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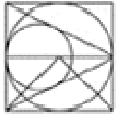
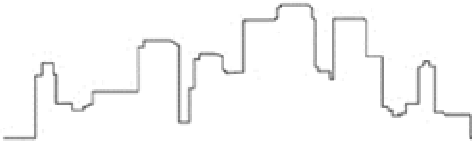
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Flood Risk Assessment Compliance

**For
Camp Road, Upper Heyford
Phase 8 (Parcels D2b and D3b)**

Rev 3

August 2016

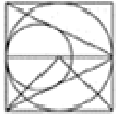
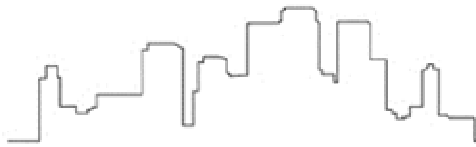


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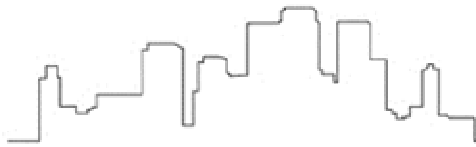
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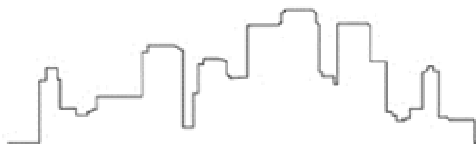
1.0 **Introduction**

- 1.1 This Flood Risk Assessment Compliance report has been prepared on behalf of the Dorchester Group in support of their Reserved Matters application for the new dwellings on phase 8 (formerly referred to as parcels D2b and D3b) 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 Waterman dated October 2010 (Ref C11234 ES 001).
- 1.3 Refer to the Site Residential Parcel Plan given in **Appendix A**.
- 1.4 This report is intended to assist in the discharge of any planning conditions 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.
- 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 The Phase 8 development is located north of Camp Road, Upper Heyford and consists of two distinct parcel of land- Parcel D2b to the west and Parcel D3b to the east.
- 3.2 This phase is a Dorchester Group development and comprises of 37 new dwellings on parcel D2b and 48 new dwellings on parcel D3b (refer to **Appendix B** for proposed layout).
- 3.3 The FRA denotes this development as draining into Catchment Area 3.
- 3.4 The Indicative Surface Water Drainage Layout within the approved FRA suggests attenuation of surface water for Catchment 3 is provided by the use of, attenuation tanks.

Discharge Strategy

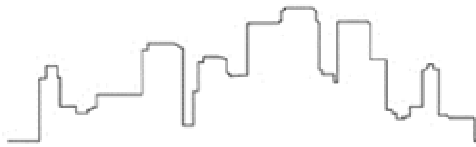
- 3.5 Paragraph 3.20 of the FRA states: “In accordance with PPS25, local policy and EA guidance the rate of surface water runoff from new development would be controlled so that it does not increase over the existing situation for the 1 in 100 year even, while taking climate change into account”.
- 3.6 Paragraph 3.21 requires a 10% betterment of flows discharging to the east of the site.
- 3.7 It is proposed to connect the phase 8 drainage runs and attenuation to the existing downstream network at five locations as shown on the drainage layout.

The existing downstream network then discharges into the existing watercourse to the east of the site which is a tributary of Gallos Brook.

- 3.8 Following a detailed assessment of the topographical survey, site visits and proposed layout below are the Microdrainage simulation results. Note any runs that are not head of runs have had the flood volumes upstream added to their result.

Existing network Run ref	Existing 100 year discharge rate (l/s)	Existing 100 year flood vol (m cu)
10.002 (D2b)	13.30	8.47
13.001 (D3b)	39.50	101.64
14.000 (D2b)	20.70	21.60
15.000 (D3b)	27.70	65.67
25.000 (D3b)	4.20	0.00
27.000 (D3b)	21.40	18.64
Total	126.80	216.02
Total flow minus 10%	114.12	

Proposed network Run ref	Prop 100 year + cc discharge rate (l/s)	Prop 100 year + cc flood vol (m cu)
6.001 (D2b)	5.00	0.00
7.001 (D2b)	1.10	0.00
15.008 (D3b)	84.30	0.00
22.001 (D2b)	22.30	0.00
30.001 (D3b)	0.60	0.00
Total	113.20	0.00



Attenuation Strategy

- 3.9 The attenuation will be located on the phase in the form of cellular storage tanks
- 3.10 Soakaway tests at suitable depths have not been undertaken due to solid rock/ stone being encountered at 1.8m and 1.2m in on phase boreholes BHNSA 26 and BHNSA 27.
- 3.11 The attenuation tanks will cater for the majority of the attenuation required and either be maintained by a management company or the land owners.
- 3.12 The final discharge from the parcel will be controlled using private orifices, small diameter pipes and adoptable hydrobrakes.
- 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

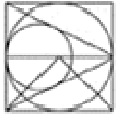
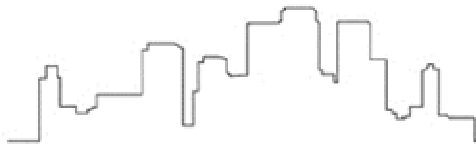
- 4.1 A detailed Microdrainage model has been constructed to simulate the 1 in 100 year storm in both existing and proposed systems (plus climate change post development).
- 4.2 The proposed Microdrainage model (see **Appendix D**) demonstrates that the proposed 1 in 100 year (plus climate change) discharge rate does not exceed the allowable discharge rate.
- 4.3 The existing Microdrainage model is contained within **Appendix C**.

Exceedance

- 4.3 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.
- 4.4 The existing flood route indicates that water would flow to the south into the existing road network. 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 (plus climate change) have been completely removed.

Pollution prevention

- 4.5 As no parking area is 800m sq or greater, PPG3 states that trapped gullies will provide suitable protection against contamination. Permeable areas will filter through granular material. It is noted that this phase passes through an off parcel interceptor.



Maintenance

- 4.6 Private drainage serving multiple dwellings or located within shared areas will be maintained by the maintenance company.
- 4.7 Adoptable drainage will be maintained by the water company.
- 4.8 SUDS features (such as storage tanks) contributing to the overall drainage strategy will be maintained by the maintenance company.
- 4.9 Refer to “SUDS Maintenance Regime” report dated June 2016 which covers this phase for further details. This document along with relevant designer’s risk assessments, calculations and drawings will be made available to the maintenance company.

5.0 Summary and Conclusions

- 5.1 This report has been prepared to allow discharge of any planning conditions which require evidence of compliance with the approved Flood Risk Assessment.
- 5.2 The FRA requires surface water runoff from new developments to be restricted to existing 1 in 100 year runoff rates, and flows attenuated including a 30% allowance for climate change. A 10% betterment is to be provided on existing flows discharging to the eastern tributary of Gallos Brook.
- 5.3 The Microdrainage models demonstrate a betterment in parcel discharge rates and removal of all on parcel flood volumes for the designed storms.

APPENDIX A

Residential Parcel Plan

APPENDIX B

Proposed levels and drainage layout

APPENDIX C

Existing Microdrainage Calculations

APPENDIX D

Proposed Microdrainage Calculations

Note:	The calculations include the entire network including existing areas outside of this phase. The runs numbers which relate to Trenchard Circle (in the order shown in the calculations) are:
Pipe refs within parcel D2b	
1.007 (to be diverted)	
6.000 6.001	
7.000 7.001	
22.000 22.001	
Pipe refs within parcel D3b	
15.000 15.001 15.002 15.003 15.004 16.000 15.005 15.006 15.007 17.000 15.008	
29.000 (diversion) 30.000 30.001 29.001(diversion)	

APPENDIX E

Residual Flooding Masterplan