

Engineers Comments Regarding Surface Water Drainage

Application Reference:	F/14/24/RES	Reviewer Reference:	ADC/SB
Planning Officer:	Jessica Riches	Date of Review:	28/02/2025
Site Name:	Land at Ford Airfield Ford		
Application Description:	Approval of reserved matters (layout, scale, appearance and landscaping) following outline consent F/4/20/OUT for the infrastructure reserved matters including the provision of a primary spine road and associated secondary road junctions, pavement, footpaths, cycle infrastructure and bus stops; site wide drainage infrastructure including foul pumping stations, foul sewer infrastructure, SUDS basins, SUDS swales, surface water infrastructure; acoustic fencing; public open space including landscape details, play areas, footpaths & associated works. This application affects a Public Right of Way, may affect the setting of a Listed Building and falls within CIL Zone 1 (Ford strategic site - zero rated).		
Assessment Number:	1 of 1		

Policy and Guidance Information

Arun District Council Surface Water Drainage Guidance - <https://www.arun.gov.uk/surfacewater>

Land Drainage Consent – <https://www.westsussex.gov.uk/fire-emergencies-and-crime/dealing-with-extreme-weather/flooding/flood-risk-management/ordinary-watercourse-land-drainage-consent/> and

<https://www.arun.gov.uk/land-drainage-consent/>

Arun District Council surface water pre-commencement conditions -
<https://www.arun.gov.uk/planning-pre-commencement-conditions>

The SuDs Manual [C753] by CIRIA

Sustainable drainage systems: non-statutory technical standards'

<https://assets.publishing.service.gov.uk/media/5a815646ed915d74e6231b43/sustainable-drainage-technical-standards.pdf>

Response	Objection
-----------------	------------------

Critical Items for Surface Water Drainage Design Conditions

The failure to adequately address the following items will result in an objection to a surface water drainage design.

If any of these items are inadequately addressed by the submission, then their correction may result in a redesign of the surface water drainage scheme. A redesign is likely to have site wide implications such as the potential for storage structures to increase in volume or plan area.

Critical Item	Reason	Status
Winter groundwater monitoring data.	Adequate winter groundwater monitoring data must be supplied to evidence that infiltration designs have sufficient freeboard from the	Insufficient

	<p>base of structures and the peak groundwater level.</p> <p>The same data is necessary to ensure that the potential for buoyancy has been adequately considered in attenuation designs.</p>	
Winter infiltration testing data.	<p>Adequate winter infiltration testing must be supplied to justify the proposed discharge method and design infiltration rates.</p> <p>Infiltration tests must be completed strictly in accordance with BRE DG 365, CIRIA R156 or a similar approved method. Testing depths must account for peak groundwater levels and correspond with the location and depth of proposed infiltration features.</p> <p>Designs must be based upon the <u>slowest</u> infiltration rate evidenced closest to a proposed infiltration feature. Average design rates will not be accepted.</p> <p>The results of incomplete tests should not be extrapolated to obtain design values for infiltration rates.</p>	Insufficient
The hierarchy for sustainable drainage.	<p>The proposed discharge method must accord with the SuDS hierarchy as given below. Evidence must be supplied to justify the proposed discharge method.</p> <ol style="list-style-type: none"> 1. Rainwater reuse where possible. 2. Complete discharge into the ground (infiltration). 3. Hybrid infiltration and restricted discharge to an appropriate water body or surface water sewer. 4. Restricted discharge to an appropriate water body. 5. Restricted discharge to a surface water sewer. 6. Restricted discharge to a combined sewer. <p>A water body may be defined as a river, watercourse, ditch, culverted watercourse, reservoir, wetland or the sea.</p> <p>Engineers cannot support any proposed connection of surface water to the foul sewer.</p>	Insufficient

Calculations	<p>Calculations for pre-development run off rates must be based upon the positively drained area only.</p> <p>Proposed discharge rates must not increase flood risk on site or elsewhere. Discharge rates must be restricted to QBAR or 2 l/s/ha, depending on whichever is higher.</p>	Not Assessed
	<p>Designs must be based on the most recently available rainfall data at the time of conditions being applied. <u>FSR rainfall data will not be accepted.</u> FEH rainfall data is based upon more recent records and continues to be updated.</p>	Not Assessed
	<p>Designs must use the correct climate change allowances at the time of determination of the outline or full planning application.</p> <p>CV values for all events must be set to 1. This includes summer, winter, design, and simulation events.</p> <p>The correct allowance for urban creep must be applied.</p> <p>Additional storage must be set to zero unless it can be evidenced where this is provided.</p> <p>Infiltration half-drain times must be less than 24 hours.</p> <p>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.</p> <p>A surcharged outfall must be modelled.</p>	Not Assessed
Natural catchments design.	<p>The submission must define the natural drainage characteristics within, and hydraulically linked to, the site and demonstrate that the drainage proposals will integrate with and not compromise the function of the natural and existing drainage systems.</p> <p>The condition, performance (including capacity where appropriate) and ownership of any existing site surface water drainage infrastructure must be accurately reported.</p>	Insufficient

	<p>Appropriate easements to watercourses and other services must be shown on all plans.</p> <p>Where there are areas of flood risk from any source on the site, it must be shown how a sustainable surface water drainage design can be accommodated on the site without conflicting with those areas of flood risk.</p> <p>Designs must replicate the natural drainage catchments of the site. All surface water drainage designs must therefore drain via gravity to corresponding points of discharge.</p> <p>The use of pumps for surface water drainage is not sustainable and will not be supported.</p>	
Plans	Plan areas, depths and levels of drainage infrastructure must accurately correspond with the supporting calculations.	Not Assessed
Water quality benefits.	An assessment of water quality is necessary to evidence that the proposed design provides adequate treatment of surface water.	Not Assessed
Biodiversity and amenity benefits.	The surface water drainage design must provide biodiversity and amenity benefits.	Not Assessed
Trees and planting	<p>There should be no conflict between surface water drainage infrastructure and existing or proposed trees or planting.</p> <p>The design must consider the potential growth of proposed trees and adequate mitigation must be provided to protect drainage infrastructure where conflict <u>cannot</u> be avoided.</p>	Not Assessed

Drainage Impact on Other Planning Matters

This application has been assessed with regards to surface water drainage design only.

Other planning matters occasionally effect the surface water drainage design. If plans relating to other matters have been assessed for their impact on the proposed drainage, then it must not be assumed that they have been assessed for any other purpose. The planning officer is advised to check for conflicts with any existing approved plans and to consult any relevant consultees as appropriate.

It has been identified that the following consultees may have comments about the plans that have been submitted and reviewed for this application:

Landscaping officer (proposed trees and landscaping)

Tree officer (existing trees)

Environment Agency (main rivers and fluvial/tidal flood risk, groundwater source protection zones)

Southern Water (foul drainage and surface water disposal to public sewer network)

Portsmouth Water (groundwater source protection zones)

Lead local flood authority (all other sources of flooding and ordinary watercourses)

Other:

None

Additional comments to the planning officer

The NPPF states that when determining any planning application, local planning authorities should ensure that flood risk is not increased elsewhere (paragraph 181, 182 and 187e). The PPG guides local planning authorities to refer to 'Sustainable drainage systems: non-statutory technical standards' and detailed industry guidance like The SuDS Manual [C753] by CIRIA to guide decisions about the design, maintenance, and operation of sustainable drainage systems for non-major development.

This consultation has been primarily informed by The SuDS Manual.

The following documents have been submitted to support the application with reference to surface water drainage:

- Drainage Technical Note IRM_04.B, reference 2205771-R16-C, dated 13/12/2024. Referred to as the **Technical Note**.
- 2205771-D020 Rev H - Sitewide Indicative Surface Water Drainage Strategy. Referred to as **ISW Plan**.
- 2205771-250 – Pre-development Drainage Catchments Plan. Referred to as the **Greenfield Catchment Plan**. [Note that this plan was not uploaded to the portal to this application at the time of review].
- TOR-RMIN-XX-DR-L-P-022 Rev A – Ryebank Park Basin Sections Ryebank Park 2 of 2
- TOR-RMIN-XX-DR-L-P-021 Rev A – Ryebank Park Basin Sections Ryebank Park 1 of 2
- TOR-RMIN-XX-DR-L-P-012 Rev B – Reserved Matters Infrastructure Site sections – Ryebank Park
- TOR-RMIN-XX-DR-L-P-011 Rev B – Reserved Matters Infrastructure Site sections – Landings Green
- 2205771-D100 Rev P13 – Enabling Infrastructure General Arrangement
- 2205771-210 Rev B – Infrastructure RM – Impermeable Area Plan (Sheet 1)
- 2205771-211 Rev B – Infrastructure RM – Impermeable Area Plan (Sheet 2)

Within the Drainage Technical Note, the following documents and plans are contained and referred to as follows:

- Omnia (Interim Report) Winter Groundwater Monitoring, reference A11918-3/240/326/L1.1, dated 28/03/2024. Referred to as the **Omnia Report**. [Appendix C]

- 2205773-SK003 – Groundwater monitoring and Infiltration Testing Results. Referred to as the **GI Plan**. [Part of Appendix G]
- 2205771-130 Rev B – IRM - Drainage Strategy (Sheet 1)
- 2205771-131 Rev C – IRM - Drainage Strategy (Sheet 2)
- 2205771-132 Rev C – IRM - Drainage Strategy (Sheet 3)
- 2205771-133 Rev C – IRM - Drainage Strategy (Sheet 4)
- 2205771-134 Rev B – IRM - Drainage Strategy (Sheet 5)
- 2205771-135 Rev B – IRM - Drainage Strategy (Sheet 6)
- 2205771-136 Rev B – IRM - Drainage Strategy (Sheet 7)

Insufficient information has been submitted regarding the existing site, its current drainage arrangements and natural catchments to determine if the proposed discharge locations and rates will not increase flood risk.

Surface water drainage locations must replicate the natural drainage catchments of the site to ensure that flood risk is not increased. To understand how a site naturally drains, ground investigations are required. The applicant must demonstrate the peak ground water level, the infiltration potential of the ground and the existing topography. On a site of this scale there are multiple sub-catchments which may drain surface water by different means and to different locations.

It appears that the ground investigations have been coordinated to align with the proposed layout rather than to inform it. This means that there is a significant risk that the design does not emulate the natural drainage for parts of the site. This is a particular issue in the northern half of the site where all surface water is proposed to discharge to a single outfall to a watercourse. This is despite infiltration potential being evidenced and not investigated further.

By displacing surface water that would naturally drain to ground to a watercourse, flood risk will be increased. Designers may argue that by reducing runoff rates to below greenfield runoff rates they are mitigating for this risk. But the greenfield runoff rate applies to the land that would drain to watercourses naturally. By adding additional areas which naturally drain to ground, even at reduced runoff rates, a developer will increase the volume of surface water that ultimately ends up in the watercourse system. This volume will impact flood risk.

Where there is potential to drain surface water to ground, this must be prioritised in accordance with the surface water drainage hierarchy prescribed by The SuDS Manual, Approved Document H of the Building Regulations, and the SuDS non-statutory technical standards.

Groundwater monitoring

The applicant has submitted evidence of groundwater monitoring in the Omnia Report. This gives an early indicator of any likely infiltration potential across the site.

In the south of the site, the groundwater levels have been evidenced to be consistently high, at a level that is high enough to rule out infiltration as a means of surface water disposal. This is because 1m of unsaturated ground must be allowed for between the base of the soakaway or infiltration structure and the peak groundwater level. This approach allows for potential groundwater level rise over the lifetime of the development and provides surface water treatment and thus protection to the groundwater.

Despite ground investigations being sparse towards the north of RM4 (South), the groundwater levels are so consistently high that enough confidence has been offered that infiltration is not viable for this area.

However, in the north of the wider site, the ground conditions are different and variable. At the most northern boundary, groundwater levels are high enough to rule out infiltration. However, for a significant area of the site peak groundwater levels would suggest infiltration may be viable.

As the ground conditions and the groundwater levels are variable in the north of the site, the applicant must evidence a more rigorous monitoring regime. This ensures that infiltration is maximised where possible and that the natural drainage characteristics are emulated.

At present the groundwater monitoring in the north of the site is not extensive enough for this purpose. The number of monitoring locations may seem high when plotted or listed without context. However, when compared with the scale of this proposed development they are clearly insufficient in number. RM1 (North) alone, comprises of 341 dwellings. Within this parcel there are 3 groundwater monitoring points, 2 of which have groundwater levels that are low enough to justify further investigation into infiltration potential.

The planning officer is reminded that all proposed development of at least 2 dwellings within this district is expected to evidence the ground conditions on site to justify their drainage strategy. This will include a full winter of groundwater monitoring in all cases. All major development of least 10 dwellings as assessed by the Lead Local Flood Authority [LLFA] will also be expected to complete groundwater monitoring to justify their drainage strategy. In this parcel the developer has one monitoring location per 113.7 dwellings. There are entire blocks of houses where we have no indication of likely groundwater levels.

There are groundwater monitoring points in the locations of all open storage features. All of which are proposed to attenuate surface water before discharging it at a restricted rate to three boundary watercourses. It is noted that WS413 in one of the detention basins (named differently between plans), had peak groundwater levels that are low enough that infiltration could be viable.

Infiltration Testing

No infiltration testing report has been submitted.

The GI Plan indicates that some infiltration testing has been completed on the site, however, no further evidence of this has been submitted. Therefore, it is not possible to assess the results that are illustrated on the plan. The descriptions of testing depths are vague ('shallow' or 'deep'), we do not know when the testing was completed, nor if it was compliant with the methods described in BRE DG 365.

However, the information that has been provided indicates that infiltration may be viable in parts of the site. Although there are significant areas of the site for which we have no data, the limited testing that is referenced indicates that there are several parts of the site where there is infiltration potential. The SuDS Manual states that infiltration viability should be given full consideration where rates of 10^{-6} m/s or greater exist on the site.

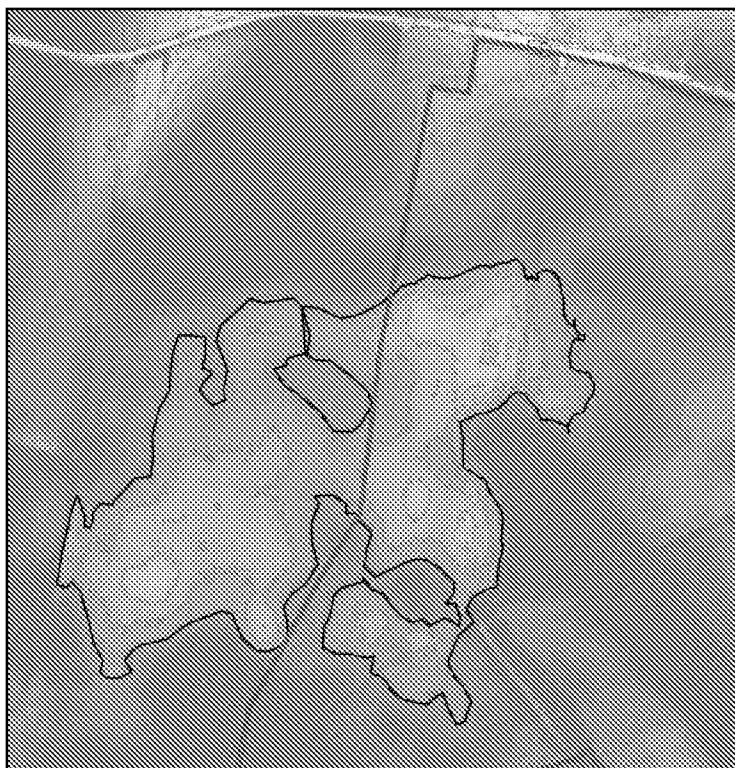
Topography

In addition to the observed site-specific geotechnical data, it is important for the applicant to accurately demonstrate the existing topography of the site. This ensures that surface water is not directed to areas where it would not naturally flow and therefore increase flood risk.

The Greenfield Catchment Plan indicates that a section of the northwest of the site flows to the northwest boundary. The boundary of this catchment does not appear to be based upon the topography of the land. Contours shown within the plan indicated that a wider area would be included in this catchment. It also does not distinguish between areas which may infiltrate and those that discharge to the watercourse.

We have produced the attached LIDAR plan which illustrates the topography of the site, high ground is shown in blue, and low in red. Contours are shown for every 0.2m change in elevation. The planning officer should be aware that this is not information submitted by the applicant but serves as an evidence base to support our rationale.

The LIDAR plan shows that there are depressions in the land where you would expect surface water to accumulate and infiltrate as there is no watercourse in these locations. Where water could not infiltrate, it would overflow to the northwest, presumably to the watercourse at Long Barn. For this to occur, there would be a significant volume of water flooding the land at depths of up to 0.8m. This is shown on the snip from the LIDAR plan below, the snip highlights the overflow contour in black:



Surface water flood mapping shows similar ponding areas for the 0.1% Annual Exceedance Probability [AEP] event (1 in 1000 year). These areas are not shown with a surface water flow path to the northwest for the same event. This event is used as a proxy for the 1% AEP + an allowance for climate change, in the absence of that data.

Impact

The proposed design discharges all surface water for the site to three watercourses, without adequately investigating or justifying the non-viability of infiltration as a means of disposal. Whilst it is agreed that infiltration is not viable for most (if not all), of the south of the site, the applicant has evidenced infiltration potential without investigating it further in the north.

This means that the applicant has not sufficiently evidenced that the proposed design and therefore layout, are following the hierarchy for sustainable drainage.

As stated above, the ground investigations appear to have been programmed to align with the proposed layout rather than to inform it. The infiltration potential of the site should have been thoroughly investigated before the layout was submitted for approval. This would ensure that areas where infiltration was possible were reserved for this purpose, thus reducing the impact of additional surface water flow to the watercourse network.

The proposed layout means that high density housing is proposed where infiltrating surface water drainage features may have been viable. The layout of this housing informs the infrastructure that serves it and therefore we must object in principle to the application.

The proposed layout is assumed to conflict with the following policies:

Local Plan Policy W SP1:

A: "Sustainable Drainage Systems reduces the creation and flow of surface water"

B: "reduces the risk to homes and places of work from flooding"

Local Plan Policy W DM2:

B: "without increasing flood risk elsewhere and reduce flood risk overall"

Local Plan Policy W DM3:

F: "Follow the hierarchy for preference for different types of surface water drainage disposal systems as set out in Approved Document H of the Building Regulations and the SuDS manual produced by CIRIA."

Ford Neighbourhood Plan Policy EH4

"ensure that the risk of flooding both on-site and downstream is not increased."

NPPF Paragraph 181

"ensure that flood risk is not increased elsewhere"

NPPF Paragraph 182

"incorporate sustainable drainage systems to [...] reduce volumes of runoff"

Consultation Limitations

Due to the objection in principle to the layout, based on the insufficient ground investigations and the risk that natural drainage characteristics and the sustainable drainage hierarchy have not been followed, the submission has not been assessed in further detail.

It is possible that there are further reasons for objection which are not elaborated upon here, these include:

- Discharge rates and volumes
- Disposal locations and connectivity over third party land (south)
- Contributing areas
- Landscaping conflicts
- Biodiversity, amenity and interception drainage
- Capacity for upstream (offsite) drainage at the Ford Lane outfall
- Basin depths
- Site levels and ground raising



Ford Airfield (North)
LIDAR and Watercourse
Mapping

Legend

ADC Engineers Mapping

Culverted Ordinary Watercourse

Ordinary Watercourse Nodes [8824]

* Headwall [6503]

● Manhole [1810]

— Ordinary Watercourse

*** Highway Drain

Highway Drain Nodes

■ Gully

● Manhole

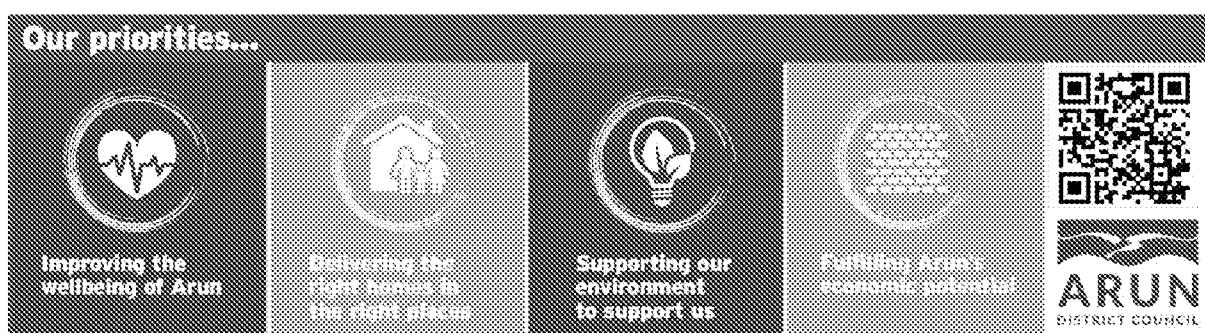
*** Surface Water Drain

● Waterwells 2005

Notes:

Arun District Council, Civic Centre, Maltravers Rd
Littlehampton, West Sussex, BN17 5LF
www.arun.gov.uk

To register to receive notifications of planning applications in your area please go to
<https://www1.arun.gov.uk/planning-application-finder>



From: Sarah Burrow <Sarah.Burrow@arun.gov.uk>
Sent: 28 February 2025 14:05
To: Planning.Responses <Planning.Responses@arun.gov.uk>
Cc: Karl McLaughlin <Karl.McLaughlin@arun.gov.uk>; Paul Cann <Paul.Cann@arun.gov.uk>; Jessica Riches <Jessica.Riches@arun.gov.uk>; David Easton <David.Easton@arun.gov.uk>
Subject: RE: Planning Consultation on: F/14/24/RES

Hi Jessica,

Please see my consultation – an objection – attached.

Kind regards

Sarah Burrow

Flood Risk and Drainage Engineer, Coastal Engineers and Flood Prevention



Usual working pattern:

Monday – Flexible between 8am and 6pm

Tuesday and Wednesday – 9:15am to 2:45pm

Thursday – 9am to 6pm

Friday – Flexible between 8am and 6pm

Arun District Council, Civic Centre, Maltravers Rd
Littlehampton, West Sussex, BN17 5LF

www.arun.gov.uk



From: Planning.Responses <Planning.Responses@arun.gov.uk>

Sent: 06 February 2025 12:48

To: Land Drainage <Land.Drainage@arun.gov.uk>

Subject: Planning Consultation on: F/14/24/RES

To: **Engineers (Drainage)**

NOTIFICATION FROM ARUN DISTRICT COUNCIL

The Town & Country Planning Act 1990 (as amended)

Town & country Planning (Development Management Procedure) (England) Order 2015 - Article 6

Approval of Reserved Matters Following Outline Approval

Application No: **F/14/24/RES**

Registered: 11th September 2024

Site Address: Land at Ford Airfield Ford

Grid Reference: 499204 102967

Description of Works: Approval of reserved matters (layout, scale, appearance and landscaping) following outline consent F/4/20/OUT for the infrastructure reserved matters including the provision of a primary spine road and associated secondary road junctions, pavement, footpaths, cycle infrastructure and bus stops; site wide drainage infrastructure including foul pumping stations, foul sewer infrastructure, SUDS basins, SUDS swales, surface water infrastructure; acoustic fencing; public open space including landscape details, play areas, footpaths & associated works. This application affects a Public Right of Way, may affect the setting of a Listed Building and falls within CIL Zone 1 (Ford strategic site - zero rated).

The Council have received the above application.

[Click here to view the application details](#)

Should you have any comments to make, these should be sent by replying to this email by 27th February 2025 . You can also monitor the progress of this application through the Council web site:

<https://www.arun.gov.uk/planning-application-search>

The application will be determined having regard to the development plan policies (if any are relevant) and other material considerations. The development plan can be accessed via the website

<https://www.arun.gov.uk/development-plan> as can information on what comments we can consider

<https://www.arun.gov.uk/planning-application-comments>

Please be aware that any comments you may make will be available on our website so please do not insert personal details or signatures on your reply.

Should the application go to appeal the Planning Inspectorate will publish any comments made to the Council on their website:<https://aciplanninginspectorate.gov.uk/> but they will protect personal details.

In the absence of a reply within the period stated, I shall assume that you have no observations to make.

Yours sincerely

Jessica Riches

Planning Officer- Arun District Council

Telephone: 01903 737852

Email: jessica.riches@arun.gov.uk

PLCONSULT (ODS) 2020