Derbyshire County Council
Environmental Services

Preliminary Flood Risk Assessment for Derbyshire

May 2011

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Revision Schedule

Preliminary Flood Risk Assessment

May 2011

Rev No	Date	Details	Prepared by	Reviewed By	Approved By
00	10th May 2011	Final Report	Steve Mead - Flood Risk Manager James Biddlestone - Project Engineer Robert Twiggs - Flood Risk Trainee	Scrutiny and Improvement	Main Cabinet

Executive Summary

The Flood and Water Management Act 2010 resulted from the Pitt Review and concerns over flooding and in particular the need to address Surface Water Flooding "perhaps the most significant feature of last summer's events (2007 floods) was the high proportion of surface water flooding compared with flooding from rivers". The Act introduced new duties for County and Unitary Authorities in respect of flooding from surface water, designating them Lead Local Flood Authorities. These new duties are being phased in over a number of years to allow Lead Local Flood Authorities to build knowledge and capacity to manage these responsibilities.

This Preliminary Flood Risk Assessment comprising; the document, mapping and accompanying spreadsheets represents the first stage of the regulatory requirements. The report has been prepared to meet the requirements of a European Directive and the Flood Risk Regulations 2009 regarding flood risk in the UK and the European Union. It is aimed at providing a high level overview of existing and potential flood risk from those sources of flooding for which the Lead Local Flood Authorities are now responsible, including; Surface Water, Groundwater and Ordinary Watercourses.

- The Preliminary Flood Risk Assessment identifies the number of residential, non residential and elements of critical infrastructure that have been affected by past flooding and those that are at risk of potential future flooding recognising that "surface water flooding is complex and affected by many factors, such as the capacity of drainage systems, saturated ground and high river levels that prevent the system from discharging."

The assessment is based on the use of historic data relating to flood incidents captured from existing records and a recent consultation with the Council Members and Parish / Town Councils. Data regarding predicted flooding is based on the Environments Agency's "Flood Maps for Surface Water" which indicate where surface water originating from a 1 in 200 chance rainfall event is most likely to drain and collect at depths of 300mm.

The methodology used for the assessment complies with guidance prepared by the Environment Agency and DEFRA. This requires that where the number of properties and / or critical infrastructure considered to be at risk of flooding within any one kilometre grid square exceeds thresholds, then that one kilometre grid square be identified as an area at risk.

In Derbyshire the thresholds for identifying flood risk have been set to take account of the largely rural nature of the County, as a result the number of one kilometre grid square at risk appears excessive. To allay fears that the whole of Derbyshire is "at risk" identified grid squares have been prioritised to identify areas where advice on building personal resistance and resilience to future flooding may be more appropriate than large flood management works.

The preparation of the Preliminary Flood Risk Assessment is primarily a duty arising from the European Directive and Flood Risk Regulations. However, it is perhaps of greater value in identifying and understanding the current and future Flood Risk within Derbyshire, as well as forming the basis of the Local Flood Risk Strategy that the Council will be preparing over the coming year.

Glossary of Terms and Abbreviations

Term	Definition
AStSWF	Areas Susceptible to Surface Water Flooding
Confirm	Derbyshire's Asset Management System
DCC	Derbyshire County Council
DEFRA	Department For Environment, Food And Rural Affairs
DG5	Water Authority Record of Flooding Resulting From Sewer Inundation
EA	Environment Agency
EU	European Union
FRM	Flood Risk Management
Flood Event	Flood event comprising many individual flood incidents, ie heavy rain
Flood Incident	A single incident of flooding, ie road closed due to flooding
FMfSW	Flood Maps for Surface Water
GHG	Greenhouse Gases
GIS	Geographical Information System
INSPIRE	EU Spatial Data Infrastructure Directive for GIS Data Management
Km Grid Square	OS National Grid mapping overlay of 1km x 1km squares
LCLIP	Local Climate Impacts Profile
LDF	Local Development Framework
LIDAR	3D Topographic models of the landform generated by aerial survey
LLFA	Lead Local Flood Authority
LRF	Local Resilience Forum
MasterMap	OS mapping including intelligent information relating to map features
MapInfo	Derbyshire's Preferred Geographical Information System Mapping Software
NRD	National Receptor Data – Intelligent information relating to building use
NI 188	National Indicator 188: Planning To Adapt To Climate Change
OS	Ordnance Survey
PFRA	Preliminary Flood Risk Assessment
PPS25	Planning & Policy Statement 25: Development And Flood Risk
RFDC	Regional Flood Defence Committee
RMA	Risk Management Authority – (generally lower tier authorities)
SAB	SuDs Approving Body
SFRA	Strategic Flood Risk Assessment
SuDs	Sustainable Urban Drainage Systems
SWMP	Surface Water Management Plan
UKCIP	UK Climate Change Impacts Programme
UKCP09	UK Climate Projections 2009

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1 Introduction

The main drivers in the production of this PFRA have been two recent pieces of legislation; The Flood Risk Regulations 2009 and the Flood and Water Management Act 2010. The result of this legislation is that all County Councils and Unitary Authorities designated Lead Local Flood Authorities have been allocated new responsibilities with regard to Flood Risk Management

The Flood Risk Regulations 2009 transpose the European Community Flood Risk Directive into law in England placing responsibility with the Environment Agency and DEFRA to prepare;

- Preliminary Flood Risk assessments
- Flood Hazard and Flood Risk Maps
- Flood Risk Management Plans

The new responsibilities require the LLFAs to prepare Preliminary Flood Risk Assessments with respect to Surface Water, Groundwater and Ordinary Watercourses and to submit these to the EA by June 2011 for inclusion in the overall UK submission to the EU.

22nd June 2011	Prepare Preliminary Flood Risk Assessments	Consider Surface Water, Groundwater and Ordinary Watercourses as sources of flooding
22nd June 2011	Identify Flood Risk Areas	Identify areas of significant risk in accordance with the national criteria set by the UK Secretary of State

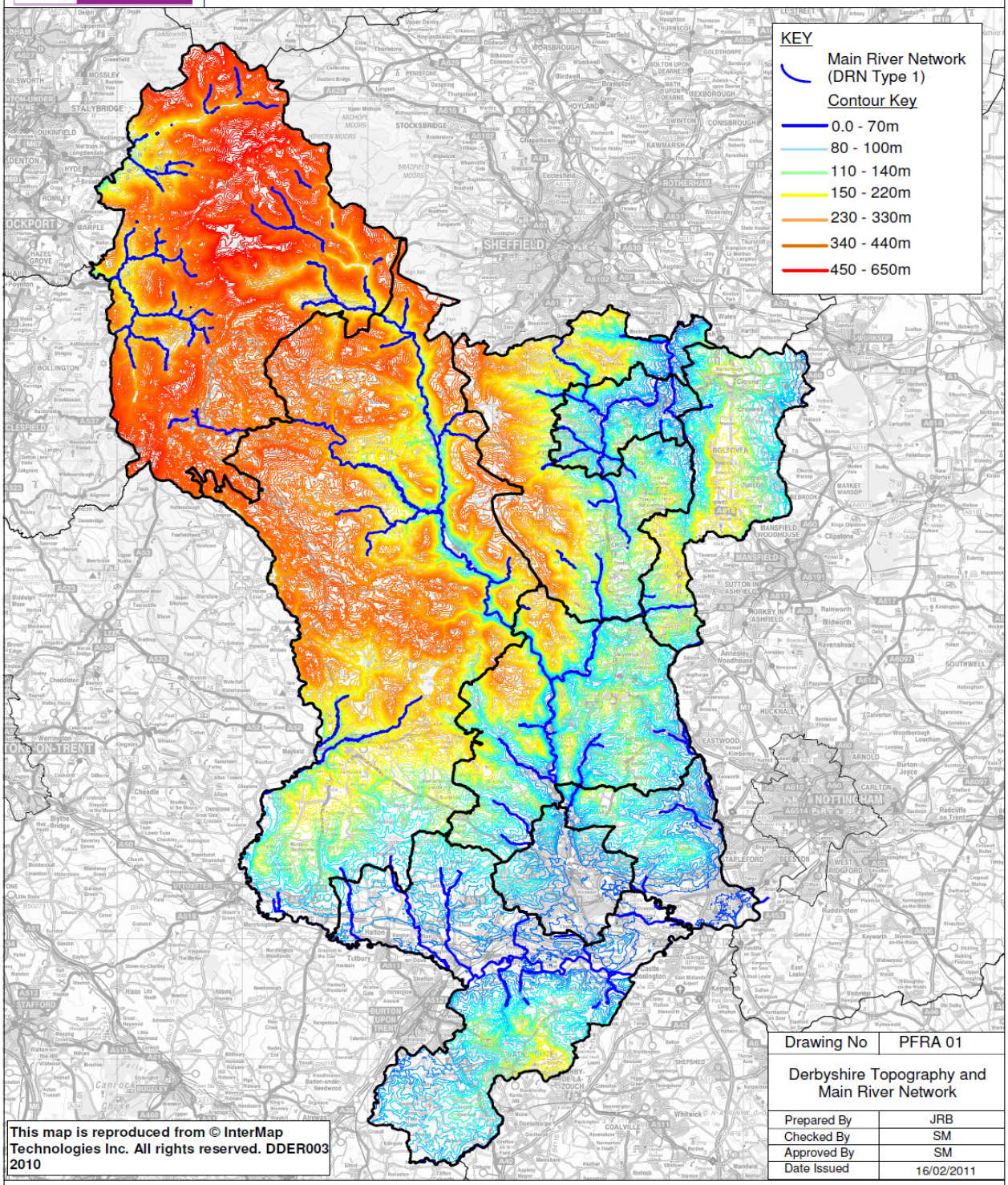
Table 1.1 Flood Risk Regulations 2009 – Requirements of LLFAs

Derbyshire is a Shire County within the East Midlands region of England. The northern part of Derbyshire overlaps with the Pennines, a chain of hills and mountains forming the backbone of England. The county comprises an area of 2625km^2 with a population of approximately 1,000,000 and borders on Greater Manchester, Yorkshire, Nottinghamshire, Leicestershire, Staffordshire and Cheshire. The city of Derby is now a unitary authority responsible for its own PFRA area, but remains part of the ceremonial county of Derbyshire. The county contains 30 towns with between 10,000 and 100,000 inhabitants as well as a large amount of sparsely populated agricultural upland.

Derbyshire sits about as far from the coast as a County can in the UK but its' wide variety of topography, varying from the southern end of the Pennines with steep fast watersheds and large catchments to the flatter land of the south, provides a challenge to Flood Risk Management. As shown in "Drawing No PFRA 01 - Derbyshire Topography and Main River Network", on the following page.

Derbyshire Topography and Main River Network

Drawing No : - PFRA 01



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The study area for this Preliminary Flood Risk Assessment is governed by the administrative boundary of Derbyshire County Council. The three principal rivers in Derbyshire are the Derwent, Trent and the Dove and form part of the River Humber river basin district and eventually discharge into the North Sea via the River Humber. In the North West of the County the Etherow and Goyt discharge into the Atlantic Sea via the River Mersey. The largest tributaries are rivers Wye, Amber and Erewash. There are three catchment areas in Derbyshire; Derbyshire Derwent; Dove; Lower Trent and Erewash. Derbyshire consists of four Water Authorities; Severn Trent, Yorkshire Water, Stafford Water and United Utilities.

The County of Derbyshire includes eight District / Borough Authorities:-

- Amber Valley Borough Council
- Bolsover District Council
- Chesterfield Borough Council
- Derbyshire Dales District Council
- Erewash Borough Council
- High Peak Borough Council
- North East District Council
- South Derbyshire District Council
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…and also the Peak District National Park Authority (PDNPA) although they have no Flood Risk responsibilities as they are not designated a Risk Management Authority (RMA) within the scope of the Flood and Water Management Act.

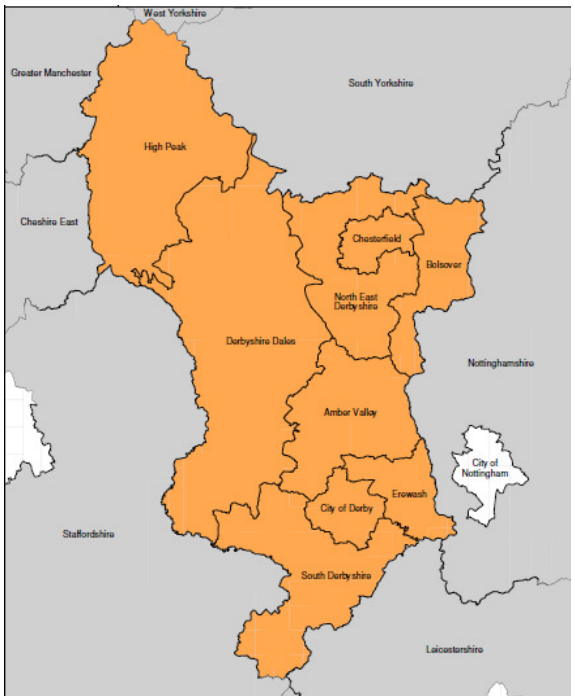

Figure 1.1 Derbyshire Location, Borough / Districts and Borders

The County suffers the usual rainfall typical of the UK but this rainfall has led to increasing floods as the upland areas of the Pennines have lost their water holding capacity resulting in small isolated storms causing rapid run off and affecting small villages in the surrounding dales. In the more urban areas channelling of watercourses, less water abstraction by industry and increased impermeable development have created floods affecting infrastructure, commerce and residential.

The recent introduction of the Flood Risk Regulations and the Flood and Water Management Act places the responsibility of Lead Local Flood Authority (LLFA) upon Derbyshire County Council along with requirements to produce a Preliminary Flood Risk Assessment (PFRA). The PFRA is the first step for the LLFA in determining a Local Flood Risk Strategy, drawing in all the partners, Borough and District Councils, Water Companies, Environment Agency, adjacent LLFAs, and others involved in managing flood risk.

What is a PFRA and what do we hope to gain from it;

- Legal requirement of the Flood Risk Regulations 2009, the UK enactment of a European Directive following an increase in flooding in central Europe since 2000
- High level screening exercise to locate areas where the risk of flooding is significant and requires further investigation
- Identify partners for better coordination of assessing and responding to flood risk
- Assess historic flood events in conjunction with DEFRA / EA Flood Maps for Surface Water (FMfSW) to predict where future flood events may arise
- Understand the local flood risk to people, properties, communities, services, businesses and the infrastructure that holds together the economy of Derbyshire
- Inform communities of the risk and encourage them to be more resilient to the possibilities of flooding whilst providing a basis for investigating how measures can be brought forward to reduce the risk
- Inform the County Emergency Planning and Emergency Services regarding what action to take given a potential flood scenario
- Provide information to improve engagement and collaborative working with partners and stakeholders to achieve better outcomes regarding flood risk, resilience and reducing the risks.

The PFRA should consider sources of flooding originating from; Surface Water, Groundwater and Ordinary Watercourses and must consider floods that have significant harmful consequences for human health economy, infrastructure and the environment.

Derbyshire is committed to developing a pragmatic approach to Flood Risk within the County recognising that this involves a partnership approach to finding solutions and providing better information to;

- Those at risk,
- The Emergency Services and Emergency Planning organisations,
- Those involved in the planning for new development.

2 Lead Local Flood Authority Responsibilities

2.1 Governance and partnership arrangements

The preparation of a PFRA is just one of the new responsibilities of the LLFA under the Flood and Water Management Act which also makes provision for;

- Coordination of Flood Risk Management
- Investigating Flood Incidents
- Maintaining an Asset Register of structures and other features that may have an influence on flood risk
- Preparing a local strategy for flood risk management
- SuDs Approving Bodies

Derbyshire has been successful in setting up an early Strategic Flood Board, building on the partnership work undertaken by the Emergency Planning in coordinating flood response in recent years. The Strategic Board has been used as a model for many other East Midlands authorities and is active in its relationships with flood resilience and warning as well as taking on the new roles and requirements resulting from the Flood and Water Management Act and Flood Risk Regulations. Leadership of the Strategic Board rests with the Strategic Director - Environmental Services, as many aspects of the act are related to an engineering approach. However the information gathered and the manner in which it is being made available will greatly inform, not only the Councils engineering teams but also the Emergency Services, Emergency Planning and Town & Country Planners.

The Strategic Board currently comprises Derbyshire County Council LLFA, Emergency Planning, District / Borough Authorities, Derby City Council, Derbyshire Fire and Rescue Service, Derbyshire Police Constabulary, Environment Agency, Severn Trent Water and Yorkshire Water.

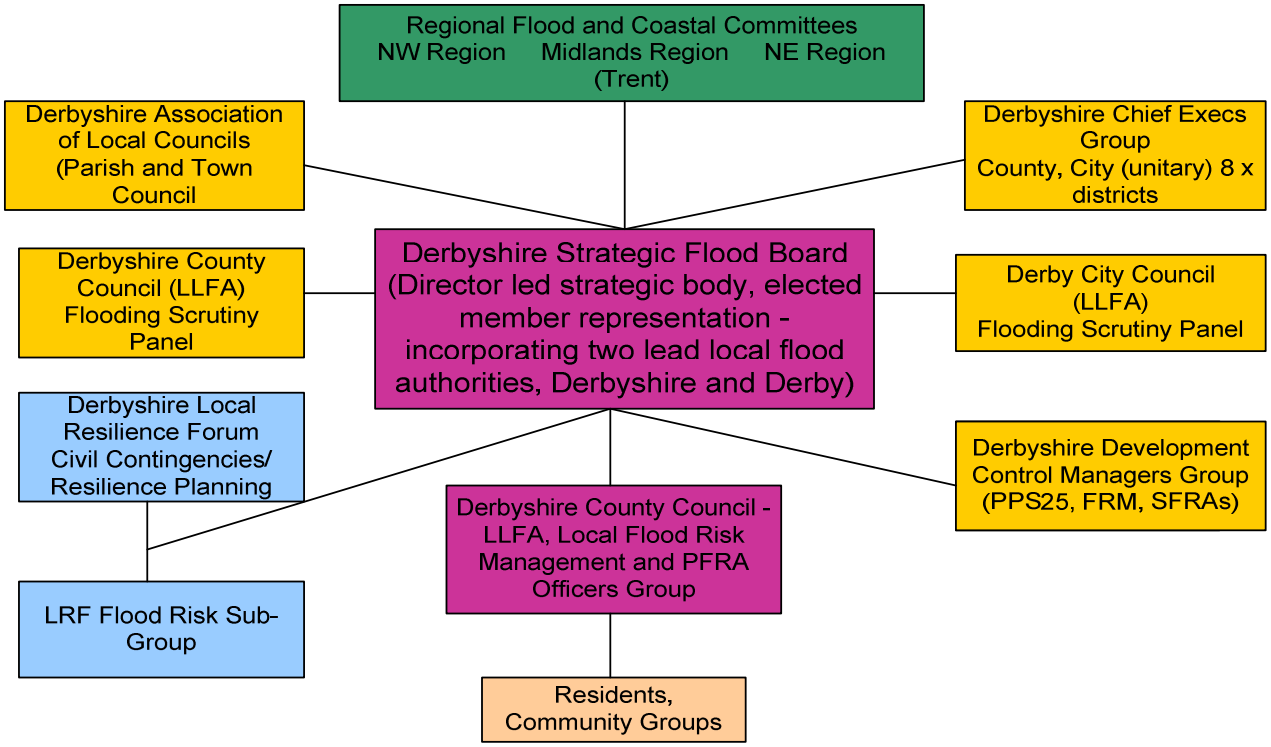

Figure 1.2 Partnership group structure

Overview of Groups

Derbyshire County Council Flooding Scrutiny Panel: -
Derbyshire County Council's Improvement and Scrutiny Committee (Communities, Culture and the Environment) has established a Flooding Risk Working Group to oversee how the Council and its partners respond to the risk of flooding throughout the county. The group has an action plan, a record of all its activities and recommendations, and reports to the full Improvement and Scrutiny Committee, the role of which has been enhanced with the introduction of the Flood Risk Management Overview and Scrutiny Committee (England) Regulations 2011.

Regional Flood and Coastal Committees: -
Administered within each Environment Agency Region, the RFCC's take elected member representatives from each LLFA (Lead Local Flood Authority). Flood protection schemes are considered and funds allocated where the schemes meet the cost benefit criteria.

Derbyshire County Council Local Flood Management and PFRA Officer Group: -
The operational level working group comprised of appropriate professionals with flood risk management experience and consults widely with stakeholder professionals to obtain further expertise and local knowledge.

Derbyshire Association of Local Councils: -
Shares and disseminates information between County / Borough / District / Town and Parish councils allowing communities that have common problems on flooding to benefit from shared good practice e.g. community resilience schemes in flood risk areas.

Derbyshire Local Resilience Forum: -
County wide forum which ensures the appropriate contingency planning arrangements are in place to meet the area's risk profile. Flood risk, both pluvial and surface water are considered high risks.

Derbyshire LRF Flood Risk Sub-group: -
Specialist working group under the LRF brings together contingency planning specialists from the emergency services, local authorities and Environment Agency ensures the accuracy of civil contingencies' flood risk assessments.

Derbyshire Development Control Managers Group: -
Establishes local development policies in line with Planning Policy Statement 25 and ensures the strategic flood risk assessments for planning purposes are taken into account on planning decisions.

Derbyshire Chief Executives Group: - The Heads of Service within Derbyshire local authorities are kept informed of progress under the new Flood Risk Management (FRM) framework and where necessary endorse resource requirements within their authority.

2.2 Communications with partners and public

Derbyshire has been able to capitalise on previous experiences of partnership working with its Boroughs and Districts to open easy lines of communication to set about the task of assessing flood risk within the county. This has not been limited to simply talking and exchanging ideas but to loan of IT equipment to capture key data in land drainage and to the work undertaken by the County's Emergency Planning teams in the organisation of 'flood fairs' and other events to develop an understanding of problems and solutions with residents and businesses affected by flooding.

One of the problems highlighted in the Pitt Report was not just the lack of coordinated response to flooding but also the communication between organisations and the sharing of data.

Derbyshire's original intention was to host all flood management data on the county's Geographical Information System (GIS), accessible to all members of the Strategic Flood Board. This was envisaged as a website portal, but problems of access, differing file structures and software led to a decision to share information on a more simplified basis using Microsoft SharePoint. (See 3.4 information Sharing)

Communications with the public are an area to be developed but as a newly formed LLFA with limited experience in dealing with the technical aspects of flooding the Council is feeling its' way and will be cautious about publishing data related to flood risk until a Local Flood Risk Strategy has been fully developed.

3 Methodology and data review

3.1 Information gathered

Whilst the EA / DEFRA recommend that the data used in developing the PFRA should be restricted to that already held, determining Derbyshire to be the LLFA meant that there was little historic data referring to flooding other than that recorded as a part of the Local Climate Impacts Profile (LCLIP) review, incidents affecting the highway and / or Derbyshire's own property portfolio.

Understanding that there was a considerable amount of ground to cover to produce a meaningful PFRA, work commenced to share information with our partner authorities before the Act became legislation. An initial trawl netted Strategic Flood Risk Assessments (SFRA) undertaken for the Local Planning Authorities and a wealth of information from Call Centres and the groundworks / highways maintenance teams working for the Boroughs, Districts and the County.

This information was received in a number of differing formats. The key to its value was that either a street or National Grid reference was available for 90% of the data enabling it to be plotted on the County GIS systems to provide an initial assessment of areas of historic flooding.

Data has been captured from the following sources and is summarised in the table at the end of this section.

DCC Highway District Managers – records of flooding events which have had a detrimental affect on the Highway Infrastructure, includes some land drainage issues where surface water run off flows onto the adopted highway

DCC Emergency Planning Team –records of flood instances which have been reported directly to the team.

Elected Members and Town/Parish Councils – all of our Elected Members and Parish/Town Councils have been provided with maps of their electoral ward / town / parish seeking the following information;

- Road Name / Location
- Source of flooding
- Type of Properties affected / areas affected by flooding
- Frequency of Flooding

The consulted parties were encouraged to draw / annotate the maps making reference to individual flooding event. The response has been extremely rewarding providing a better understanding of historic flooding within the county.

CONFIRM Reports – CONFIRM is the software used by DCC's Environmental Services 'back office' systems. It is used to log calls from members of the public and inspector reports using sub categories; Collapsed drain, Drain/gully blocked, Flooding and Ponding/Surface Water. Reports date back to 2000.

District / Borough Officers – Strategic Flood Risk Assessment Stage 1 data and Land Drainage information.

Emergency Services – Historic information from the Emergency Services had predominately been provided within the District / Borough Strategic Flood Risk Assessments. Derbyshire Police Constabulary and Derbyshire Fire and Rescue Service are now partners for data sharing using the Microsoft SharePoint site that has been developed.

Highways Agency – A1+ (HA's current contractor) provided flood incident reports for the Highway Agencies Infrastructure within Derbyshire.

Water Authorities – Severn Trent Water, Yorkshire Water and the Council have begun the first steps of data sharing signing a 'Data Sharing Protocol'. Discussions with United Utilities and Stafford Water require more work.

Derbyshire's LSP Local Climate Impacts Profile (LCLIP) – Derbyshire County Council took part in the first regional LCLIP in 2008. The regional LCLIP was developed to better understand the vulnerability of services to severe weather events on the understanding that the frequency of severe weather events is likely to increase in the future. The LCLIP findings were used to look at the effects flooding and snow melt had on the county between January 2000 and June 2008. The methodology was based upon standards developed by UKCIP;

- Local media sourced for articles about severe weather events between January 2000 and June 2008.
- Weather events were correlated with local authority records to establish the impact of each event on service provision

Derbyshire Local Resilience Forum (LRF) – Flood risk assessments prepared for the Civil Contingencies Act 2004.

Newspaper articles and reports – In addition to the information contained within the LCLIP a separate media search was undertaken for flooding events within the County. This search did not have any date restrictions

Data sets were collated and reviewed to identify not just the individual incidents of flooding but also to identify details of major past flood events and associated consequences.

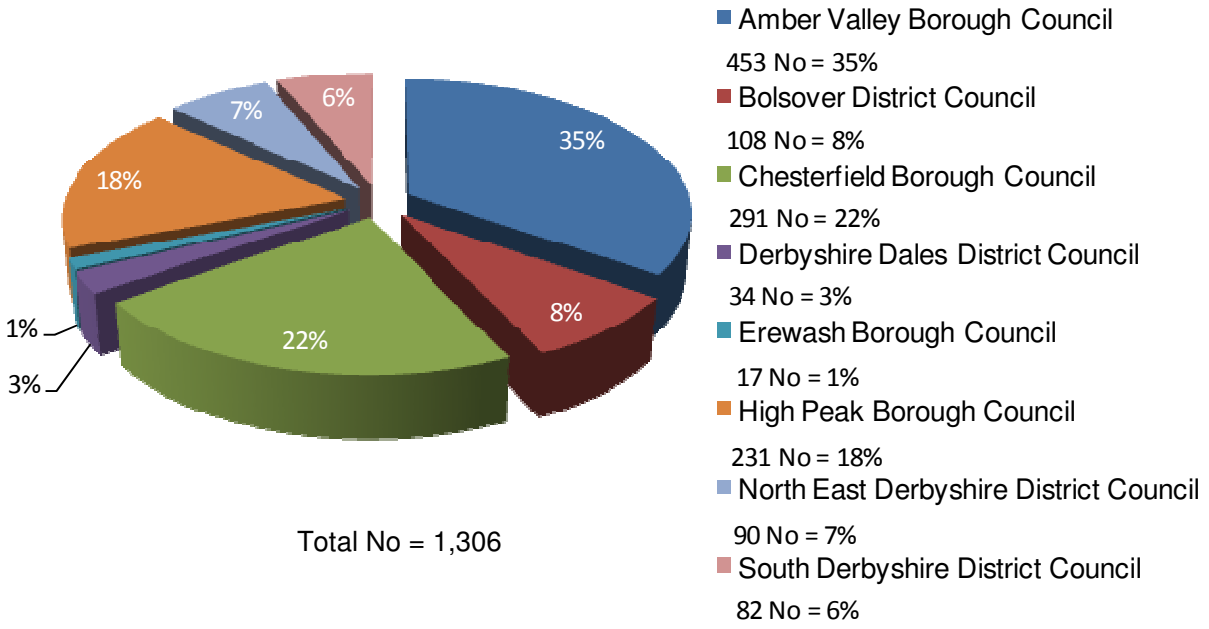

Figure 1.3 Number of historic events recorded across the County Update Chart

As figure 1.3 shows there is wide ranging variation of recorded flood events within each of the eight District/Borough Councils, the highest number being recorded within Amber Valley Borough. However the supporting detail to substantiate events varies significantly. Some events are simple point features with no information attributed to them. South Derbyshire District Council only equates to 6% of the total events within the County although the data set behind the events is quite comprehensive. The data provides a snap shot of the information received, although it is difficult to compare due to the varying levels of detail provided by the different authorities.

Currently the Council are still receiving information from Parish and Town Councils in relation to past flooding events within the community.

Data is still being actively sought from the following sources;

- British Waterways
- Water Authorities – DG5 etc
- EA Geosets
    - Historic Surface Water and Groundwater database
    - Historic Flood Map