

16871

Flood Risk Assessment Compliance

**For
Camp Road, Upper Heyford
Parcel B3
Rev 1**

October 2017



Contents

- 1.0 Introduction
- 2.0 Overview of Approved FRA
- 3.0 Proposed Development
- 4.0 Hydraulic Performance
- 5.0 Maintenance
- 6.0 Summary and Conclusions

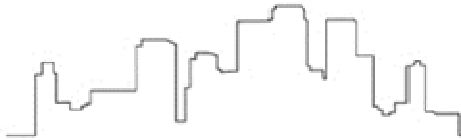
Appendices

- Appendix A Residential Parcel Plan
- Appendix B Proposed level and drainage layouts
- Appendix C Proposed Microdrainage Calculations
- Appendix D Residual Flooding Masterplan



1.0 Introduction

- 1.1 This Flood Risk Assessment Compliance report has been prepared on behalf of Bovis Homes in support of their Reserved Matters application for Parcel B3 of the redevelopment off Camp Road, Upper Heyford.
- 1.2 The purpose of this report is to demonstrate that the proposed drainage design for Parcel B3 complies with the approved Flood Risk Assessment (FRA) carried out by Waterman dated October 2010 (Ref C11234 ES 001).
- 1.3 Parcel B3 is located to the west of the development and immediately north of Camp Road.
- 1.4 Parcel B3 is as shown in the original Site Residential Parcel Plan (given in Appendix A)
- 1.5 This report is intended to assist in the discharge of Planning Conditions of the Outline Planning Consent that requires the developer to demonstrate compliance with the approved FRA.



2.0 Overview of Approved FRA

- 2.1 The entire site is located within Flood Zone 1.
- 2.2 The FRA sets out a detailed approach to attenuation across the Upper Heyford site which comprises of areas identified for retention, areas for refurbishment and areas for redevelopment to provide new residential dwellings.
- 2.3 The Environment Agency (EA) has confirmed that areas identified solely for retention and refurbishment do not require attenuation of existing surface water discharge.
- 2.4 The fundamental principle of the FRA is that runoff from proposed areas of redevelopment should be attenuated to existing 1 in 100 year flows with a 30% allowance for climate change.
- 2.5 Attenuation is to be provided through the use of balancing ponds, permeable paving and attenuation tanks where necessary. Swales will be incorporated through the site where appropriate.
- 2.6 The FRA splits the development into four main catchment areas and provides a series of calculations for each.
- 2.7 The FRA also requires a 10% betterment of existing flows entering the eastern tributary of the Gallos Brook.



3.0 Proposed Development

- 3.1 Parcel B3 of the proposed development is located to the west of the Upper Heyford Site taking its main access off Camp Road.
- 3.2 Parcel B3 is located north of parcel B2b which has been previously developed.
- 3.3 Refer to **Appendix B** for proposed layouts.
- 3.4 The FRA denotes the parcel as being located within Catchment Area 1 as identified in the approved FRA. Catchment 1 comprises a total area of 9.03 hectares.
- 3.5 The remaining areas of catchment 1 consist of parcels B1, B2a and B2b as previously developed.
- 3.6 The Indicative Surface Water Drainage Layout within the approved FRA suggests attenuation of surface water for the entirety of Catchment 1 is located within a series of linked ponds between parcels B2a and B2b. These have been detailed in the FRA Compliance note for parcel B2a.

Discharge Strategy

- 3.7 Paragraph 3.20 of the FRA states: "In accordance with PPS25, local policy and EA guidance the rate of surface water runoff from new development would be controlled so that it does not increase over the existing situation for the 1 in 100 year even, while taking climate change into account".
- 3.8 Parcel B3 forms part of a wider catchment. The entire catchment will be restricted by a strategic flow control to a rate no greater than the existing 1 in 100 year rate prior to discharge to the existing watercourse. Sub parcels, such as parcel B3, will not be restricted until it reaches the strategic control.
- 3.9 The FRA prescribes the following existing 1 in 100 year runoff rates for use in calculations:

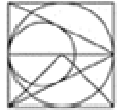
Existing 1 in 100yr Greenfield runoff 10.7 l/s/ha
Existing 1 in 100yr Brownfield runoff 112.8 l/s/ha
- 3.10 The purpose of this report is not to revisit the calculation of these rates. Further information on how these rates were derived can be found in the approved FRA.
- 3.11 Following detailed assessment of the topographical survey and site visits the following calculations can be derived:

Parcel B3		
	Area	1 in 100yr rate
Existing impermeable surfacing	17,951m ²	202.48 l/s
Proposed impermeable surfacing	15,830m ²	Free Discharge to strategic ponds



Parcel B3 Attenuation Strategy

- 3.12 In accordance with FRA a series of cascading ponds have been proposed as part of the B2a works. The cascading ponds will, in part, provide the attenuation required for parcel B3 with any changes to the downstream flow control devices. The ponds will also provide enhancements in water quality.
- 3.13 Living roofs have been discounted as they are not in keeping with the strict urban planning requirements within a conservation area. Rain water harvesting has also been discounted due to ongoing maintenance issues and integration into domestic plumbing. Water butts will be provided on social units.



4.0 **Hydraulic Performance**

Parcel B3

- 4.4 A detailed Microdrainage model has been constructed to simulate the full Catchment 1 area, including all sub parcels (refer to **Appendix C**).
- 4.5 The model comprises all parcels that will drain into the cascading ponds (parcels B1, B2a, B2b and B3) and the strategic flying field diversion.
- 4.6 It should be noted that this report pertains only to Parcel B3 and previous reports have been submitted for the other parcels and the strategic ponds within Catchment 1 at the appropriate stages of development.
- 4.7 The original ponds and Parcel B2b designs included an allowance for parcel B3. The current detailed Microdrainage results show that there is no additional flooding to the system which follows the original strategy.
- 4.8 During the most extreme events, small amounts of above ground storage are provided within the road corridor in the vicinity of manholes S2 and S6 before water re-enters the below ground system via the proposed gullies.
- 4.9 The invert levels of the ponds are driven by the invert levels of the connections from the contributing sub parcels. This has meant the ponds provide an over provision of attenuation but due to the depth of the incoming connections cannot be made shallower and smaller. This over provision of attenuation has led to a reduction in the achieved discharge and extreme event flood volumes.
- 4.10 Parcel B3 will discharge into one of the four ponds. Once this takes place, the performance of these ponds can be summarized as follows:

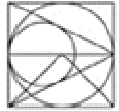
	Pipe Ref	Min CL	IL	Max WL
Pond 1	1.012	124.835	122.890	124.615
Pond 2	1.015	124.340	122.635	123.183
Pond 3	1.019	123.860	121.700	122.466
Pond 4	1.022	123.235	121.224	122.435

Exceedance

- 4.11 During storms in excess of the designated storm, there is the potential for the storage structures and drainage system to be overwhelmed, leading to flooding. Indicative finished floor levels and external levels have been designed so that during these periods, flood water will be directed away from the proposed building entrances and into the roads and soft landscaping areas.

Pollution prevention

- 4.12 As the parking areas are smaller than 800m sq, PPG3 states that trapped gullies will provide suitable protection against contamination.
- 4.13 It is noted that the offsite sewer passes through a petrol interceptor before discharge into the existing watercourse which meets the requirements of PPG3.



5.0 Maintenance

- 5.1 Private drainage serving multiple dwellings or located within shared areas will be maintained by the maintenance company.
- 5.2 Adoptable drainage will be maintained by the Water Company.
- 5.3 On parcel SUDS features (such as storage tanks) contributing to the overall drainage strategy will be maintained by the maintenance company.
- 5.4 Refer to “SUDS Maintenance Regime” report dated October 2017 which covers this parcel for further details. This document along with relevant designer’s risk assessments, calculations and drawings will be made available to the maintenance company.

6.0 Summary and Conclusions

- 5.1 This report has been prepared to allow discharge of planning conditions which requires evidence of compliance with the approved Waterman Flood Risk Assessment.
- 5.2 The FRA confirms no attenuation is required for areas being refurbished or retained.
- 5.4 A Microdrainage model has been created and demonstrates that the approved philosophy has been adhered to, that there is no risk of flooding to dwellings on parcel B3 and that there is sufficient capacity with the ponds during a 1 in 100 year storm event plus a 30% allowance for climate change.
- 5.5 The significant reduction in discharge rates provides a betterment on the existing drainage situation and demonstrates a clear reduction in flood risk downstream.

APPENDIX A

Residential Parcel Plan

APPENDIX B

Proposed levels and drainage layouts

APPENDIX C

Proposed Microdrainage Calculations

Note: The calculations include the entire network including existing areas outside of this phase and areas covered by other FRA-C documents. The runs numbers which relate to this parcel are:

Pipe refs within parcel B3

1.000
1.001
1.002
1.003
1.004
1.005
1.006
1.007

15.001
15.002
16.000
16.001
15.003
17.000
17.001
17.002
17.003
15.004

APPENDIX D

Residual Flooding Masterplan