

# Camp Road, Upper Heyford Phase 10

Flood Risk Assessment and Drainage Strategy Compliance Note

January 2023

Version 3



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# Contents

1.0 Introduction

2.0 Overview of Approved Flood Risk Assessment

3.0 Proposed Surface Water Drainage Strategy

4.0 Summary and conclusion

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# Appendix

<b>Appendix A</b>	Location plan
<b>Appendix B</b>	Proposed level/drainage layout and impermeable areas plan
<b>Appendix C</b>	Proposed Microdrainage Calculations
<b>Appendix D</b>	Residual Flooding Masterplan
<b>Appendix E</b>	SUDS Maintenance Regime

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# Report Reference

16871/FRA-C-PH10

## Revision History

Version	Amendments	Prepared By	Checked By	Date
1	Initial issue	AT	JF	27.04.2022
2	Updated to suit latest layout	AT	JF	05.07.2022
3	Updated to suit latest layout	AT	JF	19.01.2023

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# Introduction



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# Introduction

- 1.1 This Flood Risk Assessment Compliance report has been prepared on behalf of the Dorchester Living in support of their Reserved Matters application for the new dwellings on phase 10 located north of Camp Road, Upper Heyford.
- 1.2 The purpose of this report is to demonstrate that the proposed drainage design complies with the approved Flood Risk Assessment (FRA) carried out by Hydrock dated March 2020 (Ref HPH-HYD-XX-XX-RP-D-5001 rev P4).
- 1.3 This report is intended to assist in the discharge of any planning conditions that requires the developer to demonstrate compliance with the approved FRA.

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# Overview of Approved Flooding Risk Assessment



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# Overview of Approved Hydrock FRA

- 2.1 The Masterplan Area covers an area of around 449ha around the former RAF Upper Heyford
  - 2.2 The entire site is located within Flood Zone 1.
  - 2.3 The EA mapping indicates that the site is predominantly free from surface water flood risk with a small section lying in the north-east of the site, along Camp Road, is shown to have a localised area at high risk of surface water flooding. A review of the topographical information shows this area to correspond with lower lying areas on both sides of Camp Road.
  - 2.4 As the site has been confirmed as being within Flood Zone 1, the site is concluded as being sufficiently elevated above the worst case groundwater risk and to therefore conducted to be at low risk from this source.
  - 2.5 Owing to the generally developed nature of the site there is considered to be an existing sewer network (both surface and foul drainage systems). In the event of the surcharging of any of this network, overland flows will likely be conveyed by topography and contained within the existing road network and directed away from/around the site and not pose any significant risk to the site.
  - 2.6 An initial investigation in to the underlying bedrock shows predominantly White Limestone formation. This suggests that surface water discharge via infiltration may be a possibility though this will be subject to confirmation through site specific/plot specific infiltration testing at a later stage.
  - 2.7 A 10% allowance for urban creep has also been applied to the residential parcel impermeable areas.
  - 2.8 A factor of 40% allowance for climate change has been included for the 1 in 100-year event.
  - 2.9 Discharge will be limited to greenfield runoff rates based 4.3l/s/ha.
  - 2.10 Table 2 assumes the PH10 catchment will be 2.99ha (3.289ha including urban creep), 12.8l/s discharge rate and 2616m cu of attenuation.
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# Proposed Surface Water Drainage Strategy

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# Proposed Surface Water Drainage Strategy

## 3.1 General Philosophy

- 3.1.1 The Phase 10 development is located north of Camp Road, Upper Heyford.
- 3.1.2 This phase is a Dorchester Living development and comprises of 138 new dwellings. Refer to **Appendix B** for proposed layout.

## 3.2 Surface Water Disposal and Attenuation Strategy

- 3.2.1 Two Microdrainage models include this phase as well as the upstream and downstream existing systems outfalling into the existing brook. The networks are contained within **Appendix C**.
  - 3.2.2 The pipe references relate to this phase in the western calculations are runs 7, 8 and 9.
  - 3.2.3 The pipe references relate to this phase in the eastern calculations are runs 21, 22, 23 and 24.
  - 3.2.4 The outfall point shown in the FRA remains suitable for the majority of the development, however due to topography on the western side, this area of the site discharges into this system further west at an additional location as shown on the drainage layouts.
  - 3.2.5 The Microdrainage calculations have been expanded to consider the existing system to a much greater degree to ensure that there are no negative impacts of this which would bring it into conflict with the original FRA summary.
  - 3.2.6 The original FRA states a permitted rate of 4.3l/s/ha which, based on the current impermeable area of 2.21ha (excluding urban creep) would result in a maximum permitted rate of 9.5 l/s.
  - 3.2.7 The detailed design catchment is 2.277ha resulting in a permitted flow rate of 9.8l/s.
  - 3.2.8 This rate has been split over two flow controls as 5.5l/s (west) and 4.3l/s (east) during the 1 in 100 year even plus climate change.
  - 3.2.9 The original FRA states a predicted attenuation volume of 2616m cu.
  - 3.2.10 The current design splits the storage and locates it as follows:
    - Attenuation area north west- 774m cu
    - Attenuation area south west- 375m cu
    - Attenuation area east- 1061m cu
  - 3.2.11 All attenuation features ensure adjacent dwellings are suitable higher than the maximum water level for the 100 year event +40% allowance for climate change.
  - 3.2.12 In accordance with the original FRA. infiltration testing should be carried out at the detailed design stage and in accordance with BRE365. It is noted that the Environment Agency have requested no infiltration on the adjacent phase therefore the use of infiltration irrespective of favorable rates, should be discussed with the EA at the detailed design stage.
  - 3.2.13 As part of detailed design, all private drainage is to be designed in accordance with Approved Document H - Drainage and Waste Disposal (2015 edition) of the Building Regulations.
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3.2.14 Existing flooding has been identified in the original FRA north of the development. A new high capacity drainage channel is proposed along the northern boundary in the areas of existing flooding to ensure this water is held below ground without ponding and also to mitigate the risk of flooding to the phase from offsite sources.

3.3 System Performance & Compliance

3.3.1 Detailed Microdrainage models have been simulated to assess the performance of the systems and to determine compliance with the approved FRA for storm events up to and including a 1 in 100 year event plus climate change. The results indicate that the drainage within the phase does not result in any flooding or flood risk to dwellings.

3.3.2 The results also indicate that development does not lead to an increase in flood risk to the surrounding area of Heyford Park.

3.4 Climate Change and Urban Creep

3.4.1 The Approved FRA includes a 40% allowance for climate change which has been included in the design.

3.4.2 The Approved FRA includes a 10% allowance for climate change which has been included in the design of the attenuation basins above the catchment areas stated in section 3.2.7.

3.5 Pollution Control

3.5.1 All gullies are to be trapped.

3.5.2 The use of balancing ponds/ swales will provide water quality and pollution control benefits as follows based on Ciria C697 section 16:

Balancing pond pollutant removal: Suspended solids - Medium Heavy metals - Medium

Swale pollutant removal: Suspended solids - High Heavy metals - Medium

3.5.3 The replacement of the western downstream primary petrol interceptor will provide a final levels of treatment from this development and upstream network before outfalling into the existing brook.

3.5.4 The eastern system passes through an existing petrol interceptor located just downstream of the connection point.

3.6 Exceedance

3.6.1 If an area of the drainage network was to become blocked or in instances where a storm in excess of the designated storm occurs, there is the potential for the storage structures and drainage system to be overwhelmed, leading to flooding. Finished floor levels and external levels have been designed in consideration of these, so that during these periods flood water will be directed away from the proposed building entrances and into the roads and soft landscaping areas.

3.6.2 Flood routing indicates that water would flow into Camp Road. The proposals do not alter this extreme event flood route, although flooding from on parcel sources for storm events up to and including a 100 year event have been carefully considered and designed out.

3.6.3 Refer to the residual flooding and flood routing plan contained with **Appendix D**.

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3.7 Maintenance and Inspection

3.7.1 The primary drainage under the roads are proposed for adoption by the Water Company under a Section 104 application.

3.7.2 The downstream attenuation will be maintained by the Water Company or a management company.

3.7.3 Inspections will be required regularly in order to assess their performance and to schedule any required maintenance. These will consist of:

- Routine Inspections to assess the need for maintenance and checking the functionality of the drainage system.
- Engineering Inspections to assess engineering aspects of the drainage that are not likely to be picked up during a routine inspection such as manhole damage, concrete deterioration and pipe blockages.

3.7.4 Routine inspections may comprise, but is not limited to:

Routine Inspections for Maintenance shall be carried out over the life of the development and on a monthly basis during the construction period and three months afterward. Thereafter, inspections shall continue on a six monthly basis and after heavy rainfall (i.e. greater than 100mm over 48 hours) to ensure they are free of debris and litter.

3.7.5 As routine inspections are to establish the need for basic maintenance, such inspections do not necessarily require professional engineering knowledge and may be carried out by a responsible person.

3.7.6 Engineering Inspections are primarily concerned with checking engineering aspects of the drainage that are not likely to be picked up during a routine inspection such as manhole damage, concrete deterioration and pipe blockages.

3.7.7 The purpose of the Engineering Inspections is to:

- Provide supplementary advice with regard to items requiring Routine Maintenance.
- Check that the routine inspections and maintenance activities have been carried out.
- Re-assess the required frequency of routine and engineering inspections based on results of previous inspections and current drainage performance.
- Identify if any repairs are required where the integrity of the system is compromised, or if the element is likely to deteriorate without repair.

3.7.8 Engineering Inspections may comprise, but not limited to:

- Manholes will require to be inspected externally and internally. External inspections will determine the overall condition and should record deterioration of exposed concrete, access lids, restricted access due to overgrown vegetation/debris.
- Flow control inspections will determine the condition to ensure it is working efficiently.
- Headwall inspections will determine the overall condition of the headwalls & flap valves and record deterioration of exposed concrete, evidence of exposed reinforcement or concrete staining due to deteriorating reinforcement below the surface. Restricted access/flow due to overgrown vegetation/debris should also be recorded.

3.7.9 Prior to undertaking an Engineering Inspection, the Engineer should become familiar with the drainage design, construction records and review previous inspection reports.

3.7.10 Engineering Inspections shall be carried out over the life of the development.

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- 3.7.11 Engineering Inspections are required to establish the need for engineering maintenance, on this basis, such inspections should be carried out by a qualified Civil Engineer. Routine Inspections may also be completed by the engineer.
- 3.7.12 For further details please refer to the SUDs Maintenance Regime contained within **Appendix E**.
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# Summary & Conclusions

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# Summary & Conclusions

- 4.1 This report has been prepared to allow discharge of the relevant Flood Risk and Drainage Strategy Planning Conditions for Phase 10 which require evidence of compliance with the approved Flood Risk Assessment.
  - 4.2 It is proposed to discharge surface water by means of a piped network and attenuation basins. This system includes flow control devices to maintain the permitted discharge rate.
  - 4.3 The FRA requires surface water runoff from new developments to the prescribed greenfield runoff rate whilst including a 40% allowance for climate change and 10% Urban Creep which have all been included.
  - 4.4 The current proposals do not create a flood risk to the dwellings within the phase and do not increase of flooding to the surrounding area.
  - 4.5 From the above it can be seen that the site can be drained effectively and in accordance with the approved documents.
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# Appendix A



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# Appendix B

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# Appendix C



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# Appendix D



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# Appendix E



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