



WEST OXFORDSHIRE
DISTRICT COUNCIL

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Parish Flood Report: **Crawley**

July 2008

Version 1 – This report may be revised in the future to incorporate ongoing consultation results



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1.0 INTRODUCTION

On the 20th July 2007 large parts of the South of England were subjected to intensive storms. The scale and speed of the rainfall was unprecedented and took most communities by surprise causing widespread flooding of highways and property. On this occasion, unlike previous storms / flooding experienced, this impacted on many properties that had never been affected before, due to much of the flooding coming in the form of rain water run off from land.

A swathe of the district was particularly badly affected by the massive storms, which commenced in the morning and subsided in the evening. During the following days further disruption occurred due to rising river levels. At RAF Brize Norton, the records show that over 125 mm (5 inches) of rain fell in 12 hours, and this is a record going back over 100 years. Not only that, but the period from May to July had been the wettest on record since 1903 and meant that the ground was saturated and unable to absorb any more water.

On the 10th October 2007, the District Council's Cabinet considered a report of the Head of Street Scene and approved additional resources in order that a review of the affected areas could be carried out and further reports be prepared for the Council's considerations.

1.1 Purpose of the report

In response to requests from both the Parish and Town Councils and the general public West Oxfordshire District Council has produced a number of reports that identify each individual cause of flooding within the Parish / Town, what work is being carried out by external agencies (EA, Thames water etc); what the potential options are for future mitigation - and who might be best placed to fund such schemes. The reports themselves reflect the series of water systems that all played a part in the flooding experienced in July 2007 and will help all the organisations involved understand the need to sequence their activities.

This report has been prepared by a qualified Engineer in consultation with the key external agencies and seeks to explore the main reason behind why the floods happened in July 2007 and give an overview of the event itself. It will also provide an understanding of the different roles and levels of responsibility for the agencies involved.

This report should be used to make sure that all the agencies involved with flood prevention – like the Environment Agency, Thames Water, Oxfordshire County Council, Town / Parish Councils and private land owners – work in true partnership for the good of everyone in the local community.

A key outcome of the reports is that residents are given a broad overview of the complex linkages between the different organisations involved and also the range of options available.

1.2 Roles and responsibilities

One of West Oxfordshire District Councils key ongoing roles is to continue to lobby National agencies / Government on behalf of the residents and businesses of the district to secure funding and/or additional resources to assist with flood prevention and other relevant activities. The Council will also work closely with other agencies and organisation in order to highlight the local issues and actions identified in the report.

The legal responsibility for dealing with flooding lies with different agencies and is complex, so below is a simplified summary.

Environment Agency (EA) – permissive powers¹ for main rivers

Oxfordshire County Council (OCC) – Responsible for adopted highways and highway drainage.

Thames Water (TW) – Responsible for adopted foul and surface water sewers.

West Oxfordshire District Council (WODC) – duties as a riparian² land owner, and permissive powers¹ under Land Drainage Act 1991, Public Health Act 1936, Highways Act 1980 and Environmental Protection Act 1990.

Private land owners - duties as a riparian land owner.

1.3 Consultation and consent

The key organisations mentioned above are currently carrying out their own investigations, but operate independently of each other, have different methods of prioritisation and different funding criteria. The District Council has consulted with these agencies together with Parish Councils, Town Councils and individual property owners in order to prepare this report.

It is recognised that the majority of the options proposed in this report require further investigations / feasibility studies and / or consultation before they are carried out. Therefore these options may not be appropriate in every case when full costings, environmental, landscaping, biodiversity, built environment and historic factors are fully considered.

When considering protection against future flooding, it must be emphasised that the risk and impact of flooding can be mitigated against but in some cases not fully removed.

1.4 Response to this report

The options section of this report highlights the potential areas of work / activities under the responsible agency, for example the Environment Agency, West Oxfordshire District Council etc. If you have any specific questions relating to these activities please contact the relevant agency using the contact details provided at the top of the chart.

If you have any general questions please contact your Parish / Town Council who have been a key contributor to the production of the report and have agreed to act as the first point of contact.

The Council is also planning to hold a series of road shows in the Parish areas where representatives from all the relevant areas will be available to answer any questions local residents have as well as provide more information on ways residents may help themselves.

¹ Permissive powers are when an organisation may choose whether or not to exercise their powers. I.e. they are NOT under a duty. In making this choice account must be taken of any factors required by the legislation, plus for example how urgent, how necessary they are, cost, likely result, etc

² Riparian owners are responsible for the maintenance of any watercourse within or adjacent to the boundaries of their property.

1.5 Legal

No part of this report is to be reproduced, copied or used by any third party without the prior express written consent of WODC in its absolute discretion. All those reading this report acknowledge that any conditions, warranties or other terms implied by statute or common law are excluded to the fullest extent permitted by law. Without limiting the scope of the foregoing, West Oxfordshire District Council does not give any warranty, representation or undertaking as to the efficacy or usefulness of the information contained within this report, nor that any advice contained within this report will produce satisfactory results if followed. West Oxfordshire District Council hereby excludes liability to the fullest extent permitted by law for any reliance placed in this report by third parties.

2.0 THE DISTRICT COUNCIL'S ACHIEVEMENTS OVER THE PAST 12 MONTHS

Ditch Clearance

- 1731 Linear metres WODC owned ditches cleared overall
- 1923 Linear metres Privately owned ditches cleared overall
- Overall 2.27 miles of ditches have been cleared

Flood Grants

- 1137 WODC Flood Grants totalling £284,250 given out overall
 - 6 (£1500) for Crawley
- 112 Red Cross Flood Grants totalling £211,590 administered by WODC overall
- 301 Hardship Grants totalling £155,050 given out overall

Reports

- Interim Flooding Report published October 2007
- 12 Parish Flood Reports completed by June 2008, 1 report for Crawley.

Actions from the Council's Interim Report published in January 2008

- The table below provides a summary of some of the completed actions identified in the report

Bronze command procedure to be updated to recognise the need for ensuring shift rotas are in place in the early stages of an emergency
Consider producing a revised warning system that identifies a higher category of risk that is only issued in exceptional circumstances
The emergency plan specifically addresses the need to keep in regular contact with elected members
That in future emergency situations District Councils ensure that they have a representative present at Silver Command from the start of the emergency to act as a conduit for information between Silver Command and the District Councils
The council should encourage all residents residing in the flood plain and in areas at risk of flooding to sign up to the EA Flood Alert system.
Provide clear information to residents and businesses about what type of waste we can collect and how it will be collected
Explanations to residents of our need for bulky waste to be placed on the roadside for collection
Commence a review of the mapping of the many thousands of privately owned ditches and culverts, and ensure they are kept clear and well maintained in accordance with the new policy (2 TOR 3)
Lobby central government for a single agency to take control of all land drainage issues
WODC continues to act in a coordination capacity with key external agencies
Continue to liaise with EA to ensure that procedures relating to planning consultations are robust. Seminar being arranged to take place during 2008 to progress this
Progress the Strategic Flood Risk Assessment
Approaches to be made to the EA and Metrological Office with regard to improving their predictive capability
During emergency events, have an external media person (BBC) in Bronze Command
Purchase digital TVs to assist with reviewing weather, local and national news to assist emergency management

3.0 EXECUTIVE SUMMARY

Following the flooding events of July 2007, West Oxfordshire District Council (WODC) has responded to requests from both Town and Parish Councils to aid the coordination of all the agencies and bodies that were undertaking their own investigations into the floods through the production of Parish Flood Reports.

This document is the Parish Flood Report for Crawley and has been prepared by the Council's Engineering team. It pulls together information from external agencies and individual property owners and seeks to identify the causes of flooding in Crawley during July 2007 and potential mitigating solutions.

The village of Crawley is situated in West Oxfordshire approximately 1.5 kilometres north west of Witney and contains two watercourses. The River Windrush, located in the southern section of the Parish flows north east towards Crawley from Minster Lovell where it meanders south alongside New Mill continuing south east towards Witney.

Showells Brook originates from Showells Spring to the north of Crawley village. The brook flows south then continues as an intermittently culverted channel in a south westerly direction through the centre of Crawley village, towards the confluence with the River Windrush east of Crawley Mill. A number of additional drainage ditches are present within water meadows to the south west of the Parish.

Visual walkover surveys have been undertaken of the flooded areas and affected properties. Meetings have been held with members of Crawley Parish Council (CPC) and some of the affected residents.

The EA's 'Witney Flood Review: July 2007' (February 2008) states that less than five properties were recorded as being flooded in Crawley as a result of the summer floods. WODC however have records of six applications for Flood Relief Grant Aid within the Parish.

Flooding experienced in Crawley has been assessed as two separate areas. Area 1 is Foxburrow Lane and the immediate surrounding area, which suffered flooding from Showells Brook as a result of flow restrictions presented by riparian vegetation and silt accumulation. Area 2 is Crawley Mill, New Mill and Crawley Village centre including Dry Lane, which suffered flooding directly as a consequence of overtopping of the River Windrush, agricultural drains and ditches.

Conclusions and recommendations, including maintenance and flood defence improvement measures and a programme, are provided in Section 7.

This report also includes Appendix 1 showing Photographs, Appendix 2 showing Maps and Appendix 3 provides a glossary.

4.0 SURVEY

4.1 Description of Area

The village of Crawley is situated in West Oxfordshire approximately 1.5 kilometres north west of Witney within the West Oxfordshire District Council administrative area.

The River Windrush is classified by the Environment Agency as a statutory 'Main River' flowing for approximately 64 kilometers through the English Cotswolds, and forming part of the River Thames catchment. The River Windrush flows towards Crawley in a north easterly direction from Minster Lovell where it meanders south to the east of Crawley Mill. Downstream of New Mill, the River flows south east towards the town of Witney. The approximate catchment size from the Flood Estimation Handbook (FEH) shows the area upstream of the village is 311 km².

Showells Brook is an 'ordinary watercourse', which originates from Showells Spring due north of Leafield Road. The Brook flows south from its source and continues as an intermittently culverted channel in a south westerly direction through the centre of Crawley Village, towards its confluence with the River Windrush east of Crawley Mill. The approximate catchment size from FEH shows that the area upstream of the village is 8 km².

OS mapping indicates that a number of additional drainage ditches are present within water meadows to the south west of the main village area.

4.2 Survey Method

A visual walk-over survey of the area affected by the July 2007 flooding has been undertaken, including the properties on Foxburrow Road. Meetings have been held with members of Crawley Parish Council (CPC) and some of the affected residents.

See Appendix I for photographs of the flooding during July 2007.

4.3 Meetings

Table I: Summary of Meetings and Flooding Descriptions

Date	Location	Description
05.02.08	Crawley Village	<ul style="list-style-type: none">• A meeting was held between Crawley Parish Council (CPC) and Mr. Philip Page of WODC who gave a presentation detailing the response of WODC in conjunction with the EA regarding the July 2007 flood event in Crawley.
22.07.08	Crawley Village	<ul style="list-style-type: none">• A meeting was held with CPC and some of the affected residents to discuss the causes and effects of the summer 2007 floods.• On Friday 20th July, residents observed that water levels in Showells Brook were high and that surface water was running quickly off the fields.• Water from Showells Brook flowed down Foxburrow Lane into the centre of the village. Floodwaters flowed at high velocity and mobilised large amounts of debris. Branches and sticks that normally attenuate flows were not effective (as they were during a more recent flood in January 2008).• When floodwater subsided residents noticed that large volumes of sediment were present in the channel.• On Saturday 21st July, water levels rose again in Showells Brook

		<p>as a result of high water levels in the River Windrush and a subsequent backing up of flows. Flow velocities were less than the initial flooding that occurred the day before.</p> <ul style="list-style-type: none"> • Residents felt that the management of surface water on agricultural land to the north east of the village had a large part to play in the flooding caused by Showells Brook. Concerns were also raised that riparian owners were not managing vegetation on the banks of Showells Brook, especially willow trees which affected flows in some areas resulting in a perceived increase in the risk of blockages. In addition, Dry Lane acts as a barrier to flood water as water is held upstream until levels are high enough to weir over the road and towards fields to the west. • Since the floods of July 2007, the outcome of discussions between Crawley Parish Council and local Riparian Landowners proved positive with regards to acknowledgment of their responsibilities following advice they received. Their progress with clearing the watercourses continues to be monitored by CPC.
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4.3 Stakeholder Communications and Actions

Table 2: Stakeholder Communications and Actions

Stakeholder	Description
CPC	<ul style="list-style-type: none"> • Crawley Flood Prevention Group provided a report to WODC which was prepared in April 2008 in response to the meeting with WODC and the EA in February 2008.
TW	<ul style="list-style-type: none"> • Jenny Elliott of Thames Water has been approached regarding historic sewer flooding and any plans for further work in Crawley. A comment has been returned that there are no plans for upgrading the public foul sewer.
WODC	<ul style="list-style-type: none"> • See Table 1
OCC	<ul style="list-style-type: none"> • Mr. Gordon Hunt of Oxfordshire County Council Highways Department has been approached regarding historic instances of highway flooding and any plans for future work in Crawley. OCC have not been able to provide comment.
EA	<ul style="list-style-type: none"> • Philip Garvey and Nick Read were approached in July 2008. • The EA are aware that New Mill is regularly maintained. • The EA advised that Showells Brook is an Ordinary Watercourse and was known to have caused significant flooding in July 2007. • At present no future EA flood defence work is planned upstream of Witney. • However, investigations are being undertaken into the feasibility of channel dredging though this is an invasive and unsustainable technique and is not normally favoured by the EA. • The 'Flood Review July 2007: Witney' (February 2008) was undertaken by the EA and this report makes reference to Crawley with regard to its effect on flooding in Witney.

4.4 Application for Grant Aid

The District Council has distributed a range of financial support to the residents of district in the form of;

- Emergency Flood Relief Grant Aid of £250
- 'Hardship' Grants
- Red Cross Grants

To date the owners of six residential properties in Crawley have received Emergency Flood Relief Grant Aid, however it is acknowledge this is not the total number of properties affected in the Parish as some owners have been reluctant to claim.

Whilst the Emergency Flood Relief Grant Aid was not paid to industrial and commercial properties, the Council did provide advice and support to local business affected by the flooding on funding available from Business Link and other organisations.

5.0 PROBLEMS AND CAUSES

5.1 Plans

Figure 1 in appendix 2 shows areas in Crawley where properties flooded in July 2007 and where owners have made claims for grant assistance. The flooding can be broadly split into two areas being:

Area 1 – Foxburrow Street and immediate surrounding area

Area 2 – Crawley Mill, New Mill and the surrounding area towards the centre of the village

A map detailing the following is shown in Appendix 2:

- 1% annual probability of flooding - Flood Zone 3 (previously referred to as 1 in 100 year flooding)
A plan showing the 2008 Environment Agency 1% probability Flood Zone, this is the area defined by the EA as the extent of a flood with a 1 per cent chance happening in any year. This is the high probability risk zone.
- 0.1% annual probability flooding – Flood Zone 2 (previously referred to as 1 in 1000 year flooding)
A plan showing the 2008 Environment Agency 0.1% probability Flood Zone, this is the area defined by the EA as the extent of a flood with a 0.1 per cent chance happening in any year. This is the medium probability risk zone.

5.2 Area 1 – Foxburrow Street and immediate surrounding area

The EA's 'Witney Flood Review July 2007'³ states that less than five properties were recorded as being flooded in Crawley as a result of the summer floods, however WODC recorded six.

Six properties in Area 1 claimed flood damage grants following flooding of July 2007. These properties are located in the EA Flood Zone 1 and Flood Zone 3 being at <0.1% and 1% risk of flooding from fluvial sources respectively.

On Friday 20th July 2007, Showells Brook overtopped its banks flooding Foxburrow Road to a depth of 0.3 metres (approximately 1.5 feet)⁴. The main cause of the problem was determined by Crawley Parish Council⁴ to be a result of significant debris and silt accumulation which caused damming of the Brook, leading to uncontrolled releases of large volumes of backed-up water. This created the potential for low lying properties to become inundated during the event.

Upstream of the village, Showells Brook has limited floodplain on the right bank (looking downstream). Water flowing out of bank upstream of the village can pool and flood the garden immediately above the Foxburrow Lane culvert. However, once water flows onto Foxburrow Lane it can only flow into the village centre.

Residential properties on Foxburrow Lane immediately to the east of the village square and properties on Dry Lane to the south of the village square are accessed by small bridges over Showells Brook. The presence of these structures reduces the capacity of the channel and increases the risk of blockage. However, the volume of water passing through the culvert beneath Foxburrow Lane upstream on Showells Brook is the main controlling factor.

The potential for flooding as a result of further heavy rainfall during early 2008 was recognised in time and flooding was subsequently prevented through action taken by CPC.

³ *Witney Flood Review July 2007 (February 2008), Environment Agency*

⁴ *Crawley Flood Prevention Group Report, Crawley Parish Council (April 2008)*

5.3 Area 2 – Crawley Mill, New Mill and the surrounding area towards the centre of the village

No properties in Area 2 claimed flood damage grants following flooding of July 2007. However, extensive flooding was experienced and flooding in this area also affected Area 1.

On Saturday 21st July 2007 floodwater overtopped the raised embankments along the reach of the River Windrush flowing through Crawley Parish. Floodwater reached the centre of Crawley village inundating Dry Lane and Witney Hill Road⁵ and making Spring Lane impassable⁶ until at least the 25th July. In their review of the summer 2007 flood, the EA³ note that even without the presence of any development in the floodplain, the channel capacity would have been significantly exceeded and water would have dispersed across the floodplain. The presence of existing industrial development only served to alter the flood flow routes.

The flow control infrastructure (sluice gates) historically required to power Crawley Mill were inundated by extremely high water levels. Historically, mill owners have the legal right to manage water levels in order to power their mill for manufacturing processes⁴. The bylaw that governs this right also states that the mill owner has the responsibility to not inconvenience adjacent landowners by flooding.

Two water wheels (now removed) previously occupied two separate mill races at Crawley Mill. The sluice gates at Crawley Mill have remained open and unadjusted since a previous flooding event which damaged the Old Mill main building. Combined with the removal of water wheels, the open sluice gates have resulted in unrestricted flow through the mill race.

One of the two mill races is largely obstructed by vegetation and silt, resulting in limited flows. Erosion of the banks of the second mill race is being experienced due to the resulting disproportionate flow volumes⁴. According to the EA³, the structure at New Mill (downstream of Crawley Parish in Hailey Parish) had been opened fully on the 18th July 2007. This was carried out as a reaction to rising water levels and media broadcast warnings. If the sluice at New Mill had remained closed during high flows, it would have exacerbated localised flooding to the buildings at the New Mill site.

The operation of the sluices at Crawley Mill, New Mill could play a critical role in ensuring that the floodplains upstream and downstream of the village are utilised to their maximum. The sluice at Crawley Mill remains in poor condition and the EA³ has confirmed that it remained open during the July 2007 event. Had the sluice been closed, it would have caused more extensive flooding of the industrial buildings and workshops at the site.

6.0 OPTIONS

The following table shows the possible options available for flood alleviation schemes throughout the Parish, and their potential effectiveness, as assessed by the District Council Engineers. The areas affected by flooding within the Parish have been given unique area numbers, i.e. Area 1. Several options for flood alleviation projects are identified for each area as “Actions” or “Options”.

Many of these options will require further detailed investigation along with the agreement of the responsible landowner, identification of budget and a cost benefit analysis to be carried out before they could be implemented.

Some of the options shown are also mutually exclusive, that is if one option is carried out then another will not be necessary, to find if this is the case for an option, please look at the detailed description in the Conclusions and Recommendations Section (7.0).

⁵ http://www.thisisoxfordshire.co.uk/mostpopular.var.1570449.mostviewed.flooding_roads_update.php Accessed 18/07/2008

⁶ http://news.bbc.co.uk/2/hi/uk_news/england/oxfordshire/6913025.stm Accessed 18/07/2008

If you require further information regarding a particular option, please contact the agency that would be responsible for implementation of the proposal, where this has been shown, using the contact information at the top of the column. If no contact details are shown, there may be a private landowner responsible. If this is the case the District Council will ensure that private landowners are made aware of their responsibilities.

Parish Flood Options										
Crawley										
Version 1 – July 2008										
Option Ref	Flood Overview	Description of work required					Key issues			Comments
		Options	Environment Agency	Oxfordshire County Council	Thames Water	WODC	Private	Effectiveness	Affects on Adjacent Land	
		For queries Tel 08708 506 506 Or email enquiries@environment-agency.gov.uk	Main switchboard: 0845 310 1111 Or e-mail: online@oxfordshire.gov.uk	Enquiries: 0845 200 800	Switchboard: 01993 861 000					
Area I – Foxburrow Street and immediate surrounding area										
	Flooding attributed to flow restrictions in Showells Brook									
A	Riparian landowners to remove restrictions to flow by actively clearing and managing vegetation within the channel and on the banks of Showells Brook.	To be undertaken in cooperation and agreement with the EA and with the necessary consents and licenses.			WODC to co-ordinate.	Riparian Landowner co-operation needed to organise clearance and maintenance of river channels and ditches.	Will increase the capacity of the channel and prevent silt accumulation, thus restoring the effectiveness of the channel to convey floodwater, and subsequently preventing flooding of Foxburrow Lane and immediate surrounding area.	Water levels at Crawley will be reduced, thus the flood risk will be reduced.	Up to £5,000	Information and advice given by CPC to Riparian Landowners. Progress being monitored.
B	Desilting of Showells Brook.	To be undertaken in cooperation and agreement with the EA and with the necessary consents and licenses.			WODC to co-ordinate.	Riparian Landowner and Parish Council co-operation required	Will restore effectiveness of channel to convey floodwater by increasing the capacity of the channel.	Water levels at Crawley will be reduced, therefore reducing flood risk.	£5,000 to £10,000	
C	Flood-resilient measures on properties. Additionally the Parish needs to create its own emergency flood plan.	The EA website contains reference information on flood resilient measures to properties.			WODC to approve emergency flood plan.	Homeowners to provide protection against flooding to their properties e.g. flood boards, flood proofing of exterior walls, sand bags.	Only effective if defences are put in place before the water level rises.	May increase flood risk to adjacent properties as flood water will be displaced	to £5,000	On completion of the emergency flood plan, it should be sent to WODC for approval and registration.

Option Ref	Flood Overview	Description of work required					Key Issues			Comments
		Options	Environment Agency	Oxfordshire County Council	Thames Water	WODC	Private	Effectiveness	Affects on Adjacent Land	
		For queries Tel 08708 506 506 Or email enquiries@environment-agency.gov.uk	Main switchboard: 0845 310 1111 Or e-mail: online@oxfordshire.gov.uk	Enquiries: 0845 200 800	Switchboard: 01993 861 000					
Area I – Foxburrow Street and immediate surrounding area (continued)										
D	Upsize Showells Brook culvert beneath Foxburrow Lane	To be undertaken in cooperation and agreement with the EA and with the necessary consents and licenses.			WODC to co-ordinate.	Riparian Landowner and Parish Council co-operation required.	Will improve conveyance of floodwater by removing flow restriction therefore reducing the risk of flooding on Foxburrow Lane	May increase risk of flooding to properties downstream as a greater volume of water will be conveyed downstream	to £10,000	
E	Reprofile or install bunds in the agricultural land adjacent to Showells Brook upstream of Crawley village to provide flood storage.				WODC to co-ordinate.	Riparian Landowner and Parish Council co-operation required.	Will reduce the volume of water reaching Showells Brook culvert beneath Foxburrow Lane and therefore reduce the risk of flooding to Crawley village		£5,000 to £10,000	
F	Upsize small bridges over Showells Brook which provide access to properties on Foxburrow Lane and Dry Lane.	To be undertaken in cooperation and agreement with the EA and with the necessary consents and licenses.			WODC to co-ordinate.	Riparian Landowner and Parish Council co-operation required.	Will improve conveyance of floodwater by removing flow restriction therefore reducing the risk of flooding on Foxburrow Lane		to £5,000 per bridge	

Option Ref	Flood Overview	Description of work required					Key Issues			Comments
		Options	Environment Agency	Oxfordshire County Council	Thames Water	WODC	Private	Effectiveness	Affects on Adjacent Land	
		For queries Tel 08708 506 506 Or email enquiries@environment-agency.gov.uk	Main switchboard: 0845 310 1111 Or e-mail: online@oxfordshire.gov.uk	Enquiries: 0845 200 800	Switchboard: 01993 861 000					
Area 2 – Crawley Mill, New Mill and the surrounding area towards the centre of the village										
	Flooding as a direct consequence of the River Windrush flowing north via Dry Lane.									
A	Riparian Landowners to remove restrictions to flow by actively clearing and managing vegetation within the channel and on the banks of both the River Windrush, and within mill races, agricultural drains and ditches in the Parish. This should particularly be implemented along the reach upstream of Crawley Mill to New Mill, including the secondary water race through Crawley Mill and those alongside Watery Lane.	To be undertaken in cooperation and agreement with the EA and with the necessary consents and licenses.			WODC to co-ordinate.	Riparian Landowner co-operation needed to organise the clearance and maintenance of river channels and ditches.	Will increase the capacity of the channel and prevent silt accumulation thus restoring the effectiveness of the channel to convey floodwater, and will allow floodwater to be effectively conveyed across the floodplain.	Water levels at Crawley will be reduced, thus the flood risk will be reduced.	to £5,000	Information and advice given by CPC to Riparian Landowners. Progress being monitored.
B	Ensure that hand operated sluice gates at Crawley Mill are fully refurbished and operational. A policy should be developed to oversee the control of the sluice gates at Crawley Mill and New Mill to attenuate flows within the upstream water meadows between Crawley Mill and Minster Lovell.	The EA should centrally oversee and administer the control of the sluice gates to deliberately flood the water meadows when necessary. This is not present policy, but professional advice could be given, to assist this action.			WODC to co-ordinate.	Landowners of water meadows and owners of Crawley Mill and New Mill to organise and fund the refurbishment of the gates.	Will utilise large storage potential of water meadows upstream of Crawley Mill, reducing water levels in Crawley Village centre and in Witney downstream.	May increase flood risk to properties at the Crawley Mill and New Mill sites as flood water will back up behind the sluice gates.		Practice abandoned approximately 5 years ago in response to fulfilling sustainability objectives.
C	Desilting or dredging of the River Windrush.	River Windrush is classified as a statutory main river. Work to be undertaken by the EA.			WODC to co-ordinate.	Riparian Landowners co-operation required.	Will restore effectiveness of channel to convey floodwater by increasing the capacity of the channel.	Water levels at Crawley will be reduced, thus the flood risk will be reduced.	£5,000 to £30,000	No current EA flood mitigation practices planned upstream of Witney where Crawley is located. It is possible that in the 09/10 programme, this work could be included.

D	Flood-resilient measures on properties.	The EA website contains reference information on flood resilient measures to properties.				Homeowners to provide protection against flooding to their properties e.g. flood boards, flood proofing of exterior walls, sand bags.	Only effective if defences are put in place before the water level rises.	May increase flood risk to adjacent properties as flood water will be displaced	to £5,000 per dwelling	
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7.0 CONCLUSIONS AND RECOMMENDATIONS

At present there is no co-ordinated management plan to control water levels along the reach of the River Windrush flowing through Crawley, or for Showells Brook through the centre of Crawley.

7.1 Area 1 – Foxburrow Street and immediate surrounding area

7.1.1 Maintenance

- Option A - Riparian Landowners to remove restrictions to flow by actively clearing and managing vegetation within the channel and on the banks of Showells Brook. This will increase the capacity of the channel and prevent silt accumulation, thus restoring the effectiveness of the channel to convey floodwater, and subsequently prevent uncontrolled releases of built up water upstream of Foxburrow Lane.

Since the floods of July 2007, the outcome of discussions between Crawley Parish Council and local Riparian Landowners proved positive with regards to acknowledgment of their responsibilities following advice they received. Their progress with clearing the watercourses continues to be monitored by CPC.

7.1.2 Flood defence improvement schemes

Immediate (under 1 year)

- Option C - Flood-resilient measures on properties. Additionally the Parish needs to create its own emergency flood plan. Homeowners need to be made aware of measures they can undertake to protect their own properties from flooding. Flood proofing measures, for example fitting demountable flood barriers, rendering external lower walls with waterproof sealants and having sand bags stored locally, should be implemented.

Medium Term (1 to 2 years)

- Option D - Upsize Showells Brook culvert beneath Foxburrow Lane
- Option B - Desilting or dredging of Showells Brook. This will restore the effectiveness of channel to convey floodwater by increasing the capacity.
- Option E – Reprofile or install bunds in the agricultural land adjacent to Showells Brook upstream of Crawley village to provide flood storage.

Long-Term (3 years or more)

- Option F – Upsize small bridges over Showells Brook which provide access to properties on Foxburrow Lane and Dry Lane.

7.2 Area 2 – Crawley Mill, New Mill and the surrounding towards the centre of the village

7.1.1 Maintenance

The following ongoing maintenance is recommended:

- Option A - Riparian landowners to remove restrictions to flow by actively clearing and managing vegetation (particularly existing Willows) within the channel and on the banks of both the River Windrush, and within other agricultural drains and ditches in the Parish.

This should particularly be implemented along the reach upstream of Crawley Mill down to New Mill, including the secondary water race through Crawley Mill and those alongside Watery Lane.

This will increase the capacity of the channel and prevent silt accumulation thus restoring the effectiveness of the channel to convey floodwater, and will allow floodwater to be effectively conveyed across the floodplain.

Since the floods of July 2007, the outcome of discussions between Crawley Parish Council and local Riparian Landowners proved positive with regards to acknowledgment of their responsibilities following advice they received. Their progress with clearing the watercourses continues to be monitored by CPC.

7.1.2 Flood defence improvement schemes

Immediate (under 1 year)

- Option D - Flood-resilient measures on properties. Additionally the Parish needs to create its own emergency flood plan.
Homeowners need to be made aware of measures they can undertake to protect their own properties from flooding. Flood proofing measures, for example fitting demountable flood barriers, rendering external lower walls with waterproof sealants and having sand bags stored locally, should be implemented.

Medium Term (1 to 2 years)

- Option C - Desilting or dredging of the River Windrush will restore the effectiveness of the channel to convey floodwater by increasing the capacity of the channel.

Long-Term (3 years or more)

- Option B - Ensure that hand operated sluice gates through which the River Windrush flows at Crawley Mill are fully refurbished and operational.
A policy should be developed to oversee the control of the sluice gates at Crawley Mill and New Mill to utilise their potential to attenuate flows within upstream water meadows between Crawley Mill and Minster Lovell, by utilising their large storage potential, thus reducing water levels in Crawley Village centre and in Witney downstream.

Appendix I: Photographs

Flooding July 2007



Source: Crawley Flood Prevention Group Report, Crawley Parish Council (April 2008)

Flooding July 2007



Source: Crawley Flood Prevention Group Report, Crawley Parish Council (April 2008)

New Mill Sluice Gates



Source: Crawley Flood Prevention Group Report, Crawley Parish Council (April 2008)

Crawley Mill Sluice Gates



Source: *Crawley Flood Prevention Group Report, Crawley Parish Council (April 2008)*

Showells Brook culvert exit beneath Foxburrow Lane



Photograph taken July 2008

Drain adjacent to the west of Dry Lane looking North (upstream)



Photograph taken July 2008

Mill Race and Crawley Mill looking south west (upstream)



Photograph taken July 2008

Mill Race and flow beneath Crawley Mill. A culvert to the left of the photograph is blocked with vegetation



Photograph taken July 2008

A typical bridge over Showells Brook to access property. Such structures reduce the capacity of the channel and present potential restrictions to flow.



Photograph taken July 2008