WEST OXFORDSHIRE
DISTRICT COUNCIL

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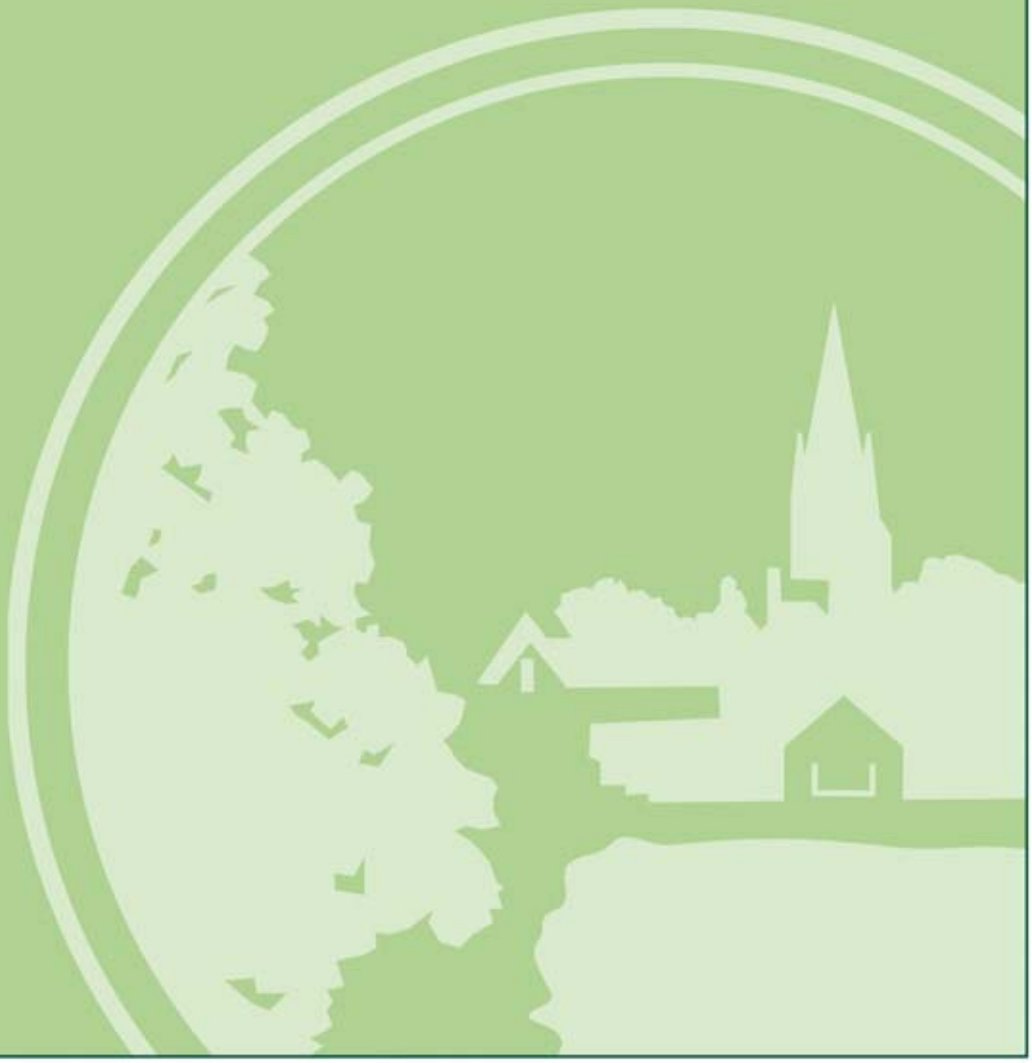
Parish Flood Report:
Milton Under Wychwood

May 2008



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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 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 organisations 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 powers[1] 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 riparian[2] land owner, and permissive powers[1] 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

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
    - 14 (£3,500) for Milton under Wychwood
- 40 Red Cross Flood Grants totalling £80,929 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 Milton under Wychwood

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 Milton-under-Wychwood 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 Milton under Wychwood during July 2007 and potential mitigating solutions.

Milton-Under-Wychwood is a rural parish located approximately 8 miles to the south west of Chipping Norton and 6 miles north of Burford in the heart of the Cotswolds. The parish sits in the catchment of the River Evenlode and contains two watercourses, the Little Stock Brook and an un named watercourse that crosses the Shipton road at Wychwood C of E Primary School.

Visual walkover surveys have been undertaken of the flooded areas and properties. Meetings have been held with affected residents and a Parish Councillor. WODC have record of 14 applications for Grant Aid in Milton-Under-Wychwood.

Flooding experienced in Milton-Under-Wychwood has been assessed in three separate areas (see section 5) comprising The Heath (Area 1) and The Old Mill (Area 2) and The Quart Pot Pub (Area 3).

The Heath (Area 1) suffered extensive damage with 7 properties experiencing flooding, costing £400,000 in repairs. Flooding was noted as originating from two main sources being the Little Stock Brook as water backed up from the Church Road bridge and excessive localised overland flow.

The Old Mill in Milton-Under-Wychwood (Area 2) has flooded frequently in recent years which has been attributed to a combination of factors: poor maintenance of the downstream watercourse, blockage of road gulleys, overloading of the Thames Water pumping station and localised overland flow (see photos of Area 2 – The Old Mill included in Appendix 1)

The Quart Pot Pub (Area 3). The road outside the Quart Pot Pub in the village centre experiences surface water flooding on a regular basis. These flooding problems have been attributed directly to the road drainage and poor maintenance.

Flooding problems and options, including description of works and how each public and private body is affected, effectiveness of each solution, affects on adjacent land and cost, are included in Section 6. Priority ranking is also included here.

Conclusions and recommendations, including maintenance and flood defence improvement schemes and programme, are shown in Section 7.

4.0 SURVEY

4.1 Description of Area

The village of Milton-Under-Wychwood the largest of 'the Wychwoods' in terms of area, which also include Shipton-Under-Wychwood and Ascott-Under-Wychwood. It is located approximately 8 miles to the south west of Chipping Norton and 6 miles north of Burford in the heart of the Cotswolds.

The parish is rural in nature forming part of the catchment area for the River Evenlode. The village sits in between two watercourses, the first is located to the north of the village flowing through 'The Heath' and across Church Road in a west-east direction to its confluence with the River Evenlode. This watercourse is known as the Little Stock Brook. The second is located to the south of the village, flowing in a south west – north east direction, crossing the Shipton Road at Wychwood C of E Primary School before flowing to its confluence with the Little Stock Brook at the Thames Water Sewage works to the east of the village. This watercourse is not named on Ordnance Survey Plans and for the purpose of this report will be referred to as the old Mill Stream.

The catchment of the Little Stock Brook is approximately 6.95km^2, including Grange Farm, Fifield and Idbury to the watershed at the A424.

The catchment of the Old Mill Stream is a similar size of approximately 6.59km^2, including Upper Milton and Milton Downs.

A map of both catchment areas is included in Appendix 2.

4.2 Survey Method

A visual walk-over survey of properties affected by the July 2007 flooding has been undertaken including The Heath, the Old Mill and the Quart Pot Pub. A visual inspection of the Little Stock Brook and The Old Mill Stream have also been made.

See Appendix 2 – Photographs.

4.3 Meetings

A summary of meetings about Milton Under Wychwood flooding in July 2007 are given in Table 1.

Table 1: Summary of meetings and flooding descriptions

Date	Location	Description
19.03.08	WODC Witney	• To discuss flooding in Milton and data that can be provided by WODC. • It was confirmed that OCC carry out gulley cleaning 1.25 times a year.
26.03.08	Properties at 'The Heath'	• Meeting with local residents to discuss flooding at 'The Heath'. • Whole of 'The Heath' was flooded in July 2007. • The Little Stock Brook flows in open channel in front of the properties flooded and water entered the properties. • A tributary of the Little Stock Brook passes to the rear of the properties and also inundates properties at the same time.

		• Properties were flooded to a depth of approximately 300mm. • £400,000 has been spent on repairing the properties affected following the July 2007 event. • The water rises and falls very quickly with a 5hr duration on flooding. • There is concern over allowing an additional property to be built on land in the Heath that is prone to flooding – this will exacerbate the problem • Residents state that the bridge crossing Church road is not big enough, water backs up and floods their properties. • The location of Church Meadows land drainage is upstream of the bridge adding to flooding.
26.03.08	The Quart Pot Pub	• Meeting with the resident of the Quart Pot Pub to discuss flooding of the road outside the Quart Pot Pub in the village centre. • During periods of heavy rainfall surface water collects at the junction of the High Street, Church Road and Shipton Road. • Water did not enter the pub although waves from traffic were up to the doorway. • There is no local knowledge of gulley's being cleared and visual inspection showed that they were in a poor state, heavily silted up.
26.03.08	The Old Mill	• Meeting with the owner of the garage and previous owner of the old Mill to discuss flooding at the property. • During periods of heavy rainfall surface water collects in the Shipton Road outside the Old Mill. • Waves from traffic wash over the front of the property and have led to flooding. The resident felt that the road drainage was not sufficient. • The property is also flooded from overland flow from fields at the rear where the old mill pool used to be located. • The area has been affected by flooding from foul sewage as during times of heavy rainfall the Thames Water pumping station has failed leaving to flooding in the road of foul sewage. • There is concern as school children walk through contaminated water to reach the adjacent school.
26.03.08	Milton Under Wychwood	• General look at affected properties not listed above including The Sands and Shipton Road where surface water entered properties from surrounding roads. • Gullies were in a poor condition, heavily silted.

WODC has liaised with the Environment Agency, Oxfordshire County Council and Thames Water. All of the above have met with residents of The Heath and carried out visual inspection of The Little Stock Brook at The Heath.

Details of conversations in April 2008 are included in Table 2.

Table 2: Summary of Telephone Calls made with EA, TW and OCC.

Company	Comments
EA	EA have completed a flood review for the July 2007 event for The Upper Cotswolds which includes Milton-Under-Wychwood. The EA have recommended the following: • Further investigation to increase the flow capacity of the bridge at the Heath be carried out • Further investigation of the surface water drainage system in Milton-Under-Wychwood. Particularly to determine whether surface water could be routed downstream of Heath Bridge. The report also mentions that the Little Stock Brook is on their annual winter maintenance schedule with trimming of banks, weed cutting and removal of obstacles scheduled for November each year. The EA consider that the provision of upstream storage at the Heath is unlikely to bring significant reductions to flood levels. This first report dated March 2008 is currently being reviewed and updated.
OCC	OCC have visited the Heath and are proposing to investigate the removal of the surface water outfall from Church Meadow from upstream of Church Road bridge at the heath to downstream OCC were unaware of flooding problems at the Quart Pot Pub. OCC felt that road drainage at the Mill would be greatly improved if the adjacent ditch was cleared to allow water to flow.
TW	Thames Water have provided the following comment on Milton-Under-Wychwood: All the wychwoods drain to Milton-Under-Wychwood, flooding at Milton during July 2007 prevented access to the pump station. The area suffers from SW and river water entering the foul system via public and private covers (inundation) and also misconnections. The village was sewered (designed) as foul only flows, however, it would appear that many have connected patio/roof drainage etc to the foul system therefore making the system storm responsive. The Heath – investigations (97DD R241) uncovered problems with the foul sewers flooding The Heath – namely hydraulic incapacity in the sewer downstream of the flooded properties and replicated surcharge/flooding conditions. The analysis recommended upsizing 104m of 150mm to 60m of 225mm, 36m of 250mm and 8m of 300mm. The line of the sewer was also improved. The study assessed the sewer pumping station (SPS) capacity, which is deemed adequate for the population served. These works were completed in 2005. Pump levels were also dropped at the SPS to enable better draw down.

4.3 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

There have been 14 applications for Grant Aid from in the Parish of Milton-Under-Wychwood.
Many locations have been surveyed to verify the claim. All claimants have been given a sum of £250 towards Emergency Aid.

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 shows areas in Milton-Under-Wychwood where properties flooded in July 2007 and where owners have made claims for grant assistance. The flooding can be broadly split into three areas being:

Area 1: The Heath
Area 2: The Old Mill
Area 3: The Quart Pot Pub and other surface water flooding

The remaining properties that do not fall into any of these areas are highlighted as being affected by flooding on the plan in Appendix 2.

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 of 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

- River Catchment Boundaries – this is a plan showing river catchment boundaries and locations of watercourses.

5.2 Area 1 – The Heath

In 2007 properties located in The Heath were affected by flooding and claimed flood damage grants. Approximately £400,000 was spent on repairs to the properties.

The properties are located in the 2007 Environment Agency 1% probability of flooding (1 in 100 year Flood Zone) associated with the Little Stock Brook.

The last severe flood was in 1979.

The Little Stock Brook collects runoff from a rural upstream catchment of approximately 6.95km2 including Grange Farm, Fifield and Idbury to the watershed at the A424.

The cause of flooding is assumed to be the following:

5.2.1 Inadequate capacity of the bridge at Church Road
The capacity of the opening of the bridge at Church Road was not sufficiently adequate to take the peak runoff flow in the Little Stock Brook in July 2007. Water levels the Little Stock Brook rose significantly in a short period of time. It was recorded that the water level was greater than the capacity of the Church road bridge which led to 'backing up' of water along the Little Stock Brook running both in front, and behind properties at the Heath. This led to flooding of an approximate depth of 300mm within properties.

5.3 Area 2 – The Old Mill

One property flooded in July 2007, although the area is known to flood regularly as it is located in a natural low point on the Shipton Road.

The property is located in the 2007 Environment Agency 1% probability of flooding (1 in 100 year Flood Zone).

We have assumed the cause of flooding to be one or a combination of the following:

5.3.1 Road runoff
The property is located in a dip on the Shipton Road and had a door sill level at road level hence any wash from traffic in the road entered under the door. The door has subsequently been filled in and now water washes across the front of the house.
Road runoff discharges to the old mill watercourse which is heavily overgrown and silted up.

5.3.2 Natural Low Point in catchment
The property was historically used as a water mill and is located in a natural low point in the catchment. Even through the mill run has been culverted, the property is located in a natural flow path and is affected by overland flow from the rear of the property.

5.3.3 Pumping station
The Thames Water pumping station located opposite Mill Cottage on the Shipton road is unable to cope with peak volumes of surface water arriving from the village combined sewers during peak storm periods. This has led to foul flooding across the Shilton Road.

5.4 Area 3 – The Quart Pot Pub and other surface water flooding

The pub was not flooded internally during the flood event of July 2007 however wash from traffic reached the door. Surface water regularly collects at the junction of the High Street, Church Road and Shipton Road.

The property is not located in any Environment Agency Flood Zones.

5.4.1 Road runoff
Seven further instances of flooding have been recorded across Milton. All of these flooding instances have been attributed to surface water flooding due to low kerb lines, allowing water to wash into properties, and poor maintenance of existing gullies.

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).

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

Milton Under Wychwood

`Version 1 – April 2008

Option ref	Flood Overview / Options	Description of work required: Environment Agency	Oxfordshire County Council	Thames Water	WODC	Private	Key issues: Effectiveness	Affects on adjacent land	Cost	Comments
		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: 08459 200 800	Switchboard: 01993 861 000 Parish clerk tel: 01993 831365					
Area 1 – The Heath - 7 properties flooded, low frequency, high impact										
	Primary Cause - Following periods of heavy rain, (such as July 2007), water level in the Little Stock Brook rises and surcharges at the Church Road Bridge. Water backs up the Little Stock Brook and floods properties at The Heath.									
A	Carry out a flood study on the Little Stock Brook to include a computerised Hydraulic model of the watercourse to assess the capacity of the Church Road bridge in order to establish its effect on water levels upstream. Option - Increase bridge capacity either by replacing the existing Church Road Bridge or by building a flood relief culvert. Hydraulic modelling to be used to establish bridge span required to accommodate flood flows in the watercourse. This is a large project and funding would need to be agreed. Channel and bridge survey required.	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 existing road bridge. 2) Install an additional flood relief culvert running under the road parallel to the bridge. N.B. all options need to look at Flood Defence impact on downstream property		WODC to provide a co-ordination role		Hydraulic Study will inform on feasibility of the bridge This has potential to solve the flooding problem although level of protection can only be ascertained following hydraulic modelling.	Flooding immediately downstream of the Church Road bridge may be increased. Hydraulic modelling would be required to define this	£5k to £10k survey £5k to £10k model approx > £100k for new bridge	OCC have been approached regarding the bridge replacement. They have a proioity list based partly on structural integrity, therefore the Church Road bridge isn't currently high priority.
B	Re-direct surface water from Church Meadow to outfall downstream of the Church Road Bridge so as to reduce flows upstream during periods of heavy rain.		OCC to remove existing highway drainage outfall to the Little Stock Brook and replace it to outfall on the downstream side of the Church Road bridge.		WODC to provide a co-ordination role.		This will ease flooding of the Heath by ensuring highway run-off from Church Meadow does not enter upstream of the road bridge.	Flooding immediately downstream of the Church Road bridge may be increased. Hydraulic modelling would be required to define this	£5k to £20 k	OCC are aware of this and have agreed to carry out work.
C	Changes in land management upstream e.g. contour ploughing	Advise landowner of upstream catchment on land management techniques to reduce runoff or store water prior to reaching the Little Stock Brook.			WODC to provide a co-ordination role.	Landowners to change farming technique so as to increase infiltration. More hedgerows to be planted across the slope to reduce overland flow rates.	Studies have shown that this has mixed results	There will be a change in land use in the upstream catchment	Riparian owners time Up to £5k	Landowners in the upstream catchment have not been approached, it may be possible for landowner/farmer to obtain environmental grant to plant hedgerows.
D	Increased in upstream and site storage	Consent required and modelling assistance. The EA may form a partnership with residents.			WODC to provide a co-ordination role with participation from the EA.	Landowners and farmers to be approached. Residents gardens could be re-landscaped and lowered to provide flood storage.	Depending on storage area provided, this could prevent flooding up to the 1 in 100 year storm.	There will be a change in land use in the upstream catchment	Depends on extent of works. £50k to £100 k	Landowners in the upstream catchment have not been approached. Land negotiations and compensation would greatly increase cost.
E	Maintain the Little Stock Brook to prevent blockage during a flood event.	Where watercourse is enmained, EA to carry out channel maintenance			WODC under Land Drainage Act to ensure riparian owners carry out maintenance.	Where not enmained, riparian owner to clear watercourse when required.	This will provide a level of protection against property flooding caused by ditch blockages.	None	Riparian owners time	Riparian owners currently clear brook at The Heath. EA have removed debris from Little Stock Brook post July 2007
F	Flood resilient measures on properties in the 1 in 100 year Flood Zone.					Homeowners to provide protection against flooding to their properties e.g flood boards, flood proofing of exterior walls, sand bags.	Only effective if the flood boards are put in place before the water level rises.	None	Up to £5k	Some homeowners have already bought flood resilient measures.

G	Build flood defence wall along watercourse banks on The Heath.	Consent required			WODC to provide a co-ordination role.	Build bund/wall along banks of the Little Stock Brook to prevent flooding to houses. The bund/wall would have to surround the houses completely to prevent overland flow entering from the rear. Hydraulic modelling would be required to assess impact on surrounding land. Access bridges etc to be flood gated.	Depending on height of bund/wall and its construction this could be effective up to the 100 year flood event and higher. Will only work effectively with designated flood wardens in The Heath to operate gates etc if home owners are away	There may be changes on flooding to adjacent property (raising flood levels), the extent of which could only be established through hydraulic modelling.	£5k to £20k	Property owners not approached regarding this option.
Area 2 – Old Mill Cottage – 1 property flooded, high frequency										
	One property flooded at a regular frequency of a number of times a year. **Cause 1 – Surface water collecting at low spot in road**									
A	Highway drainage located at Mill cottage is not capable of draining the road. A substantial pool of water has to collect before any water drains away.		OCC to carry out a CCTV survey of road drainage and manholes to establish condition of the highway drainage.				Information collection	None	Up to £5k	OCC feel that drainage ditch needs to be cleared before highway drainage would work effectively.
B	Clear road gullies		OCC to Clear road gullies along Shipton Road.				Reduce road flooding (assuming road drainage is working). Reduction in flood risk from flood water washing onto the Mill from the road.	This will not cause or exacerbate flooding in other areas.	Up to £5k per annum based on 1.25 clearance per year	OCC clear road gullies 1.25 times per year.
C	Re-design highway drainage		OCC to re-design highway drainage to use ditches/swales on the northern side of the road to slow rate of runoff and reduce pooling of water in the road at the mill.		WODC to provide a co-ordination role		Reduction in flood risk from water washing onto the Mill.. Safer driving conditions.	This will not cause or exacerbate flooding in other areas.	£5k to £20k	OCC feel that drainage ditch needs to be cleared before highway drainage would work effectively.
D	Maintenance of watercourse that is located on the northern side of the Shipton Road, on the downstream side of Old Mill Cottage.	Potential land drainage consent required. Consult EA on ecology and potential for presence of contaminated silt which would require a waste licence.			WODC to provide a co-ordination role. WODC to examine powers under the Land Drainage Act which may enable forced clearing of the blocked ditch.	The Ditch needs to be cleared out and de-vegetated at least to the point where the two ditches converge downstream of the property. A regular maintenance strategy needs to be devised to be undertaken at regular intervals e.g. every year.	Reduction in flood risk from water washing onto the mill and safer driving conditions Works will allow the road drainage to work more efficiently as will be able to drain to the ditch	This will not cause or exacerbate flooding in other areas.	Up to £5k	Riparian owner has not been approached.
	Cause 2 – Failure of Thames Water Pumping Station **Storm water runoff from properties in Milton Under Wychwood are connected to the pumping station on the northern side of the Shipton Road at the Old Mill. During times of flood the pumping station fails causing flooding of foul water of the Shilton road and The Old mill.**									
E	An assessment of the Thames Water pumping station needs to be made			Thames Water to complete an assessment of the pumping station and up-sizing where required.	WODC to provide a co-ordination role.		This scheme should totally remove risk of foul sewage flooding the road and the Old Mill.	This will not cause or exacerbate flooding in other areas.	Thames Water to provide 100% funding £5k to £20k	

	Cause 3 – Overland flow from rear of property **The property forms a barrier to the natural flow path of overland flow.**									
F	Re-create a mill pool upstream of the property where it originally was to act as storage during times of heavy rain. Replace existing culvert under garden with a culvert of larger capacity or open the culvert up. The culvert under the road needs to be investigated and cleared. The new culvert will connect to the newly cleared ditch.	EA to provide advice on capacity of mill pool.	The potential for OCC to provide part funding should be investigated as this works may reduce the strain on highway drains as overland flow will be reduced	The potential for TW to provide funding should be investigated as works will reduce overland flow and resulting flow to the pumping station. This may ease capacity problems.	WODC to provide a co-ordination role	Funding to be provided by landowner	Works will help to prevent flooding to the Mill and road and could potentially reduce loading on the TW pumping station	Adjacent field required to construct mill pool. This will not cause or exacerbate flooding in other areas.	£5k to £20k	Landowners in the upstream catchment have not been approached. Land negotiations and compensation would greatly increase cost.
G	Flood resilient measures on properties in the 1 in 100 year Flood Zone.					Homeowners to provide protection against flooding to their properties e.g flood boards, flood proofing of exterior walls, sand bags.	Only effective if flood boards are put in place before the water level rises. There is no flood warning in place.	None	Up to £5k	Property owner not contacted.
Area 3 – Quart Pot Pub										
	Primary Cause – Inadequate road drainage									
A	Clear Road Gullies.		Clear out road gullies on Church Road at junction with the high Street, The High Street from Poplar Farm Close to Church Road and Shipton road from the High Street to the Old Mill.				If blockages are removed and road gulleys maintained, ponding should no longer occur.	Reduce risk of flooding from road	Up to £5k	Consultation with OCC – OCC unaware of problem. Gullies are cleared 1 and ¼ times per year.
B	Raise the kerb and pavement levels around the Quart Pot Pub		OCC to raise pavement and kerb levels for 10m around the Quart Pot Pub					This will not cause or exacerbate flooding in other areas.	£5k to £20k	
C	Install additional point gullies or linear drainage channels in the area around Quart Pot Pub that is susceptible to flooding.		OCC to provide additional surface water drainage at the Quart Pot Pub				Additional surface water drainage will reduce flood risk in this area.	This will not cause or exacerbate flooding in other areas.	£5k to £20k	

7.0 CONCLUSIONS AND RECOMMENDATIONS

7.1 Area 1 – The Heath

7.1.1 Maintenance

The following on-going maintenance is recommended (Option E):

- The watercourse running behind the properties is not highlighted by the EA as being enmained. Therefore, riparian owners should maintain the watercourse to reduce potential blocking of the Church Road bridge.
- The Little Stock Brook running in front of the houses on the Heath is shown to be enmained and is the responsibility of the EA. Ditches to be cleared out by the EA when required to prevent blocking of the Church Road Bridge.

7.1.2 Flood defence improvement schemes

The following flood defence improvement schemes are recommended:

Immediate (under 1 year)

- Option B – OCC to remove existing highway drainage outfall to Little Stock Brook and replace it out falling downstream of the bridge.
- Option F – Flood resilient measures on properties in the 1% (1 in 100 year) Flood Zone

Mid-Term (under 1 -2 years)

- Option A – Increase bridge capacity (to include flood study of Little Stock Brook) either using a flood relief culvert or by increasing bridge span. Decision to be made as to most suitable method using results of the hydraulic model.

Long-Term (3 years or more)

- Option C – Changes in land management upstream, planting of hedgerows.
- Option D – Increase in upstream storage
- Option G – Build flood defence wall along watercourse banks on The Heath

7.2 Area 2 – The Old Mill

7.2.1 Maintenance

The following on-going maintenance is recommended:

- OCC to clear and maintain road gulleys along the Shipton Road (Option B)
- Riparian owners to clear and maintain ditch located on the northern side of Shipton road adjacent to the Thames Water pumping station (Option D).

7.2.2 Flood defence improvement scheme

The following flood defence improvement schemes are recommended:

Immediate (under 1 year)

- OCC to carry out a CCTV survey of highway drainage at the Mill to establish its condition. (Option A) and re-design if required (Option C)
- Thames Water to carry out an assessment of the capacity of the pumping station and increase capacity if required (Option E).

Mid-Term (under 1 -2 years)

- Option F – re-create mill pool upstream of the old mill to act as storage during times of heavy rain and either de culvert the watercourse running across the property or re-construct the existing culvert including clearance of the Shipton Road crossing to prevent backing up and flooding of the property. Riparian owner to complete this work.

7.3 Area 3 – The Quart Pot Pub

7.3.1 Maintenance

The following on-going maintenance is recommended:

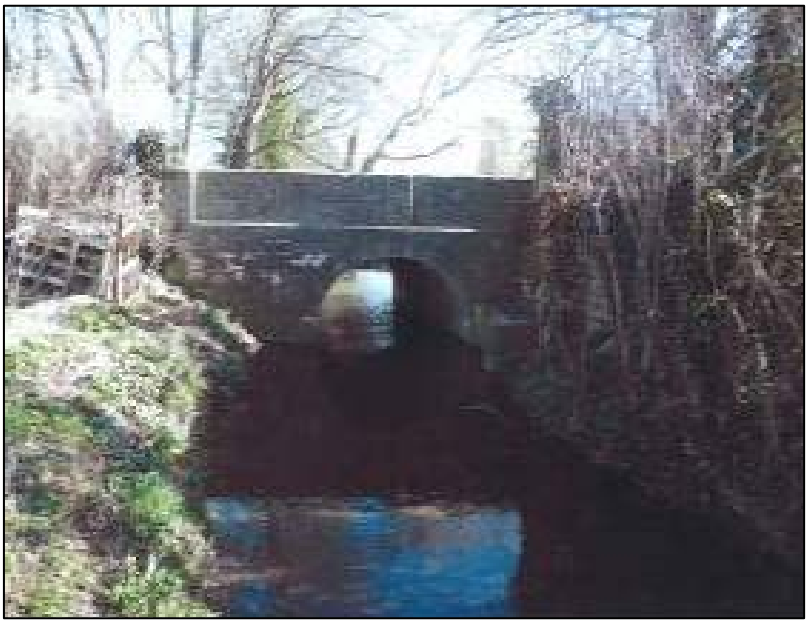
- OCC to clear and maintain road gullies along Church Road, The High Street and Shipton Road (Option A)

7.3.2 Flood defence improvement scheme

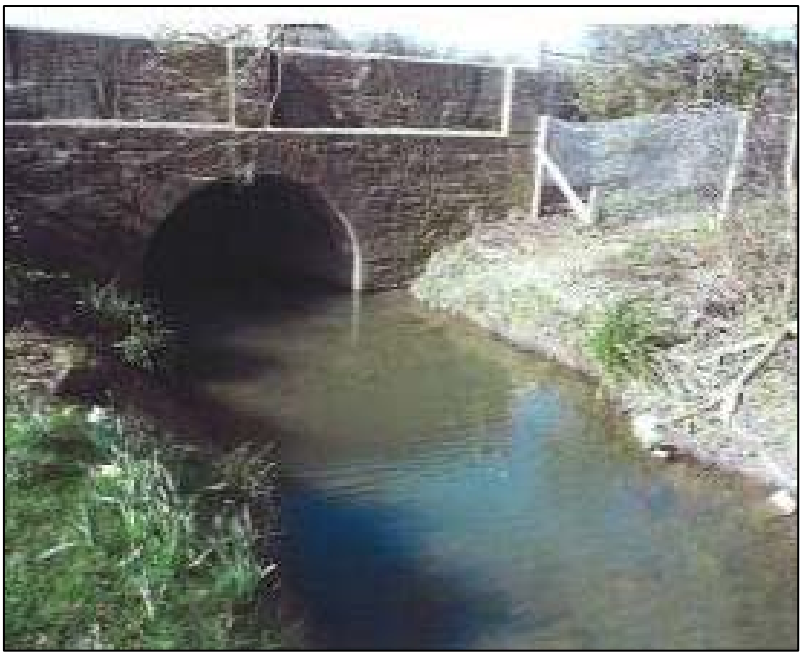
- Kerb and pavement levels to be raised by OCC around the Quart Pot Pub (Option B).
- OCC to provide additional surface water drainage at this location (Option C).

Appendix 1: Photographs

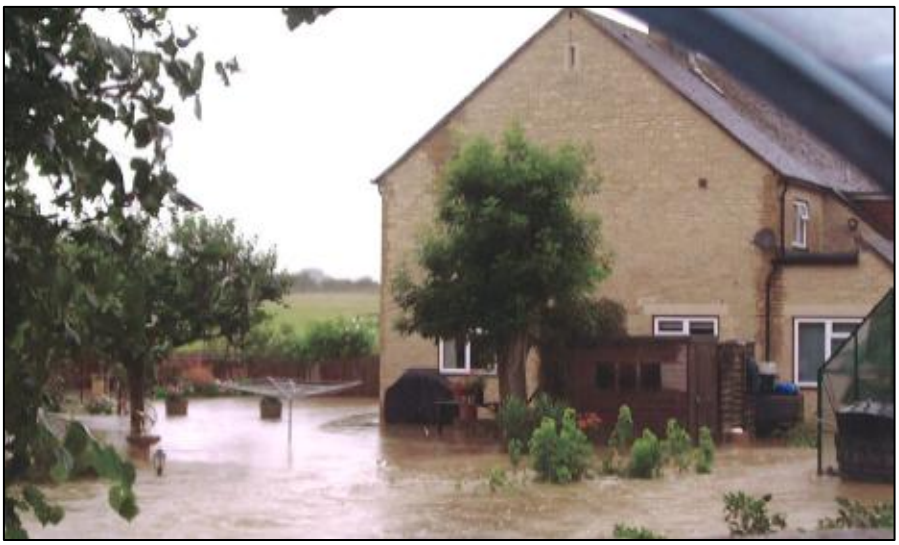
Area 1 – The Heath
Church Road Bridge, looking downstream along Little Stock Brook



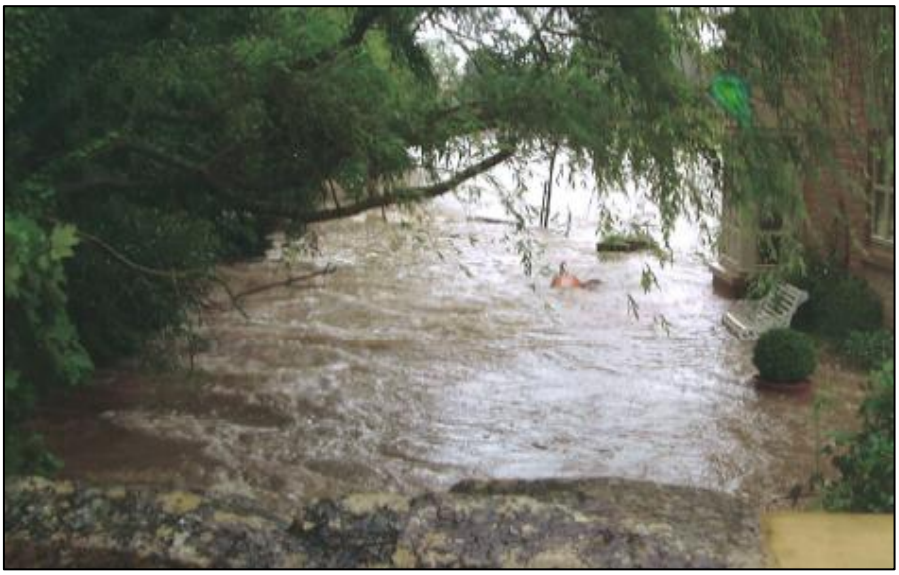
Area 1 – The Heath
Church Road Bridge, looking upstream along Little Stock Brook



Area 1 – The Heath
July 2007 flood, looking upstream from Church Road Bridge to properties at the Heath

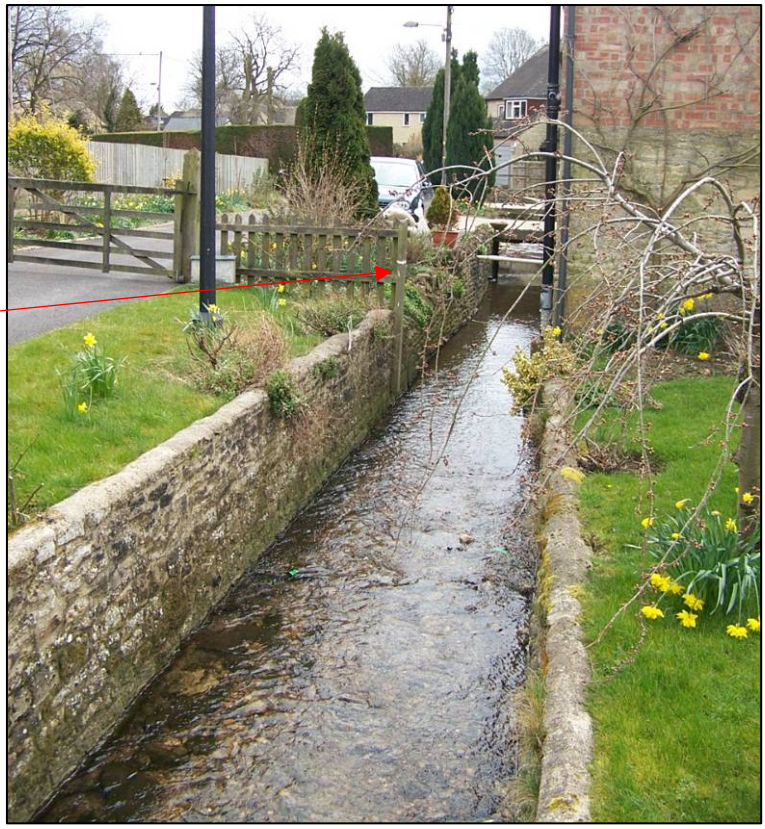


Area 1 – The Heath
July 2007, looking downstream from Church Road Bridge along Little Stock Brook

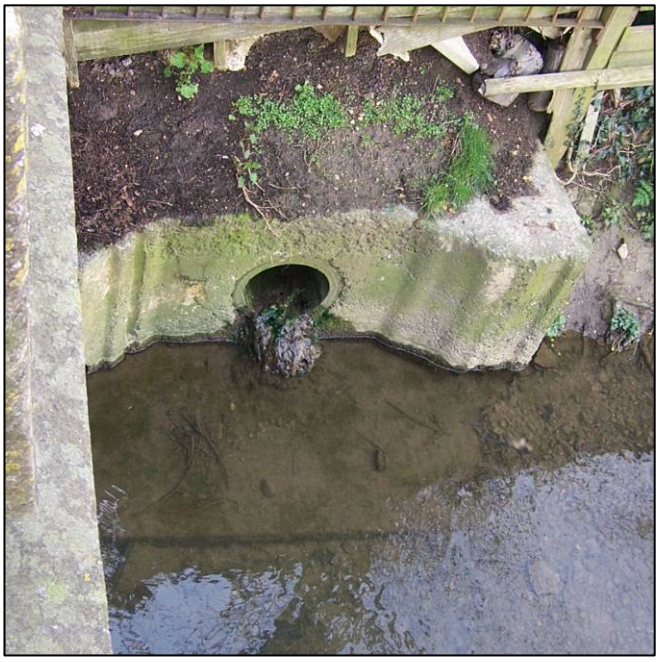


Area 1 – The Heath
Little Stock Brook running in front of properties

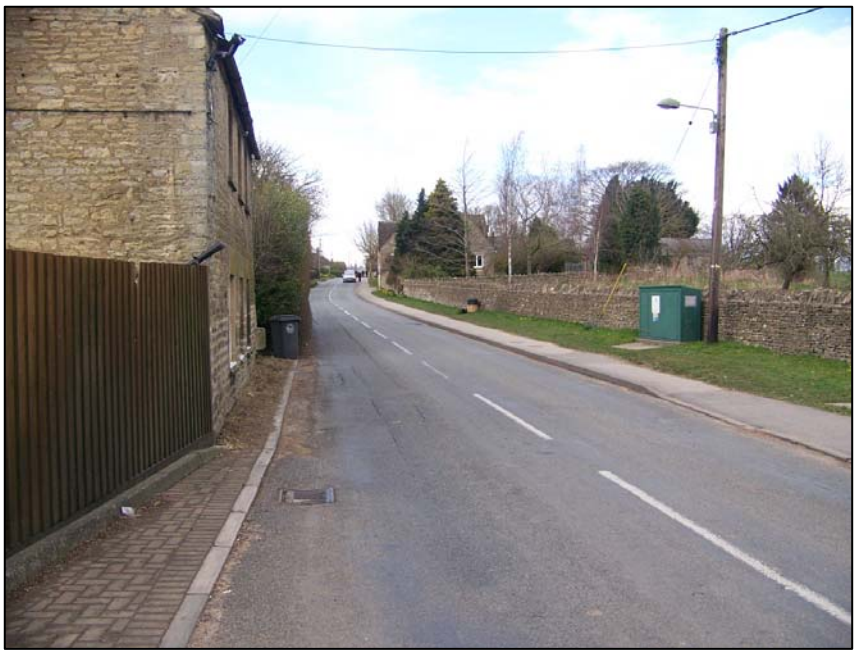
White mark shows height of flood water July 2007



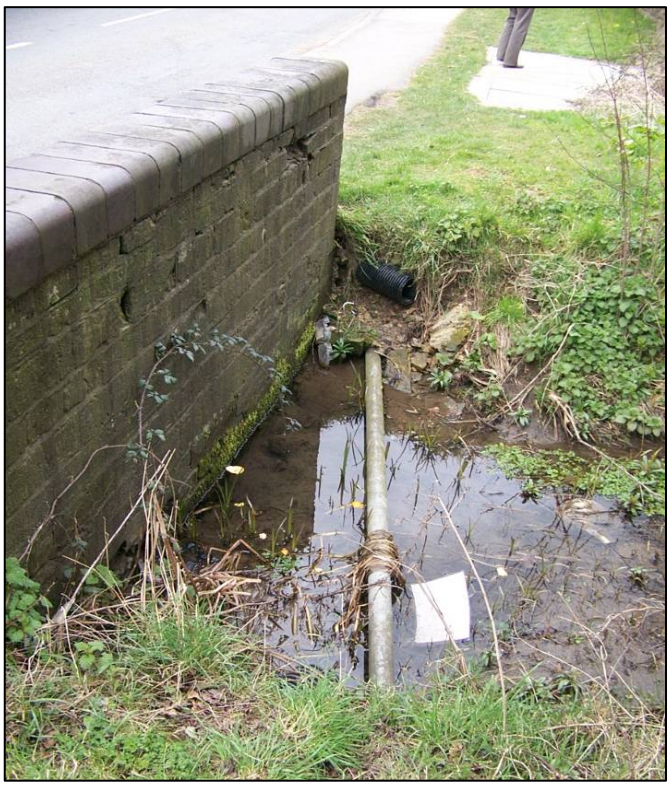
Area 1 – The Heath
Road drainage outfall from Church Meadow



Area 2 – The Old Mill
Looking towards Milton along the Shipton Road, showing location of the Old Mill and Thames Water pumping station

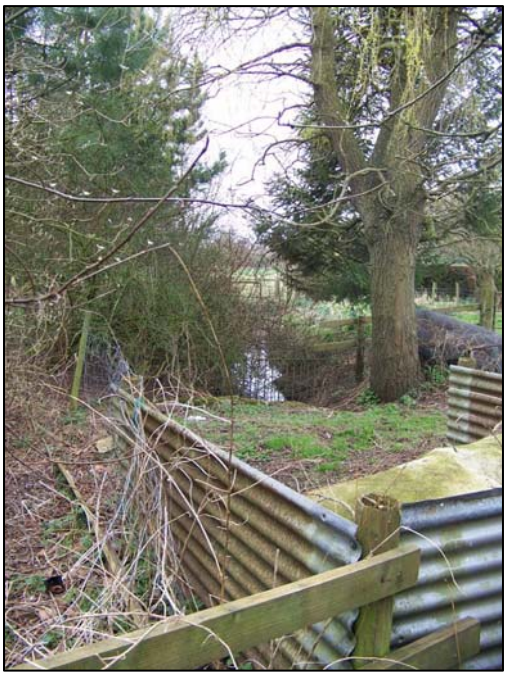


Area 2 – The Old Mill
Road Drainage outfalls to blocked ditch



Area 2 – The Old Mill

View along the overgrown ditch that receives water from the highways and the upstream culvert running under the Old Mill.



Area 2 – the Old Mill

Looking away from the rear of the Old Mill, open water can be seen to enter a culvert but there is no obvious outfall.