The Landings, Ford Airfield

Phase RM4 (South)

Drainage Technical Note
RM4_05.A
August 2024

Vistry Group

ARUN DISTRICT COUNCIL P/182/21/RES

ARDENT
CONSULTING ENGINEERS
AN EMPLOYEE OWNED COMPANY

VISTRY HOMES LIMITED

THE LANDINGS, LAND AT FORD AIRFIELD, FORD

RM4 (South) Drainage Technical Note

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[redacted]

Email: enquiries@ardent-ce.co.uk

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Document Control Sheet

REV	ISSUE PURPOSE	AUTHOR	CHECKED	APPROVED	DATE
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A	Final	VL	AD	MR	15/08/2024
B	Final	VL	AD	MR	22/08/2024

Distribution

1. Introduction

1.1. Ardent Consulting Engineers (ACE) has been appointed by Vistry Homes Limited to advise on the Flood Risk and Drainage aspects of the proposals for a residential-led mixed-use development on Land at Ford Airfield, Ford.

1.2. Outline (all matters reserved except access) permission (ref F/4/20/OUT) was granted in July 2023 for

"the development of up to 1,500 dwellings (Use Class C3), 60-bed care home (Use Class C2), up to 9,000 sqm of employment floorspace (Use Classes B1), local centre of up to 2,350 sqm including up to 900 sqm retail / commercial (Use Classes A1-A5) and 1,450 sqm community / leisure floorspace (Use Classes D1-D2), land for a two-form entry primary school (Use Class D1), public open space, allotments, new sports pitches and associated facilities, drainage, parking and associated access, infrastructure, landscape, ancillary and site preparation works, including demolition of existing buildings and part removal of existing runway hardstanding"

1.3. The development will be brought forward via a number of reserved matters applications. This Drainage Technical Note (TTN) covers the Reserved Matter 1 (RM4) application, which consists of:

Approval of reserved matters (layout, scale, appearance and landscaping) following outline consent F/4/20/OUT for phase RM4 (South), for the erection of 357 no. residential dwellings plus associated roads, infrastructure, parking, landscaping, open space & play areas, and associated works.

1.4. This DTN outlines the foul and surface water design for the RM4 Phase. A separate DRN (Report Ref. 2205771-R16) has been produced to cover the foul and surface drainage strategy for the Infrastructure Reserved Matters (IRM) application, which focuses on the enabling infrastructure, including the strategic foul and surface water drainage networks and SuDS features for the wider development site.

1.5. A site-wide drainage strategy was produced by JNP Group as part of the outline planning application and has been used as the basis for the detailed drainage design. The drainage design has been updated to incorporate further findings of ground investigations as well as pre-application discussions with West Sussex County Council as the LLFA. A response to comments made by the LLFA as part of pre-

application discussions is included in Ardent's letter response in **Appendix B** (Ref. MCE/2205771).

Phase RM4 location and site layout

1.6. The approximate RM4 site boundary relative to the wider development area are shown in Figure 1-1 below. A site layout is shown in Figure 1-2, and included in **Appendix A**.

1.7. The approximate RM4 site boundary, the wider development area, and the surrounding area are shown in Figure 1-1.

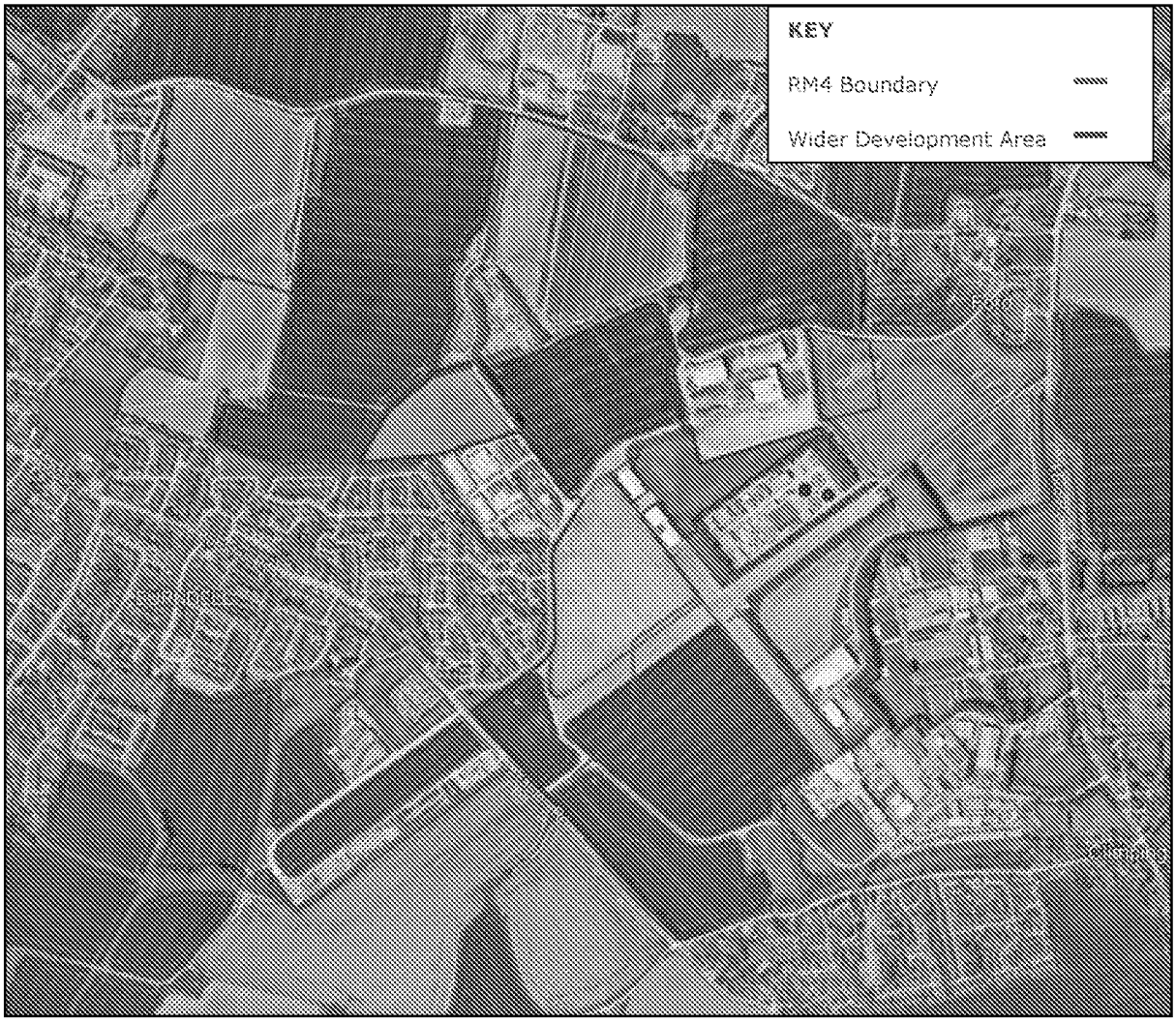

Figure 1-1: Site Boundaries and Surrounding Area

Figure 1-2: Site Layout

2. Surface Water Drainage

Technical Standards

2.1. The proposed surface water drainage strategy for the development is in accordance with the following technical standards and best practice guidance:

- West Sussex County Council (WCCC) Sustainable Drainage Systems Design Guidance;
- CIRIA SuDS Manual (C753);
- Non-statutory technical standards for sustainable drainage systems. A Best Practice Guidance was published by the Local Authority SuDS Officer Organisation (LASOO) in July 2015 to accompany this document;
- The National Planning Policy Framework.

RM4 (South) Drainage Design

2.2. Surface Water Drainage drawings are included in **Appendix D**. It should be noted that the Indicative Sitewide Drainage Strategy plan (drawing no. 2205771 - D020) has been provided for context only. The drainage design for this RM application is shown on drawings 2205771 – D142 (Sheet 1 of 2) and 2205771 - D143 (Sheet 2 of 2) in **Appendix D**. Detention basins and outfall arrangements form part of the strategic drainage network which is covered in a separate Infrastructure Reserved Matters application, and described in Ardent's Drainage Technical Note Ref. 2205771-R16.

Drainage Discharge Hierarchy

2.3. In line with CIRIA C753's discharge hierarchy, drainage strategies must aim to use a method of discharge as high up the following hierarchy as possible:

1. Store water for later use
2. Discharge to the ground via infiltration
3. Discharge to a surface water body
4. Discharge to a surface water sewer

5. Discharge to a combined sewer

2.4. It is proposed to include water butts across the site for water re-use. However, the benefits of rainwater harvesting on a specific design storm event cannot be quantified, due to the variable availability of storage within the structure. As such, these have not been included in the drainage strategy calculations.

2.5. Ground investigations including winter groundwater monitoring were undertaken by Omnia Ltd between December and April 2024 (refer to **Appendix C**). Within the RM4 boundary, the investigations recorded groundwater levels at the ground surface. As a result, infiltration systems have been discarded as a method of disposal of surface water.

2.6. Following the discharge hierarchy outlined above, it is proposed to attenuate flows from RM4 within an attenuation basin prior to discharging surface water into an ordinary watercourse located to the south-west of the site.

Proposed discharge rates

2.7. Surface Water Drainage strategy drawings are included in **Appendix D**.

2.8. Based on the natural topography of the site, surface water runoff from the RM4 plot is conveyed via a combination of grassed swales and a piped drainage network into a series of strategic detention basins on the south-western extent of the site, prior to discharging at a rate equivalent to the mean greenfield runoff rate (Qbar) into an adjacent watercourse. Flows will be controlled by a vortex flow control. It should be noted that the detention basins and outfall arrangements form part of the strategic drainage network which is covered in a separate Infrastructure Reserved Matters application, and described in Report Ref. 2205771-R16.

2.9. A Qbar rate of 2.42 l/s/ha has been calculated for the site using the FEH method. The proposed maximum allowable discharge rate for the site is based on the gross development area and including a 10% allowance for urban creep.

Surface Water Drainage Calculations

2.10. Causeway Flow results for the wider site are included in **Appendix E**. FEH 2022 data has been used in the calculations. The results demonstrate there is not flooding onsite for all rainfall events up to the 1 in 100 year +40%CC, and there is no surcharging in the network during the 1 in 2 year event.

2.11. Following discussions with the LLFA, a sensitivity check has been carried out using a Volumetric Run-off Coefficient (CV) value of 1. The results demonstrate that the additional runoff is stored within the available freeboard of the detention basins.

2.12. All outfalls have been modelled as fully surcharged up to the flood levels (assumed as top of bank levels) in a 1 in 100 years + 40% CC event.

Designing for Exceedance

2.13. Drainage exceedance may occur if the rate of surface water runoff exceeds the capacity of the drainage system, the receiving water or piped system becomes overloaded or blocked, or when the outfall becomes restricted due to flood levels in the receiving watercourse.

2.14. Exceedance routes have been identified in drawing no. 2205771- D020 in **Appendix D.** As mentioned above, all outfalls have been modelled as fully surcharged up to the flood levels (top of bank levels) in a 1 in 100 years + 40% CC event.

Future Maintenance

2.15. The drainage elements covered within the IRM application (the sewer network, swales and basins) will be offered for adoption by a New Appointments and Variations (NAV) company company under a S104 agreement.

2.16. The connecting pipework will be maintained by a private company.

2.17. A Maintenance and Management Plan for all drainage features is provided within **Appendix F**, detailing the operational requirements for each drainage element for the lifetime of the development.

3. Foul Drainage

3.1. Details of the strategic foul drainage infrastructure for the wider site have been submitted as part of the IRM application, and are described below for information. The foul drainage network to be approved under this application is shown in the drainage drawings in **Appendix D**.

3.2. The foul drainage strategy has been designed to convey foul flows to 3no. proposed adoptable pumping stations (Pump Stations 1, 2 and 3), which will in turn discharge into a fourth pump station (Terminal Pump Station 4). Foul Pump Station 4 will pump flows to Ford wastewater treatment works to the east of the site.

3.3. All pumping stations will be fitted with a telemetry system and emergency storage to adoptable standards.

3.4. Refer to Table 3-1 below for pumping station catchment details.

Table 3-1 Foul drainage catchments

Station Reference	Type	Catchment
Pump Station 1	Satellite	132 Dwellings plus 12l/s design flow from an adjacent development
Pump Station 2	Satellite	717 Dwellings
Pump Station 3	Satellite	437 Dwellings
Pump Station 4	Terminal	98 Dwellings, 60 bed care home, 2 form entry primary school, 2320m2 local centre plus pumped flows from Pump Stations 1,2 and 3

3.5. Total foul flows from Terminal Pump Station 4 have been calculated as 87.51 l/s. Desing flows for each pumping station are set out in Table 3-2 below.

Table 3-2 Foul drainage design flows

Pump Station	Design Flow (l/s)
1	18.22
2	33.19
3	20.23
4* (*Total site flows, including flows from PS 1, 2 and 3)	87.51

4. Summary and Conclusion

4.1. Ardent Consulting Engineers (ACE) has been appointed by Vistry Homes Limited to advise on the Drainage and flood risk aspects of the proposals for a residential-led mixed-use development on Land at Ford Airfield, Ford.

4.2. The development will be brought forward via a number of reserved matters applications. This DTN outlines the foul and surface water design for the RM4 Phase. A separate DTN (Report Ref. 2205771-R16) has been produced to cover the foul and surface drainage strategy for an Infrastructure Reserved Matters (IRM) application, which focuses on the enabling infrastructure, including the strategic foul and surface water drainage networks and SuDS features for the wider development site.

4.3. The Local Planning Authority (LPA) is Arun District Council (ADC) and the Lead Local Flood Authority (LLFA) is West Sussex County Council (WSCC). Pre-application discussions with the LLFA have taken place and have informed the drainage design for the RM design phase.

4.4. The surface water drainage strategy for the RM4phase proposes to attenuate flows within an attenuation basin before discharging into an ordinary watercourse located to the south-west of the site, at a rate restricted to the equivalent mean greenfield runoff rate (Qbar). It should be noted that the detention basin forms part of the strategic drainage network which is covered within the separate Infrastructure Reserved Matters application.

4.5. Causeway Flow results demonstrate there is not flooding onsite for all rainfall events up to the 1 in 100 year +40%CC, and there is no surcharging in the network during the 1 in 2 year event.

4.6. All outfalls have been modelled as fully surcharged up to the flood levels (assumed as top of bank levels) in a 1 in 100 years + 40% CC event.

4.7. Details of the strategic foul drainage infrastructure for the wider site have been submitted as part of as separate IRM application, and included in this technical note for information. The foul drainage network to be approved under this application is shown in the drainage drawings in **Appendix D**.

4.8. A Maintenance and Management Plan for all drainage elements of the wider site is included in **Appendix F** of this DTN.

Appendix A