



WEST OXFORDSHIRE
DISTRICT COUNCIL

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Parish Flood Report: **Black Bourton**

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
 - 12 (£3,000) for Black Bourton
- 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

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 Black Bourton 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 Black Bourton during July 2007 and potential mitigating solutions.

Black Bourton is a rural parish located approximately 2 miles to the south of Carterton. The parish sits in the catchment of the River Thames and contains two watercourses, the Shill Brook and the Black Bourton Brook. The Shill Brook rises in farmland to the north of Shilton and flows in a south easterly direction, passing to the west of Carterton to the parish of Black Bourton. Here the watercourse flows through the centre of the village in a southerly direction before turning sharply to the east at the Village Green to flow towards Bampton.

The Black Bourton Brook rises in the centre of Black Bourton where it branches from the Shill Brook at an unattended weir structure. The watercourse flows in a southerly direction, flowing through the Parish of Clanfield before continuing south easterly to its confluence with the Radcot Cut at Sharney Bridge and onto the River Thames at Shifford.

Visual walkover surveys have been undertaken of the flooded areas and properties, and meetings have been held with the affected residents. WODC have record of 12 applications for Grant Aid in Black Bourton.

Flooding experienced in Black Bourton has been assessed as two areas (see section 4.1), comprising of Area 1: Station Road/ Burford Road Junction and Area 2: Burford Road.

Flooding at the Station Road/Burford Road junction (Area 1) has been attributed to under capacity of the Station Road Bridge, poor maintenance of the Shill Brook leading to it bursting its banks and inadequate highway drainage on the Burford Road.

Flooding on Burford Road (Area 2) has been attributed to excessive overland flow and inadequate highway drainage.

Another area of concern to the village is the extension of the impermeable area on Brize Norton RAF base; this has also been discussed both with the EA and the site drainage contractors, BREY.

Following the 2007 flood event, the villagers of Black Bourton have combined with the residents of Clanfield, Brize Norton and Alvescot to form a joint flood defence committee. WODC, OCC and the constituency MP have also held meetings with the village.

Flooding problems and how each public and private body is affected, effectiveness of each solution, affects on adjacent land and cost, are included in Section 5.

Conclusions and recommendations, including maintenance and flood defence improvement measures and programme, are shown in Section 6.

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

Black Bourton is a rural parish, located approximately 2 miles to the south of Carterton in the south Cotswolds. The Parish of Black Bourton sits in the catchment of both the Shill Brook and Black Bourton Brook.

The Shill Brook rises in farmland to the north of Shilton and flows in a south easterly direction, passing to the west of Carterton to the parish of Black Bourton. Here the watercourse flows through the centre of the village in a southerly direction before turning sharply to the east at the Village Green to flow towards Bampton and ultimately onto the River Thames.

The Black Bourton Brook rises in the centre of Black Bourton where it branches from the Shill Brook at an unattended weir structure. The watercourse flows in a southerly direction, flowing through the Parish of Clanfield before continuing south easterly to its confluence with the Radcot Cut at Sharney Bridge and onto the River Thames at Shifford.

Using the flood Estimation Handbook (FEH), the catchment area of the Shill Brook is estimated to be 38.5km².

The catchment area of Black Bourton Brook upstream of Black Bourton village is minimal. This is because the watercourse is a divergent channel of Shill Brook.

4.2 Survey Method

A visual walk-over survey of the area affected by the July 2007 flooding has been undertaken.

See Appendix I – Photographs.

4.3 Meetings

A summary of meetings about Black Bourton flooding in July 2007 are given in Table I.

Table I: Summary of Meetings and Flooding Descriptions

Date	Location	Description
15.05.07	Black Bourton	<ul style="list-style-type: none">• Meeting with MP David Cameron and villagers to discuss July 2007 flooding and residual concerns.• Concerns over housing development at Carterton.• EA planning reduction in manpower on Thames sluices.
16.05.07	Black Bourton	<ul style="list-style-type: none">• Meeting with village representatives/ BREY (RAF drainage contractors) and EA to discuss maintenance and proposed development on the air base and how this may affect Black Bourton.• Build up of debris on the trash screen of Shill Brook at exit from RAF Brize Norton has been reported.• Local residents understand that no planned drainage improvements are scheduled on Brize Norton airfield until 2010

06/06/08	Local residents descriptions of local issues	<ul style="list-style-type: none"> • Local residents have walked the Black Bourton Brook from the weir to the far side of the Clanfield to Bampton Road and the Shill Brook from Alvescot to Black Bourton. • It has been noted that the EA have done a good job of clearing the watercourses but the large amount of wood and debris removed from the Shill Brook illustrate the condition it was in during July 2007 which must have contributed to flooding in the village green • Local residents state that 'almost' nothing has been done in the period of 10 years up to July 2007 and local farmers were told not to clear ditches for fear of harming wildlife. • There is concern over the operation of lock gates and the affect that this may have on Black Bourton. • There is also concern over proposed development in Carterton and at RAF Brize Norton and the impact this may have on local watercourses.
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4.3 Stakeholder Communications and Actions

Details of conversations in May/June 2008 are included in Table 2.

Table 2: Summary of Telephone Calls made with EA, TW and OCC (June 2008)

Location	Description
EA	<ul style="list-style-type: none"> • EA confirmed that RAF Brize Norton will be re-designing the existing trash screen on the Shill Brook upstream of Black Bourton and will increase maintenance on the new structure, to include clearance of the grill on a monthly basis and clearance on an exceptional basis in times of flooding. It was not felt that leaving the trash screen partially blocked would be advantageous as the debris would at a point 'burst' through the trash screen and cause a sudden surge down the Shill Brook which could potentially cause more damage than regular maintenance • The EA do not currently offer a full flood warning service to the Shill Brook as they do not have any flood warning level gauges on the Shill Brook. • Defence Estates are constructing a new Aircraft service Platform (ASP), consisting of increased impermeable drainage areas. The ASP at Brize Norton falls into the category of 'permitted development' subject to consultation with the local planning authority. EA have met with consultants acting for Defence Estates and provided guidance relating to the control of runoff from impermeable areas and guidance relating to flood risk. The MOD agreed to design the ASP to a 1 in 100 year standard in accordance with Planning Policy Guidance 25 (PPG25) which was the relevant guidance at the time. As the works did not require planning permission, neither WODC nor EA have been able to review the drainage design of the surface water systems and cannot comment on their effectiveness. • The EA have confirmed that they intend the current weir structure and level at the head of the Black Bourton Brook to remain.
OCC	<ul style="list-style-type: none"> • A representative of OCC drainage team has been contacted regarding drainage in Black Bourton. • OCC has confirmed that Black Bourton has been visited with regard to drainage • OCC have suggested the use of swales to contain extra flow in the vicinity of the Village Green.

	<ul style="list-style-type: none"> OCC are aware that the surface water drainage system running in a pipe in the southern verge of the Burford Road at Model cottages outfalls to the Black Bourton Brook at a low level and will consequently be 'locked' during periods of intense rainfall.
WODC	<ul style="list-style-type: none"> Representatives from WODC regularly attend a flood prevention working group meeting at RAF Brize Norton with representatives from EA/OCC/BREY and TW.
TW	<ul style="list-style-type: none"> There have been no instances of foul water flooding reported in Black Bourton during July 2007.

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 12 residential properties Black Bourton have received Emergency Flood Relief Grant Aid, however it is acknowledge this is not the total number of properties affected in the Parishes 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, which can be found in appendix 2, shows areas in Black Bourton 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: Station Road / Burford Road Junction
- Area 2: Burford Road

The map shows areas where properties were affected by flooding in July 2007, overlaid with 2008 Environment Agency Flood Zones.

- 1% probability of flooding - Flood Zone 3 (previously referred to as 1 in 100 year flooding)
 - 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% probability of flooding – Flood Zone 2 (previously referred to as 1 in 1000 year flooding)
 - 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 – Station Road/Burford Road Junction

Within Area 1 are two watercourses, the Black Bourton Brook and the Shill Brook.

Three properties flooded in this area, one property is shown to reside in Flood Zone 3 (1% or 1 in 100 year floodplain) associated with Black Bourton Brook. During July 2007, flood waters from the Black Bourton Brook directly inundated one property at the junction of Station Road and Burford Road.

No properties are shown to reside in the floodplain of the Shill Brook at this location as the EA indicative floodplain outline indicates that once downstream of the Black Bourton Brook, the Shill Brook remains in channel throughout the remainder of the parish.

In July 2007, 5 homes in the above area were flooded.

Flooding is attributed to the following:

5.2.1 Inadequate capacity of the bridge at Station Road/Burford Road junction (see photo 2)

The capacity of the bridge opening was not sufficient to take the peak runoff flow in the Black Bourton Brook in July 2007. Water levels rose significantly in a short period of time causing backing up of water along the Black Bourton Brook and flooding of property.

5.2.2 Inadequate capacity of the Black Bourton Brook downstream of Station Road Bridge (see photo 4 and 5)

A site visit highlighted that the capacity of the Black Bourton Brook upstream of the road bridge is larger than that of the engineered channel downstream. Local residents believe that this led to backing up of the watercourse and prevented drainage of surface water away from the village.

Local residents stated that the River Thames was causing flooding in Black Bourton due to backing up along the Black Bourton Brook. This is unlikely as accounts downstream at Clanfield confirm that they were not flooded by the River Thames backing up along watercourses as the River Thames was not in flood at the onset of flooding in the villages (the river Thames has a longer response time to periods of heavy rainfall). The EA noted however, that 6 days after flooding was experienced in Clanfield in July 2007, flood water remained. This was then caused by the high levels in the River Thames preventing drainage of the area i.e. the levels in the Thames may have prevented flood waters from receding after the flood event.

5.2.3 Inadequate maintenance of the Shill Brook

Flooding in Area 1 was also caused by the Shill Brook breaching its banks. As water levels rose in the Shill Brook upstream of the junction with Black Bourton Brook, the banks were breached and water flowed across the floodplain to join the Black Bourton Brook and its associated floodplain, flowing towards the Station Road/Burford Road junction.

The Shill Brook is enmained and as such the EA have permissive powers for maintenance. However, local residents feel that the watercourse had not been maintained for at least 10 years prior to the July 2007 flood event and was full of vegetation and silt with overhanging trees, broken branches and collapsed banks.

5.2.4 Inadequate drainage on Burford Road (see photo 7)

The drainage provision on Burford Road consists of a ditch on the southern side of the road at Model Cottages. The ditch appeared to be poorly maintained on inspection in May 2008. The ditch enters a small culvert which outfalls to the Black Bourton Brook. Ownership of this ditch needs to be confirmed with OCC to allow the necessary works in Section 6.0 to be carried out.

Local residents confirmed that surface water and highway runoff was running straight down the Burford Road during July 2007. The outfall for the highway drainage is a small pipe to the Black Bourton Brook which due to its low level becomes submerged when the water level rises in the Brook.

The low invert level of the outfall into Black Bourton Brook may well have allowed flood water from the watercourse to 'back up' through the highway drainage system to inundate the Burford Road at the junction with Station Road. In addition to this, water would not have been able to drain away.

5.3 Area 2 – Burford Road

In July 2007, 8 homes in the above area were flooded.

Flooding here is attributed to the following:

5.3.1 Flooding from overland flow onto Burford Road

Burford Road falls at least 5-6m from north to south and is bordered on both sides by fields.

Following the period of heavy rainfall in July 2007, water flowed from the surrounding farmland and onto the Burford Road to flow to the Shill Brook. Where properties reside at lower levels, or have dropped kerbs, surface water flooding resulted.

Direct overland flow occurs when the ground either becomes fully saturated, preventing any percolation into the upper layers of soil, or where the rainfall intensity and rate is

greater than the percolation rate of the receiving ground. Both result in sheet runoff, or water flowing directly off the surface of the land.

Several properties along Burford Road and School Lane were affected by surface water flooding.

5.3.2 Inadequate maintenance of drainage on Burford Road

A site visit showed a number of gullies located on Burford Road between the abandoned railway line and School Lane. These connect into a piped system and a series of ditches which outfall to the Shill Brook at the Burford Road crossing.

During the period of heavy rainfall experienced in July 2007, ponding was observed on roads throughout the village. As the rainfall intensity increased, the surface water drains and gullies began to surcharge and water flowed down roads, increasing in depth until kerbs and drives were overtopped and properties with lower floor levels were flooded.

5.4 Other sources of flooding

During the meeting with Parish representatives on 7th May 2008, the question was asked as to whether any foul sewer flooding of properties had occurred in July 2007. It was confirmed that foul water flooding was not an issue during the July 2007 flood event.

15 properties flooded on Station Road in July 2007. All of these properties are located in the 2007 Environment Agency Flood Zone 1, comprising of land having less than 0.1% probability of flooding (less than 1 in 1000 year) of flooding from rivers.

The cause of flooding at this location is one, or a combination of the following

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 I. 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).

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										
Black Bourton										
Version 1 – June 2008										
Option ref	Flood Overview	Description of work required					Key issues			Comments
	Options	Environment Agency For queries Tel 08708 506 506 Or email enquiries@environment -agency.gov.uk	Oxfordshire County Council Highways: 0845 310111 Or e-mail online@oxfordshire.gov .uk	Thames Water Enquiries: 08459 200 800	WODC Switchboard: 01993 861000	Private	Effectiveness	Affects on adjacent land	Cost	
Area 1 – Station Road/Burford Road Junction										
	In July 2007, following a period of intense rainfall, water level in the Black Bourton Brook rose and surcharged at the Station Road bridge. Water levels backed up behind the bridge and flooded properties near to the Village Green									
A	Carry out a flood study on the Black Bourton Brook to include a hydraulic model of the watercourse to assess the capacity of the Station Road bridge in order to establish its effect on water levels upstream. Option – to increase the bridge capacity, either by replacing the existing Station Road bridge or by building a flood relief culvert.	Correspondence with the EA for data and advice	OCC to provide funding as part of a feasibility study into the bridge. Two options: 1) replace the bridge 2) Install an additional flood relief culvert running under the road parallel to the bridge.		WODC to provide co-ordination role		Hydraulic study will inform feasibility of the bridge. This has potential to solve the flooding problem although the level of protection can only be ascertained following hydraulic modelling	Flooding immediately downstream of the Station Road bridge may be increased. Hydraulic modelling would be required to define this.	£5k to £20k feasibility £100k to £250k new bridge	OCC have a priority list regarding bridge works based on structural integrity, therefore the Station Road Bridge is not a priority. OCC are not sure that the bridge is the restriction, the downstream channel may have a large influence, meaning that upsizing the bridge may have no impact.
B	Improve channel maintenance of Black Bourton Brook including the downstream reach to Clanfield	Black Bourton Brook is 'main river' EA to carry out maintenance. Consent is required if anyone else is to complete the work			WODC to provide co-ordination role		Will improve channel capacity and reduce flooding during lower return period events	Will contain flood waters in channel for longer and reduce flooding of surrounding land	Up to £5k to 20k	EA have cleared bankside vegetation – June 2008
C	Flood- resilient measures on properties.	The EA website contains reference information on flood resilient measures for use on properties			WODC to provide a co-ordination role where required	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	None	up to £5,000 per property	Homeowners have not been approached regarding flood resilience measures
	Flooding from combination of overtopping of Black Bourton Brook above the station road bridge and overtopping of Shill Brook above station road bridge									
D	Construct attenuation pond upstream of Glebe Farm	EA to investigate feasibility of attenuation pond			WODC to provide co-ordination	Could involve purchase of land from land owners	Will reduce flow reaching village green area	Will require land take and temporary inundation of storage basin during operation	£5k to £20k Feasibility £50k-100k costs	
E	Flood- resilient measures on properties.	The EA website contains reference information on flood resilient measures for use on properties			WODC to provide a co-ordination role where required	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	None	up to £5,000	Homeowners have not been approached regarding flood resilience measures
F	Improve take up of EA flood warning provision	EA to provide consultation and promote flood warning scheme			WODC to assist in promotion of scheme	Homeowners to sign up to Flood Warnings Direct	Will provide advance warning to minimise damage to properties			
G	Improve channel maintenance of Black Bourton Brook and Shill Brook in vicinity of village. Watercourses are EA main river	EA to examine recent maintenance history and improve					Will improve channel capacity and reduce flooding during lower return period events		£5k to £20k	OCC have already cleared channel since July 07 flooding

Parish Flood Options										
Black Bourton										
Version 1 – June 2008										
Option ref	Flood Overview	Description of work required					Key issues			Comments
	Options	Environment Agency For queries Tel 08708 506 506 Or email enquiries@environment -agency.gov.uk	Oxfordshire County Council Highways: 0845 310111 Or e-mail online@oxfordshire.gov .uk	Thames Water Enquiries: 08459 200 800	WODC Switchboard: 01993 861000	Private	Effectiveness	Affects on adjacent land	Cost	
	Highway drainage and overland flow Water from surrounding farmland flowed onto the highway where existing drainage was unable to cope with the volumes of water.									
H	Improve maintenance of existing highway drainage system, including a survey of pipe condition, blockages and ditch condition		OCC to inspect highway drainage and improve capacity where required (e.g. where roots have damaged or blocked pipe work)		WODC to confirm ownership of ditches in Black Bourton	Riparian owners to clear and maintain ditches where WODC show them to be responsible under the Land Drainage Act	Will identify improvements for operation of highway drainage		up to £5k to 20k feasibility	
I	Ditch system in southern verge of Burford Road nr Model Cottages links to Black Bourton Brook via a small outflow pipe. OCC to enlarge the outfall to the Black Bourton Brook and if possible, raise the level of the piped outfall to prevent locking and backing up of the system.	Liaison with EA	OCC to increase the size of out fall to Black Bourton Brook and raise the level of the outfall.				Will improve drainage during all return period events.	Improved land drainage	£5k to £20k Feasibility and construction	OCC are aware of the potential problems regarding the height of the outfall in relation to water level
J	OCC to increase the grip provision along the Burford Road between shill Brook bridge and Black Bourton Brook Bridge. OCC to investigate the feasibility of increasing the number of swales in the village green area to improve local highway drainage.		OCC to increase grip provision along Burford Road and investigate the feasibility of installing more swales in the village green area/		WODC to provide co-ordination		Will improve drainage of surface water from the highways into drainage ditches.	Improved land drainage	£5k to £20k	OCC suggested the use of more swales in the village green area
Area 2 – Burford Road										
	Flooding of property due to overland flow Surface water from surrounding farmland flowed onto the highway where existing drainage was unable to cope with the volumes of water									
A	Undertake blockage and siltation inspections of road gullies and associated drainage along the Burford Road. Where necessary undertake jetting or other clearance measures.		OCC to inspect highway drainage and improve capacity where required				Will identify improvements for highway drainage		up to £5,000	
B	Investigate the feasibility of creating a kerb line adjacent to property to prevent water from flowing from highway into property		OCC to complete kerbing works on Burford Road to prevent flooding to property. Where driveway access is required, these should be ramped where necessary		WODC to provide co-ordination role		Will prevent flooding of property from highway during lower return period events	None	£5k to £20k	
C	Flood- resilient measures on properties.	The EA website contains reference information on flood resilient measures for use on properties			WODC to provide a co-ordination role where required	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	None	up to £5,000	Homeowners have not been approached regarding flood resilience measures
D	Changes to land management e.g. contour ploughing to reduce direct runoff from farmland entering property	EA to advise land owner of land management techniques to reduce runoff or store water prior to flowing onto the lane at Lower End			WODC to provide a co-ordination role where required	Landowner/occupier of fields to change farming techniques to increase infiltration. Where fields are pasture, drainage ditches at perimeter fences should be installed to prevent runoff to highways	Can improve drainage of fields and reduce sheet flow run-off	None	up to £5,000	

7.0 CONCLUSIONS AND RECOMMENDATIONS

7.1 Area 1 – Station Road/Burford Road Junction

7.1.1 Maintenance

The following on-going maintenance is recommended:

- **Option B & G** - EA to improve maintenance of Black Bourton Brook and Shill Brook to include downstream reaches. EA have recently cleared vegetation on the Black Bourton Brook at the village triangle (June 2008).
- **Option H** - OCC to improve maintenance of existing highway drainage system to include a survey of pipe condition, blockages and ditch condition.

7.1.2 Flood defence improvement schemes

Immediate (under 1 year)

- **Option C & E** – Flood resilient measures to be installed on individual properties.
- **Option F – EA** to improve dissemination of information and take up of flood warning provision in Black Bourton.

Mid-Term (under 1 -2 years)

- **Option A** - OCC to complete feasibility of enlarging Station Road bridge opening at village green/Black Bourton Brook and/or installation of flood relief culvert.
- **Option D** – EA to complete feasibility of creation of a flood attenuation pond upstream of Glebe Farm (lower farm nr Station Rd).
- **Option I** - OCC to enlarge and raise the highway drainage outfall to Black Bourton Brook subject to a level survey allowing this to be achieved.
- **Option J** – OCC to increase the grip provision and maintenance along Burford Road between Shill Brook and Black Bourton Brook.

7.2 Area 2 – Burford Road

7.2.1 Maintenance

The following on-going maintenance is recommended:

- **Option A** – OCC to increase the frequency of maintenance of highway drainage along Burford Road.

7.2.2 Flood Defence Improvement Schemes

The following flood defence improvement schemes are recommended:

Immediate (under 1 year)

- **Option B** - OCC to complete feasibility of creating a kerb line adjacent to property to prevent water from flowing from the highway to property.

- **Option C** - Flood resilient measures to be installed on individual properties.
- **Option D** – Changes to land management techniques to include contour ploughing, hedgerow / associated ditch re-instatement to in order to interrupt run-off over large open fields

Appendix I: Photographs

Area I – Station Road/Burford Road junction



Photo 1 - Flooding on Station Road above the village green July 2007



Photo 2 – Station Road Bridge at village green

Area I – Station Road/Burford Road junction (cont...)



Photo 3 - Junction with Station Road – village green on right, looking towards Alvescot



Photo 4 - Black Bourton Brook looking upstream from Station Road towards Glebe Farm

Area I – Station Road/Burford Road junction (cont...)



Photo 5 - Black Bourton Brook – looking downstream from Station Road Bridge. Channel capacity smaller than upstream of the bridge (Photo 4)



Highway drainage
outfall

Station road bridge
downstream face

Photo 6 - Black Bourton Brook – Station Road Bridge to left, highway drainage outfall at bed level in right.

Area I – Station Road/Burford Road junction (cont...)



Photo 7 - Highway drainage on southern side of road above Station Road junction near Model Cottages. Channel was overgrown on inspection in May 2008.

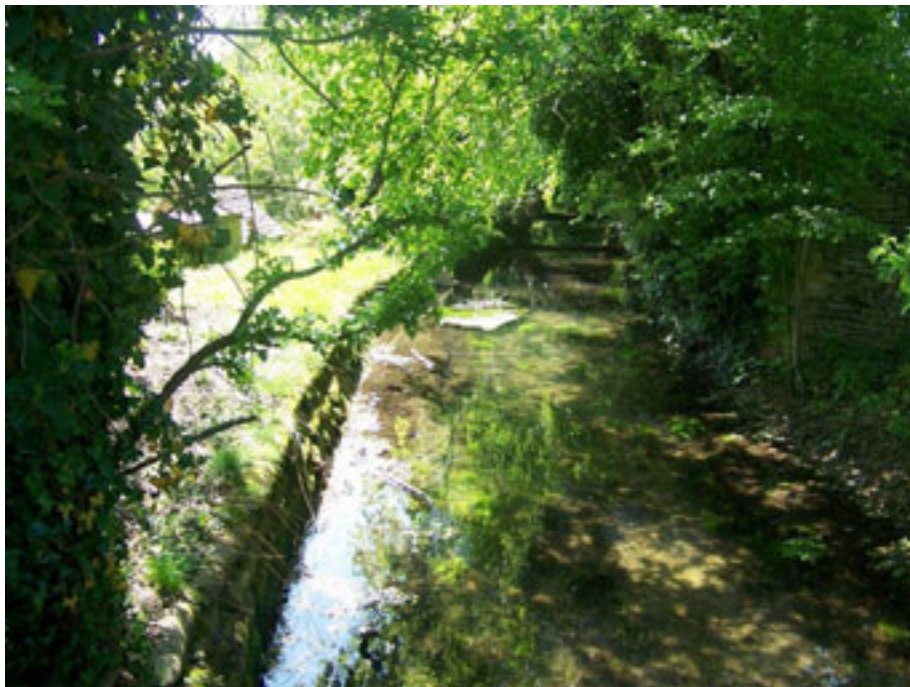


Photo 8 - Shill Brook through village – looking upstream from footbridge near to village green

Area I – Station Road/Burford Road junction (cont...)

Photo 9 – looking along Burford Road with Model cottages on left illustrating overgrown drainage ditch.



Photo 10 – Highway drainage at Model Cottages

