Risk Assessment and Drainage Strategy. Dated: 14th August 2025, Motion.
- Proposed Landscape Plan, Drawing No: 0901, Revision: P03, Dated 14/08/2025, Landscape Consultancy and Design Ltd.

HDC Drainage find that the drainage details provided within the application are on track to meet the requirements of the NPPF and PPG, National standards for sustainable drainage systems (June 2025), and the Horsham District Planning Framework (2015) – Policy 38.

HDC Drainage request that a finalised detailed Foul and Surface Water Drainage Strategy Plan, also showing levels and expected exceedance routes, is submitted to the local planning authority for further review and the comments in the Main Comments Section below are addressed.

MAIN COMMENTS:

- The Flood Risk Assessment and Drainage Strategy (FRA) has been thorough in its approach to an assessment of current site conditions and in identifying constraints on site.
- The FRA and resulting drainage strategy provides sufficient justification for the proposals, demonstrating an appropriate response to existing site conditions and constraints. In addition, the proposed development and drainage strategy offers a vast improvement to the existing surface water drainage on site.
- HDC Drainage note the correct/ appropriate use the specific modelling requirements within the drainage calculations and hydraulic model.
- The Design and Access Statement notes a consideration of "*Natural ground soakaways (and lawned areas) to promote infiltration Rainwater collection via discreet downpipes and roof layouts"* however, it is to be noted that the FRA has not confirmed ground conditions are suitable for soakaways on site. Without the results from a BRE365 assessment to establish infiltration potential on site, the use of soakaways as part of the drainage strategy cannot be determined. It has been noted within the FRA, the nearest existing borehole (approx. 530m to the east) established the presence of clay and "*it is expected that Lower Perrylands Farm is also underlain by clay geology*". The use of soakaways, therefore, may be inappropriate and so HDC have disregarded this statement on the Design and Access Statement and believe it to be superseded by the information provided within the FRA.

- The applicant must demonstrate beyond all reasonable doubt, that the proposals have considered flood risk in reference to Section 5.0 of the FRA and the supporting plan 'Appendix O: NaFRA2 Future Surface Water Flood Extents and Development Layout'.

  The Design and Access Statement notes:
  "Avoidance of built form within areas of potential flood risk".

  The FRA has stated: *"only the car ports that have been located within areas of 'Low' (1 in 1,000-year) surface water flood risk"* and *"All thresholds will be raised to **150mm** above ground levels and safe access and egress is achievable to the south of the dwellings into the open land, which leads back to the access road without having to cross the watercourse or the areas of surface water flood risk."*

  It is understood that *"the flood depth mapping for the climate change scenario outlines that flooding of **200mm** is present in a small area and in the 'Low' risk event",* but it is unclear where this value came from or which area(s) this is isolated to on site. The applicant should confirm if raising levels of all thresholds 150mm above ground levels, as opposed to 200mm, is still considered appropriate in light of this information.
- HDC Drainage note the Drainage Strategy Layout Plan in the FRA. The applicant should provide a detailed Drainage Strategy Plan, identifying all elements of the foul and surface water drainage strategy, showing levels and exceedance routes.
- Supporting foul flow calculations, in line with Sewerage Sector Guidance and/or Building Regulations Part H, is to be provided. It should be noted that any proposed foul water system and foul water treatment unit should be in line with current legislation and best practice for the management of domestic waste, with any method for disposal justified and appropriate permits sought.
- HDC Drainage note that a drainage Maintenance and Management Plan has been provided. The applicant should provide any proprietary device manuals, for all drainage features and SuDS devices.

Further evidence in addition to that requested above may be required once the additional information is submitted.

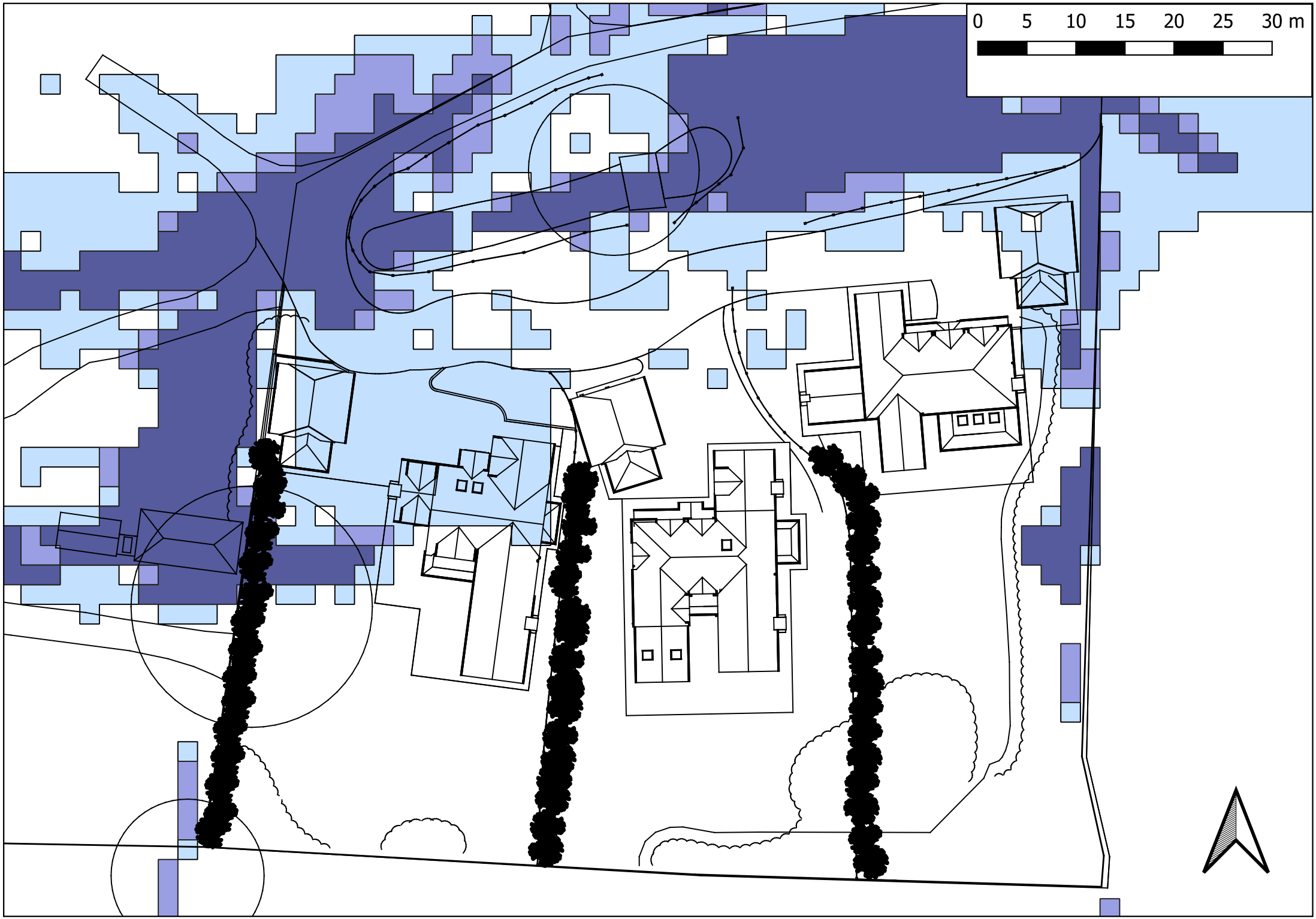
Advisory notes:

- The West Sussex LLFA Policy for the Management of Surface Water (November 2018) is currently being updated however the FRA and drainage strategies response to the LLFA's 2018 Policy, is considered appropriate by Horsham Drainage.
- In reference to Foul Water Drainage, HDC Drainage acknowledge the applicant has provided a statement regarding the drainage strategies adherence to the general binding rules. It is for the applicant to uphold these general binding rules or otherwise seek an environmental permit from the Environment Agency.
- In addition to Planning Permission, the applicant may additionally require Ordinary Watercourse Consent (OWC) from the Lead Local Flood Authority at West Sussex County Council, to consent to any works adjacent to or within an ordinary watercourse.
- Whilst not a mandatory requirement, HDC Drainage welcome and encourage the consideration of rainwater harvesting within the proposed development.

ANY RECOMMENDED CONDITIONS: A detailed Foul and Surface Water Drainage Strategy (plan), must be submitted to and approved by the Local Planning authority, prior to development.	
NAME:	A. Furness
DEPARTMENT:	Horsham District Council - Drainage
DATE:	27/11/2025

Appendix B

Distribution of Maximum Future Flood Depth of 0.2m (0.1% AEP)


0 5 10 15 20 25 30 m

Appendix C

Drainage Strategy Plan

north

Pipe 2.002/2.003
1200mm x 800mm (w x h) PCC Box Culvert
L = 34.52
Volume = 32.069m³
Cover to PCC Box Culvert: 500mm (min)

Outfall 'Outfall'
Outfall to watercourse
CL: 19.740
IL: 19.127
Modeled as fully surcharged to
0.613m for 1,440-minutes

Pipe 2.004 L = 11.095
1500 1:31.6

Non-return
valve

Manhole 4: Hydrobrake
Ref: MD-SHE-0086-3400-1100-2400
CL: 20.750
IL: 19.477
Design Flow: 3.4 l/s
Design Head: 1.100m

Pipe 4.001
L = 3.725
150Ø
1:17.2

'PP Unit 1' Outfall
Orifice [Ø41mm]
Design Flow: 2.4 l/s
Design Head: 0.48m

Node 'PP Unit 1'
Composite Permeable Paviours
Area: 150m²
CL: 21.000
IL: 20.420
Total Depth 0.580m
Porous Aggregate Depth: 0.250m
Porous Aggregate Porosity: 30%
Geocellular crate depth 200mm
Total Att'n Depth: 450mm
Total Att'n Volume : 39.800m³

Pipe 2.001
L = 11.689
150Ø
1:30.8

S3
CL: 21.250
IL: 19.950

Pipe 3.001
L = 2.714
150Ø
1.15.9

'PP Unit 2' Outfall
Orifice [Ø54mm]
Design Flow: 4.2 l/s
Design Head: 0.47m

Node 'PP Unit 2'
Composite Permeable Paviours
Area: 140m²
CL: 21.250
IL: 20.670
Total Depth 0.580m
Porous Aggregate Depth: 0.250m
Porous Aggregate Porosity: 30%
Geocellular crate depth 200mm
Total Att'n Depth: 450mm
Total Att'n Volume : 37.144m³

'PP Unit 3' Outfall
Orifice [Ø32mm]
Design Flow: 1.5 l/s
Design Head: 0.48m

Node 'PP Unit 3'
Composite Permeable Paviours
Area: 210m²
CL: 21.500
IL: 20.920
Total Depth 0.580m
Porous Aggregate Depth: 0.250m
Porous Aggregate Porosity: 30%
Geocellular crate depth 200mm
Total Att'n Depth: 450mm
Total Att'n Volume : 55.717m³

UNIT 1
UNIT 2
UNIT 3

0 5 10 15 20m
SCALE IN METRES
1:250

Notes

1. This Drainage Strategy Plan is for planning purposes and does not constitute detailed designs and should not be used for construction purposes
2. All levels and dimensions are to be checked on site before any work commences. All dimensions are in metres unless stated otherwise.
3. This drawing has been based upon survey supplied information and Motion cannot guarantee the accuracy of the data provided.
4. The drainage levels are based on existing levels, but also proposed levels where existing site features present unusual changes in gradient.
5. Any discrepancies should be reported to the engineer immediately, so that clarification can be sought prior to the commencement of works.
6. This drawing should be read in conjunction with all other relevant engineering details, drawings and specification.
7. 350mm minimum cover is to be provided for private pipes laid in soft/paved areas, with 900mm minimum cover to be provided for private pipes laid beneath roads / driveways unless not practicable. Where unachievable, shallow pipe drains may require protection using concrete surround or paving slabs bridging the trench, subject to the NHBC Inspector's requirements.
8. Manholes situated within areas accessible to motor vehicles are to be fitted with suitable strength covers and frames.

Legend

- Composite Permeable Paviours
- Surface Water Gravity Pipe
- Surface Water Manhole
- Porous Pavement Outfall with Orifice Plate
- Hydrobrake
- Non-return valve
- Headwall

Rev.	Description	Drn	Chk	App	Date
P01	First Issue	PA	PA	PA	04/08/2025

Drawing Status:
FOR PLANNING
NOT FOR CONSTRUCTION

motion
Guildford - Reading - London
www.motion.co.uk

Client:
Church Barn Group

Project:
Lower Perrylands Farm

Title:
Drainage Strategy Layout

Scale: 1:250 (@ A1)

Drawing: 2503099-0500
Revision: P01

C:\Users\phillalen\Motion\SaffSite - 1ecd6 2503099\Drawings\0500-2503099-P01-Drainage Strategy.dwg

Appendix D

Southern Water Foul Flow Modelling Criteria

Developer Services

Foul Sewerage Modelling Criteria:

Southern Water continues to review its modelling procedures and design standards. Our current update on the impact of a new development on the public sewer network is as below:

Item			
Development Size – Number of units	N		
Per Capita Flow -Litres/ head / day	G	125	(see note 4)
Infiltration – Percentage	I	10	(see note 5)
Occupancy – Persons/Dwelling	O	2.4	(see notes 6 & 7)
Dry Weather Flow multiplier (PF - Peaking Factor) (SD –Storm Duration– minutes)		SD	PF
		30 to 240	2.5
		240 to 480	2.0
		Above 480	1.4
Allowance for misconnected surface water		1.4 Square Metres per Dwelling (see note 8)	
Population – Number of people	P	N x O	

Hence: Design flow = (PF + 0.1) PG (foul flow element) plus the impact of 1.4 x N sq. m. (allowance for misconnected surface water)

Note that the above criteria applies subject to:

1) Only to the case of new domestic foul flow.

2) No proposed discharge of surface water into the foul sewer.

3) Southern Water supports the Hierarchy of H3 of Building Regulations with regards to the disposal of Surface Water.

4) Compliance with G2 of Building Regulations; that reasonable provision must be made by the installation of fittings and fixed appliances that use water efficiency for the prevention of undue consumption of water.

5) That upstream sewers are designed and constructed with materials and method fully compliant with Sewers for Adoption and Southern Water published addendum and corrigendum, in order to ensure that the infiltration of groundwater is minimised to the low rate of 10% of base flow.

Southern Water

6) That unless we are advised otherwise, we will assume the occupancy rate of 2.4 persons per property to be appropriate and in accordance with survey data that Southern Water has for development within its area.

7) Should the makeup of development be known and advised to Southern Water, with regards to the number of 1-bedroom, 2-bedroom units etc. then the modelling can be revised on the basis of:

   - Number of bedrooms + 1, as the occupancy for each unit type.

   - This level of information may not be available for initial Capacity Check assessments and in this case the default figure of 2.4 persons/dwelling is considered appropriate.

8) Should the density of the development be known, (where development density is calculated based on the number of expected new addresses divided by the area of the proposed site development) and advised to Southern Water, then the allowance for misconnected surface water can be adjusted to the following:

Development Density (Properties / 4Ha)	Misconnected surface water allowance m^2/property
<=100	2.1
120	1.6
140	1.1
180	0.6
>=200	0.3

   Flats, housing association, and commercial property addresses will have no misconnected surface water allowance applied.

9) With regards to the allowance for misconnected surface water, reference is made to published guidance or studies including LASOO, CIRIA, DEFRA, and UKWIR.

10) With regards to any proposed pumped flow rates.

   - For the hydraulic design of pumping stations (and associated rising mains) we are guided by Sewers for Adoption and in the case of Edition 7, by clauses D4.6 and D5.3.1.

   - This has a range of velocity of discharge in the rising main between 0.75 to 1.8 m/s, when the pump is operating. Our preference would be for a higher velocity than the minimum.

   - If however the discharge is by gravity, then we would seek flows within the pipe capacity and self cleansing range.