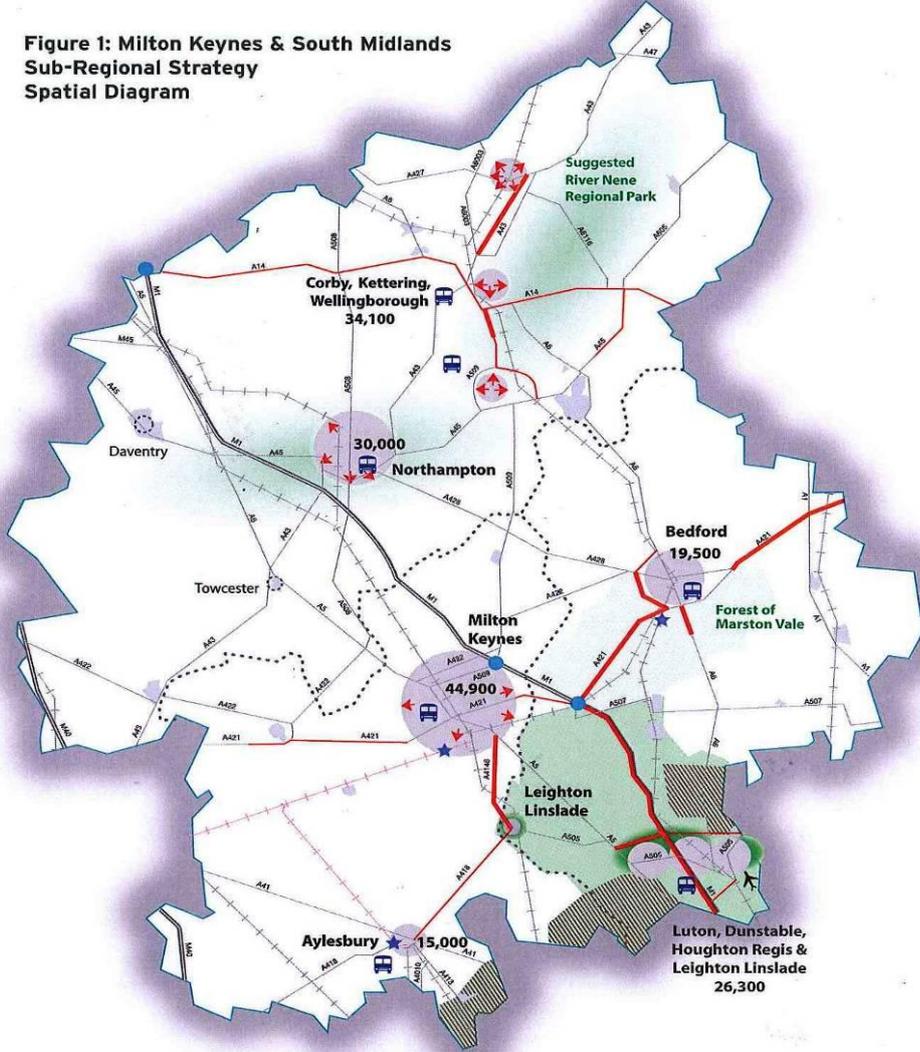


A Maps

Figure 1: Milton Keynes & South Midlands Sub-Regional Strategy Spatial Diagram



B Water Related Policy Review

Introduction

This Appendix summarises the current and evolving water related planning policy framework which are most relevant to the development of a Water Cycle Strategy (WCS).

The Surface Water Plan, 2002

The Surface Waters Plan is the product of the efforts of the Surface Waters Group. It seeks to encourage landowners, developers and planners to work with the drainage authorities and Community Forest team to devise lasting solutions, with a broad range of benefits encompassing amenity and conservation for the management of flood risk and surface drainage in the Marston Vale.

The Surface Waters Plan is a non-statutory document; its main purposes are to;

- Publicise and promote the policies of the Surface Waters Group
- Identify positive solutions for dealing with the potentially adverse impact of development pressure on the watercourses and other open water bodies in the Marston Vale
- Encourage schemes that result in a range of benefits, having regard to the variety of functions of surface waters including discharge of surface run-off, flood risk management and environmental and recreational asset
- Support adopted and emerging local plan policies dealing with flooding and surface water drainage and to assist with the consideration of development proposals
- Provide guidance to landowners and developers on approached to surface water management that the members of the Surface Waters Group would be likely to support.

Bedford

Core Strategy and Rural Issues Plan, Water related issues, April 2008

Policy CP21; *Designing in Quality* states that, amongst other things, 'All new development should:

- vii) Address sustainable design principles including renewable energy resources, energy efficiency, recycling and sustainable construction practices and
- 'Mitigate against the effects of any pollution including air quality, noise, water, light and land contamination'.

Policy CP26; *Climate Change and Pollution* states that 'the Council will require development to:

- vii) Incorporate facilities to minimise the use of water and waste; and
- viii) Limit any adverse effects on water quality, reduce water consumption and minimise the risk of flooding'.

Local Plan Saved Policies

Policy NE16 Flooding states that the Borough Council will not permit development where;

- it would intensify the risk of flooding; or
- it would be at an unacceptable risk from flooding; or

- it would prejudice existing flood defences or interfere with the ability to carry out flood control and maintenance work; or
- it would adversely affect wildlife habitat in the floodplain unless, the Borough Council, in consultation with the Environment Agency and internal Drainage Board as appropriate, is satisfied that the developer will provide appropriate mitigation, protection and compensatory measures

Policy NE24 Protection and Enhancement of Water Resources states that the Borough Council will seek to protect, and where possible, enhance, the water resources in the Borough by:

- Not permitting developments which would adversely affect the quality or quantity of water resources or their amenity or nature conservation value;
- Not permitting development which would unduly restrict access to the River and other water bodies with recreational potential;
- Actively negotiating with developers in order to achieve more sustainable methods of surface water management and drainage.

Policy U2 states that The Borough Council will not permit development that compromises the capacity of the floodplain, balancing ponds, drainage pipes, channels and other flood defences and works to alleviate flooding, or would be at risk of being flooded or would unacceptably increase the risk of flooding or pollution through seepage or run off.

Policy U3 goes on to state that the ability of development proposals to effect satisfactory means for the disposal of waste water shall be a material consideration.

Mid Bedfordshire

Core Strategy and Development Management Policies, October 2008

Policy CS13; Climate Change states that under water supply there is a need to set encourage sensible water use and conservation as part of sustainable development in the Eastern Region. Climate change could have further fundamental effects on water supply and therefore this policy promotes sustainable use of water resources.

It goes on to state that under flood and drainage flood risk is an important issue in spatial planning and as the effects of climate change are being realised, the need to take account of flood risk is integral for sustainable development. The suitability of any new land for development needs to be considered in accordance with the sequential approach towards flood risk management advocated in PPS25.

According to Policy CS13 the Council take measures to ensure sustainable design and construction of new buildings including high standards of energy and water efficiency. The Council will require new development including housing, new commercial development (including substantial extensions to existing commercial buildings) and new community and leisure facilities, to incorporate measures to take account of climate change.

In relation to water supply the range of measures to be considered will include:

- Provision for conserving water resources and recycling water as well as limiting any adverse effects on water quality;
- Minimising the risk of flooding and management of residual risks; and
- Provision of sustainable water supply and drainage infrastructure.

Policy DM4; Water Efficiency and Sustainable Urban Drainage Systems of the Draft Mid Bedfordshire Development Management Policies states that ‘The Council will require major developments and developments which have high water consumption to incorporate measures to minimise their use of ‘white’ water (water processed for human consumption). Planning applications which do not demonstrate how this can be achieved or will result in excessive use of ‘white’ water will be refused.

The Council will require the provision of Sustainable Urban Drainage Systems for the disposal of surface water within and leading from development sites’.

One of the effects of climate change is increased flood risk. Whilst flooding is not a wide spread issue for Mid Bedfordshire, the Ivel Valley in particular is vulnerable and was subject to flooding in 2003 in Biggleswade, Sandy and Langford. The provision of sustainable ways of managing surface water run-off, particularly in large scale developments is therefore important.

Local Plan Saved Policies

Policy DPS17 Surface Water Drainage states that developers must take full account of the water drainage and infrastructure and incorporate appropriate controls as necessary. The Council will refuse proposals for development that would;

- Intensify the risk of flooding;
- Be at an unacceptable risk of flooding;
- Prejudice to existing flood control and maintenance works; or
- Adversely affect wildlife habitat in the floodplain

Planning applications may be required to include a levels survey of the proposal site. Any compensatory works associated with development proposals will be considered against other Local Plan policies as appropriate.

Policy DPS18 Sewerage Infrastructure states that the Council will encourage Anglian Water Services to invest and upgrade existing sewerage infrastructure, where necessary, so as to facilitate the development of land allocated for development in the Local Plan and on other suitable sites as appropriate. Where there are difficulties in ensuring the necessary provision, the Council may refuse planning permission or, where appropriate, grant consent subject to a phasing condition to allow sufficient time for the necessary improvements to be undertaken.

The Council will refuse planning permission for the development of private forms of sewage treatment or disposal in locations served by public sewers.

C Housing

The Milton Keynes and South Midland Strategy has set ambitious plans for the Bedford Growth Area. The following tables compare past rates of housing completions and conversions, commitments and urban housing capacity figures, with the East of England Plan (RSS14) requirements.

Bedford

Table 1.1 Dwelling supply in the Growth Area for period 2005-2021

Source of Supply	Site	Number of Housing Units	Planning Status @ 31/03/07
Completions 2001-2006/07		2,433	Complete
Planning Permissions at 31/03/07	Other Sites	7,628	PP granted
Local Plan Commitments @ 31/03/07	H2 Britannia Works Phase E	255	Resolution to grant pp subject to S106 agreement
	H2 Britannia Works Phase F	100	Estimated additional site capacity
	H8 Land north of Bomham Rd	1,200	Resolution to grant pp subject to S106 agreement
	H9 Land at Shortstown	130	Resolution to grant pp subject to S106 agreement
	H11 South of Fields Rd, Wootton	500	Resolution to grant pp subject to S106 agreement
	H12 North of Fields Rd, Wootton	580	Resolution to grant pp subject to S106 agreement
	H13 Stewartby	610	Resolution to grant pp subject to S106 agreement
Additional Capacity Estimate	Wixams	500	
Town Centre Area Action Plan	TC7 TC10 TC11 TC13 TC15 TC16 TC17 and other sites	635	
Other Windfall Commitments at 31/03/07	small sites with resolution to grant	173	Resolution to grant pp subject to S106 agreement
Windfall Allowance 2007/08-2021	125 p.a	1,750	
Total Supply and Completions		16,494	
MKSM Policy Requirement		16,270	
Progress of supply towards meeting MKSM target		+224	

Source: Bedford Core Strategy and Rural Issues Plan

Mid Bedfordshire

Table 1.2 Housing Completions & Commitments 2001-2026

	Northern Marston Vale	Remainder of Mid Beds	District Total
Total Requirement 2001-2021	3230	11000	14230
Requirement 2021 - 2026	810	2750	3560
Total Requirement 2021-2026	4040	13750	17790
Completions 2001-2008	346	4539	4885
Deliverable commitments @31/03/08	1047	3595	4642
Developable commitments @31/03/08	1860	1598	3458
Total completions & commitments @31/03/08	3253	9732	12985
Requirement 2001-2021 not yet identified	-23	1268	1245
Requirement 2021- 2026 not yet identified	810	2750	3560
Total requirement not yet identified	787	4018	4805

Source: Mid Beds Draft Core Strategy

Table 1.3 Mid Bedfordshire Main Settlement Dwelling Breakdown

	completions 2001-2007	5-year 'deliverable supply	remaining developable commitments	sub total	new allocations (indicative range only)	Total No of dwellings to be considered*
Biggles- wade	484	1170	1200	2854	205-500*	2870
Sandy	428	29		457	50-200*	229
Ampthill	118	281	10	409	250-500*	791
Flitwick	360	38		398	500-750*	788
Wixams	0	550	1700	2250	800-1000*	3250
Arlesey	333	27		360	1000+	1027
Cranfield	83	249	150	482	150-250*	649
Marston Moretaine	309	391	100	800	0-100	591
Potton	224	32		256	150-250*	282
Shefford	250	214		464	150-250*	464
Stotfold	913	1034	238	2185	150-250*	1522
Silsoe	37	143		180	400	543
Sub total	3539	4158	3398	11095	4450	12006
Rest of District i.e. villages	1346	484	60	1890	400	944
Total	4885	4642	3458	12985	4850	25956
	* The assessment for this study, considers the maximum number of new dwellings for each settlement which is considered.					

Source: Mid Beds Draft Core Strategy

D Employment

Introduction

This report uses the Bedford Core Strategy and Rural Issues Plan and the Mid Beds Core Strategy to look at quantities of employment land and investigates the future requirements of employment land in both the areas.

Class B1 is Business, Class B2 is General industry and Class B8 is Storage and Distribution

Bedford

Table 1.4 Employment Land Supply 2001-2021

Bedford	B1, B2, B8	B1 (estimate)
Completions 2001-2007	52.75 (net) 78.40 (gross)	13.5
Sites with Planning Permission		
Growth Area		
B1	2.55	2.55
B1/B8		
B2/B8	0.22	
B8	0.13	
B1/B2/B8	39.68	5.22
Total	42.58	7.77
Rural Policy Area		
B1	9.1	9.1
B1/B2	17.8	9
B1/B8	1.26	0.45
B2	0.21	
B8	0.2	
B1/B2/B8	7.59	3.02
Total	36.16	21.57
Sites with Resolution to Grant Planning Permission		
Growth Area		
H131 Stewartby (B1/B2/B8)	2.4	1
H11 Wootton (B1/B2/B8)	9	2
H8 Land North of Bromham Rd (B1/B2)	4	2
Total	15.4	5

Table 1.4 Employment Land Supply 2001-2021 – continued

Bedford	B1, B2, B8	B1 (estimate)
Sites Without Planning Permission		
Growth Area		
E4 Land West of B530	3.4	1
E5 Land East of B530	1.36	1
E10 Elstow Brickworks	8	2
Tc13 Railway Station (TCAAP)	2	2
Total	14.76	6
Overall Total	161.65* ha	53.84 ha

Source: Bedford Core Strategy and Rural Issues Plan

* At 2007 planning permission had been granted for the loss of a further 2.87ha of employment land to uses outside the 'B' range. This reduces the overall total of 161.65ha to 158.78 ha.

Mid Bedfordshire

Table 1.5 Employment Land Supply 2001-2026

	Completion Since 2002	Remaining Commitments	Sub Total	New Allocations indicative range
Biggleswade	0.964	18.69	19.654	10-15
Sandy	4.045	3.56	7.515	5-10
Amphill/Flitwick	0.741	1.06	1.8	10-15
Northern Marston Vale	6.63	32.84*	39.47*	10-20
Arlesey/Stotfold/Fairfield	3.74	1.3	5.04	10-15
Cranfield	1.373	23.6	24.973	5-10
Potton	0	0.16	0.016	1-2
Shefford	-1.273	-0.037	-1.274	2-4
Silsoe	0.28	0	0.28	1-2
Total				Approx 77ha

Source: Mid Beds Core Strategy (excludes provision of 16ha as part of Wixams new settlement.)

E Development sites in Flood Zones

E.1

Mid Bedfordshire

p = partially within the floodplain

i = inside the floodplain

Mid Bedfordshire		Floodplain					
Site		Environment Agency Flood Zone		Elstow Brook		SFRA Level 2b	
<i>Id</i>	<i>Name</i>	2	3	100 year	1000 year	2	3
Site Allocations DPD submission sites							
H262	Taylors Road, Stotfold	p	-	-	-	-	-
H307	Old Oak Close, Arlesey	p	p	-	-	-	-
E06	Land off Malthouse Lane, Stotfold	p	p	-	-	-	-
E11	Stratton Business Park Phase V, Dunton Lane, Biggleswade	p	p	-	-	-	-
E12	Land at Chase Farm, Arlesey	i	p	-	-	-	-
E12a	Land to east of Arlesey	i	p	-	-	-	-
E16	Nirah, Stewartby	p	p	-	-	p	p
E25	Pig Development Unit, Hitchin Road, Stotfold	i	p	-	-	-	-
E34	Newlands, Dunton Lane, Biggleswade	p	p	-	-	-	-
E39	Bell's Brook, Biggleswade	i	p	-	-	-	-
E49	Rowney Warren Wood, Shefford	-	p	-	-	-	-
E51	Land west of the Midland Mainline Railway, Harlington	p	p	-	-	-	-
E58	Land adjacent to the A1, Biggleswade	i	i	-	-	-	p
E60	Land adjacent to A1, Biggleswade	i	p	-	-	-	p
E61	Land at Stewartby Water Sports Club, Stewartby	p	p	i	i	p	p
E64	Doolittle Mill Phase 2	p	p	-	-	-	-
E65	Land at Bells Brook, Biggleswade	i	p	-	-	p	p
E67	Land at Stratton Farm, Biggleswade	p	p	-	-	-	-
E68	Doolittle Mill Phase 1, Ampthill	p	p	-	-	-	-
E76	Henlow Lakes, Arlesey Road, Henlow	p	p	-	-	-	-
E76a	Henlow Lakes, Arlesey Road, Henlow	p	p	-	-	-	-
E77	Silverbirch Field, Stotfold	p	p	-	-	-	-
E79	The Old Orchard, Water End Road, Maulden	i	p	-	-	-	-
E80/ H367	Land west of Langford Road/North of Stockbridge Road/Newtown, Henlow	i	p	-	-	-	-
E81	Hamlet End House & adjacent land	p	p	-	-	p	p
E88	Site D, Silsoe Road, Maulden	p	p	-	-	-	-
H003	Land west of High Street & South of Chase Hill Road, Arlesey	i	-	-	-	-	-
H010	Land at Bury Hill, Potton	p	p	-	-	p	-

p = partially within the floodplain

i = inside the floodplain

Mid Bedfordshire

Floodplain

Site		Environment Agency Flood Zone		Elstow Brook		SFRA Level 2b	
<i>Id</i>	<i>Name</i>	2	3	100 year	1000 year	2	3
Site Allocations DPD submission sites - continued							
H014	Land opposite Woodmer Close, Bury Road, Shillington	p	-	-	-	p	-
H023	Land west of M1, Junction 13 between Bedford – Bletchley railway and the A421	i	p	-	-	-	-
H046	Land at Clifton Road, Henlow	p	p	-	-	p	-
H047	Mayfield Farm, Lower Stondon	p	p	-	-	p	-
H051	Land off Sharp Close, Maulden	p	p	-	-	p	-
H055	Land at Stanford Road, Shefford	p	p	-	-	p	-
H056	Land south of Malthouse Lane, Stotfold	p	p	-	-	p	-
H075	Land South of Horne Lane, Potton	i	p	-	-	-	-
H088	Mill End Nurseries, Harlington Road, Sharpenhoe	p	p	-	-	p	-
H098	Eldon Way Industrial Estate, Biggleswade	p	-	-	-	p	-
H101	Land adjacent to Chestnut House, Mill Lane, Sandy	p	p	-	-	p	p
H118	Land at LW Vass Ltd, Springfield Farm, Silsoe Road, Maulden	i	p	-	-	-	-
H126	Newlands, Dunton Lane, Biggleswade	p	p	-	-	p	-
H134	Plot 39 Clifton Road, Henlow	p	p	-	-	p	-
H135	Plot 42 Arlesey Road, Henlow	p	p	-	-	p	-
H137	Land rear of 92 Ampthill Road, Flitwick	p	-	-	-	p	-
H146	Land to the West of Henlow	i	p	-	-	-	-
H151	Land South of New Road, Sandy	p	p	-	-	p	p
H155	Land off Common Road, The Boot PH, 110 High Street, Langford	p	p	-	-	p	-
H159	Land off Arlesey Road, Stotfold	p	p	-	-	p	-
H160	Land rear of The Wrestlers PH, High Street, Langford	p	-	-	-	p	-
H163	Shefford Town Football Club, Ivel Road, Shefford	p	p	-	-	p	-
H164	Land at Church Street, Langford	p	-	-	-	p	-
H164	Land at Church Street, Langford	-	p	-	-	-	-
H166	Fairfield Nursery, Biggleswade	p	p	-	-	p	p
H193	Land off Clophill Road, Hall End, Maulden	i	p	-	-	-	-
H202	Land north of Sunderland Road/Beamish Close	p	p	-	-	p	p
H210	Albone Way Industrial Estate, Biggleswade	p	p	-	-	p	p
H212	Land at Thorncote Green, Northill	p	-	-	-	p	-
H213	Rear of 5 Mayfields, Shefford	i	p	-	-	p	-
H217	Maltings Farm, Grange Road, Blunham	p	p	-	-	p	p

p = partially within the floodplain

I = inside the floodplain

Mid Bedfordshire

Floodplain

Site		Environment Agency Flood Zone		Elstow Brook		SFRA Level 2b	
		2	3	100 year	1000 year	2	3
<i>Id</i>	<i>Name</i>						
Site Allocations DPD submission sites - continued							
H225	Water End Road, Maulden	p	p	-	-	p	-
H230	Longview Farm, Silsoe Road, Maulden	p	p	-	-	p	-
H232	Land at 88 Church Street, Langford	p	p	-	-	p	-
H235	Land off Shefford Road, Clifton	p	p	-	-	p	-
H236	Tempsford Road, Georgetown, Sandy	p	p	-	-	p	p
H240	Rega Factory, New Street/Station Road, Sandy	p	p	-	-	p	p
H247	Pig Development Unit, Hitchin Road, Stotfold	p	p	-	-	p	-
H248	Maulden Road, Flitwick	p	p	-	-	p	-
H252	Land to the West of Langford	p	-	-	-	p	-
H253	Land to the south of John Howland Close, Henlow	i	i	-	-	p	-
H260	Land south of Arlesey Road, Stotfold	i	p	-	-	p	-
H262	Taylor's Road, Stotfold	i	-	-	-	-	-
H265	Land at The Old Swan House	p	p	-	-	p	-
H275	Camel, Land off Bedford Road (B530), west of Houghton Conquest	p	p	-	-	p	p
H276	Station Road (New Road), Sandy	i	p	-	-	p	p
H278	Wixam Park – South of Thickthorn lane, Wilstead	i	p	-	-	p	p
H287	Land North West of Shefford	p	p	-	-	p	-
H288	Land east of Ickwell	p	p	-	-	p	-
H289	Home farm, Ickwell	p	p	-	-	p	-
H293	East of High Street, Arlesey	i	p	-	-	-	-
H300	Grange Road, Blunham	p	p	-	-	p	p
H301		i	-	-	-	-	-
H301a	Land to west of High Street, Henlow	p	p	-	-	p	-
H305	72 Hitchin Road, Henlow	p	p	-	-	p	-
H306	Land rear of 62 Ampthill Road, Shefford	i	p	-	-	p	-
H307	Old Oak Industrial Estate, Arlesey	p	p	-	-	p	-
H308	The hostel site, adjacent to Elstow Storage Depot, Kempston Hardwick	p	p	-	-	p	p
H309	52A Ivel Road, Shefford	p	p	-	-	-	-
H317	One-O-One Garage, Ampthill Road, Flitwick	p	p	-	-	-	-
H320	Land adjacent to A1 Beeston	p	p	-	-	p	p
H325	The Sheepwalk site, r/o Sheepwalk Close, Bury Hill	p	p	-	-	-	-
H326	Land at Gamlingay Road, Potton	p	p	-	-	-	-

p = partially within the floodplain

I = inside the floodplain

Mid Bedfordshire

Floodplain

Site		Environment Agency Flood Zone		Elstow Brook		SFRA Level 2b	
		2	3	100 year	1000 year	2	3
<i>Id</i>	<i>Name</i>						
Site Allocations DPD submission sites - continued							
H327	Campton Field, Western Fringe of village, Campton	p	p	-	-	-	-
H330	Merle, west of Hitchin Road, Stotfold	p	p	-	-	-	-
H331	Silverbirch Field, Stotfold	p	p	-	-	-	-
H334	Stonebridge Farm, Station Road, Langford End, Tempsford	p	p	-	-	p	p
H346	Hamlet End House & adjacent land	p	p	-	-	p	p
H351	Pedley Lane, Clifton	p	-	-	-	-	-
H361	Land at Waters End, Stotfold	p	p	-	-	-	-
H367	Land west of Langford Road/North of Stockbridge Road/Newtown, Henlow	p	p	-	-	-	-
H368	Land adjacent to Pope's Farm, Tempsford Road, Sandy	p	p	-	-	p	p
Local Plan allocations							
HO8(11)	Land at Queen Street Stotfold	p	p	-	-	-	-
HO8(17A)	Land at Shefford Road/Pedley Lane Shefford	p	-	-	-	-	-
HO8(19)	Land at Shefford Town Football	p	p	-	-	-	-
HO8(25A)	Land at the rear of Braybrooks Drive Potton	p	p	-	-	-	-
HO8(3A)	Land East of Bedford Road Marston Mortaine	p	p	-	-	p	p
HO8(4)	Elstow Storage Depot	p	p	-	-	p	p
HO8(8)	Land To The East Of Biggleswade and South Of Potton Road Biggleswade	p	p	-	-	-	-
HO8(9)	Land at Hitchin Street Biggleswade	p	-	-	-	-	-
HO9(10)	Land to the South of Stotfold	p	p	-	-	-	-
EMP1(25)	Shefford Industrial Estate, Shefford	p	-	-	-	-	-
EMP4(7)	Land Forming Phase III of Shefford Industrial Estate	p	-	-	-	-	-

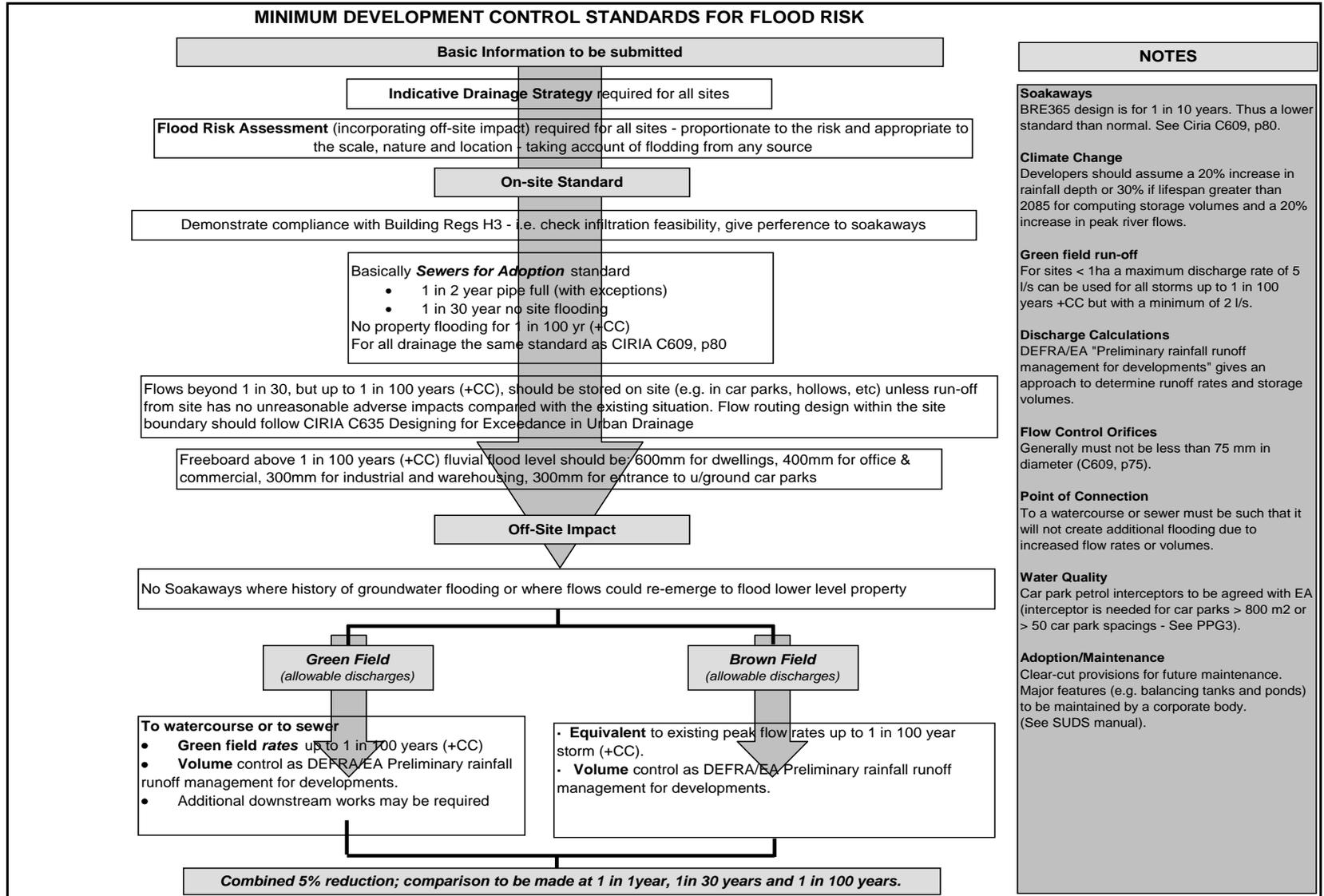
E.2 Bedford Borough

p = partially within the floodplain
i = inside the floodplain

Bedford		Floodplain					
Site		Environment Agency Flood Zone		Elstow Brook		SFRA Level 1	
<i>Id</i>	<i>Name</i>	2	3	100 year	1000 year	2	3
TCAAP	Town Centre Area Action Plan	p	p	-	-	p	p
H18	New Road, Gt Barford (1/H18)	p	p	-	-	p	-
H10b	Land north of Norse Road (3/H10B)	p	p	-	-	p	-
	Appeal Norse Road (4)	p	p	-	-	p	-
H10a	North of Brickhill (5/H10A)	p	p	-	-	p	-
H8	Land north of Bromham Rd (7/H8)	p	p	-	-	p	-
H6	Biddenham Loop (8/H6)	p	p	-	-	p	-
H7	Land west of Kempston (9/H7)	p	p	-	-	p	-
H14	Wixams (12/H14)	p	p	-	-	p	-
H2	Britannia Works, Kempston Rd (14/H2)	p	-	-	-	p	-
E2	Land off Cambridge Rd (15/E2)	p	p	-	-	p	-
E5	Land east of B530 (16/E5)	p	p	-	-	p	-
H13	Land at Stewartby (17/H13)	p	p	-	-	p	-
E4	Land west of B530 (18/E4)	p	p	p	p	p	-
H3	Austin Canons, Kempston (19/H3)	p	p	-	-	p	-

F

Local Planning Authority and Developer Guidance for Flood Risk



SURFACE WATER MANAGEMENT – CALCULATION & DRAWING REQUIREMENTS

Purpose: To assist developers in demonstrating that they are complying with latest guidance on managing surface water run-off the following calculations and drawings shall be submitted:

1) General Drainage Information

A summary sheet (1 page max) showing the global variables which have been used in the design of the surface water sewerage system.

For Bedford, the following values are typical: $M5_{60} = 19.6\text{mm}$, $\text{Ratio}_R = 0.45$, $C_v (\text{Summer}) = 0.750$, $C_v (\text{Winter}) = 0.840$.

Note: The values of C_v may be increased by 20% or 30%, as appropriate, to model the effects of climate change, if there is not other provision in the developer's software.

Pipe roughness: As per *Sewers for Adoption* guideline values.

The Following Key Data must be provided:

- (a) The total impermeable area of the whole development
- (b) The existing impermeable area and the allowable peak discharge from the site.
(See Notes on previous page)
- (c) The total volume of attenuation storage which will be provided both above and below ground.

Provide a drawing showing a schematic of the drainage layout, with all pipes, manholes, ponds, etc clearly numbered or referenced to the model output.

On-Site Standards

2) No Surcharge up to 1 in 2 year return period

Provide a *summary sheet* demonstrating compliance

3) No Flooding up to 1 in 30 year return period

Provide a *summary sheet* demonstrating compliance

Off-Site Standards

4) Maximum Discharge

Provide results of peak flow from site, which must be $<$ allowable discharge

5) No Additional Run-off from site up to 1 in 100 years + Climate Change

Provide results showing the peak water level in any ponds, or tank (and hence volume). Provide a drawing showing the size and location of all the attenuation storage provided. Where attenuation storage is located above ground, provide details

of finished ground levels and demonstrate flood pathways to the storage areas.

Note: There is no need to provide reams of hydraulic calculations. There is a need to demonstrate compliance with the parameters given in *Minimum Development Control Standards for Flood Risk*, which are based on the provisions of PPS25.

SUDS TREATMENT CONSIDERATIONS

The number of treatment train components (assuming effective pre-treatment is in place)

Taken from The SUDS Manual CIRIA report C697

Receiving water sensitivity → Runoff catchment ↓ characteristic	Low	Medium	High
Roofs only	1	1	1
Residential roads, Parking areas, commercial zones	2	2	3
Refuse collection/ industrial areas/ loading bays/lorry parks/highways	3	3	4

Other Issues to be considered include:

Source protection zones in proximity of the site
 Geological mapping
 Sensitive sites mapping as given in the appropriate Water Cycle Strategy

Choosing the right SUDS system

The choice of SUDS system will depend on a number of factors such as:

- the pollutants present in run-off;
- the size of and drainage strategy for the catchment area;
- the hydrology of the area and infiltration rate of the soil;
- Groundwater Source Protection Zones or contaminated land.

Large-scale ponds and wetlands are generally more appropriate for sites larger than 5ha. Infiltration trenches, swales, filter strips and porous pavements are suitable for

both large and small sites. The best drainage solution for a site will often incorporate a mix of mechanisms.

**EARLY CONSULTATION AND COMMUNICATIONS
WITH THE
ENVIRONMENT AGENCY, INTERNAL DRAINAGE BOARD AND LOCAL
WATER AUTHORITY IS RECOMMENDED.**

G Developer Checklist

EARLY CONSULTATION AND COMMUNICATIONS
WITH THE ENVIRONMENT AGENCY, INTERNAL DRAINAGE BOARD AND
LOCAL WATER AUTHORITY IS RECOMMENDED.

	Checklist Items	Complete
	Flood Risk Management	
1	Is a Flood Risk Assessment (FRA) submitted with the application in accordance with Annex E of Planning Policy Statement 25 (PPS 25), Planning Policy Guidance Note 25: Development and Flood Risk? For further information see ‘Development and Flood Risk: A Practice Guide Companion to PPS25’. For EA standard guidance relating to PPS25 see www.pipernetworking.com/floodrisk .	Y/N
2	Is development proposed within flood zone 2 or 3? (Refer to the flood maps published on the Environment Agency website)	Y/N
3	If yes, is the Sequential test applied? (See Annex D of PPS 25)	Y/N
4	Have the three elements of the Exception test been passed? (See para. D.9, Annex D of PPS 25)	Y/N
5	If development is approved for an area with a medium/high probability of flooding, are the building ground levels, access routes and car parks above flood level? Has an appropriate assessment been undertaken of how the building will react to flooding? (See Chapter 4 of Code for Sustainable Homes (CSH): Technical Guide)	Y/N Y/N
6	Does the FRA assess all possible sources of flooding? Is the development located outside flood flow routes? The risks may be from groundwater, overtopping or breach of flood defences, surface water, overland flow, breached reservoirs or sewer flooding. (See Annex C, PPS 25) Has the design of the site been checked for exceedance flows. These occur when the capacity of the sewer network is exceeded. For guidance see CIRIA C635 “Designing For Exceedance In Urban Drainage”	Y/N Y/N
7	Does the FRA assess the implications of climate change and suggest ways the impact can be minimised? (See Annex B of PPS 25)	Y/N
8	Provide evidence confirming whether there will be a reduction in flood risk to upstream or downstream communities.	Y/N
9	Confirm that the development allows adequate access for maintenance of watercourses in accordance with the byelaw margin.	Y/N

10	Provide outline details and where relevant supporting manufacturer's data for any proposed flood mitigation measures for the development. (See Annex G of PPS 25)	Y/N
11	Do any proposed flood defence measures reduce performance of functional flood plains elsewhere?	Y/N
12	If the development involves the raising of ground levels within flood zones 2 and 3, provide details of any proposed compensatory flood storage areas.	Y/N
Surface water run off and Sustainable Drainage Systems (SUDS)		
13	Is the site over 1 ha? (If so a FRA is required to comply with PPS 25.) Note the FRA will need to be agreed by the Environment Agency. For other required data and consultation with the EA see www.pipenetworking.com/floodrisk . Is the site less than 1 ha? (If so a drainage strategy will be required by the Local Authority. This should comply with the design requirements of DEFRA/EA Preliminary Rainfall Runoff Management from Developments.)	Y/N Y/N
14	Confirm the previous use of the site, stating the extent of impermeable areas both before and after development.	% before % after
15	Confirm familiarity with the Marston Vale Surface Waters Plan and demonstrate that due consideration has been given to implementing a strategic solution to surface water management, where feasible.	Y/N
16	Confirm that the sizing of balancing facilities is in accordance with guidance in Preliminary Rainfall Run Off Management for Developments, Revision C. (Calculations must include adequate sensitivity tests to determine the effect of changing parameters).	Y/N
17	Confirm that any surface water storage measures are designed so that proposed outflows are equal to, or less than, the existing site runoff rates. The design should compare proposed outflow rates, including an allowance for climate change, to the existing 1 in 1 year, 1 in 30 year and 1 in 100 year return period rainfall events.	Y/N
18	Provide layout plans, cross section details and long section drawings of attenuation measures, where applicable.	Y/N
19	Is justification provided for any new crossings over watercourses and confirm that they are of clear span design. Any river crossings or weed screens are to be designed to minimise risk of blockage. For further advice please refer to your local area Environment Agency office guidance.	Y/N or N/A
20	The number of outfalls from the site should be minimised. Do any new or replacement outfall designs follow standard guidance form SD13, available from the local area Environment Agency office?	Y/N
21	Are details provided of any SUDS proposed with supporting information, for example, calculations for sizing of features, ground investigation results and soakage tests. (See CIRIA guidance for more information.)	Y/N
22	Confirm whether driveways and other hard surfaces are to be constructed from permeable paving where the geology is suitable. Information is provided within the outline water cycle strategy.	Y/N

23	Quantify the percentage of surface water run-off to be attenuated by SUDS and rainwater holding facilities during the peak flow of an event. Does this satisfy the minimum standard requirements defined in Chapter 4 of CSH: Technical Guide? Does this % of attenuation satisfy the requirements of other statutory bodies, in particular the EA.	% Y/N Y/N
24	Confirm whether the proposed SUDS are to be adopted as part of public open space, or by a wastewater undertaker and provide supporting evidence. Alternatively, provide details of the maintenance contributions to be provided over the life of the development.	Y/N Y/N
25	Are there any proposed measures to encourage public awareness of SUDS and increase community participation? If so, please provide details.	Y/N
Water Consumption		
26	Confirm the development water consumption target of the dwellings: If this is private housing, does this satisfy Chapter 4 of CSH: Technical Guide, Code 3 requirements? If this is public housing, does this satisfy Chapter 4 of CSH: Technical Guide, Code 4 requirements? Is there a strategy provided, including details and calculations of how reductions will be achieved (e.g. water saving appliances, rainwater harvesting etc.)	l/h/d Y/N Y/N
27	Confirm whether grey water recycling is to be utilised and where applicable provide location and details of the measures.	Y/N
28	Confirm whether the development will utilise rainwater harvesting (minimum tank size 2.5m ³ per house, see Environment Agency Guidance).	Y/N
29	Has a practicable alternative strategy been included for the supply of water for fire fighting?	Y/N
30	Provide details of any proposed measures to increase public awareness and community participation for water minimisation measures.	Y/N
Pollution prevention		
31	Provide details of measures to minimise pollution to watercourses during construction.	Y/N
32	Provide details of pollution prevention measures for the life of the development, such as oil and silt interceptors. Consider whether permeable pavement areas are protected from siltation.	Y/N
Water Supply and Sewage Treatment		
33	Provide evidence to confirm that water supply capacity is available, and that demand can be met in accordance with the Outline Water Cycle Strategy.	Y/N
34	Provide evidence to confirm that sewerage and wastewater treatment capacity is available, and that demand can be met in accordance with the Outline Water Cycle Strategy.	Y/N

	Conservation / Enhancement of Ecological Interest	
35	Confirm that the green infrastructure, such as the surface water system, links to the neighbouring green infrastructure to assist the creation and maintenance of green corridors?	Y/N
36	Confirm that at least 25% of flood attenuation ponds/wetlands will be designed for multifunctional uses, such as providing access, footpaths, cycleways, recreational uses, and submit outline details.	Y/N
37	Confirm that an environmental assessment, proportional to the size and nature of the development, has been undertaken. This should identify any impacts on wildlife habitats (include surveys) and detail suitable mitigation measures, where necessary.	Y/N
38	Confirm whether buffer zones are provided adjacent to watercourses and other sensitive zones, such as wetland areas.	Y/N
39	Confirm whether the development will impinge directly or indirectly on any Main River (Wildlife Site) and confirm the status of any Designated Fishery.	Y/N
40	Confirm all ponds within 500m of the site boundary have been surveyed for presence of great-crested newt populations.	Y/N
41	Identify whether opportunities exist to use surface drainage/grey water for creating or enhancing wetland habitat areas including: <ul style="list-style-type: none"> • Ponds for great crested newts • Wet drainage ditch networks • Wet grassland 	Y/N
42	Identify opportunities for creating or improving watercourses and adjacent habitats for otter and water vole, where practicable.	Y/N
43	Confirm whether the Local Biodiversity Action Plan (LBAP) has been consulted and whether any habitats or species detailed within the LBAP are present or near the development site.	Y/N
44	Confirm whether any County / City Wildlife Sites are present or near to the development area.	Y/N

H

H.1

Detailed Geology of Key Centres

Bedford Borough Summary

Stewartby

The bedrock geology in Stewartby is the Lower Oxford Clay Formation in the North Eastern half and Clunch Clay and Shale in the South Western half. The superficial deposits comprise Head Deposits of Clay, Silt and Sand and Gravel in the centre of the settlement. There is also a narrow band of Alluvium deposits approaching from the North. There is worked and made ground to the West and South of the existing settlement.

The geology is not suitable for infiltration or soakaway drainage.

Wootton

The bedrock geology within the North-Western third of the settlement is Clunch Clay and Shale with Oxford Clay Formation in the remaining areas. There are superficial Head deposits of Clay, Silt, Sand and Gravel to the North and North West of the settlement.

The geology is not suitable for infiltration or soakaway drainage.

Wixams

The bedrock geology in the Wixams settlement is the Lower Oxford Clay Formation with a small outcrop of Clunch Clay and Shale in the Eastern area and along the Southern boundary. The superficial deposits of Alluvium and Head deposits are located along the Western and North Western boundary following the watercourse. Within the settlement there are two small outcrops of made ground.

The potential for infiltration drainage is low within the Oxford Clay bedrock.

Bromham

The Kellaways Formation of Sandstone, Siltstone and Mudstone forms the bedrock in the northern half of the settlement. The bedrock in the central area is the Cornbrash Formation comprised of Limestone, with the Great Oolite Limestone occupying the majority in the South. The Southern area also has outbreaks of Kellaways Clay mudstone and sand. The superficial deposits are Glacial Till and Glaciofluvial deposits of Sand and Gravel in the Northern half. In the Southern area and following the Western boundary are Alluvium deposits of Clay, Silt, Sand and Gravel.

It is anticipated the Sand and Gravel dominant in the south will provide infiltration drainage options. Infiltration feasibility in the northern half will be dependent on ground investigation findings.

NB. The eastern majority of Bromham is located within the Outer Source Protection Zone as defined by the Environment

Agency. *This categorisation may mean the proposed development may be restricted in the use of infiltration drainage methods.*

Great Barford

The bedrock in Great Barford is the Oxford Clay Formation. The superficial deposits in the area comprise Glacial Till from the North and the South with Head deposits through the Northern half along the watercourse. In the Eastern area River Terrace deposits of Sand and Gravel are present.

Infiltration drainage is an unlikely option but may be feasible where superficial deposits are present and subject to ground investigations.

Harrold

The Great Oolite Formation of Limestone forms the bedrock in Harrold. Superficial River Terrace Deposits of Sand and Limestone are present in the Northern half, with Alluvium comprising Clay, Silt and Sand and Gravel in the Southern half.

The use of infiltration methods is likely to be viable in this area due to the favourable geology.

Clapham

The bedrock in Clapham is the Oxford Clay Formation along the Northern boundary, the Kellaways Formation in the Northern half, the Cornbrash Formation in a band from South East to South West and the Great Oolite Limestone to the South. The superficial deposits comprise Till in the Northern extremities, River Terrace deposits of Sand and Gravel to the South with Alluvium, Sand and Gravel along the watercourse.

The uses of infiltration drainage methods are likely to be viable in the Southern half of the settlement only.

NB. *Southern Clapham is however located within the Outer Source Protection Zone as defined by the Environment Agency. This categorisation may mean the proposed development may be restricted in the use of infiltration drainage methods.*

Sharnbrook

The Great Oolite formation of Limestone forms the bedrock beneath the centre and majority of Sharnbrook, with a band of Cornbrash encircling the Northern and Western perimeter of the settlement and Oxford Clay and Kellaway Beds beyond. Superficial deposits of Till and Diamicton exist beneath the Northern third of Sharnbrook and encroach from the South West.

The use of infiltration methods is likely to be viable in this area due to the favourable geology.

Wilstead

The bedrock in Wilstead is the Oxford Clay Formation of Mudstone. Superficial Head Deposits of Clay, Silt, Sand and Gravel are located in the South Eastern areas.

It is unlikely that infiltration drainage will be viable. Limited possibility exists in the South Eastern extents subject to ground investigations.

H.2

Mid-Beds District Summary

Potton

The bedrock geology is the Woburn Sands Formation overlying the West Watton and Ampthill Clay Formation. Superficial deposits of Alluvium exist adjacent to Potton Brook with localised bands of Head deposits in addition.

Infiltration drainage is an unlikely option but may be feasible where superficial deposits are present and subject to ground investigations

Biggleswade

The bedrock geology at Biggleswade is the Woburn Sands Formation overlying the West Watton and Ampthill Clay Formation which is exposed in the centre of the settlement. The superficial deposits comprise glacial deposits within the Eastern and South Eastern area of the settlement. The deposits to the South East are Glaciofluvial deposits with Glacial Till deposits to the East and South. The Western area of the settlement has River Terrace deposits with Alluvium deposits adjacent to the River Ivel.

The potential for infiltration and soakaway drainage at the site is unknown with soakaway tests recommended within the Glaciofluvial deposits and Woburn Sands. The potential for infiltration is unlikely in the West Watton and Ampthill Clay Formations. Infiltration drainage is expected to be feasible in the River Terrace deposits.

Sandy

The bedrock geology at Sandy is the Oxford Clay Formation, with exposed areas in the Eastern and Western extremes of the settlement. The superficial deposits in this area are Alluvium with River Terrace deposits adjacent to the River Ivel through the centre of the site.

The potential for infiltration drainage is high within the River Terrace deposits.

Shefford

The bedrock at Shefford is the Woburn Sands Formation, with the Gault Formation to the North and South of the settlement. The Woburn Sands are exposed in the North West with Gault exposed in the North and South of the settlement. The superficial deposits comprise Alluvium and River Terrace deposits adjacent to the River Ivel through the centre of the settlement. There are localised superficial Head and Glacial deposits towards the outskirts of the settlement.

The potential for infiltration drainage within the catchment is good in the Woburn Sands and the River Terrace deposits subject to testing.

Arlesey

The bedrock geology in Arlesey is the Gault Formation overlain by the Lower Chalk Formation which is exposed throughout the settlement. There are no superficial deposits with some areas of made ground to the West of the settlement.

The potential for infiltration is low within the settlement, however soakaway tests are recommended to confirm this.

Stotfold

The bedrock geology in Stotfold is the Lower Chalk Formation. The superficial deposits are Alluvium adjacent to the River Ivel, with Glaciofluvial deposits present across the majority of the settlement.

The potential for infiltration is low within the settlement, however soakaway tests are recommended to confirm this.

Flitwick

The bedrock geology in Flitwick is the Woburn Sands Formation with some exposures in the centre of the settlement. The superficial deposits in the catchment include deposits of Alluvium adjacent to the River Flit, Glacial Sands and Gravels in the East and North West and Glacial Till in the West. There are also Head deposits in the North, South East and East of the settlement.

The potential for infiltration drainage is good with soakaway tests required to confirm the potential within the Glaciofluvial Sand and Gravels, Head deposits and Woburn Sand Formation.

Amphill

The bedrock in Amphill is the Woburn Sands Formation, with exposed areas throughout the settlement. There are localised areas where the West Watton and Amphill Clay formation are exposed. The superficial deposits are Alluvium and Head deposits in the South of the settlement.

The potential for infiltration is good within the Woburn Sands Formation, yet unlikely within the West Watton and Amphill Clay Formation. Soakaway testing is recommended in order to be conclusive.

Marston Moretaine

The bedrock geology is the Oxford Clay Formation with Oxford Clay exposed across the settlement. The superficial deposits are Alluvium through the centre of the site, with Valley Gravels located in the Eastern extreme of the settlement.

The infiltration within the settlement is anticipated to be high in the valley Gravels, however Clay will have a low potential.

Cranfield

The bedrock geology in the settlement is the Oxford Clay Formation, with Oxford Clay exposed in the south east of the settlement. The superficial deposits are Glacial Till across the majority of the settlement.

The potential for infiltration is unlikely due to the Glacial Till and Oxford Clay bedrock.

Wixams – see above entry under Bedford Borough Council

I SUDS Maintenance Programme

SUDS Element	ACTIVITY	FREQ.	STAFF	Unit	Time (day)	No. of times per year
Swale	Grass cutting - to retain grass height within specified design range	Monthly during the growing season (6 months).	2 people	1 Km	1	6
	Litter and debris removal	Monthly and after severe storms	2 people	3 Km	1	6
	Manage other vegetation and remove nuisance plants	Monthly (at start, then as required)	2 people	12 Km	1	12
	Check for poor vegetation growth due to lack of sunlight or dropping of leaf litter, and cut back adjacent vegetation where possible	Annually	2 people	4 Km	1	1
	Re-seed areas of poor vegetation growth. Alter plant types to better suit conditions, if required.	Annually, or if bare soils is exposed over 10% or more of the swale treatment area	2 people	4 Km	1	1
	Inspect inlets, outlets and overflows for blockages and clear if required.	6 month interval and after severe storm	2 people	6 Km	1	2
	Inspect infiltration surfaces for ponding, compaction and silt accumulation. Record area where water ponding is for > 48 hours.	Monthly, or when required	2 people	8 Km	1	12
	Inspect bar screen	Monthly and after severe storm	2 people	8 Km	1	12
	Inspect and repair side and base erosion to ensure sheet flow	6 month interval and after severe storm	2 people	4 Km	1	2
	Inspect inlet and facility surface for silt accumulation. Establish appropriate silt removal frequencies.	Twice a year	2 people	8 Km	1	12
	Inspect internal overflow to bypass	Annually	2 people	8 Km	1	1
	Grass cutting - public areas	Monthly, during growing season (6 months)	2 people	4 ha	1	6

SUDS Element	ACTIVITY	FREQ.	STAFF	Unit	Time (day)	No. of times per year
Pond	Grass cutting - meadow grass	6 months interval (in spring before nesting season and in autumn)	2 people	4 ha	1	2
	Inspect vegetation to pond edge and remove nuisance plants (for first 3 years).	Monthly at the start and then as required	2 people	4 Km	1	10
	Hand cut submerged and emergent aquatic plant (at minimum of 0.1 m above pond base; include max 25% of pond surface)	Annually	2 people	500 m ²	1	1
	Remove 25% of bank vegetation from water edge to a minimum of 1 m above water level	Annually	2 people	2 Km	1	1
	Tidy all dead growth before start of growing season	Annually	2 people	2 ha	1	1
	Remove sediment from forebay	1-5 years, or as required	2 people	500 m ²	1	0.3
	Remove sediment from one quadrant of the main body of ponds without sediment forebays.	2-10 years	2 people	500 m ²	1	0.15
	Remove sediment from the main body of big ponds when pool volume is reduced by 20%	> 25 years (usually)	2 people	500 m ²	1	0.04
	Inspect structures for evidence of poor operation	6 months interval	2 people	4 ha	1	2
	Inspect banksides, structures, pipework etc for evidence of physical damage	6 months interval	2 people	4 ha	1	2
	Inspect bar screen	monthly and after severe storms	2 people	4 ha	1	12
	Inspect and clear solid waste	monthly and after severe storms	2 people	4 ha	1	12
	Inspect water body for signs of eutrophication	Monthly (May- October)	2 people	4 ha	1	6
	Inspect silt accumulation rates and establish appropriate removal	7 to 10 year interval	2 people	4 ha	1	0.1

SUDS Element	ACTIVITY	FREQ.	STAFF	Unit	Time (day)	No. of times per year
	Check penstocks and other mechanical devices	Twice a year	2 people	4 ha	1	2
Wetland	Litter / trash / debris and surface scum removal	Monthly	2 people	2 ha	1	2
	Grass cutting - public areas	Monthly (during growing season)	2 people	4 ha	1	6
	Grass cutting - meadow grass	6 months interval (in spring before nesting season and in autumn)	2 people	4 ha	1	2
	Inspect vegetation edge and remove nuisance plants (for first 3 years).	Monthly at start and then as required	2 people	4 Km	1	10
	Hand cut submerged and emergent aquatic plant (at minimum of 0.1 m above pond base; include max 25% of pond surface)	Annually, or as required	2 people	500 mq	1	1
	Remove 25% of bank vegetation from water edge to a minimum of 1 m above water level	Annually, or as required	2 people	2 Km	1	1
	Tidy all dead growth before start of growing season	Annually	2 people	2 ha	1	1
	Remove sediment from one quadrant of sediment forebay	Annually, or as required	2 people	500 mq	1	1
	Remove sediment from one quadrant of the main body of wetlands without sediment forebays.	2-5 years	2 people	500 mq	1	0.3
	Remove sediment from the main body of wetland when its volume is reduced by 20%.	> 25 years (usually)	2 people	500 mq	1	0.04
	Inspect structures for evidence of poor operation. Take remedial action if required.	Monthly or after severe storms	2 people	4 ha	1	2
Infiltration Trench	Litter and debris removal from trench surface, access chambers and pre-treatment devices	Monthly, or as required	2 people	1 Km	1	1
	Removal and washing of exposed stones on the trench surface	Annual (bi-annual the first year) or when silt is evident on the surface	2 people	400 m	1	1.5

SUDS Element	ACTIVITY	FREQ.	STAFF	Unit	Time (day)	No. of times per year
	Trimming of any roots that may be causing blockages	Annual (semi-annual the first year)	2 people	1 Km	1	1.5
	Remove weeds on the trench surface	Monthly at the start and then as required	2 people	1 Km	1	12
	Removal of sediment from pre-treatment devices	6 months	2 people	1 Km	1	2
	At locations with high pollution loads, remove surface geotextile and replace, and wash or replace filter media.	5 years	2 people	400 m	1	0.2
	Inspect inlets, outlets and overflows for blockages and clear if required.	Monthly	2 people	1 Km	1	12
	Inspect pre-treatment systems, inlets, trench surfaces and perforated pipework for silt accumulation. Establish appropriate silt removal frequencies.	6 months	2 people	400 m	1	2