

Date: 29 July 2025

Your Ref:

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Planning Officer
Planning and Building Control
Arun District Council
Arun Civic Centre
Maltravers Road
Littlehampton
West Sussex
BN17 5LF

Dear Sir/Madam

NEW COURTWICK LANE, WICK, LITTLEHAMPTON
LU/72/25/OUT - Land to the West of New Courtwick Lane, Wick, BN17 7RZ

Further to Planning Consultation comments received from the Arun District Council (ADC) engineer with regard to the surface water drainage strategy for the above development, we present below our response based on our recent site investigation work and subsequent design development.

1.0 BACKGROUND

The existing development at New Courtwick Lane comprises a large warehouse and office building with external areas of hard-paved car parking and access routes. Historic information indicates that surface water runoff is directed to PC ring style soakaways. A CCTV drainage survey established that these soakaways are installed to the north and south of the building with the bases proven to be at around 4.00m depth below ground level (bgl).

This system of surface water management has served the development throughout its lifetime (since the mid 1990s) with no evidence of surface water flooding occurring at the site.

With the opportunity for redevelopment of the site, the proposed sustainable drainage (SuDS) strategy looks to replicate the management of surface water through disposal to ground through infiltration at source.

Since the original soakaway design was constructed, significant changes in the design requirements for infiltration measures has been implemented. The aim being a greater focus on surface water management of developments to mitigate the wider flood risk arising from urban creep and the adverse effects of climate change.

As a consequence of these changes and applying the current SuDS guidance to the site in the design of infiltration systems has shown that the current arrangement of soakaways is not compliant. This has resulted in the proposed drainage strategy approach to manage surface water wholly within the site. The main aim being to demonstrate that the flood risk at

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the site and to downstream and neighbouring properties is mitigated through the principles of SuDS design.

2.0 ADC COMMENTS

Comments were issued to the Planning Case Officer, Amber Willard, on 16.07.2025 (*Engineers Comments Regarding Surface Water Drainage*) relating to the drainage scheme prepared by HOP Consulting Ltd (HOP) and submitted with the Planning Application. This original scheme was based on assumptions made for the management of surface water which reflected the existing arrangement of surface water disposal at the site utilising a network of deep soakaways.

The following section provides a response to each of the 'Critical Item' comments raised by ADC with reference to further information where relevant.

3.0 HOP RESPONSES

Winter groundwater monitoring data

Winter infiltration testing data

Infiltration Testing was first undertaken in April 2023 by GESL which indicated that infiltration at 2.50m bgl on the Phase 1 site was not considered effective and that deeper testing should be considered as an alternative approach. With the existing soakaways installed to a depth of 4.00m bgl, it was assumed that this depth would yield favourable infiltration potential and testing was commissioned. The timeframes for mobilisation of this testing could not be met to inform the FRADS report for Planning and the drainage strategy was based on the assumption of replicating infiltration depths as per the existing deeper arrangement.

Subsequent to the submission of the drainage strategy for planning, the results of targeted infiltration testing at depth and groundwater monitoring at the site, during February, March and April 2025, were received by HOP. The report detailing the results of this testing is included in Appendix A (ref: Land Science LS8074 of 07.04.2025).

This indicated that the groundwater level was not favourable to the continued use of deep soakaways at the site, as it was recorded at a minimum depth of 2.63m bgl. The existing soakaways have their base level at around 4.00m bgl, which does not provide the required 1.0m unsaturated zone between the base of infiltration features and the groundwater level.

The fieldwork pertaining to groundwater monitoring was undertaken in the period from 24.02.2025 to 24.04.2025. This spans the months of February, March and April which are considered to be 'winter months' in accordance with the National Standards for SuDS.

Given the stipulation for a minimum 'freeboard' of 1.0m from the base of infiltration SuDS features to the highest recorded groundwater level, it was clear that an alternative method of

surface water management, other than the deep soakaways that serve the current warehouse and hardstanding, needed to be proven to serve the site.

In assessing an alternative discharge method, further inspection of the DEFRA MagicMap data indicated the potential for 'drains' to be present on the northern boundary of the site. Enquiries with the LLFA and the Arun Drainage Officer did not yield any more details on these features. A site visit was undertaken and it was discovered that these 'drains' were shallow ditches with no interconnectivity or formal discharge points. Their suitability for use to serve a site-wide surface water runoff strategy was therefore discounted and an alternative infiltration SuDS approach was pursued.

Based on the intrusive investigations undertaken to date to determine infiltration potential at depth and groundwater monitoring, additional infiltration testing has been undertaken at shallower depths. This testing was carried out in 3No. locations at a depth of 850mm below ground level with the base of the trial pits within the underlying virgin ground. The Land Science report describes this strata directly below the sub-base of the hardstanding block paved surfacing as a sandy, GRAVEL or gravelly SAND. Both descriptions would appear to be favourable to a shallow form of infiltration SuDS. Testing was subsequently carried out in accordance with the BRE DG 365 method and the results are included in Appendix B.

The two northernmost tests yielded some favourable results for the utilisation of a permeable sub-base/drainage blanket style of infiltration SuDS across the site, with the lowest value recorded at 9.55×10^{-4} m/s in TP101S and 2.02×10^{-5} m/s in TP103S.

The test in TP102S failed with no drop in water level recorded over a 2-hour period.

The testing was undertaken on 17.06.2025 which is acknowledged as being in the 'summer' months. The results do provide some comfort that a shallow infiltration system could be a practicable means of surface water management for the site. In producing the hydraulic calculations, for the purposes of feasibility, a three-fold reduction in the recorded soakage rate for TP101S and TP103S has been applied, to account for the summer testing period. This gives effective soakage rates of **3.18×10^{-4} m/s** in TP101S and **6.73×10^{-6} m/s** in TP103S. For the purposes of design, the lower of these two rates has been utilised for the drainage blanket calculations.

The hierarchy for sustainable drainage.

Through the use of infiltration SuDS to manage all surface water runoff at source, with no off-site runoff generated through the redevelopment of the New Courtwick Lane site, it is considered that the hierarchy of preferred surface water discharge is met. Both the SuDS Manual and Building Regulations Part H place infiltration at source as being the most sustainable method of surface water disposal. Rainwater harvesting can assist in part with increased sustainability credentials for development, however, these systems rely on mechanical means of management and distribution that lead to an increased carbon footprint

and maintenance liability for site operators. Issues of water quality can also be a concern with recycled water, with particular sensitivity in food preparation and food storage environments. Rainwater harvesting can be explored as an option during the detailed design stage, however, it is not considered as an element of the SuDS design for calculation purposes.

Calculations

The results from the extensive infiltration testing undertaken are considered to provide the only viable solution to managing surface water runoff at source across the site, through the utilisation of a permeable sub-base/drainage blanket layer in which to dissipate and infiltrate runoff from roofs and external hardstanding areas to ground.

It has been shown that the existing site manages runoff through infiltration to ground for both the built-up eastern portion and the open ground to the west. Pre-development runoff rates are therefore considered to be zero, as all runoff is managed at source.

Applying the lower infiltration rate across the site and modelling the system in Causeway Flow software, the results indicate that a permeable sub-base of depth 850mm spread over a plan area of 3,800m² (the extent of the supermarket car park area, north of TP103S) would be sufficient to accommodate the rainfall from a 1 in 100 year event plus 45% allowance for climate change. This infiltration area would be limited to the area north of TP103S in order to found the permeable sub-base material on ground with natural infiltration properties.

An additional area of non-permeable sub-base storage is modelled in the southern part of the Phase 1 development and provides a depth of 850mm over 750m². The outflow from this storage feature is controlled using an 85mm orifice plate limiting the discharge into the infiltration blanket to 15 litres/second. Hydraulic calculation output is included in Appendix C.

The drainage strategy layout is included as drawings ref: 16785-HOP-ZZ-XX-DR-C-0905 and 0906 in Appendix D.

Additional to the factor of 3 reduction to recent infiltration rate results, we have utilised a factor of safety of 5 in the design of the permeable infiltration blanket. This provides a significant amount of mitigation to the residual flood risk. Even allowing for the 45% CC increase the calculations show that a 850mm depth over the supermarket car park area would accommodate the runoff from the impermeable areas of the Phase 1 development for the 1 in 100-year event. A volumetric coefficient of runoff of value 1.0 has been applied to both winter and summer storm modelling. Additionally, the FEH 2022 rainfall data has been utilised in accordance with the LLFA guidance and Consultation comments.

The above paragraphs and appended information are considered to be an update to the submitted surface water drainage strategy for the development. Calculations and a revised

drainage layout plan are appended to this report for review and to establish the principle of the SuDS approach.

In summary, the following ADC comments on calculations have been addressed;

Designs must use the correct climate change allowances at the time of determination of the outline or full planning application.	An additional 45% allowance in rainfall intensity has been utilised
CV values for all events must be set to 1. This includes summer, winter, design, and simulation events.	Winter and summer CV values of 1.0 have been utilised
The correct allowance for urban creep must be applied.	Urban creep is not factored for commercial premises
Additional storage must be set to zero unless it can be evidenced where this is provided.	Additional storage is set to zero
Infiltration half-drain times must be less than 24 hours.	As shown in the attached calculations, half drain times do not exceed 24 hours
Infiltration design rates must be applied to the sides of soakaways, or to the base of infiltration blankets. Design rates must not be applied to both the base and sides of infiltration structures.	This has been applied
A surcharged outfall must be modelled.	N/A

Natural catchments design

The requirements under this section are considered to be addressed in the FRADS report issued for Planning. There are no established natural drainage characteristics within or hydraulically linked to the site, outside of the natural infiltration processes on the western part and the managed soakaway system to the east.

A CCTV survey has shown the condition and connectivity of the existing drainage infrastructure .

There are no easements to watercourses or services, therefore this comment is not applicable.

The FRADS report indicates the flood risk to the site. The proposed SuDS scheme manages runoff to incorporate appropriate mitigation to surface water flooding.

All proposed surface water drainage designs drain via gravity to the corresponding points of discharge, as shown on the appended plans.

Plans

Plan areas, depths and levels of drainage infrastructure accurately correspond with the supporting hydraulic calculations.

Water quality benefits

An assessment of water quality is included in the FRADS report for infiltration systems discharging to ground. With the introduction of a drainage blanket, the treatment of runoff from car parks and vehicular access routes is proposed to be managed through the filtration through sub-base stone as part of the SuDS system. Additional treatment is provided through the use of proprietary membranes to mitigate potential contamination to groundwater from hydrocarbon-containing runoff. This is considered to comply with the Simple Index Approach to water treatment as outlined in the SUDS Manual.

Biodiversity and amenity benefits

Open water SuDS features such as swales or ponds were considered during the design stage; however, they compromise the layout by reducing available parking provision, which is designed to meet West Sussex County Council (WSCC) parking standards. The layout also needs to maintain safe and efficient vehicle movement, servicing areas and pedestrian access, while responding to existing trees, landscape buffers and level changes.

Additionally, open water features in a busy retail environment present health and safety risks and require ongoing maintenance for water quality and litter management.

With regards to Biodiversity, the introduction of swales/ponds in either Phase of the application would conflict with the current BNG strategy to enhance and maximise protection of existing habitats within the site, by removing existing habitat areas (particularly within the Outline application area). Furthermore, open water features would require ground excavation works, which would impact root systems of existing retained trees and vegetation.

Given that the site supports infiltration at source via permeable sub-base and infiltration blanket systems and biodiversity enhancements are being delivered through a separate BNG strategy, open water features are not considered appropriate for this development.

Trees and planting

SuDS proposals take into account the provision of new and existing planting across the development site. Where conflicts cannot be avoided, suitable root protection and root barrier measures will be implemented to mitigate the risk of compromising SuDS capacity and serviceability.

Outline strategy for Phase 2 on western part of site

The Phase 2 element of the development is subject to an Outline application and the drainage strategy for this part of the site remains unchanged from the original FRADS report submitted as part of the application. The Phase 2 portion of land is located to the west at an elevation of some 1.5m higher than the Phase 1 site. More traditional crated soakaway units are proposed to manage surface water runoff from roofs and hardstanding in this zone, with good infiltration expected around 1.0 – 2.0 bgl, consistent with the favourable strata encountered in the Phase 1 zone. This strategy will be subject to further infiltration testing undertaken during the winter months ahead of addressing Reserved Matters for the Phase 2 development.

The ADC comments request that two options are considered; firstly, an infiltration scheme utilising an infiltration rate of 1×10^{-6} m/s; and secondly an attenuated flow restricted discharge to a public sewer (with Southern Water approval) or the 'Main River' by gravity.

The first option is indicated on the attached calculations in Appendix C and drainage layout strategy plan in Appendix D. The infiltration rate of 1×10^{-6} m/s is considered very conservative, given the rate achieved on the Phase 1 site at around 850mm bgl, and this rate does not allow for the drainage blankets proposed in the Phase 2 development to meet the half drain time requirement of 24 hours. Therefore, an alternative option has been provided in the calculations to show how the use of the infiltration rate of 6.73×10^{-6} m/s, utilised for the Phase 1 drainage design, allows for the drainage blankets to drain to half volume within the 24 hour period.

The second option of connecting off-site at a limiting rate, is not considered viable, due to the topography of the site and surrounding area. This precludes a gravity connection to either system and would rely on pumping, which is expressly considered as a last resort only. Other options for surface water disposal have been evidenced in this report (i.e. infiltration SuDS). Furthermore, there is no existing offsite connection to a sewer or watercourse – any discharge off the site would be considered as an increase in flow rate and volume to the receiving system, thereby having an adverse effect on flooding to the downstream receptors.

As discussed with in email correspondence with ADC engineer Paul Cann, site has thrown up some significant challenges to the consideration of an appropriate surface water management strategy. The site was previously drained via deep soakaways, which through

our investigations we have shown to be an unsuitable method to take forward for the proposed development – due to groundwater being recorded at some 1.5m higher than the soakaway base. With no existing off-site connection available to drain via an attenuated system with a limiting flow rate, we hope it can be seen that we are applying a pragmatic approach to surface water management at the site where it can be intercepted, treated and discharged at source, rather than putting more strain on the surrounding network and adversely increasing flood risk to neighbouring properties.

We hope that the above demonstrates our commitment to managing surface water runoff at source, in line with the key principles of SuDS design, to provide a sustainable solution to the disposal of surface water for the proposed development at the New Courtwick Lane site.

We have investigated infiltration at various depths, and we have come up against challenges when trying to find an existing conveyance route to the watercourse network, we therefore feel that the approach presented with the permeable sub-base/drainage blanket is the only viable option for SuDS at the site and we would appreciate the LLFA's acknowledgement of the efforts made to bring about, what we consider to be, a mutually acceptable proposal. We will, of course, refine the details and design throughout the next phase of the scheme development and would be happy to fulfil the requirements of relevant and robust Conditions that are imposed during the Planning Consultation period for each phase of the development.

In subsequent correspondence with ADC's colleagues at the Lead Local Flood Authority (LLFA), we have been directed the National Standards for SuDS (NSS) which were published on 19.06.2025. This guidance was not available at the time of preparing the FRADS report issued for Planning. The NSS provides a clearer framework of standards from which to develop a compliant SuDS scheme compared to the previous guidance published in the Non-statutory Technical Standards for SuDS.

Having reviewed the NSS, in light of the submitted FRADS report and the revised drainage strategy detailed in this report, we feel that the principles of the NSS are met through the infiltration system proposed for the development at New Courtwick Lane.

We are confident that the choice of infiltration SuDS meets with the hierarchical preference for surface water management at the site and would be happy to provide a comprehensive assessment demonstrating that the principles of the NSS are met through Planning Conditions that could be applied. In email correspondence of 09.07.2025 with the Planning Consultants (ECE Planning), the Planning Case Officer has stated that he is happy for final drainage details to be reserved to PC conditions.

I trust that this report adequately addresses the points raised in the original Consultation response from the ADC engineer and that it can be seen that the process followed in arriving at the revised surface water drainage strategy detailed above is clear and consistent and holds the principles of SuDS at its core.

Yours sincerely

A large black rectangular box redacting the signature of Andrew Keen.

Andrew Keen BEng (Hons) CEng MICE
For HOP Consulting Limited

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