



WEST OXFORDSHIRE  
DISTRICT COUNCIL

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# Parish Flood Report: **North Leigh**

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 powers<sup>1</sup> 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<sup>2</sup> land owner, and permissive powers<sup>1</sup> 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.

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<sup>1</sup> 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

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

## **1.5 Legal**

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## 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
  - 8 claimants in the Parish of North Leigh (given £250.00 each) totalling £2,000.00
- 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 North Leigh

### 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 North Leigh 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 North Leigh during July 2007 and potential mitigating solutions.

The Parish of North Leigh is located approximately 3 miles to the north east of Witney. The Parish has around 1000 properties, a small industrial estate, primary school and church and includes the villages of North Leigh, East End and New Yatt.

North Leigh falls within the River Evenlode flood warning area for Shipton-under-Wychwood to Cassington.

The Parish is largely rural located in the catchment of the River Thames. Two watercourses flow directly through the Parish including the River Evenlode meandering in a south easterly direction along the north eastern Parish boundary and a smaller un-named watercourse which is a tributary of the River Evenlode. This tributary watercourse rises in farmland to the west of the Parish and flows in a north easterly direction to its confluence with the River Evenlode near to Ashford Mill.

Flooding in the Parish of North Leigh has been assessed in four separate areas (see section 4.1), comprising North Leigh (Area 1), East End at Fairview (Area 2), East End at The Willows (Area 3) and Ashford Bridge (Area 4).

Five properties claimed flood damage grant in July 2007 in North Leigh, including one property on New Yatt Road. Flooding in this location has been attributed to inadequate maintenance of highway drainage and overland flow.

One property in East End at Fairview (Area 2) claimed flood damage grant following the flooding of July 2007. However, wide scale flooding of farmland, gardens and the highway is regularly experienced in this location. Flooding in this area has been attributed to highway drainage issues caused by insufficient grip provision and inadequate maintenance of field drainage systems. Overland flow is a major contributing factor with flood water inundating the rear of properties in East End.

One property in East End at The Willows (Area 3) claimed flood damage grant following the flood event of July 2007. As in East End at Fairview, flooding of farmland, gardens and the highway is regularly experienced at this location, with 5 incidents of flooding recorded this year alone. Flooding has been attributed to overland flow caused by inadequate maintenance of land drainage ditches and under sizing of the highway drainage culvert running under the lane in front of property.

Ashford Bridge (Area 4) has record of one property having flooded to a depth of 1.5m (5 feet). Ashford Mill Farm has a mill race running underneath the property and is located adjacent to the River Evenlode. Flooding at this location has been attributed to direct flooding from the River Evenlode.

## **4.0 SURVEY**

### **4.1 Description of Area**

The Parish of North Leigh is located approximately 3 miles to the north east of Witney. The Parish has around 1000 properties, a small industrial estate, primary school and church and includes the villages of North Leigh, East End and New Yatt.

The Parish is largely rural located in the catchment of the River Thames. Two watercourses flow directly through the Parish as described below:

The **River Evenlode** flows in large meanders in a south easterly direction forming the north eastern boundary of the Parish. The River Evenlode rises near Moreton-in-Marsh in the Cotswold Hills and flows south-east passing Stow-on-the-Wold, Bladon, North Leigh and Eynsham before reaching its confluence with the River Thames at Cassington.

A second un-named tributary of the River Evenlode rises in farmland to the west of the Parish of North Leigh at the site of a Roman Villa and flows in a north easterly direction to its confluence with the River Evenlode near to Ashford Mill Farm.

Using the Flood Estimation Handbook (FEH) the catchment of the River Evenlode is calculated to be approximately 256km<sup>2</sup> at the upstream face of Ashford Bridge and the tributary, approximately 9km<sup>2</sup> to its confluence with the River Evenlode.

The Parish also includes a large number of field drainage channels and road side ditches which connect to the above river systems, described in more detail in Section 5.0.

### **4.2 Survey Method**

A visual walk-over survey of properties affected by the July 2007 flooding has been undertaken including East End, Ashford Mill Farm and the New Yatt Road.

See Appendix 2 – Photographs.

### **4.3 Meetings**

A summary of meetings held, and correspondence received documenting flooding experienced in July 2007 in the Parish of North Leigh are given in Table 1 below:



**Table I: Summary of meetings and flooding descriptions**

Date	Location	Description
11/07/08	East End	<p>Site meeting with local residents, describing flooding in East End starting at North Leigh Common end of the lane, working north towards Ashford Bridge.</p> <p>Residents of The Malt House reported that during periods of intense rainfall, water from the pond at the front of their property “gushes” onto the road and drains away rapidly. Water from the fields behind to the west drain to this pond. Residents report that there is little water in the ditch to the north of their property and water appears to drain from north to south.</p> <p>Residents of Fairview note that there is a major build up of water from land to the north of their property, land which is currently unregistered. Residents have installed a series of ditches in this land that outfall to the highway to aid drainage. Residents feel that re-surfacing of the road has impacted on road runoff which is poor. Ditches on the opposite (eastern) verge need clearing. Blenheim Estates have agreed to clear ditches under their ownership in October 2008.</p> <p>Local residents feel that changes in local land use may have impacted on the local land drainage. There is also concern that heavy vehicles crossing land at the rear of properties in East End have prevented the runoff of overland flow to existing drainage ditches which in places are running dry, which has not been known in over 12 years.</p> <p>Residents along the road report the same issue, that water is flowing from farmland at the rear into property and that land drains and ditches need clearance and maintenance.</p> <p>Highway drainage in front of ‘The Willows’ connects to a catch pit on the western verge of the lane. Here two highway drainage pipes connect to a land drainage outfall and cross the highway in a piped culvert to connect to a ditch on the east of the highway. This culvert is undersized and flooding occurs at this location.</p> <p>In the same area large volumes of overland flow collects from the rear of the property, flowing to this culvert. Land drainage ditches are unable to cope with the volumes of water and instead, water flows over adjacent farmland. Ponds in the vicinity have not been cleared and due to their reduced capacity, more water outfalls to this location putting extra pressure on the culvert system which is unable to cope. At the time of writing property in this location had been flooded 5 times in 2008.</p> <p>Property adjacent to access to East End farm have reported standing water in the gardens where none used to appear, 15 times in 2007 and 4 times so far in 2008. Residents have been in this property for over 30 years and have only experienced flooding in the last 4-5 years.</p> <p>Land to the north of East End Farm was, in 1969 ridge and furrow, then ploughed flat in the 1970s. A grant was then given for drainage of the land and a ditch put in place on both sides of the land (one running along</p>

		<p>the northern side of East End farm driveway which led to a pond which is still shown on maps today. The land was made ridge and furrow to prevent standing water which is now common. Some of the drainage ponds are now overgrown in this area.</p>
	East End – The Green	<p>Properties in The Green have experienced flooding from surface water runoff flowing from the highway into property. OCC have carried out works to remediate this but local residents report that some gullies remain blocked.</p> <p>Local residents report a great increase in overland flow from adjacent farmland in The Green which is flowing onto property. It has been noted that runoff from fields starts early on in a rainfall event, but the larger flows of water do not start until rain has been falling for some time and continues for a period of time after the rainfall event has ended.</p>
	Ashford Mill Farm	<p>Direct flooding from the River Evenlode was experienced at this location. Insurance of over £300,000 was claimed. Residents note that the river banks of the Evenlode have widened by about 1.5m (5 feet) over the last 30 years and it is felt that the EA are not doing enough to maintain the river. Landowner has carried out major tree surgery work on one side of the river bank, but work remains to be done on the other side of the river bank by different landowner.</p> <p>N.B. Local residents of East End completed questionnaires in June 2008 describing recent flood events. WODC hold a copy of these questionnaires which should be referred to when proposing future works in the area.</p>
	North Leigh	<p>Met WODC to discuss surface water flooding at New Yatt Road. WODC have been liaising with OCC to solve problems with highway drainage at this point.</p>

WODC has liaised with the EA and OCC and meetings with residents have been held to discuss flooding issues.

A summary of correspondence with the EA, OCC and TW is included in Table 2 below:

**Table 2: Summary of correspondence with EA, TW and OCC.**

Company	Comment
OCC	<p>OCC have met with local residents on site at The Willows with a representative from Blenheim Estates. OCC comment that flood waters are flowing from farmland in East End, through property and to the highway where there are some problems being caused to the highway. OCC have planned to carry out the following works in this financial year:</p> <ul style="list-style-type: none"> <li>• OCC will re-cut the grips along East End Lane.</li> <li>• OCC will construct an additional culvert under the road outside The Willows in East End.</li> </ul> <p>OCC are aware of highway drainage issues along New Yatt Road and plan to carry out works to increase the pipe size out falling from the road to the attenuation pond.</p>
EA	<p>The EA schedule maintenance of main rivers based on flood risk priority and resources. The EA have confirmed that the River Evenlode at North Leigh is classed as a low risk system as the total number of properties within the floodplain is low with little risk to life. This category was reviewed in April 2008. No regular maintenance is scheduled for this section of watercourse, only removal of blockages should they occur.</p> <p>The EA would support riparian owners wishing to undertake maintenance of watercourses subject to them gaining EA consent where required.</p>
TW	<p>There have been no instances of foul water flooding. TW have therefore not been contacted as part of this study.</p>

#### **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 8 residential properties in North Leigh 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 North Leigh where properties flooded in July 2007 and where owners have made claims for grant assistance.

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

The flooding can be broadly split into four areas being:

### 5.2 Area 1 – North Leigh

Four properties in the village of North Leigh and one property on the North Leigh/New Yatt road claimed flood damage grant following flooding of July 2007. These properties are located in the Environment Agency Flood Zone 1, being at low risk of flooding from fluvial sources.

Flooding at this location has been attributed to the following:

#### 5.2.1 Overland Flow

Direct overland flow occurs when either the ground becomes fully saturated, preventing any percolation into the upper layers of soil, or where 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.

A number of properties in the village of North Leigh have been flooded due to overland flow from farmland at the rear of property.

On the New Yatt Road on its approach to New Yatt from North Leigh, a shallow land drainage ditch is located in the south eastern verge. This land drainage ditch has no outfall, and during periods of heavy rainfall it becomes overwhelmed and water flows onto the highway and in turn floods property situated at lower levels in relation to the highway.

#### 5.2.2 Highway Drainage Issues

On the New Yatt Road, overland flow from adjacent farmland outfalls onto the road leading to flooding of the highway. At this point, a gully with a small carrier pipe of approximately 150mm diameter is provided to deal with highway drainage. The gully and carrier pipe connect to a balancing pond on the boarder of land used by the business park, across a field approximately 100 metres away from the road. Due to the small capacity of the carrier pipe, this system quickly becomes surcharged and water can not drain from the highway and instead floods the highway. OCC agree that the highway is not adequately drained at this location.

### **5.3 Area 2 – East End – vicinity of ‘Fairview’**

One property claimed flood grant aid in East End in the vicinity of Fairview in July 2007. This property is located in the Environment Agency Flood Zone 1, being at low risk of flooding from fluvial sources.

Properties in East End in the vicinity of Fairview have experienced flooding. Overland flow from farmland at the rear of properties used to collect in a series of land drainage ditches which have become blocked due to poor maintenance and water now flows over the surface of land, finding the natural low point and flow path. This brings water through the rear of property on the west of the lane and onto the lane at the front of property. At this point surface water connects into the highway drainage system and outfalls to a ditch which flows along the boundary of North Leigh Common and onto a stream flowing in a northerly direction to the River Evenlode at Abel Wood.

Local residents have noted that water appears to pond in land to the north of affected property (unregistered land) and it was from here that water is seen entering the house. Following this event, local residents have installed a series of ditches into the unregistered land to outfall to the highway drainage system as described above.

A new tennis court has been constructed in this area and following the advice of WODC, a drainage system has been installed to ensure no adverse effect to property.

A second, separate drainage system flows in the western verge of East End Lane, flowing in a northerly direction, away from North Leigh Common. This conveys water flowing off farmland to the west, and the highway which then collects in a pond located in the garden of The Malt House. Site visits showed no obvious outfall from this pond and local residents report that during periods of intense rainfall this pond overflows onto the highway which then drains away rapidly to a ditch system running along field boundaries at North Leigh Common and onto a stream flowing in a northerly direction to the River Evenlode at Abel Wood.

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

#### **5.3.1 Overland Flow and inadequate maintenance of drainage ditches**

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.

Water flows from farmland directly into the rear of property located on East End Lane. This is caused by poor maintenance of field drainage ditches and associated ponds. Flooding has occurred at this location in July 2007, March 2008 and June 2008.

#### **5.3.2 Highway drainage issues**

During periods of intense rainfall, surface water quickly collects on East End Lane flowing in a northerly direction towards a low point in the vicinity of Fairview due to inadequate grip provision (See photo 1 and 2). This leads to flooding of the highway.

### **5.4 Area 3 – East End vicinity of The Willows**

One property claimed flood grant aid in East End in the vicinity of The Willows in July 07. This property is located in the Environment Agency Flood Zone 1, being at low risk of flooding from fluvial sources.

A small section of land located between ‘The Willows’ and ‘Chalfont’ is located in a natural drainage path conveying overland flow from farmland at the rear of property. Land drainage from farmland in this area

has historically been controlled using a series of ditches which connect to a culvert running between The Willows and Chalfont (photo 3). This culvert then outfalls to a catch pit in front of these properties (photo 8) and into a second piped culvert conveying flow under the road. The second culvert outfalls to a ditch on the eastern verge flowing along a field boundary to Abel Wood and the River Evenlode.

During periods of intense rainfall, the ditch system is overwhelmed and water flows across farmland to flood property on East End Lane. The culvert system quickly becomes surcharged and water flows across the ground surface following its natural drainage path through property.

A sketch interpretation of flow routes in the area of The Willows is included in Appendix 2.

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

#### **5.4.1 Overland Flow**

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.

In the vicinity of East End Farm are a number of poorly maintained ditches and ponds. During periods of heavy rain, water, instead of using the system of ditches flows across the surface of fields and into a well maintained ditch at the rear of property at East End Lane. The outfall from this ditch becomes surcharged and floods property.

#### **5.4.2 Road Runoff**

During periods of heavy rainfall, road runoff flows along the road surface and pools at low points causing flooding to the highway.

A site visit highlighted that highway drainage connects to the catch pit as described above and into a culvert under the road. The culvert under the road appears to be under capacity and water backs up and floods the highway and surrounding land until it reaches a level that allows it to flow over the road to the ditch to the east. The surcharging of this system also causes water to back up through the land drainage pipe system as described in section 5.3.3 (photo 3 & 4) leading to further flooding upstream of the road.

### **5.5 Area 4 – Ashford Bridge**

One property at Ashford Mill claimed flood grant aid. This property is located in the Environment Agency 1 in 100 year or 1% Flood Zone, being at high risk of flooding from fluvial sources.

Ashford Mill was flooded to a depth of approximately 1.5m (5 feet) as shown in photos 11 & 12. A mark on the Ashford Bridge shows the height of flood water during the flood event of 1857 when the water was a few inches below that of July 2007.

Flooding at this location was due to the following:

#### **5.5.1 Direct flooding from the River Evenlode**

The Ashford Mill race runs below the property and the River Evenlode is adjacent to the property. During July 2007, waters in the River Evenlode rapidly rose and inundated property at this location.

## 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										
North Leigh										
Version I – July 2008										
Option ref	Flood Overview	Description of work required					Key issues			Comments
		Environment Agency	Oxfordshire County Council	Thames Water	WODC	Private	Effectiveness	Affects on adjacent land	Cost	
		For queries Tel 08708 506 506 Or email enquiries@environment-agency.gov.uk	Main switchboard: 0845 310 1111 Or e-mail: <a href="mailto:online@oxfordshire.gov.uk">online@oxfordshire.gov.uk</a>	Enquiries: 0845 200 800	Switchboard: 01993 861 000					
Area I – North Leigh										
	Highway drainage issues on New Yatt Road. During periods of intense rainfall, overland flow from farmland flows into shallow ditches adjacent to the highway which then overtop and flood the highway. There is no sufficient outfall for drainage from this section of road and water pools, flooding houses located at natural low points in the catchment.									
<b>A</b>	OCC to upgrade the existing highway system by increasing the size of the piped outfall to the attenuation pond located beyond the adjacent field.		OCC to carry out design and installation of an upgraded system to provide a larger outfall from the highway.				Will improve highway drainage	Increase volumes of water discharging to the attenuation pond	£5,000 to £20,000	OCC intend to complete this work, this financial year
<b>B</b>	OCC to clear the attenuation pond to ensure it provides maximum storage during flood events.	EA to be consulted regarding works to the pond	OCC to carry out clearance of the attenuation pond				Will increase storage provision and reduce flooding to the highway	Increased volumes of water in storage pond. Reduced flood risk to highway	£5,000 to £20,000	OCC are aware that this work is required and intend to complete it this financial year.
<b>C</b>	Carry out maintenance of the shallow field drainage ditch				WODC to provide co-ordination role and to ensure that work is completed	Riparian owner to carry out maintenance of the field drainage ditch to ensure that it is working to its full capacity	Will improve land drainage and increase volume of storage provide by the drainage ditch	Improved land drainage	Up to £5,000	
<b>D</b>	Flood resilient measures to properties & Parish Council to create an emergency flood plan	The EA website contains reference information on flood resilient measures to properties.			WODC to provide a co-ordination role  WODC to approve emergency flood plan	Homeowners to provide protection against flooding to their properties e.g. flood boards, flood proofing of exterior walls, sandbags, air brick covers, water resistant door frames	Only effective if defences are put in place before the water level rises.	None	Up to £5,000	Homeowners have not been approached regarding this option.  On completion of the emergency flood plan, it should be sent to WODC for approval and registration.
	Overland Flow During periods of heavy rainfall, water flows from farmland and into properties in North Leigh that are located at low points in the catchment.									
<b>E</b>	Carry out maintenance of land drainage ditches in North Leigh				WODC to ensure that work is completed	Riparian owners to carry out maintenance of land drainage ditches in North Leigh	Will improve land drainage and storage provided on farmland prior to outfall	Improved land drainage	Up to £5,000	Landowners have not been approached but Blenheim Estates have agreed to ask their tenant farmers to re-grade the ditches adjacent to and discharging from the highway.
<b>F</b>	Maintain existing road drainage, clearance of grips and jetting of gullies		OCC to carry out maintenance as per their existing schedule				Improved land drainage		Up to £5,000	OCC carry out routine maintenance of highway system 1 ¼ times a year



Option ref	Flood Overview	Description of work required					Key Issues			Comments
		Environment Agency	Oxfordshire County Council	Thames Water	WODC	Private	Effectiveness	Affects on adjacent land	Cost	
	Options	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					
<b>Area 1 – North Leigh (cont...)</b>										
<b>G</b>	Flood resilient measures to properties & Parish Council to create an emergency flood plan	The EA website contains reference information on flood resilient measures to properties.			WODC to provide a co-ordination role	Homeowners to provide protection against flooding to their properties e.g. flood boards, flood proofing of exterior walls, sandbags, air brick covers, water resistant door frames	Only effective if defences are put in place before the water level rises.	None	Up to £5,000	Homeowners have not been approached regarding this option.
<b>Area 2 – East End – Vicinity of ‘Fairview’</b>										
	<b>Highway Drainage</b> During periods of heavy rainfall, water quickly spills from adjacent farmland onto East End lane where it flows down the highway causing flooding(photo 1)									
<b>A</b>	OCC to create grips along the western verge of the highway to connect to the existing drainage ditch.		OCC to carry out works				Will improve highway drainage	Improved land drainage	Up to £5,000	
<b>B</b>	Riparian owners to carry out ditch maintenance along the verges of East End Lane to ensure that water flows freely		OCC to carry out ditch maintenance works where required		WODC to ensure that this work is completed	Riparian owners to carry out ditch maintenance works where required.	Will improve land drainage and reduce the volume of water flowing onto the highway	Improved land drainage	Up to £5,000	Blenheim Estates have agreed to clear ditches that they are responsible for in October 2008
<b>C</b>	Field Farm to ensure that water is flowing from their property into drainage ditches and not directly into the highway.				WODC to provide co-ordination role	This could be achieved by installing a French drain or similar to re-direct flow to the existing drainage ditch in the western verge of East End Lane	Will reduce the volumes of water flowing onto the highway	May increase volumes of water discharging to the pond downstream, which in turn out falls to the highway	Up to £5,000	Landowner has not been approached regarding this option
	<b>Overland Flow</b> During periods of intense rainfall, water flows from the rear of property to East End Lane. A number of properties have been flooded internally.									
<b>D</b>	Riparian owners to carry out ditch maintenance on a regular basis to ensure that excessive vegetation is trimmed, debris is removed and culverts are clear of sediment and debris. Ponds should be re-instated and cleared as part of this work.				WODC to provide co-ordination role and ensure work is completed	Riparian owners to carry out ditch maintenance works where required. Ponds to be re-instated as part of this work	Will improve land drainage and reduce the volume of water flowing onto the highway	Improved land drainage	Up to £5,000	Blenheim Estates have agreed to clear ditches that they are responsible for in October 2008
<b>E</b>	Flood resilient measures to properties. Homeowners to install drainage measures to protect their property. This may include the use of French drains around the rear of property to intercept overland flow.  Parish Council to create an emergency flood plan	The EA website contains reference information on flood resilient measures to properties.			WODC to provide a co-ordination role.  WODC to approve emergency flood plan	Homeowners to provide protection against flooding to their properties e.g. flood boards, flood proofing of exterior walls, sandbags, air brick covers, water resistant door frames	Only effective if defences are put in place before the water level rises.	None	Up to £5,000	Homeowners have not been approached regarding this option.  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					
<b>Area 2 – East End – in the vicinity of Fairview (cont)</b>										
<b>F</b>	Changes in land management e.g. contour ploughing to reduce direct runoff from farmland	Advise landowner of upstream catchment on land management techniques to reduce runoff or to store water prior to flowing onto adjacent land			WODC to provide co-ordination role	Landowners to change farming technique so as to increase infiltration.	Studies have shown that this has mixed results	There will be a change in land use in the upstream catchment	Landowners time	Landowners in the upstream catchment have not been approached. it may be possible for land owners/farmers to obtain environmental grants to plant hedgerows.
<b>Area 3– East End in the vicinity of The Willows</b>										
	<b>Overland flow</b> During periods of intense rainfall, water flows from surrounding farmland to the natural low point in the catchment flooding property									
<b>A</b>	Re-instate drainage ditches and ponds in the upstream catchment.				WODC to provide co-ordination role and ensure work is completed	Riparian owners to carry out ditch maintenance works where required. Ponds to be re-instated as part of this work	Will improve land drainage and reduce the volume of water flowing onto the highway	Improved land drainage	Up to £5,000	Blenheim Estates have agreed to clear ditches that they are responsible for in October 2008
<b>B</b>	Changes in land management e.g. contour ploughing to reduce direct runoff from farmland	Advise landowner of upstream catchment on land management techniques to reduce runoff or to store water prior to flowing onto adjacent land			WODC to provide co-ordination role	Landowners to change farming technique so as to increase infiltration.	Studies have shown that this has mixed results	There will be a change in land use in the upstream catchment	Landowners time	Landowners in the upstream catchment have not been approached. it may be possible for land owners/farmers to obtain environmental grants to plant hedgerows.
<b>C</b>	Flood resilient measures to properties & Parish Council to create an emergency flood plan	The EA website contains reference information on flood resilient measures to properties.			WODC to provide a co-ordination role	Homeowners to provide protection against flooding to their properties e.g. flood boards, flood proofing of exterior walls, sandbags, air brick covers, water resistant door frames	Only effective if defences are put in place before the water level rises.	None	Up to £5,000	Homeowners have not been approached regarding this option.
<b>D</b>	Increase the size of the piped culvert running adjacent to property at The Willows				WODC to provide advice on the culvert size	Riparian owners to complete work	Will increase flows to downstream	May increase downstream flood risk	£5,000 to £20,000	This work should only be completed if required once the capacity of the highway drainage has been increased
<b>E</b>	Provide upstream storage for overland flow prior to outfall to the drainage system at the Willows				WODC to provide co-ordination role	Riparian owners to complete work	Will reduce the speed and volume of water arriving at The Willows	Improved land drainage	Up to £5,000	

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	Cost		
	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						
<b>Area 3 – East End in the vicinity of The Willows (cont...)</b>										
	<b>Road runoff</b> During periods of intense rainfall, the highway drainage system at The Willows becomes surcharged causing backing up of the system and flooding of property.									
<b>F</b>	Upsize the culvert running under the highway at The Willows		OCC to carry out works				Will increase flow to downstream	May increase flooding downstream	£5,000 to £20,000	
<b>G</b>	Maintain existing road drainage, clearance of gullies and jetting of gullies		OCC to carry out maintenance as per their existing schedule				Improved land drainage		Up to £5,000	OCC carry out routine maintenance of highway system 1 ¼ times a year
<b>Area 4 – Ashford Bridge</b>										
	<b>Direct flooding from River Evenlode</b> During July 2007, water levels in the River Evenlode quickly rose and inundated property at Ashford Mill.									
<b>A</b>	EA to install a telemetry system upstream on the River Evenlode to measure river levels and provide early warning to residents living in the floodplain.	EA to carry out feasibility and details of the location of the gauging station on the River Evenlode. EA to raise awareness of the flood warning systems when in place.				Homeowners to make themselves familiar with the flood warning system provided by the EA.	Will provide early warning to residents who can move belongings to safety.	None	£20,000 to £50,000	Requires further consultation
<b>B</b>	Flood resilient measures to properties & Parish Council to create an emergency flood plan	The EA website contains reference information on flood resilient measures to properties.			WODC to provide a co-ordination role	Homeowners to provide protection against flooding to their properties e.g. flood boards, flood proofing of exterior walls, sandbags, air brick covers, water resistant door frames	Only effective if defences are put in place before the water level rises.	None	Up to £5,000	Homeowners have not been approached regarding this option.
<b>C</b>	Carry out maintenance of the River Evenlode to ensure that blockages do not constrict flows.	EA to carry out maintenance to remove blockages in channel				EA are happy for riparian owners to complete works on the river with consent where required	Improved flow	Improved land drainage	Up to £5,000	River Evenlode is classed as low maintenance at this point therefore only blockages will be removed, not routine maintenance to take place. This was reviewed in April 2008.

## **7.0 CONCLUSIONS AND RECOMMENDATIONS**

### **7.1 Area 1 – North Leigh**

#### **7.1.1 Maintenance**

- Option C - Carry out maintenance of the shallow field drainage ditch on New Yatt Road
- Option E - Carry out maintenance of land drainage ditches in North Leigh
- Option F - Maintain existing road drainage, clearance of grips and jetting of gullies

#### **7.1.2 Flood defence improvement schemes**

##### Immediate (under 1 year)

- Option A - OCC to upgrade the existing highway system on New Yatt Road by increasing the size of the piped outfall to the attenuation pond located in the adjacent field.
- Option B - OCC to clear the attenuation pond on New Yatt Road to ensure it provides maximum storage during flood events.
- Option D & G - Flood resilient measures to properties & the Parish to create an emergency flood plan

### **7.2 Area 2 – East End, vicinity of Fairview**

#### **7.2.1 Maintenance**

- Option B - Riparian owners to carry out ditch maintenance along the verges of East End Lane to ensure that water flows freely
- Option D - Riparian owners to carry out ditch maintenance on a regular basis to ensure that excessive vegetation is trimmed, debris is removed and culverts are clear of sediment and debris. Ponds should be re-instated and cleared as part of this work.
- 

#### **7.2.2 Flood defence improvement schemes**

##### Immediate (under 1 year)

- Option A - OCC to create grips along the western verge of the highway to connect to the existing drainage ditch.
- Option C - Field Farm to ensure that water is flowing from their property into drainage ditches and not directly into the highway.
- Option E - Flood resilient measures to properties. Homeowners to install drainage measures to protect their property. This may include the use of French drains around the rear of property to intercept overland flow. The Parish are to create an emergency flood plan.

##### Long-Term (3 years or more)

- Option F - Changes in land management e.g. contour ploughing to reduce direct runoff from farmland

### **7.3 Area 3 – East End in the vicinity of The Willows**

#### **7.3.1 Maintenance**

- Option G - Maintain existing road drainage, clearance of grips and jetting of gullies

#### **7.3.2 Flood defence improvement schemes**

- Option A - Re-instate drainage ditches and ponds in the upstream catchment.

##### Immediate (under 1 year)

- Option C - Flood resilient measures to properties. Homeowners to install drainage measures to protect their property. This may include the use of French drains around the rear of property to intercept overland flow. The Parish are to create an emergency flood plan.
- Option E - Provide upstream storage for overland flow prior to outfall to the drainage system at the Willows
- Option F - Upsize the culvert running under the highway at The Willows

##### Mid-Term (under 1 -2 years)

- Option D - Increase the size of the culvert running adjacent to property at The Willows

##### Long-Term (3 years or more)

- Option B - Changes in land management e.g. contour ploughing to reduce direct runoff from farmland

### **7.4 Area 4 – Ashford Bridge**

#### **7.4.1 Maintenance**

- Option C - Carry out maintenance of the River Evenlode to ensure that blockages do not constrict flows.

#### **7.4.2 Flood defence improvement schemes**

##### Immediate (under 1 year)

- Option B – Flood resilient measures to properties & the Parish to create an emergency flood plan

##### Mid-Term (under 1 -2 years)

- Option A - Install a telemetry system upstream on the River Evenlode to measure river levels and provide early warning to residents living in the floodplain.

## **Appendix I: Photographs**

**Area 2 – East End vicinity of Fairview**

Photo 1 - Road runoff following a period of heavy rain on East End Lane looking towards North Leigh Common. The water is discoloured from the driveway of Field Farm.



Photo 2 - The same section of road, looking towards East End. Where the road dips, the runoff collects in a ditch in the eastern verge,



### Area 3 – East End vicinity of The Willows

Photo 3 - Drainage ditch flowing along the field boundary at the rear of property on East end lane. This ditch was re-instated by local residents and small dams included to regulate flows in the ditch.



Photo 4 - Ditch outfall to a small diameter pipe conveying flow to the eastern verge of East End Lane. This becomes surcharged



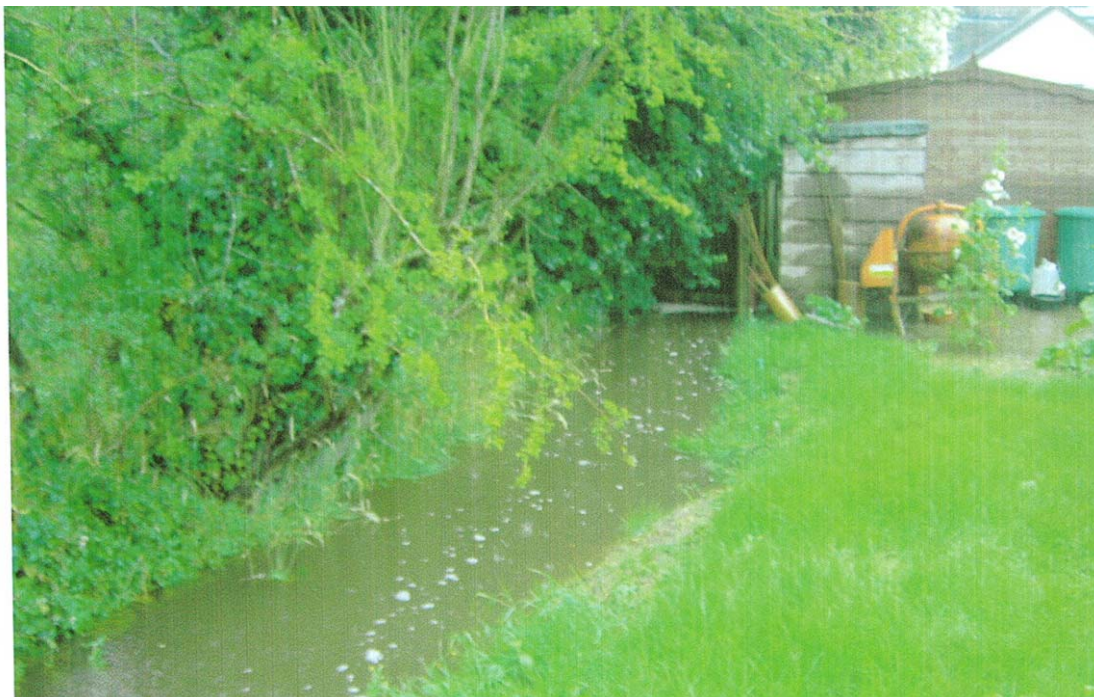


**Area 3 – East End vicinity of The Willows**

Photo 5 - Ditch outfall with the pipe clearly visible



Photo 6 - The same ditch as seen in the previous photo showing the increase of water level which leads to surcharging of the pipe and flooding of property.



**Area 3 – East End vicinity of The Willows**

Photo 7 - As the above ditch surcharges, water follows the natural flow path through property on East End lane



Photo 8 - Following the same flow route as above, water flows through property to East End lane



**Area 3 – East End vicinity of The Willows**

Photo 9 - Ditch outfall on East End Lane from drainage around East End Farm



Highway Drainage  
outfall

East End Drainage  
(behind ivy)

Connection  
running under the  
road to ditch  
downstream

Photo 10 -Ditch outfall as above submerged during times of flood



**Area 4 – Ashford Bridge**

Photo 11 – Ashford Mill Farm July 2007



Photo 12 – Ashford Mill Bridge junction in July 2007

