

Drainage Design Statement

Land West of Yapton Lane, Walberton

Doswell

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Author: M Akmenkalns

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DOCUMENT REFERENCES

D2426 SW Calculations Bellmouth Access
D2426 SW Calculations Main Site
D2426-MMS-1.0 Surface Water Management & Maintenance Report
Geotechnical Report
Groundwater Monitoring Data

1 INTRODUCTION

1.1 Background

- 1.1.1 Bright Plan Civils (BPC) is instructed by Doswell to prepare a management and maintenance strategy for a **Error! Reference source not found.** in relation to Land west of Yapton Road, Walberton.
- 1.1.2 This drainage statement has been prepared to support an application to discharge conditions relating to planning consent APP/C3810/W/22/3309365 approved dated 5th April 2023. The design, including drainage and levels, related to outline planning application with all matters reserved, other than means of access, for the construction of up to 48 dwellings (30% affordable homes) and dental/doctors' surgery (Use Class E (e)).

1.2 Condition 27

Development shall not commence, other than works of site survey and investigation until full details of the proposed surface water drainage scheme have been submitted to and approved in writing by the local planning authority. The design should follow the hierarchy of preference for different types of surface water drainage disposal systems as set out in Approved Document H of the Building Regulations, and the recommendations of the SuDS Manual produced by CIRIA. Winter groundwater monitoring to establish highest annual ground water levels and winter Percolation testing to BRE 365, or similar approved, will be required to support the design of any Infiltration drainage. No building shall be occupied until the complete surface water drainage system serving the development has been implemented in accordance with the agreed details and the details so agreed shall be maintained in good working order in perpetuity.

- 1.2.1 The civils design package sets out the full details of the design of the surface water drainage scheme.

1.3 Condition 28

Development shall not commence, other than works of site survey and investigation until full details of the maintenance and management of the surface water drainage system is set out in a site-specific maintenance manual and submitted to, and approved in writing, by the local planning authority. The manual is to include details of financial management and arrangements for the replacement of major components at the end of the manufacturer's recommended design life. Upon completed construction of the surface water drainage system, the owner or management company shall strictly adhere to and implement the recommendations contained within the manual.

- 1.3.1 Refer to report D2426-MMS-1.0 (Surface Water Management & Maintenance Report) for all details of proposed management and maintenance of the proposed surface water networks and SuDS.

1.4 Condition 28

Immediately following implementation of the approved surface water drainage system and prior to occupation of any part of the development, the developer/applicant shall provide the local planning authority with as-built drawings of the implemented scheme together with a completion report prepared by an independent engineer that confirms that the scheme was built in accordance with the approved drawing/s and is fit for purpose. The scheme shall thereafter be maintained in perpetuity.

- 1.4.1 The civils design package sets out the full details of the design of the surface water drainage scheme. As-built records will be provided upon practical completion.

2 PROPOSED DRAINAGE STRATEGY

2.1 Surface Water

- 2.1.1 A detailed drainage design for surface water run off was prepared by Bright Plan Civils for the development.
- 2.1.2 The below ground surface water drainage system at the site comprises the following:
- Sections of traditional piped system
 - Permeable pavement within shared access areas with diffusers (infiltration)
 - Permeable pavement within private driveways with diffusers (infiltration)
 - 1 no. open exceedance basin – (infiltration)
- 2.1.3 The surface water drainage system is shown on drawings **010-012**.
- 2.1.4 The site is served by multiple drainage networks. Each network collects run-off and discharges directly to the ground. All networks are linked to disperse run-off evenly across the entire site and maximise infiltration.
- 2.1.5 In addition to the above, the shared access network includes a high level overflow system which conveys exceedance run-off to an open storage basin. Each high level overflow is set to the upper permeable pavement sub-base depth and includes a 50mm orifice flow control to restrict rates.
- 2.1.6 The proposed surface water drainage system will include traditional drainage serving each of the dwellings, connected to the private drainage located beneath the proposed driveways and shared access roads. All assets are to remain private.

2.2 Groundwater Summary

- 2.2.1 Winter groundwater monitoring has been undertaken at the site by GESL, spanning from 30th November 2020 until 27th April 2021 and also from 7th December 2023 until 10th April 2024.
- 2.2.2 Peak groundwater levels were recorded within the range of 1.15m (WS03) to 2.16m (WS201) below ground level across the site. This aligns with a datum of 11.79m AOD so all soakaway bases are set above to provide a 1.0m buffer compliance.
- 2.2.3 The exceedance basin has a reduced buffer compliance of 0.36m, however this is not a primary SUD therefore a relaxation can be accepted.
- 2.2.4 GESL's records are contained within Appendix B.

2.3 Greenfield Run-off Summary (QBAR)

- 2.3.1 Greenfield runoff rates are calculated to be 4.98 l/s (based on site area), 1.92 l/s (based on proposed catchment area), however it shall be noted that infiltration is being wholly utilised so these rates will not be applicable.

2.4 S278 Highway Access

- 2.4.1 The surface water drainage system for the S278 Highway Access bellmouth is served by a number of road gullies. All works are subject to a S278 Highway Work application, subject to approval by WSCC.

- 2.4.2 All private run-off behind the highway boundary, is being intercepted and drains to ground.

2.5 Design Standards

- 2.5.1 Hydraulic modelling calculations that demonstrate the surface water drainage system will operate without exceedance for a 1 in 100 (+45% allowance for climate change) design storm event. Urban creep allowance is applied in consideration of residential dwellings at a rate of 10% in accordance with WSCC Policy for Surface Water Management.
- 2.5.2 Detailed design drawings include drainage, levels and surfacing layout plans and construction details. The drainage layout plan includes details of proposed drainage elements, pipe diameters, and levels. These are also detailed on the manhole and pipe schedules included within the hydraulic calculations documents, which accurately reflect the 3D model of the network and 1D hydraulic analysis of the drainage design. Flotation calculations have also been included as part of the detailed design for all proposed SuDS features.
- 2.5.3 The proposed levels plan demonstrates overland flow for runoff from the proposed development as well as surrounding landscaping, adhering to the level raising limitations agreed at outline planning.
- 2.5.4 The proposed exceedance basin has been designed with sufficient allowance for freeboard in a design storm event (~500-750mm).
- 2.5.5 Numerous infiltration testing over 4 years concludes variable rates between 1×10^{-5} to 2×10^{-6} .
- 2.5.6 With regards to the design rate, this has been fixed to 1×10^{-6} . Where geology is found to be highly variable across the site a factor of safety (FOS) has been applied as follows:

Shared Access Permeable Pavement	FOS = 5
Private Driveway Permeable Pavement	FOS = 3
Exceedance Basin	FOS = 5

- 2.5.7 Where the proposed surface elevation has been elevated for compliance with peak groundwater levels with a 1.0m buffer/freeboard, the permeable pavement sub-base depths has been enhanced. This ensures a suitable porous material transition into the natural soils, and additional storage benefits, thus mitigating the highly variable geology and exceedance risk.

2.6 Flotation

- 2.6.1 As cited in 2.2.1 high groundwater has been confirmed. This aligns with a datum of 11.79m AOD. All SuDS features will drain to ground wholly above peak groundwater levels, therefore flotation calculations are not required.

2.7 Surface Water Treatment

- 2.7.1 In accordance with the CIRIA SuDS Manual C753 regarding methods for managing pollution risks, the risk posed by surface water runoff to the receiving environment depends on the pollution hazard at the site (the source), SuDS treatment techniques (the pathway), and the sensitivity of the environment (the receptor).
- 2.7.2 The simple index approach considers whether SuDS techniques are appropriate for the site. The states that for SuDS components to deliver adequate treatment, the total pollution mitigation index for each

contaminant type should equal or exceed the pollution hazard index.

- 2.7.3 The SuDS Manual outlines three categories of pollution hazard identification, which vary depending on proposed land use, which are as follows:
- i. Total Suspended Solids (TSS).
 - ii. Metals (M).
 - iii. Hydrocarbons (H).
- 2.7.4 In accordance with C753 Table 26.2, the proposed land use at the site are categorised as follows:
- i. Residential Roofs and non-trafficked areas – very low/TSS=0.2/M=0.2/H=0.05
 - ii. Driveways and low traffic roads – low/TSS=0.5/M=0.4/H=0.4
- 2.7.5 In accordance with C753 Table 26.3, the values of SuDS Mitigation indices are provided for discharges to surface water:
- i. Permeable Pavement – TSS=0.7/M=0.6/H=0.7
 - ii. Pond - TSS=0.7/M=0.7/H=0.5
- 2.7.6 Minimum Mitigation Index is therefore 0.7/M=0.7/H=0.5.
- 2.7.7 As the pollution hazard index does not exceed any pollution mitigation index for any contaminant type, the proposed SuDS methods will provide sufficient treatment for the proposed development.

2.8 Construction Phasing

- 2.8.1 As detailed in report D2426-MMS-1.0 (Surface Water Management & Maintenance Report) , management and maintenance of drainage assets during the construction phase is the responsibility of the principle contractor and should be detailed within their Construction Management Plan accordingly.
- 2.8.2 The main contractor is responsible for dealing with all occurrences of groundwater emergence, surface water run-off, and siltation during the construction period.
- 2.8.3 It is recommended that the construction of ordinary watercourse remediation and amendments, dry detention basins, flow controls and outfall connections are completed prior to the commencement of construction of the buildings and hardstanding areas. This will ensure that flows are controlled and treated during construction. The proposed drainage systems will need a complete maintenance check upon completion of the development and any required remedial tasks undertaken.
- 2.8.4 By constructing these drainage components first, runoff from the construction site and the hardstanding areas will travel overland into the storage. This will ensure that run-off from the site receives the level of treatment required by the SuDS manual.

2.9 Foul Water Drainage

- 2.9.1 A detailed drainage design was prepared by Bright Plan Civils for the development.
- 2.9.2 This is shown on drawings **010-012**. This shows that the proposed foul sewer network discharges to an existing public sewer off site via a new adoptable pumping station.
- 2.9.3 Part of the foul water drainage for the site will be offered for adoption, namely the foul pumping station and off-site rising main. The remaining assets within the confines of the site are to remain

private. All assets proposed for adoption will come under the responsibility of **Sewage Authority**

2.10 Maintenance

- 2.10.1 Refer to report D2426-MMS-1.0 (Surface Water Management & Maintenance Report) for all details of proposed management and maintenance of the proposed surface water networks and SuDS. This document sets out drainage management responsibilities and maintenance regimes for the drainage systems.
- 2.10.2 Some of the proposed drainage system will be adopted by a **Sewage Authority** therefore the responsibility maintenance of those parts will remain with them. It will be maintained in accordance with the requirement of DCG.
- 2.10.3 Responsibility for the remaining parts will fall to the end user being **Doswell and individual house owners** via a Management Company.
- 2.10.4 Infrastructure which is 'shared' but unadopted (i.e. serving more than a single plot and/or falling outside of any individual plot's curtilage) will be the responsibility of the Management Company.
- 2.10.5 The responsibility of any drainage infrastructure supporting a single dwelling/plot will be the sole responsibility of the owner/occupier of the associated dwelling.
- 2.10.6 Additional maintenance activities beyond this will be the responsibility of the management company, to be appointed by the developer upon completion of the development.
- 2.10.7 The drainage network assets that are part of the S278 application will be the responsibility of **West Sussex County Council**.
- 2.10.8 The funding of the maintenance will be the responsibility of the end users as follows:
 - Adopted Parts: Whilst the **Sewage Authority** is responsible for maintaining the adopted system, annual fees will be paid to IWNL by the owners/occupiers of the dwellings.
 - Shared non-adopted parts: Whilst a **Management Company** will be responsible for maintaining the shared non-adopted parts, annual fees will be paid to the management company by the owners/occupiers of the dwellings and the Housing Association.
 - Private systems: **Each owner/occupier** will be responsible for funding their own drainage system
 - Highway drainage: Funding and maintenance of drainage within S38 and S278 Agreements will become responsibility of the **Local Highway Authority**.
- 2.10.9 The **Sewage Authority**, in their capacity, will adopt the foul pumping station and therefore will be responsible for maintenance and arrangements for the replacement of major components at the end of the manufacturer's recommended design life.

DRAWINGS

D2426/010-012	Proposed Drainage Plans Sheets 1-3
D2426/021	Exceedance Basin Details
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D2426/1000	Drainage Details Sheet 1 (Private)
D2426/1001	Drainage Details Sheet 2 (Private)
D2426/1002	Drainage Details Sheet 3 (Private)
D2426/040/042	Impermeable Areas-Sheets 1-3
D2426/034	S104 Foul Pump Station Sheet 1
D2426/035	S104 Foul Pump Station Sheet 2
D2426/037	S104 Foul Rising Main Sheet 1
D2426/038	S104 Foul Rising Main Sheet 2
D2426/043-045	Maintenance Plan Sheets 1-3
D2426/ SK006	Geotechnical Test Locations

DOCUMENT REFERENCES

D2426 1D Calculations (Access) Rev C
 D2426 1D Calculations (Main Site) Rev C
 D2426 MMS-1.0 Surface Water Management & Maintenance Report
 Geotechnical Report
 Groundwater Monitoring Data
 HR Wallingford Greenfield Data Sheet



