
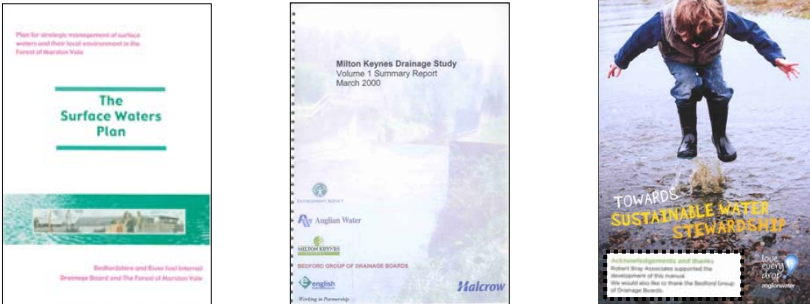


Implementing SuDS by the Bedford Group of Drainage Boards

John Oldfield



Extensive Experience held with local IDB flood risk partner

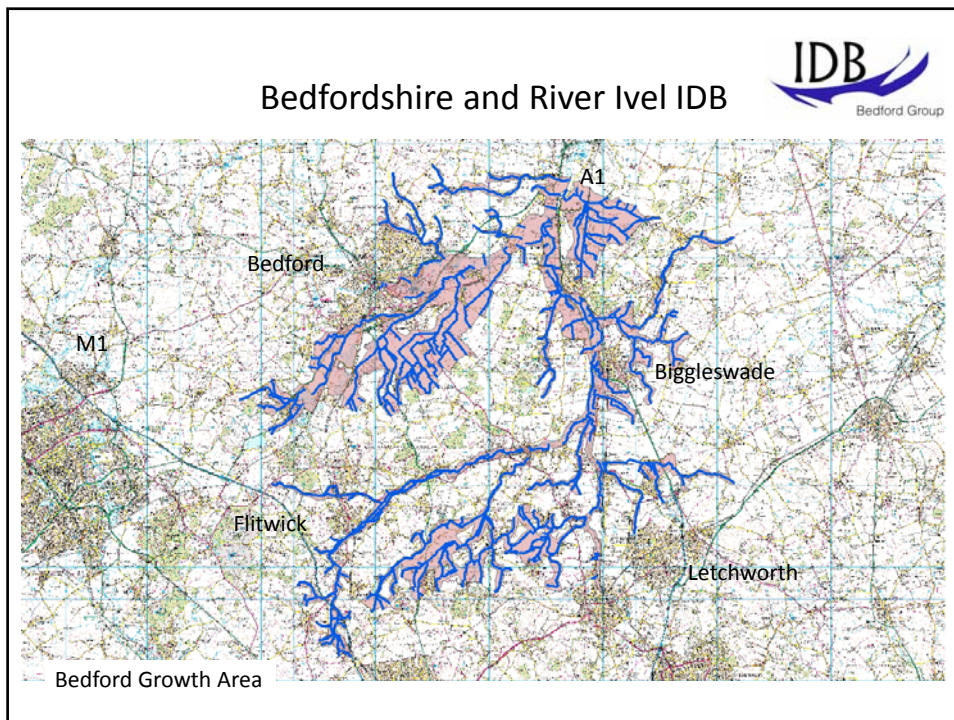
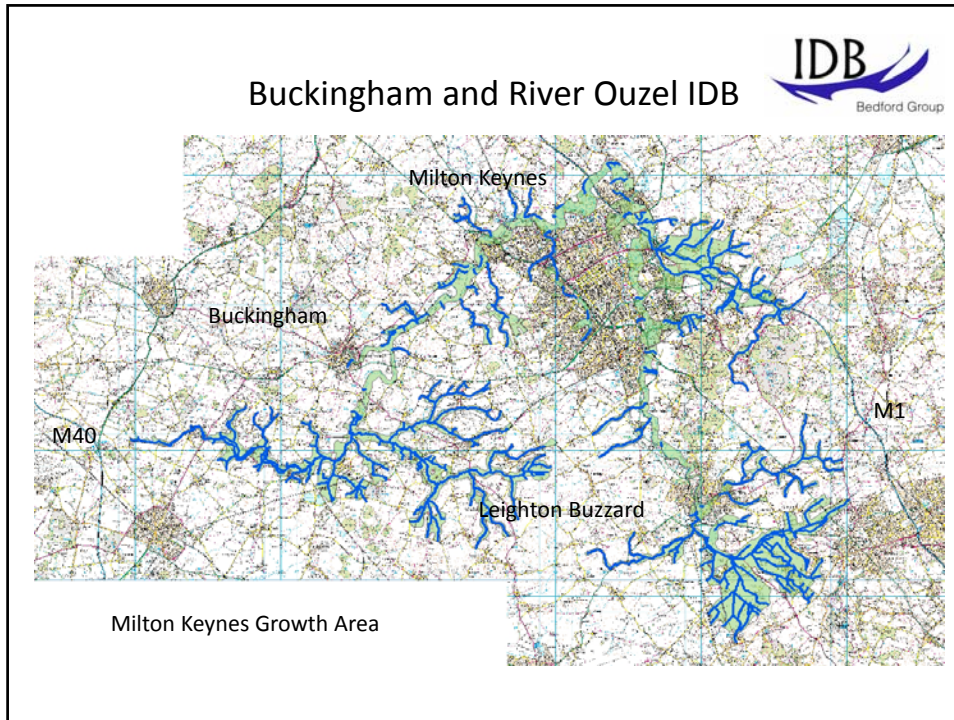


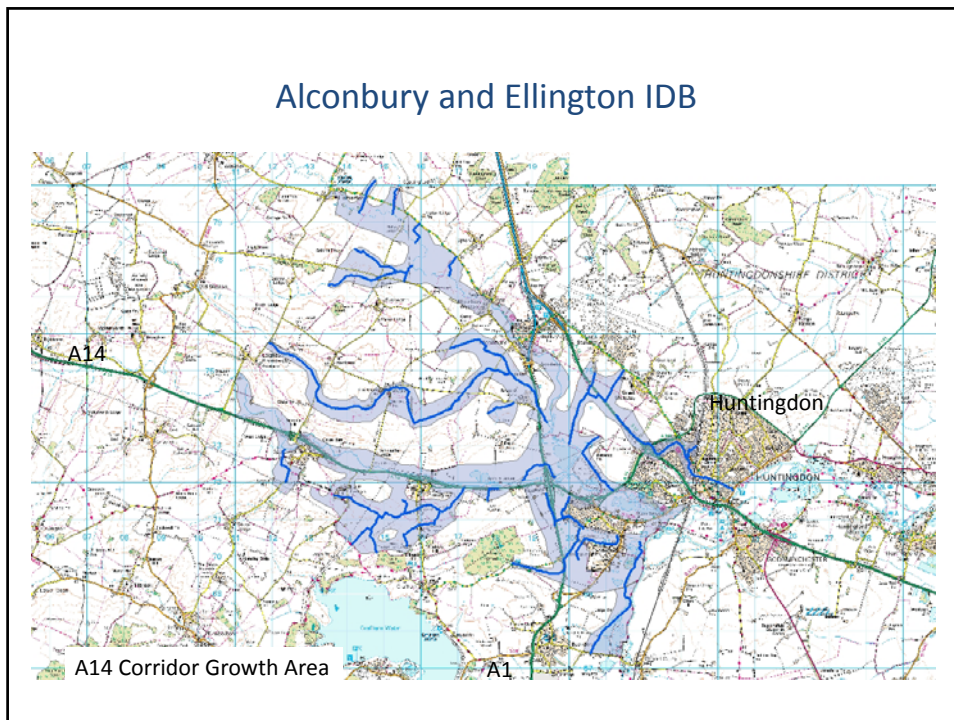
Marston Vale Surface Waters Plan

Milton Keynes Drainage Strategy and SPG


Anglian Water SuDS Adoption Manual

The Bedford Group of Drainage Board has led on SuDS since the 1990s





**Land Drainage Act 1991
Power : Duty**

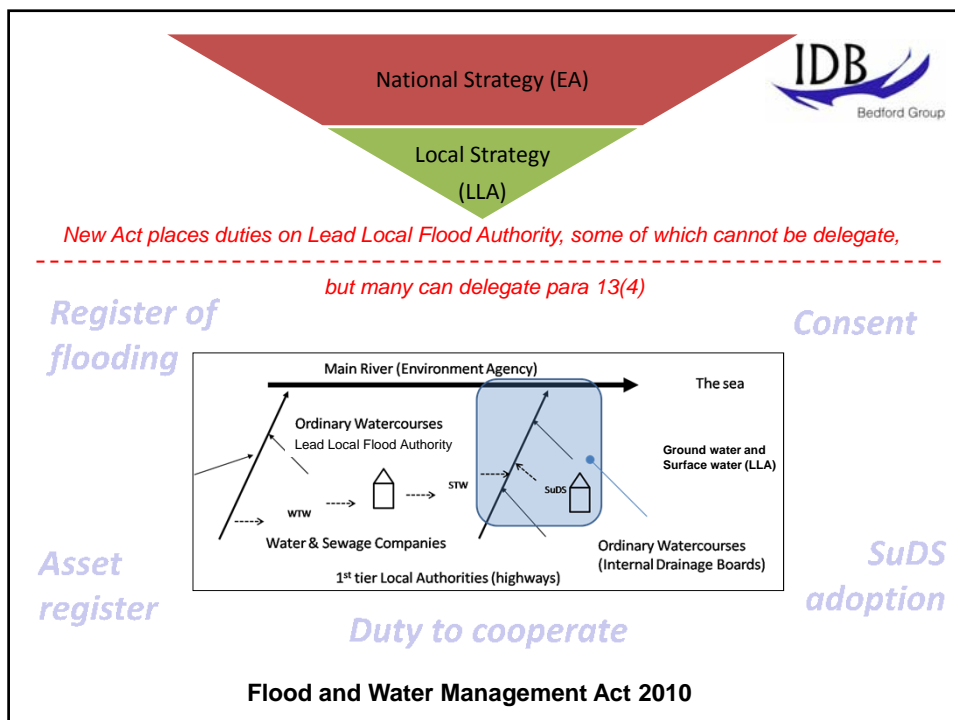
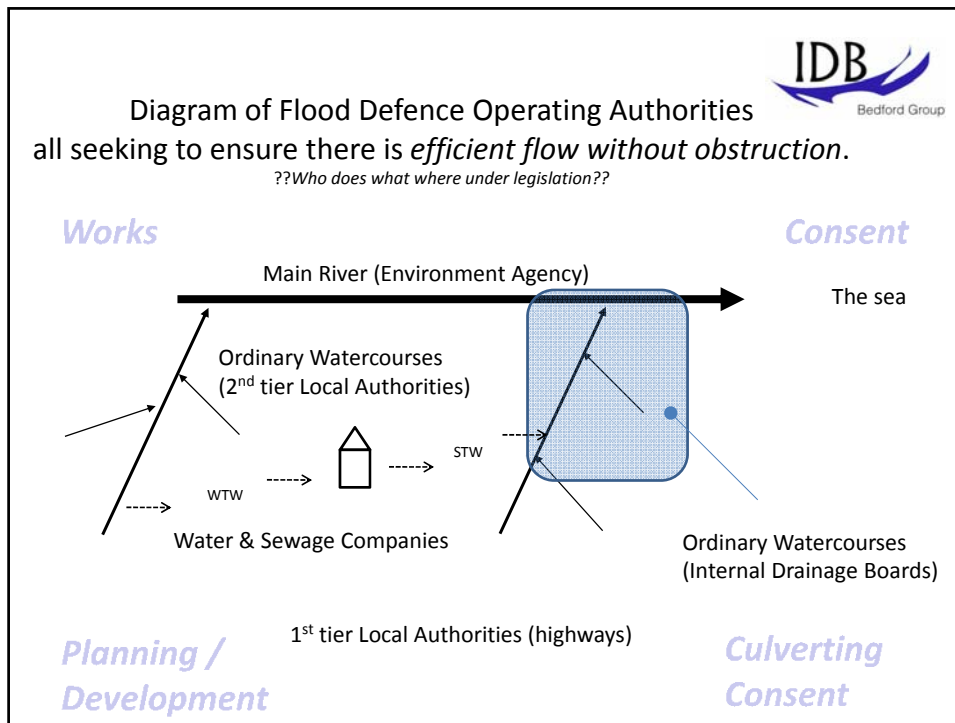


land drainage: flood risk management: water level management

Philosophy of rarely could individuals protect themselves, so Statutory Authorities empowered for the common good of land drainage and flood risk management

- **1 – Duty** to general supervision over all matters relating to drainage in District
- 12 - **Duty** to further conservation when exercising its powers.
- **14 - Power** to carry out maintenance, improvement and capital works.
- **23 – Consent** no person shall obstruct or affect flow
- 64 - **Power** to enter onto land to carry out works.
- 66 - **Power** to create new byelaws.
- **Schedule 1 – appointed and election Members (1st tier RFCC & 2nd tier IDB)**

Note All watercourses, culverted watercourses and structures are owned by the landowner, with extensive common law duties imposed upon them relating to drainage nuisance and negligence.



Development and Flood Risk

planning permission and land drainage consent



During 2007 we reviewed and commented on 1400 planning applications and issued over 180 and drainage consents under our Byelaws .



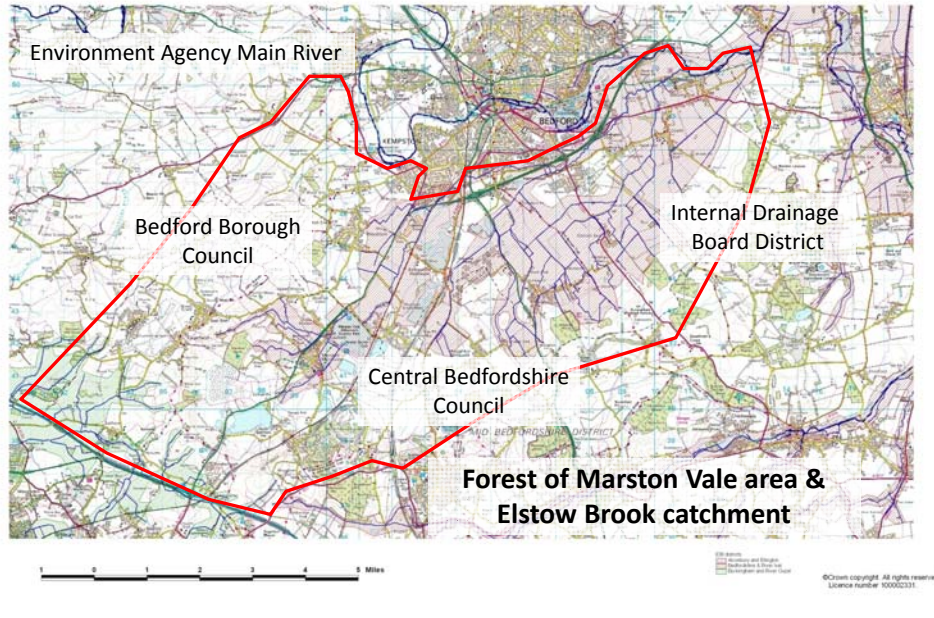
During 2008 we reviewed and commented on 1287 planning applications and issued 138 land drainage consents under our Byelaws.

Avoid development causing flooding or being flooded

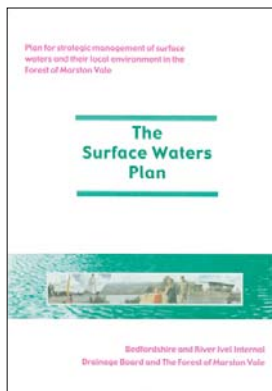
(attenuation and compensation)



Growth Area: Flood Risk Area: Multitude of Partners.....



Marston Vale Surface Waters Plan



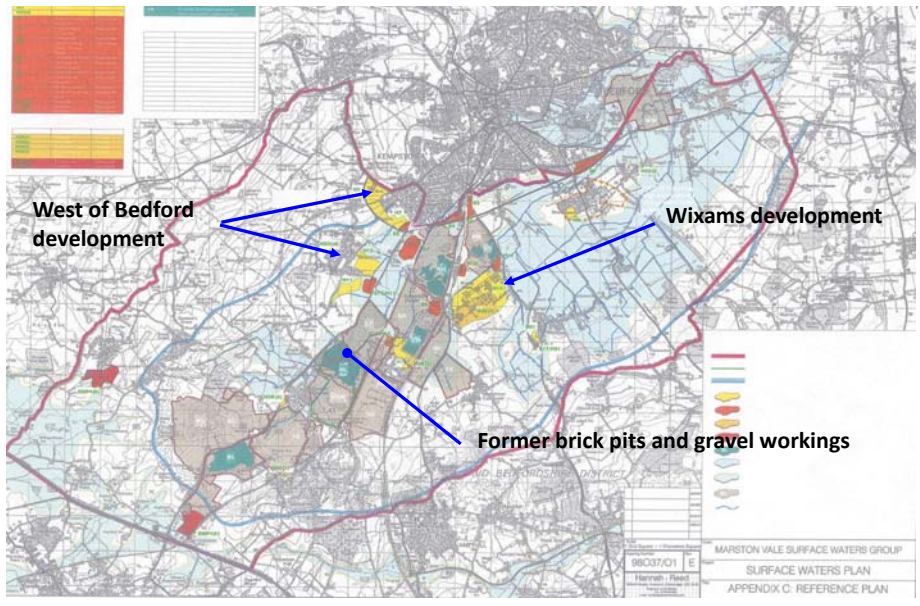
Drainage Authorities



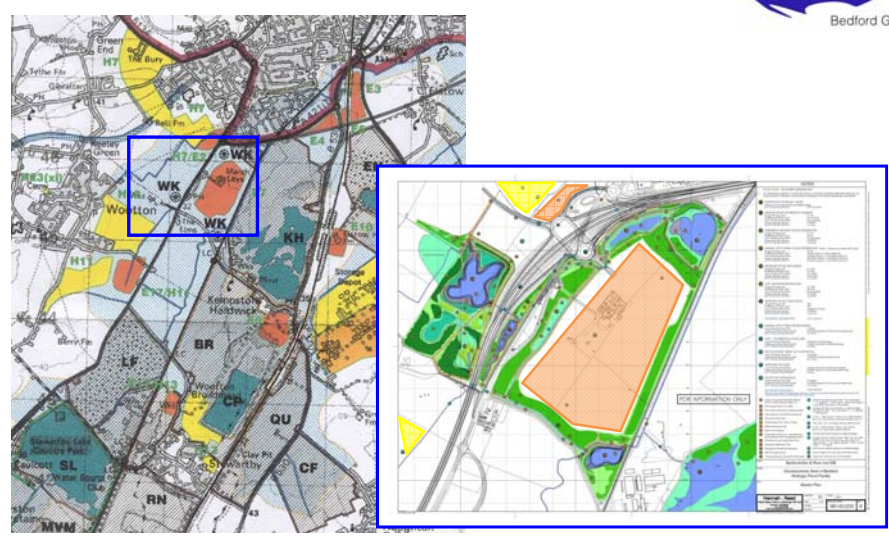
Planning Authorities



Land Allocation in Structure and Local Plans

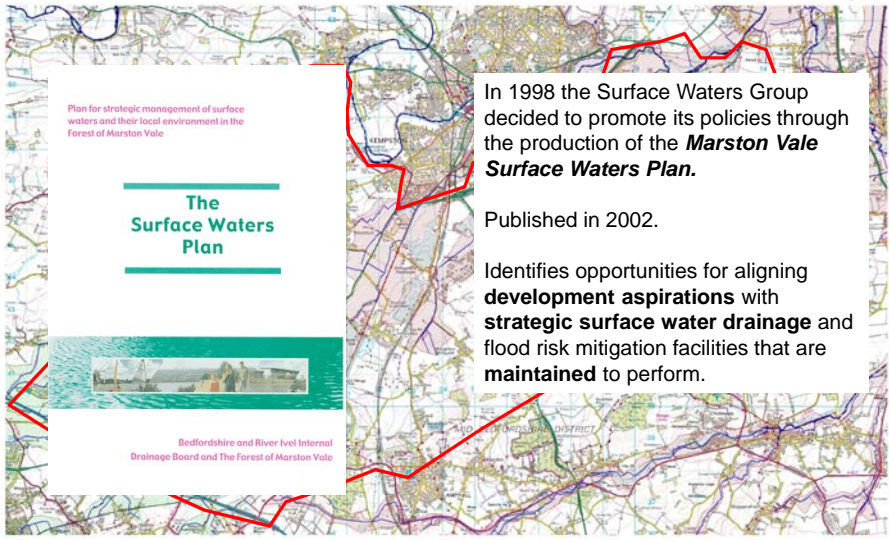


Master Plan



Detailed solution to Integrated Urban Drainage

Bedford Group of Drainage Boards



Plan for strategic management of surface waters and their local environment in the Forest of Marston Vale

The Surface Waters Plan

Bedfordshire and River Ivel Internal Drainage Board and The Forest of Marston Vale

In 1998 the Surface Waters Group decided to promote its policies through the production of the **Marston Vale Surface Waters Plan**.

Published in 2002.

Identifies opportunities for aligning **development aspirations** with **strategic surface water drainage** and flood risk mitigation facilities that are **maintained** to perform.

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Strategic, Integrated and Maintainable Sustainable Drainage Systems (SUDS)



1969 20 units/ha 2000 27 units/ha 2012 40+ units/ha

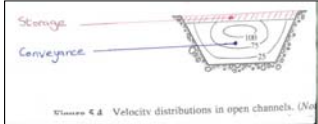







Photo from Peter Brett Associates, Eco-Town study

Strategic, Integrated and Maintainable Sustainable Drainage Systems (SUDS)





Avoid piecemeal solutions



Design of SuDS is always based on as – new optimum hydraulic condition to minimize footprint, which requires maintenance

Are these assets in optimum hydraulic condition?



Maintenance and adoption by IDB
delivers optimum asset condition



“Byelaws cover both watercourse banks, flood defences and SuDS assets”

To achieve as built condition of assets,
access for maintenance is essential



Major water features with a PPS25 design standards (1 in 100 year + climate change) will require appropriate access for machinery and dredged material

To achieve as built condition of assets,
access for maintenance is essential



Swales designed for the 1 in10/30 year event shallow grass channel cut with tractor flail

To achieve as built condition of assets,
access for maintenance is essential



Wet Flood Storage Reservoir
can be attractive features but
are expensive to maintain with
floating/suction dredging plant



Dry / Wet Flood Storage Reservoir/
linear park flood meadow
can provide amenity value and can be
easily maintained with an Aebi grass cutter

Many benefits from multifunctional assets,
whilst still providing good access for maintenance



Planting and cycleway path    Landscape bund and planting

Good access is paramount: avoid obstruction from footpaths, landscaping, street furniture...

**To achieve as built condition of assets,
access for maintenance is essential**



**Health and Safety risk reduction
vegetation control with specialist machinery**

To achieve as built condition of assets, access for maintenance is essential



Good access is paramount: obstruction from fences, street furniture, & traffic management....are costly

What is Sustainable Drainage?



Sustainability and biodiversity are often confused. Sustainability is development that meets the needs of the present without compromising the ability of future generations to meet their own needs.



Should your SuDS facility be a wildlife pond? **IDB** Group

TYPICAL SECTION A-A

Duty to protect protected species


ROAD 2

Should your SuDS facility be a wildlife pond? **IDB** Bedford Group


Duty to protect protected species
No Duty to protect people!

ROAD 2






IDB adoption funded by Developer guarantee for maintenance




Bedfordshire & River level IDB		Revision Date: 9/12						
WARDEN LEYS MASTER PLAN Committed Sum Calculator								
Estimated Costs								
CAPTION B: Master Road Discharge Channel	£98,200.00							
CAPTION C: Hydraulic Bridge Flood Protection	£66,800.00							
CAPTION D1: Aisle Road	£122,200.00							
CAPTION D2: Flood Relief Channel & Basin	£11,500.00							
CAPTION D3: RCC Retain Pit Side	£56,100.00							
CAPTION E: Aisle Road Flood Plates	£13,100.00							
CAPTION F: Aisle Discharge Flood Protection	£98,700.00							
CAPTION G: Western Road Road Beds	£31,700.00							
	£601,000.00							
Legal and Consultants Fees	£20,000.00							
IDB Administrative Costs @ 10%	£122,824.00							
	£743,824.00							
Landowner Contributions								
Landowner A:	20%	£148,765						
Landowner B:	20%	£148,765						
Landowner C:	10%	£74,382						
Landowner D:	10%	£74,382						
		£446,300						
CAPTION B: Master Road Discharge Channel								
			£98,200.00					
1	Reinforcement replacement	1	£8,000.00	25		£2,000.00		
2	Reinforcement observation	10	£18.00				£18,000.75	
3	Chip and gravel drainage labour	2	£14.00				£28,000.00	
4	Chip drainage joint	10	£28.00				£280,000.00	
5	Filling joint replacement	1	£15,000.00	25			£3,750.00	
6	Asphalting replacement	1	£3,000.00	10	30		£2,850.00	
7	Reinforcement observation replacement	1	£10,000.00	30			£3,000.00	
8	Filling joint specialist service	1	£40.00				£40.00	
9	Reinforcement joint replacement	1	£100.00				£100.00	
10	Water joints	1	£3,000.00	8	18	34		£8,208.00
11	Reinforcement battery charger replacement	1	£100.00				£100.00	
12	Reinforcement operation and labour	10	£18.00				£180.00	
13	Labour	1	£3,000.00	30			£1,700.00	
14	Reinforcement/Control equipment	1	£3,000.00	10	20	30		£2,800.00
15	Reinforcement joints	3	£200.00	10	20	30		£1,410.00
16	Reinforcement observation	1	£28.00				£28.00	
17	Reinforcement observation labour	8	£18.00	10	30		£16,710.00	
18	Channel maintenance	400	£2.00	800.00		30		£5,000.00
19	Highway guard rail observation							£14,710.84
20	PV Slipping							Not included
								£33,540.84

Planning Authority Section 106 or Legal Agreement with developer




IDB adoption funded by Developer guarantee for maintenance




Low cost two stage channel

Bedfordshire & River level IDB		Revision Date: 9/12						
WARDEN LEYS MASTER PLAN Committed Sum Calculator								
Estimated Costs								
CAPTION B: Master Road Discharge Channel	£98,200.00							
CAPTION C: Hydraulic Bridge Flood Protection	£66,800.00							
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		£446,300						
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1	Reinforcement replacement	1	£8,000.00	25		£2,000.00		
2	Reinforcement observation	10	£18.00				£18,000.75	
3	Chip and gravel drainage labour	2	£14.00				£28,000.00	
4	Chip drainage joint	10	£28.00				£280,000.00	
5	Filling joint replacement	1	£15,000.00	25			£3,750.00	
6	Asphalting replacement	1	£3,000.00	10	30		£2,850.00	
7	Reinforcement observation replacement	1	£10,000.00	30			£3,000.00	
8	Filling joint specialist service	1	£40.00				£40.00	
9	Reinforcement joint replacement	1	£100.00				£100.00	
10	Water joints	1	£3,000.00	8	18	34		£8,208.00
11	Reinforcement battery charger replacement	1	£100.00				£100.00	
12	Reinforcement operation and labour	10	£18.00				£180.00	
13	Labour	1	£3,000.00	30			£1,700.00	
14	Reinforcement/Control equipment	1	£3,000.00	10	20	30		£2,800.00
15	Reinforcement joints	3	£200.00	10	20	30		£1,410.00
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18	Channel maintenance	400	£2.00	800.00		30		£5,000.00
19	Highway guard rail observation							£14,710.84
20	PV Slipping							Not included
								£33,540.84



High cost storage area

Planning Authority Section 106 or Legal Agreement with developer



Timescales.....

John Clelland

11/04/2010
 Date: 12 September 2010 01:34
 To: Chris Brinkley
 Subject: FV1 Flood and SUDS master plan at P16 Brook Nurseries, Bedford Road, Arney
 Attachment: 100001100001.jpg; P16 Flood and SUDS master plan.docx

Chris,

Thank you for attaching the copy letter addressed to Mr MacDonnagh from the CSD dated 27th September 2010.

The planning application 100773281 was for the re-contouring of the existing pond to provide additional flood storage capacity. You may find the 'Flood' map was already referred to in the application for the works but I have included it for your information.

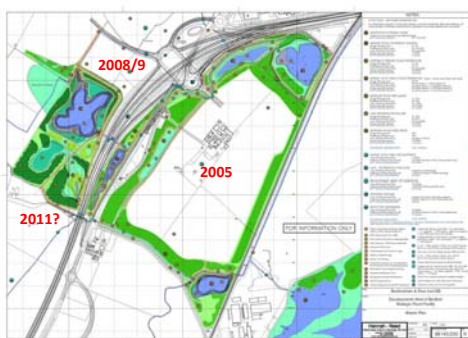
As the planning application was approved in 2010, it is assumed that the necessary planning permission for the proposed works was granted. However, it is noted that the planning permission was granted on the basis of the information provided at the time of the application.

So that the Board is kept up to date about your site, please advise the original contours for the pond and the proposed flood storage for the proposed works. This information will be used to update the Flood map and the Flood Storage map. The Flood Storage map will be updated in the next year. The Flood Storage map will be updated in the next year.

From the report that the Flood Storage map for the pond was updated in 2010, it is noted that the Flood Storage map was updated in 2010. It is noted that the Flood Storage map was updated in 2010. It is noted that the Flood Storage map was updated in 2010.

Kind Regards
 Chris Brinkley (Quality Control)@idb.com

Chris Brinkley (Quality Control)@idb.com
 The IDB Member
 100001100001.jpg; P16 Flood and SUDS master plan.docx
 Subject: FV1 Flood and SUDS master plan.docx



WINDSORSHIRE AND RIVER FV1 INTERNAL DRAINAGE BOARD

Your ref: [blank]
 Our ref: 27 September 2010

Mr S MacDonnagh
 100 Brook Nurseries
 Bedford Road
 Arney
 Bedfordshire
 MK42 0LQ
 Tel: Bedford 01234 123456
 Fax: Bedford 01234 123456
 Email: [blank]

Dear Mr MacDonnagh

Re: Planning Application 100773281

Reference to your meeting on 12 September 2010. I can confirm that the Board would not object to a planning application for further development on the site based on the plan submitted at this meeting, subject to the following conditions being fulfilled:

- 1) Filled-in blue areas of the site should not be used for any other purpose.
- 2) The site should not be used for any other purpose of the site. Land must be used only for the purpose of the site.
- 3) All areas of the site should be used for the purpose of the site.
- 4) The site should be used for the purpose of the site.

Please confirm that you have agreed to investigate the possibility of bringing the matter back to the Board for further consideration.

Yours sincerely,
 Chris Brinkley
 Quality Control
 IDB Member

Chris Brinkley (Quality Control)@idb.com
 The IDB Member
 100001100001.jpg; P16 Flood and SUDS master plan.docx
 Subject: FV1 Flood and SUDS master plan.docx

Initial developer liaison 2001, planning permission 2002: still to commence on site and still in negotiations with developer's consultant!

Marsh Leys Master Plan Rev A Jan 2000, Rev N 2007. Adoption legal agreement negotiations start 2006.....and about to be signed (2012)



Experience of implementing SuDS

Key message

- Guide, Lead and Direct
- Cooperation between partners
- Strategic and Integrated SuDS
- Balance people and environment
- Long term maintenance is paramount



