



**FLOOD RISK ASSESSMENT AND  
SURFACE WATER DRAINAGE STRATEGY ADDENDUM**  
St Michaels Convent, Ham Common

## Document History

Issue	Date	Description	Prepared By	Checked By
1	21 Feb. 17	For planning	L McGregor	J Hanlon

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- Appendix A: Proposed Site Layout
- Appendix B: Attenuation Calculation
- Appendix C: Indicative Drainage Strategy Drawing

## **1.0 Introduction**

- 1.1 This report has been prepared by Glanville Consultants on behalf of Beechcroft Developments Ltd in support of a planning application for the re-development, for residential purposes, of St Michael's Convent, Ham Common, Richmond.
- 1.2 This report is supplementary to the Flood Risk Assessment and Surface Water Drainage Strategy by Glanville Consultants, report number TR8151310/LMcG/DW/021 Issue 3 dated 1 September 2016.
- 1.3 Since the Flood Risk Assessment and Surface Water Drainage Strategy was published the proposed site layout has undergone changes based on the public consultation process. The revised site layout is included as Appendix A to this report.
- 1.4 The major changes comprise: a reduction in the number of properties proposed in the initial application from 26 to 23 residential units; the addition of a proposed estate manager's office and meeting rooms; and a general adjustment in the site layout to bring development closer into the main building.
- 1.5 The purpose of this report is to examine the changes to the development proposals and determine whether there is any change to the conclusions of the Flood Risk Assessment and Surface Water Drainage Strategy.

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## 2.0 Flood Risk Assessment

- 2.1 The Flood Risk Assessment concluded that the site was at low risk from all sources of flooding. As this assessment is based on the site itself, not the development proposal, this assessment is not affected by the changes to the proposed development.
- 2.2 Since it is at low risk of flooding, all forms of development are suitable at the site. Therefore changes to the proposed development have no effect on the suitability of the site for the development.

## 3.0 Surface Water Drainage Strategy

- 3.1 It was proposed that surface water drainage from the site be discharged partially by infiltration into the Kempton Park Gravel Formation and partially by restricted discharge into the public surface water sewer in Ham Common, re-using the existing surface water connection to this public sewer.
- 3.2 The discharge rate to the public sewer was proposed at 5 l/s, and this was considered to provide significant betterment over the existing situation.
- 3.3 SuDS features, comprising permeable pavements, infiltration trenches, and geocellular attenuation crates, were proposed to store and attenuate run-off to the appropriate discharge rate.
- 3.4 In the revised layout for the first application area, the layout has been drawn closer into the central building. This reduces the amount of impermeable area within the plan, which reduces the impact of the development from the original proposal. The revised impermeable area is measured as approximately 0.442 ha.
- 3.5 Revised attenuation storage calculations based on the new impermeable area are included in Appendix B. It can be seen that the attenuation storage volume required will be up to 306m<sup>3</sup> (not including any storage for the part of the site not included in this application, which will need to be attenuated separately).
- 3.6 Excluding areas within tree root zones, where no deep pavement excavation will be permitted, the usable paving area for sub-base storage within the new site layout is approximately 2450m<sup>2</sup>.
- 3.7 With a sub-base of 500mm depth and a 30% voids ratio, the entire required storage volume can be accommodated within this paved area. Therefore in the revised design there is no requirement for geocellular storage crates to supplement the attenuation provision.
- 3.8 Infiltration trenches will still be included within the design to provide conveyance through the sub-base and encourage infiltration where possible.
- 3.9 A revised drainage strategy plan has been included in Appendix C.

#### **4.0 Conclusion**

- 4.1 Following examination of the updated development proposals, no changes have been made to the conclusions of the Flood Risk Assessment and Surface Water Drainage Strategy.
- 4.2 Revisions have been made to the indicative drainage strategy in order to incorporate the revised site layout.

## Appendices

**Appendix A**  
**Proposed Site Layout**





To be read in conjunction with Area Schedule r7

**Appendix B**  
**Attenuation Calculation**

# Attenuation volume storage incorporating 20% CC

**Quick Storage Estimate**

Micro Drainage

**Variables**

FSR Rainfall	Cv (Summer)	0.750
Return Period (years)	Cv (Winter)	0.840
Region	Impemeable Area (ha)	0.442
Map	Maximum Allowable Discharge (l/s)	5.0
M5-60 (mm)	Infiltration Coefficient (m/hr)	0.00000
Ratio R	Safety Factor	2.0
	Climate Change (%)	20

Analyse OK Cancel Help

Enter Climate Change between -100 and 600

**Quick Storage Estimate**

Micro Drainage

**Results**

**Global Variables require approximate storage of between 185 m<sup>3</sup> and 253 m<sup>3</sup>.**

**These values are estimates only and should not be used for design purposes.**

Analyse OK Cancel Help

Enter Climate Change between -100 and 600



### Attenuation volume storage incorporating 40% CC

The 'Quick Storage Estimate' dialog box is shown with the 'Variables' tab selected. The left sidebar contains a vertical menu with options: Variables, Results, Design, Overview 2D, Overview 3D, and Vt. The main area is titled 'Variables' and contains the following input fields:

FSR Rainfall		Cv (Summer)	0.750
Return Period (years)	100	Cv (Winter)	0.840
Region	England and Wales	Impermeable Area (ha)	0.442
Map	M5-60 (mm)	Maximum Allowable Discharge (l/s)	5.0
	Ratio R	Infiltration Coefficient (m/hr)	0.00000
		Safety Factor	2.0
		Climate Change (%)	40

Buttons at the bottom: Analyse, OK, Cancel, Help. A footer note reads: 'Enter Climate Change between -100 and 600'.

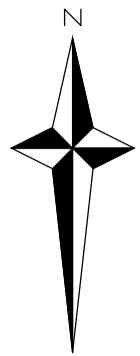
The 'Quick Storage Estimate' dialog box is shown with the 'Results' tab selected. The left sidebar is the same as in the previous screenshot. The main area is titled 'Results' and contains the following text:

**Global Variables require approximate storage of between 225 m<sup>3</sup> and 306 m<sup>3</sup>.**

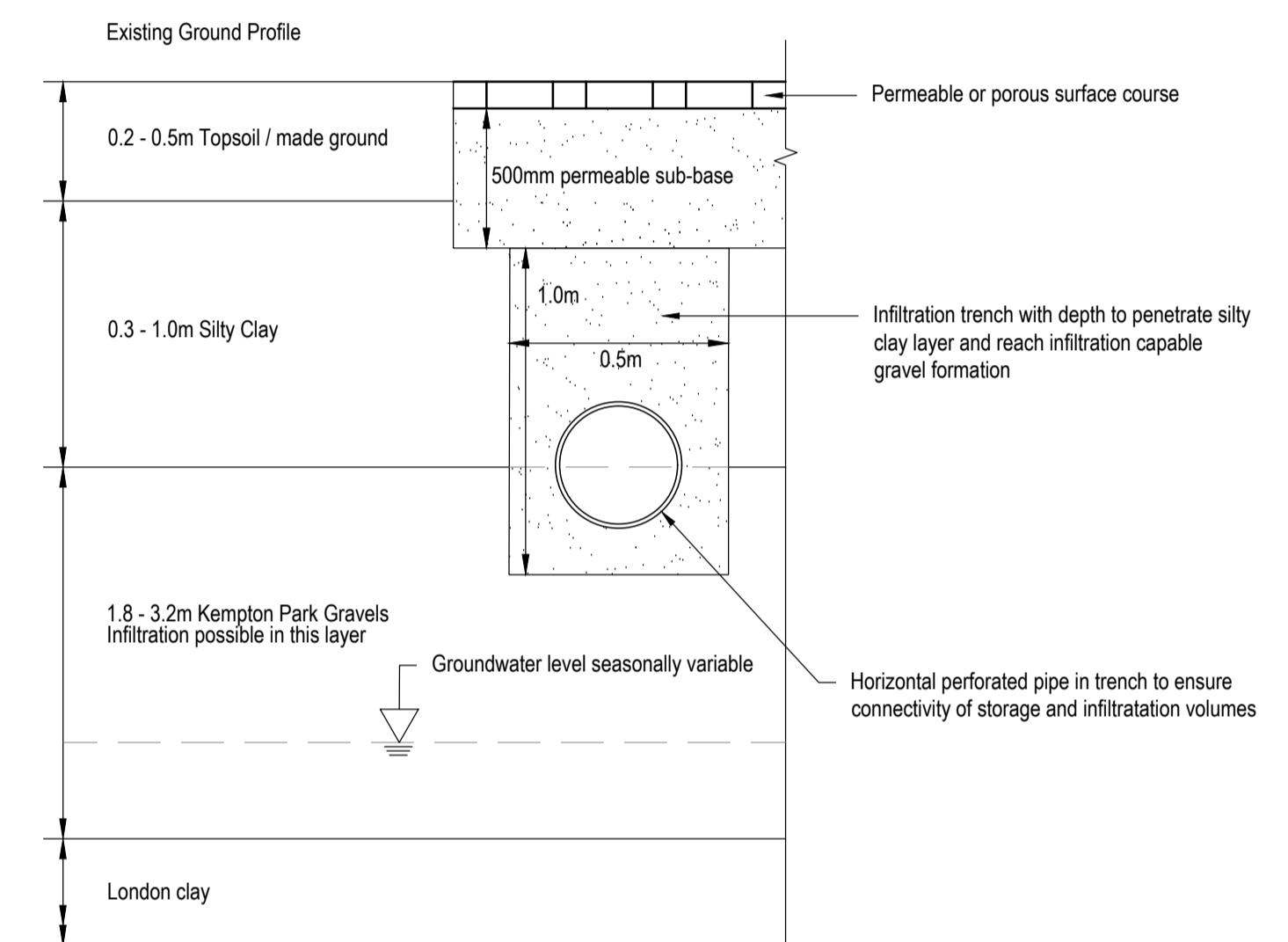
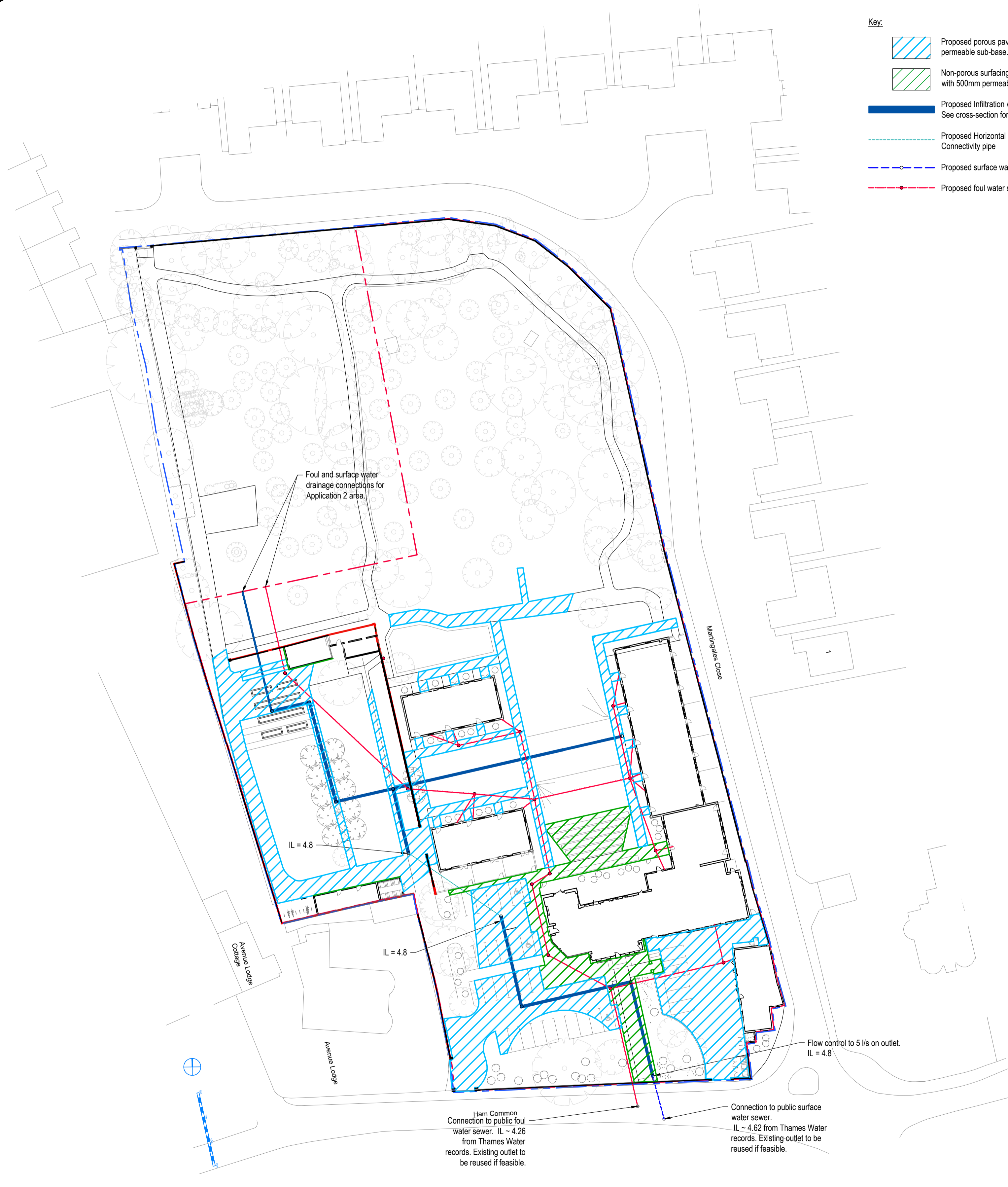
**These values are estimates only and should not be used for design purposes.**

Buttons at the bottom: Analyse, OK, Cancel, Help. A footer note reads: 'Enter Climate Change between -100 and 600'.

**Appendix C**  
**Indicative Drainage Strategy Drawing**



- Key:
- Proposed porous paving with 500mm permeable sub-base.
  - Non-porous surfacing (stone flags proposed) with 500mm permeable sub-base.
  - Proposed Infiltration / Conveyance Trench. See cross-section for typical trench detail.
  - Proposed Horizontal Conveyance / Connectivity pipe
  - Proposed surface water sewer
  - Proposed foul water sewer
- Total volume storage in permeable sub-base = 306m<sup>3</sup>



PERMEABLE PAVEMENT / INFILTRATION TRENCH CROSS SECTION

N.T.S.

P3	Planning Issue.	15.02.17 MM	LM
P2	Planning Issue.	12.08.16 MM	LM
P1	Preliminary Issue.	11.08.16 MM	LM
Rev.	Description	Date	Chkd

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Client :  
**Beechcroft Developments Ltd**

Project :  
**St Michaels Convent, Ham Common**

Title :  
**Outline Drainage Strategy**

Project Engineer : L. McGregor Scale : As shown  
 Project Director : K. Rayner Date : August 2016  
 Status : Preliminary

Drawing No. 8151310/001 Rev P3

PLAN  
 Scale 1 : 500



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