

# **CAERPHILLY COUNTY BOROUGH COUNCIL**

## **Local Climate Impacts Profile (LCLIP)**

**Prepared by the Sustainable Development & Living Environment Team**

# Local Climate Impacts Profile (LCLIP)

## Introduction and Background

With carbon dioxide remaining in the atmosphere for around 100 years, historic emissions mean that changes to the UK climate are now inevitable. These changes are predicted to include milder wetter winters, hotter drier summers and more frequent severe storms.

For Caerphilly by 2040 the UKCOP09 climate projections suggest the following:

- **winter rainfall** will increase by 11%;
- **summer rainfall** will decrease by 14%;
- **average annual temperatures** increase by 2.8 degrees;
- **summer daily temperatures** increase by 3.4 degrees;
- **winter daily minimum temperatures** to increase by 2.1

Such events are likely to affect many aspects of local authority activity, and as climate change accelerates over the coming decades, are likely to have more frequent and increasingly significant impacts on service delivery.

The Climate Change Act 2008 gave Welsh Ministers the power to issue guidance on climate change impacts and adaptation. It also gave them the power to issue a direction requesting bodies with public functions to prepare an adaptation report. Local authorities are included as 'reporting authorities' as are the Health Boards, Fire Services and others.

The Minister has published guidance in 5 parts. It set out the Welsh Government's expectation that key reporting authorities will make progress in preparing for a changing climate. This includes a requirement for reporting at the end of the financial year on what has been achieved, and the organisations proposed approach.

The guidance identifies the use of the Local Climate Impacts Profile (LCLIP) tool, developed by the UK Climate Impacts Programme (UKCIP), as an important step in understanding how the weather is already affecting an organisation. The result of this work will then be fed into the Service Plan process to demonstrate how climate change impacts on the work that we deliver.

## Local Climate Impacts Profile (LCLIP)

This Local Climate Impacts Profile (LCLIP) has been prepared as part of the process of developing a Climate Change Adaptation Strategy for the Authority, and to report on progress to Welsh Government in line with statutory guidance under the Climate Change Act 2008.

The LCLIP process involves reviewing local media reports and interviewing key stakeholders in order to identify local impacts and consequences of extreme weather events for an organisation.

## Executive Summary

The Local Climate Impact Profile (LCLIP) along with other associated work was carried out between February 2013 and May 2015.

The LCLIP exercise documented in this report forms part of the work that is required to be undertaken by Local Authorities for Welsh Government as part of the requirements of the Climate Change Act 2008.

The first phase of the LCLIP process consisted of researching media sources in order to identify occurrences of extreme weather events during the study period between January 2003 and December 2013. The research identified 89 severe weather events:

- 35 excessive rainfall/flooding events
- 25 frost/ice/snow/cold events
- 14 storm/high wind events
- 15 Events of high temperatures/heatwave/drought

As part of the next stage of the process, interviews, workshops and questionnaires were used with 43 senior managers across the 18 Service within the Authority to verify the data and to identify priority impacts.

A total of 128 impacts were identified of which 32 were rated as “high” priority.

	All weather	Excessive rainfall	Frost Ice Snow	Storm high winds	High temperatures	Total
Total impacts identified	2	43	32	21	30	128
Rated as high priority	0	13	3	4	12	32

High priority impacts include:

- Trees being blown down in high winds
- Drainage and culvert collapses in excessive rainfall
- Health of staff in extremely hot weather

The preparation of this LCLIP has identified that there is a good understanding of climate change issues across the senior officers in the Authority who were interviewed. Services are aware that the climate is changing, with many services considering and planning to adapt to the changes they are seeing. The levels of understanding of other employees was not assessed as part of this work

Across the Authority existing systems are in place which compliment and enable adaptation work. These systems include Business Continuity, Emergency Planning, Major Incident Plan, Corporate Risk assessment, as well as the individual Service Plans.

The study also identified that the Authority is subject to numerous changes being driven by external factors including the financial climate and new legislation. These are driving changes at a quicker rate than the natural adaptation of the organisation to climate change. Many of the potential changes also provide an opportunity to make the organisation more resilient to climate change. The rationalisation of buildings, changes to HR policies to enable more flexible or home working all have the potential to enable us to deal better with severe weather events. Climate change adaptation issues are being factored into the overall change process that the Authority is currently going through.

In addition to this overall LCLIP report, each of the 18 Services within the Authority has received an individual report summarising the findings from the interviews and research. Each of these reports identifies and characterises the impacts of climate change on the Service, and assess them as high, medium or low priority.

### **LCLIP Recommendations**

Part 2 of the Welsh Government guidance recommends that each organisation should consider the scale of the future work.

This should include considering whether the priority is to take a high-level look at impacts affecting the organisation as a whole, or focusing on assessing detailed impacts for specific departments/service areas/types of infrastructure/assets/communities.

This report recommends a twin track approach, with some high level issues such as a review of key policies, being combined with some further work on specific impacts relating to individual Service areas.

This report identifies a total of 14 recommendations, divided into two areas:

- Existing work and reviews where consideration of climate change adaptation issues should be included. This includes 5 recommendations under 3 headings:
  - Strategies and Plans
  - Review of policies and procedures
  - Financial considerations
- Specific additional work on climate adaptation issues. This includes 9 service specific recommendations

### **The next steps**

The completion of the LCLIP will mean that the steps outlined in Part 1 of the Welsh Government's statutory guidance will be complete. The next steps, set out in Part 2, are for those impacts identified as being of high priority, to go forward for further investigation, vulnerability assessment and risk assessment.

Subject to approval, work will need to be undertaken to prioritise and action the recommendations set out in this report

## Project Aims

Caerphilly County Borough Council is undertaking a Local Climate Impacts Profile (LCLIP) as part of the process of developing a Climate Change Adaptation Strategy for the Authority, and to report on progress to Welsh Government in line with statutory guidance under the Climate Change Act 2008. It also complements other work currently being undertaken by the Council.

The LCLIP aims to:

- identify impacts of the local weather on the operations of Caerphilly County Borough Council;
- analyse the Council's response capabilities to address the weather-related consequences;
- help the Council identify weaknesses in the current abilities to respond to weather generated events;
- disseminate the findings across the Council in an accessible format.

An anticipated outcome is that the document will promote proactive discussions within and across Service Areas of the Council on ways of more effectively planning responses to weather induced events and anticipated climate change.

### Caerphilly County Borough Council drivers

The Authority is committed to addressing climate change through adaptation and mitigation measures, and by working in partnership with stakeholders across Caerphilly County Borough. In association with the Caerphilly Living Environment Partnership, a high-level Climate Change Strategy was produced for the borough in 2009. The Strategy identified actions on mitigation (reducing the causes of climate change), adaptation (adapting to the changes) and opportunities. Mitigation is being taken forward by the carbon reduction and management work across the Authority.

The Partnership recognised the need to collaboratively produce a Climate Adaptation Plan for the borough. Under the guidance, Health, Police and Fire partners are also required to produce Climate Adaptation Reports, as responsible bodies.

Support and funding was been secured from the WLGA to initiate the process and two workshops were run on Climate Change Adaptation. These workshops introduced climate adaptation to a range of key personnel from across the Authority and developed an approach to the issues. A report setting out this proposed approach was endorsed by the Authority's Sustainable Development Advisory Panel in July 2012.

In April 2006, Caerphilly County Borough Council, together with all other Welsh councils signed the 'Welsh Declaration on Climate Change and Energy Efficiency' a declaration that recognises the risks associated with climate change, and commits to the introduction of strategies for adaptation and mitigation of its impacts.

In the context of this report the emphasis is specifically on weather, and not climate. NASA defines the difference between weather and climate as "... a *measure of time*. *Weather is what conditions of the atmosphere are over a short period of time, and climate is how the atmosphere "behaves" over relatively long periods of time.*" (NASA 2008) Thus "weather"

refers to day-to-day conditions of a particular location while “climate” refers to conditions over a long-term period. Typically, the climate of a place is defined as an average of the weather over a period of 30 years.

As a first step towards developing effective adaptation strategies, there is a clear need to measure and assess the likely impact of weather-related events on local authority staff and services. The Caerphilly County Borough Council LCLIP exercise considered the impact of weather-related events upon Council operations during the period January 2003 to December 2013. The research process broadly consisted of identifying, extracting, collating and analysing data from media resources, followed-up by meetings and interviews with Council representatives to verify the data and impacts.

Although efforts to mitigate further future climate change remain important, in order to be able respond creatively and effectively to the various threats and opportunities that will arise, local authorities must now also focus on adapting to climate change. Strategic planning in relation to climate change adaptation needs to become embedded into the authority’s planning around service delivery, staff resources, finances and reputation.

The Local Climate Impact Profile (LCLIP) presented in this report is an initial attempt to identify and quantify these likely impacts for Caerphilly County Borough Council.

## Context

Caerphilly County Borough covers 27,745 hectares, and has a population of 178,806 (2011 Census). The county is populated at approximately 6.4 people per hectare, in contrast to the Welsh average population per hectare of 1.5. This means that it is in the top 5 counties in Wales for population density.

Over the past 15 years the Hadley and Tyndall Research Centres, through the UK Climate Impacts Programme (UKCIP), have developed models to predict how global warming will affect the climate in the UK. Although there are differences in the detail, these models tend to produce broadly similar conclusions about what is going to happen in the first half of this century regardless of whether our emissions are 'business as usual' or if we act cut them. The extent to which these changes occur will depend on how we are able to control emissions. Either way, we are committed to changes. For Wales, the main impacts by 2080 are predicted to be:

- A longer growing season
- Milder wetter winters
- Drier, hotter summers
- Increases in extremes of heat, and decreases in extremes of cold
- Warmers seas and sea level rise of up to 100cm
- More extreme events (droughts, heatwaves, flooding)
- More frequent and more violent storms/gales

For Caerphilly by 2040 the UKCOP09 climate projections suggest the following:

- **winter rainfall** will increase by 11%;
- **summer rainfall** will decrease by 14%;

- **average annual temperatures** increase by 2.8 degrees;
- **summer daily temperatures** increase by 3.4 degrees;
- **winter daily minimum temperatures** to increase by 2.1

These indicate averages. Projections suggest extreme weather events will become more prevalent. It is these severe, more frequent conditions, as well as the general changes, which present some challenges to ensure Caerphilly is resilient in the future.

The UK Climate Change Act includes targets to reduce carbon emissions by 80% by 2050 based on a 1990 baseline. The EU and the UN have also set targets for reducing emissions.

## Method

The LCLIP of Caerphilly Council was undertaken by the Sustainable Development and Living Environment Team between September 2013 and March 2015 and the process was broadly divided into five phases:

1. data identification and integration from media articles,
2. data interrogation and analyses,
3. data verification,
4. attainment of Service responses, and,
5. compilation of findings within a report.

### Data identification and integration from media articles

The first phase of the LCLIP process consisted of researching media sources in order to identify occurrences of extreme weather events during the period 2003-2013 which impacted on life in Caerphilly County Borough and therefore on Caerphilly Council operations. The sources used to identify and obtain data for weather-linked severe events across Caerphilly over the 10-year study period included the Countryside Council for Wales (CCW) database, Met Office weather warnings, BBC online, Google and the CCBC media database.

The data extracted from the media reports was collated onto an Excel spread sheet. When completing the spread sheet standardised lists were used for weather types. The list (1-4) was as follows:

1. Excessive rainfall/flooding events
2. Frost/ice/snow/cold events
3. Storm/high wind events
4. Events of high temperatures/heat-wave/drought

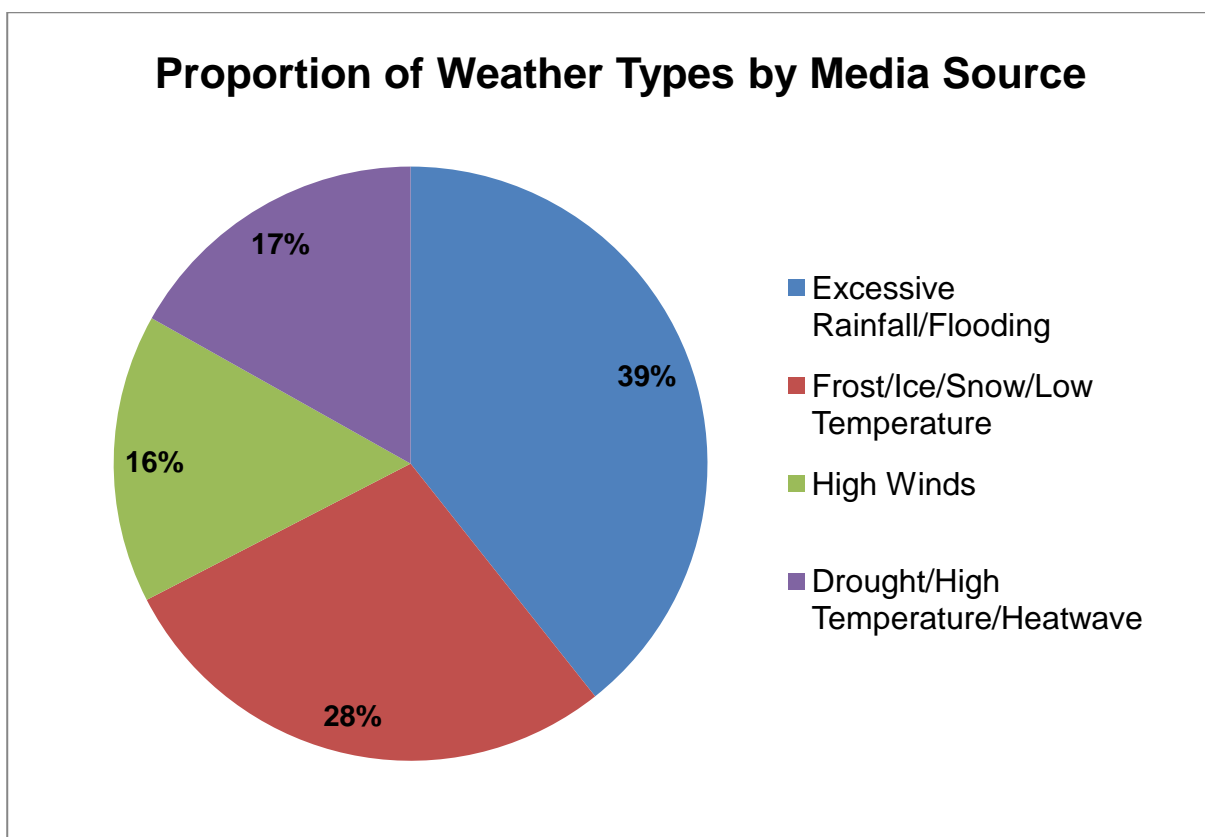
The data obtained from the media survey was then analysed in order to enable correlation of the weather-linked impacts with the Caerphilly Council Service Areas.

### Results from media reports studies

Data from the analysis of the media reports (Appendix 1) indicates that Caerphilly County Borough has experienced a variety of weather events during the period under consideration for the LCLIP (1st January 2003 to 31<sup>st</sup> December 2013). Analyses of these reports have revealed that there have been 89 incidents which have had significant impacts on life in Caerphilly. These have been directly linked to Caerphilly Council by the media.

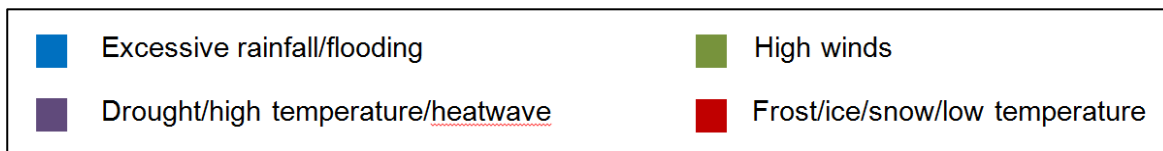
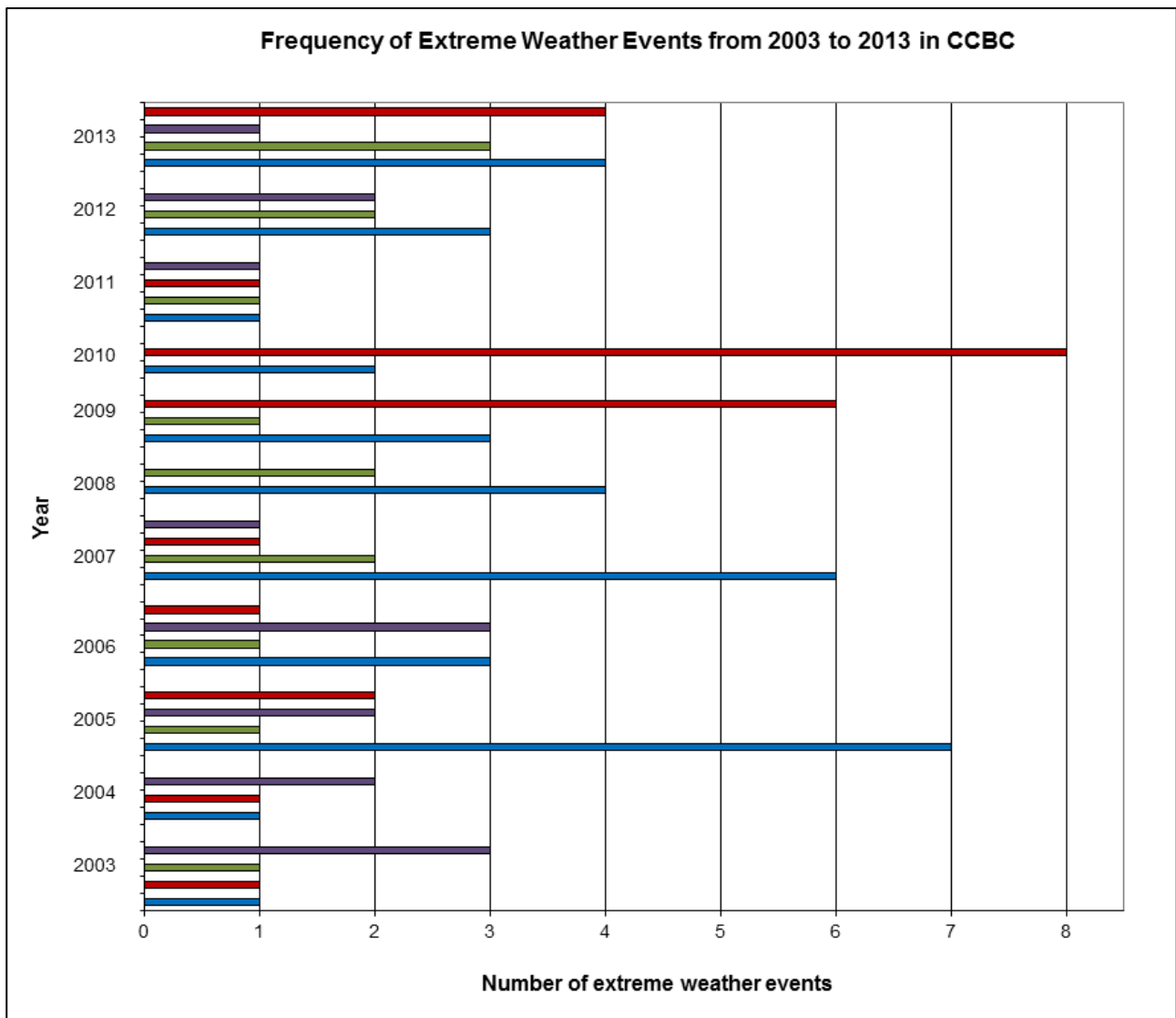
Events from the media survey included 35 excessive rainfall / flooding events, 25 frost/ice/snow/ low temperatures events, 14 storm/high wind events and 15 Events of high temperatures / heat-wave/drought.

Figure 1 presents the percentage distribution of the reported weather events over the study period. Figure 2 illustrates the diversity in the weather events compiled from the media study (Panel A).. It should be noted that these figures provide an indication of the variety of the weather only; they are neither comprehensive nor can they be considered as anything other than semi-quantitative due to the subjectivity of media reporting.



**Figure 1:** Percentage distribution of media reported weather events between January 2003 and December 2013.



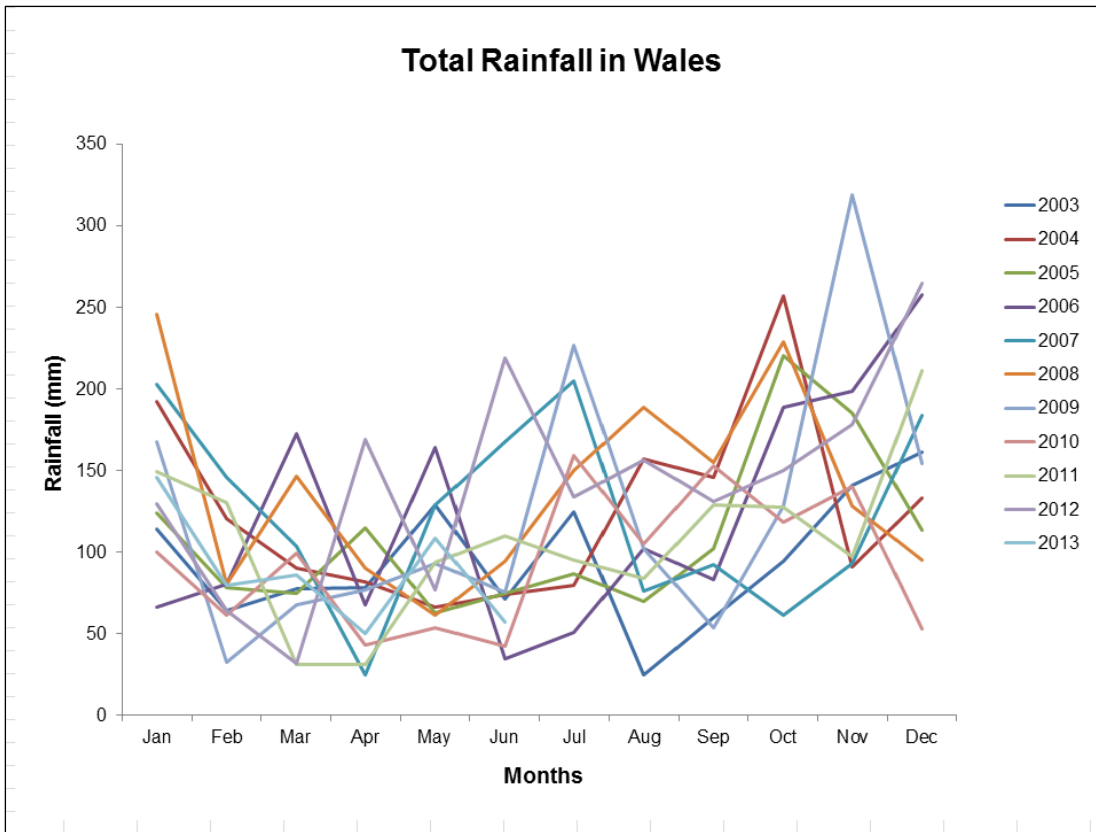


**Figure 2:** Frequency of weather events compiled from media sources between January 2003 and December 2013.

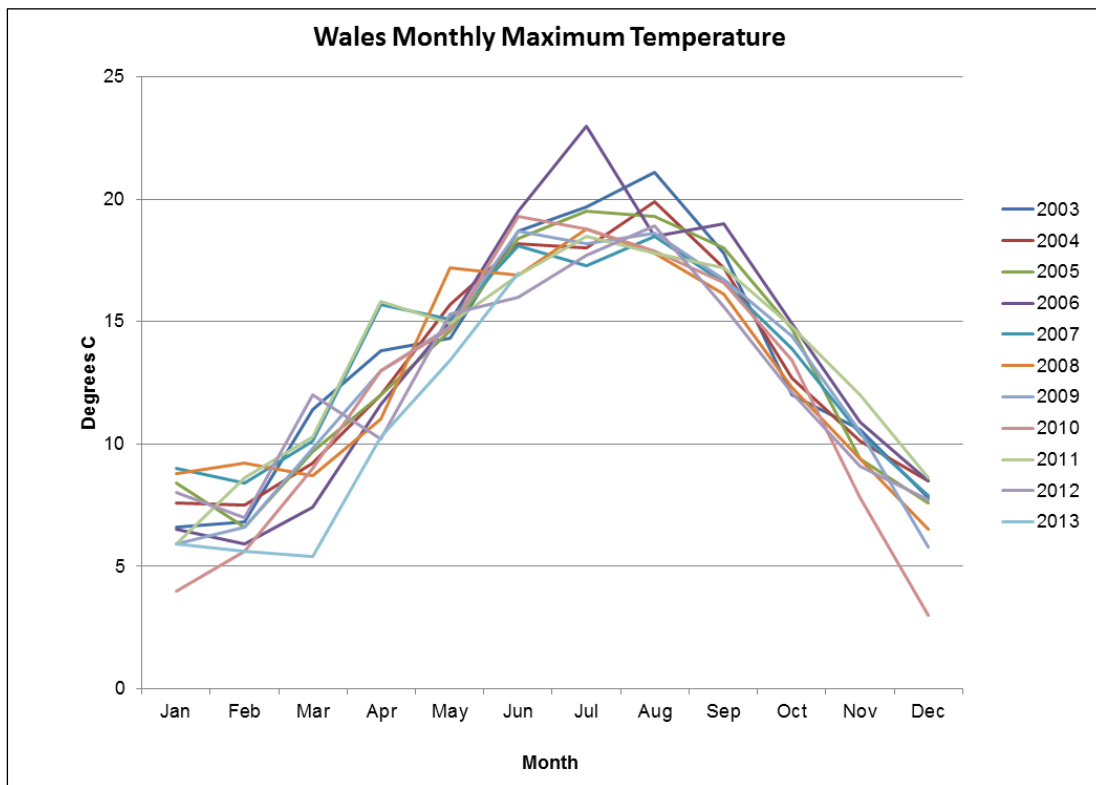
### Data from weather stations

Figures 3, 4 and 5 show month-by-month values of the total rainfall, maximum temperature and minimum temperature for Wales over the 10 years of the study period. There has been no significant change in the pattern of the maximum and minimum temperatures over the study period.

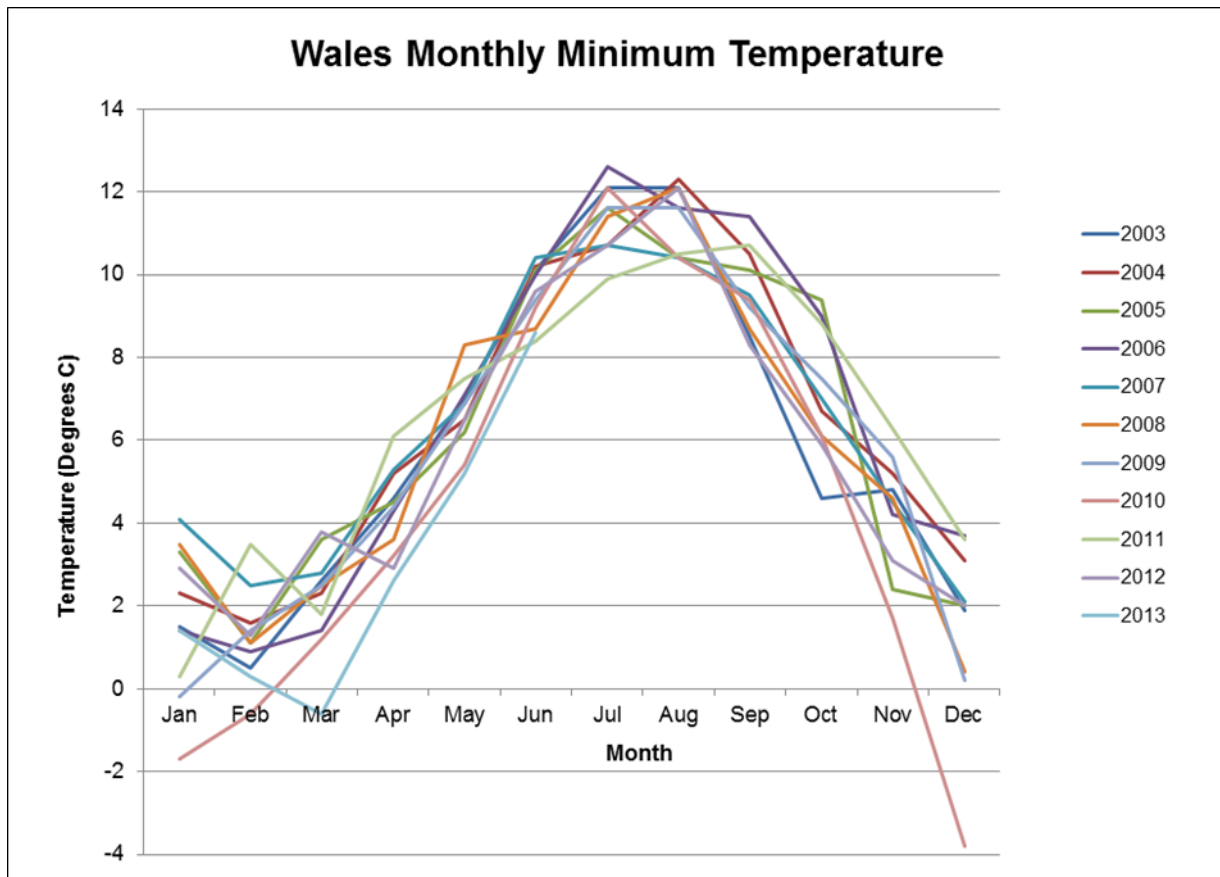
In contrast, the data for total rainfall portrays a high level of variability, with a wide range of distribution.



**Figure 3:** Plots of the total rainfall each month between January 2003 and June 2013



**Figure 4:** Plots of the maximum temperature each month between January 2003 and June 2013

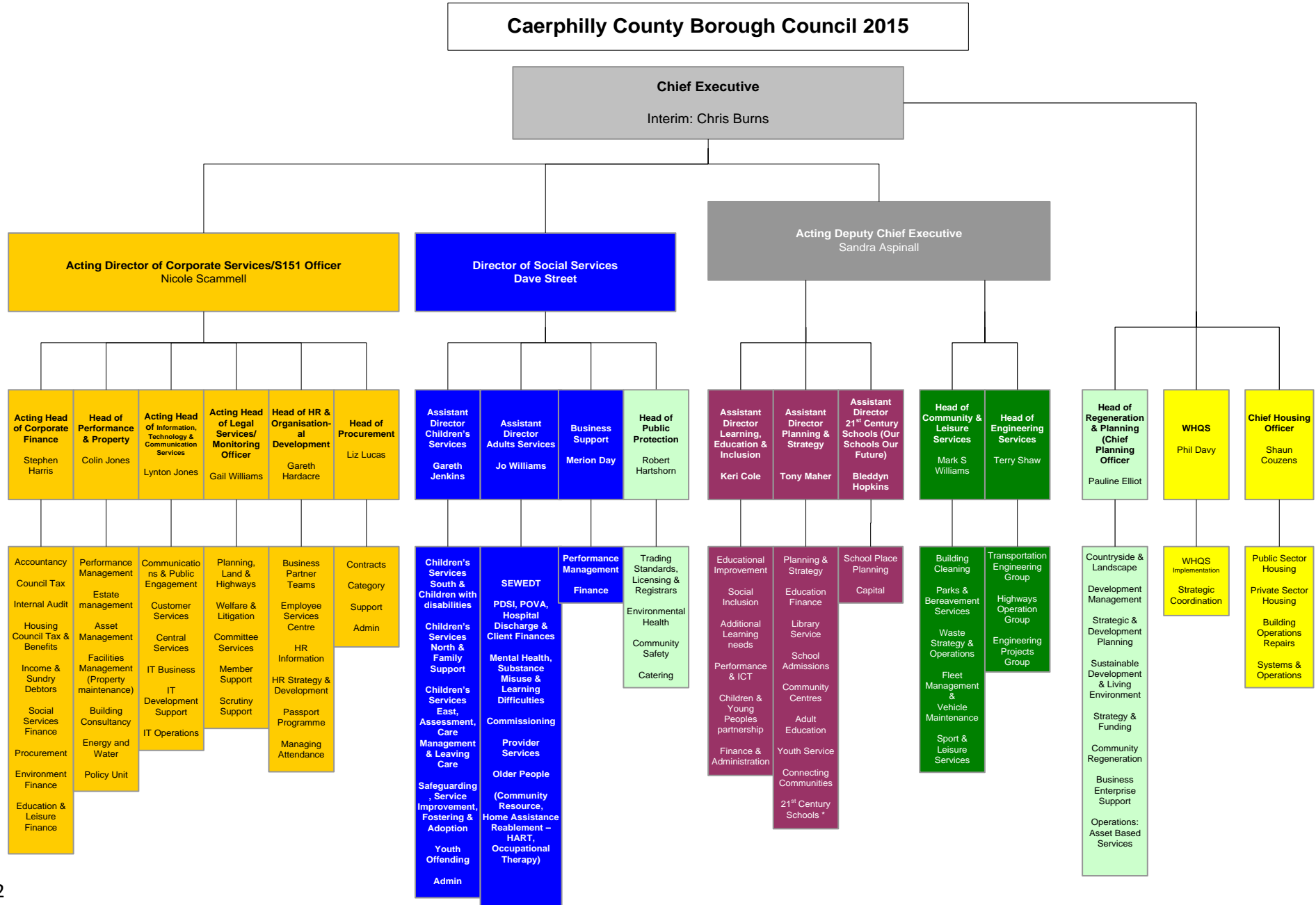


**Figure 5:** Plots of the minimum temperature each month between January 2003 and June 2013

## Data verification

The media typically report impacts of severe weather events on the public and do not usually link these to specific departments within a council. Following linkages of the media reports to the Caerphilly Council Service Areas, it was essential to ascertain the “real” relationship between the media reported events and their impacts. Also, it could be expected that the media would report the most sensational events. This could result in an omission of events perceived to be mundane by the media but of major consequence for the Council.

It was therefore essential to interview representatives from various Service areas to verify the data obtained from media resources and to investigate additional information absent from these reports.





Meetings were organised between the Team Leader for Sustainability & Living Environment, the LCLIP Researcher and senior officers within each of the Authority's 18 services.

Stages	Procedure
<b>Before Interviews</b>	Information sent via email: (i) Explanation of the process and a request for interview (ii) Summary list of weather events obtained from the media survey
<b>During Interviews</b>	(i) Further information on the LCLIP process and climate change related programmes being undertaken by Caerphilly County Borough Council (ii) Exploration of the validity of the events reported in the media (ii) Identification of additional impacts of weather events on the Service (iii) Investigation of the type of data available – qualitative and/or quantitative (iv) Identification of the Council's preparedness to respond to severe consequences arising from such weather events

**Table 1:** Interview methodology included information supplied prior to and during interview and exploration of impacts of the media reported and other weather events

### Services Responses

The information obtained during the completion of data verification via meetings with representatives of various Service areas was compiled into individual reports for each Service. These reports were then sent to the Heads of Service for comment and approval.

Meetings were held with the following 43 officers:

#### Corporate Services

- Gareth Hardacre – Head of HR & Organisational Development
- Gail Williams – Acting Head of Legal Services & Interim Monitoring Officer
- Stephen Harris – Acting Head of Corporate Finance
- Liz Lucas – Head of Procurement
- Colin Jones – Head of Performance & Property Services
- Mark Faulkner – Facilities Manager
- Lynton Jones – Acting Head of ICT & Customer Services
- Shaun Couzens – Chief Housing Officer
- Phil Davy – Head of Programme
- Mark Jennings – Housing Strategy Officer

#### Education & Lifelong Learning

- Tony Maher – Assistant Director Planning & Strategy
- Donna Jones – Health & Safety Manager
- Elizabeth Lewis – Community Focused Schools Coordinator

## **Social Services**

- Jo Williams –Assistant Director Adult Services
- Gareth Jenkins – Assistant Director Children’s Services
- Alun Ford – Facilities Manager

## **The Environment**

- Mark S Williams – Head of Community & Leisure Services
- Tony White – Waste Strategy and Operations Manager
- Derek Price – Parks and Outdoor Facilities Manager
- Mike Headington – Principal Officer Outdoor Facilities & Bereavement Services
- Christine Smart – Building Cleaning Contract Manager
- Mary Powell – Fleet Manager
- David Phenis – Sport and Leisure Services Manager
- Terry Shaw – Head of Engineering Services
- Marcus Lloyd – Highway Operations Group Manager
- Jacqui Mynott – Principal Engineer, Structures
- Kevin Kinsey - Principal Engineer, Consultancy
- Gareth Richards - Principal Engineer
- Michelle Johnson – Senior Engineer
- Clive Campbell – Transportation Engineering Manager
- Robert Hartshorn – Head of Public Protection
- Marcia Lewis – Principal Catering Officer
- Kath Peters – Community Safety Manager
- Ceri Edwards – Environmental Health Manager
- Jacqui Morgan – Trading Standards, Licensing & Registrars Manager
- Della Mahony – Superintendent Registrar
- Philip Griffiths – Acting Manager Countryside & Landscape
- Tim Stephens – Development Control Manager
- Rhian Kyte – Team Leader, Strategic & Development Planning
- Tina McMahan – Community Regeneration Manager
- Ian MacVicar – Group Manager Operations – Asset based services
- Paul Hudson – Marketing & Events Manager

## **Impacts on Caerphilly County Borough Council Service Areas**

For the purpose of this study, the impacts of the weather events on the different Caerphilly Council Service Areas are placed under the categories in Figure 1:

1. High temperatures/heat-wave/Drought
2. Excessive rainfall/flooding
3. Storms/High winds
4. Frost/ice/snow/Low temperatures

The following table collates the information gathered during the interviews and follow-up research with the 18 Service areas. The impact has been assessed as high, medium or low priority. High priority impacts will be taken forward to the next stage of assessment as recommended in the Welsh Government guidance.

Each Service has received an individual report setting out the specific information relating to the interviews with officers, research and prioritised issues for their Service area.



Caerphilly County Borough Council, Local Climate Impacts Profile (LCLIP)

Ref Number	Service Area	Impact	Description of weather event / observed change in climate	Climate variable e.g. hotter, drier summers.	Consequences	Identified as a priority impact?
	Corporate (Finance)	Significant additional costs from extreme weather related events	Any extreme event		Financial issues	Medium
	Corporate (Procurement)	Breakdown in supply chain due to extreme weather event	Any extreme event		Unable to obtain certain goods or services	Medium
	Community and Leisure	Sections of highway network impassable due to flooding	Excessive Rainfall/Flooding	Wetter Winters	Many services not able to function (delays in collection, disruption with burials). Staff unable to access work. Unable to access most vulnerable	Medium
	Community and Leisure (Cleaning)	Weather conditions stopping work being carried out e.g. delay in window cleaning	Excessive Rainfall/Flooding	Wetter Winters	Wet conditions prevent window cleaning activity	low
	Community and Leisure (Sport & Leisure)	Flooding of pitches and pavilions	Excessive Rainfall/Flooding	Wetter Winters	Loss of income, reduced physical activity, loss or severe damage to facilities resulting in potential closure	High
	Community and Leisure (Bereavement)	Extreme excavation conditions with potential for dangerous grave collapse	Excessive Rainfall/Flooding	Wetter Winters	Risk to staff and public. Loss of income - burials and internments	Medium
	Community and Leisure (Sport & Leisure)	Fine turf areas suffering disease following periods of waterlogging	Excessive Rainfall/Flooding	Wetter Winters	Loss of facilities. Could result in closure of groups/clubs. Loss of staff	Medium
	Community and Leisure (Waste)	Flooding of CA sites, depots, workshops, storage areas	Excessive Rainfall/Flooding	Wetter Winters	Damage to buildings causing disruption.	Low
	Community and Leisure (Parks)	Erosion of roads/footpaths in parks	Excessive Rainfall/Flooding	Wetter Winters		Medium

Caerphilly County Borough Council, Local Climate Impacts Profile (LCLIP)

	Community and Leisure	Structural damage to walls, embankments, blocked/collapsed culverts	Excessive Rainfall/Flooding	Wetter Winters	Impact on access and use of parks, sports and open areas, blocking roads, delays in waste collection	High
	Community and Leisure	Leachate problems in Trehir	Excessive Rainfall/Flooding	Wetter Winters		Medium
	Corporate (Property)	Flooding of sheltered housing bungalows	Excessive Rainfall/Flooding	Wetter winters	Financial issues, need to relocate residents	High
	Corporate (Property)	flood risk gap	Excessive Rainfall/Flooding	Wetter winters	Full identification of any additional buildings that may be at risk (Flood risk management plan)	High
	Corporate (Property)	Culvert collapse	Excessive Rainfall/Flooding	Wetter winters	Financial issues	Medium
	Corporate (Property)	Landslips	Excessive Rainfall/Flooding	Wetter winters	Financial issues	Medium
	Corporate	Flooding of highways	Excessive Rainfall/Flooding	Wetter winters	Staff and customers may not be able to access buildings	Low
	Corporate (ICT)	Flooding of Tredomen Data Centre	Excessive Rainfall/Flooding	Wetter Winters	Financial issues	Low
	Corporate (ICT)	Increased number of rats	Excessive Rainfall/Flooding	Milder Winters	Rats in ducts chewing through cables	Low
	Education	Sections of highway network impassable due to flooding	Excessive Rainfall/Flooding	Wetter Winters	Staff and children unable to access buildings. Closure of schools, libraries, youth centres etc.	Medium
	Education	Flooding of pitches	Excessive Rainfall/Flooding	Wetter Winters	Unable to undertake sport	Low
	Education	Flooding of sites	Excessive Rainfall/Flooding	Wetter Winters	Damage to buildings causing disruption, leading to possible closure and clean up costs.	Medium
	Education	Landslides	Excessive Rainfall/Flooding	Wetter Winters	Damage to property, blocking roads etc. Financial issues	Medium
	Education	Structural damage to walls, blocked/ collapsed culverts	Excessive Rainfall/Flooding	Wetter Winters	Impact on access and buildings, etc. Financial issues.	High
	Engineering & Transport	Delays in contracts on site	Excessive Rainfall/Flooding	Wetter Winters	Delay in contracts leading to additional costs and inconvenience	Medium

Caerphilly County Borough Council, Local Climate Impacts Profile (LCLIP)

	Engineering & Transport	Scour of culverts and drainage	Excessive Rainfall/Flooding	Wetter Winters	Potential culvert/bridge collapse	High
	Engineering & Transport	canal overflow	Excessive Rainfall/Flooding	Wetter Winters	Flooding of adjacent land	Medium
	Engineering & Transport	Landslips	Excessive Rainfall/Flooding	Wetter Winters	Landslips damaging property, blocking roads etc.	High
	Housing	Flooding of homes and buildings due to location in flood risk area	Excessive Rainfall/Flooding	Wetter winters	Financial issues, need to relocate residents	Medium
	Housing	Flooding of homes and buildings due to localised issues	Excessive Rainfall/Flooding	Wetter winters	Financial issues, need to relocate residents	Low
	Housing	Culvert collapse	Excessive Rainfall/Flooding	Wetter winters	Financial issues	Medium
	Housing	Rain penetrating external wall and bridging the cavity via the insulation material, transferring moisture to internal walls, causing damp	Excessive Rainfall/Flooding	Wetter winters	Financial issues to have the cavity wall insulation removed, and the damage repaired	High
	Public Protection	Sections of highway network impassable due to flooding	Excessive Rainfall/Flooding	Wetter Winters	Many services not able to function. Staff unable to access work (Registrars for weddings etc). Hinders access to calls. Reputational and financial risk	Medium
	Public Protection	Flooding of storage areas (pesticide, seized goods)	Excessive Rainfall/Flooding	Wetter Winters	Financial cost. Unable to prosecute cases, would need to provide compensation	Medium
	Public Protection	Damage to CCTV	Excessive Rainfall/Flooding	Wetter Winters	Cost. Security...	Low
	Public Protection	Leachate from landfill sites	Excessive Rainfall/Flooding	Wetter Winters	Toxic leachate from landfill has potential to affect homes and businesses	High
	Public Protection	Sewerage overflow	Excessive Rainfall/Flooding	Wetter Winters	Public health risk, potential for communicable disease problem...homes and businesses	High

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	Public Protection	Abnormal high volume of emergency calls	Excessive Rainfall/Flooding	Wetter Winters	Unable to answer all calls - could miss vital call - reputational risk	Medium
	Regeration & Planning	Sections of highway network impassable due to flooding	Excessive Rainfall/Flooding	Wetter Winters	Some services not able to function. Staff unable to access work.	Medium
	Regeration & Planning (C&L)	Threatened land in flood areas	Excessive Rainfall/Flooding	Wetter Winters	Boundaries of floodplains extended	Medium
	Regeration & Planning	Scour of culverts and drainage	Excessive Rainfall/Flooding	Wetter Winters	potential culvert/bridge damage	High
	Regeration & Planning (C&L)	Damage to reservoirs resulting in flooding	Excessive Rainfall/Flooding	Wetter Winters	Potential flooding/overflow from reservoirs	High
	Regeration & Planning	Flood damage	Excessive Rainfall/Flooding	Wetter winters	Clean up costs to the Authority	Medium
	Regeneration & Planning (Tourism)	Flooding of event locations	Excessive Rainfall/Flooding	Wetter Winters	Loss of income, 3rd party claims	High
	Regeneration & Planning	Policy change	Excessive Rainfall/Flooding	Wetter Winters	Sustainable Urban Drainage guidance issued and encouraged	Medium
	Social Services	Flooding of buildings	Excessive Rainfall/Flooding	Wetter Winters	No buildings in flood risk areas. Emergency plan would be implemented. If potential long term impact services may need to relocate	Low
	Community and Leisure	Sections of highway network impassable due to snow/ice	Frost/Ice/Snow	Extended cold spell	Many services not able to function (loss of income). Staff unable to access work. Unable to access most vulnerable	Medium
	Community and Leisure (Sport & Leisure)	Closure of leisure centres and sports pitches	Frost/Ice/Snow	Extended cold spell	Loss of income	Medium
	Community and Leisure (Waste)	Accumulation of waste	Frost/Ice/Snow	Extended cold spell	Health hazard (pest infestation and smell), time and cost to clear it	low
	Community and Leisure (Parks)	Damage to path surfaces	Frost/Ice/Snow	Extended cold spell	Claims risk by the public leading to rising costs	Medium

Caerphilly County Borough Council, Local Climate Impacts Profile (LCLIP)

	Community and Leisure	Burst pipes	Frost/Ice/Snow	Extended cold spell	Damage to buildings/roads/footways	Medium
	Community and Leisure (Parks)	Pest and disease in trees and fine turf areas	Frost/Ice/Snow	Extended cold spell	Loss or weakening of trees, loss of facilities (could result in closure of group/club)	Medium
	Community and Leisure	Risk damage to staff through injury and also risk damage to vehicles	Frost/Ice/Snow	Extended cold spell	Cost	Medium
	Community and Leisure (Parks)	Trees blown down	Frost/Ice/Snow	More violent storms	Damage to infrastructure, public and property e.g. buildings, head stone memorials	High
	Corporate (ICT)	Road closures from snow	Frost/Ice/Snow	Extended cold spell	ICT Staff not being able to access work	Medium
	Corporate (ICT)	Road closures from snow	Frost/Ice/Snow	Extended cold spell	Staff not being able to access work systems remotely	Medium
	Corporate	Buildings being cut off during excessive snow fall	Frost/Ice/Snow	Extended cold spell	Staff unable to deliver services	Medium
	Corporate	Continuation of service delivery	Frost/Ice/Snow	Extended cold spell	Need to be more flexible and proactive e.g. access to work electronic drives via personal computers for staff. Consideration to HR policies particularly in relation to inclement weather conditions	Medium
	Corporate	Unable to access highways	Frost/Ice/Snow	Extended cold spell	Staff not able to access work for payroll, residents not able to access services	Medium
	Corporate	Staff and customers unable to access buildings	Frost/Ice/Snow	Extended cold spell	Residents unable to access services	Medium
	Education	Sections of highway network impassable due to snow/ice	Frost/Ice/Snow	Extended cold spell	Staff and children unable to access buildings. Closure of schools, libraries, youth centres etc.	Medium
	Engineering & Transport	Sections of highway network impassable due to snow/ice	Frost/Ice/Snow	Extended cold spell	Many other services not able to function. Unable to access most vulnerable	High
	Engineering & Transport	Delays in contracts on site	Frost/Ice/Snow	Extended cold spell		Medium

Caerphilly County Borough Council, Local Climate Impacts Profile (LCLIP)

	Engineering & Transport	Collapse of walls and structures	Frost/Ice/Snow	Extended cold spell		High
	Housing	Homes and Buildings being cut off during excessive snow fall	Frost/Ice/Snow	Extended cold spell	Residents unable to access services	Low
	Housing	Staff unable to get to offices due to snow	Frost/Ice/Snow	Extended cold spell	Staff unable to deliver services	Medium
	Housing	Homeless people vulnerable in cold weather	Frost/Ice/Snow	Extended cold spell	Health issues for homeless people	Low
	Housing	Issues with outside toilets in cold weather	Frost/Ice/Snow	Extended cold spell	Potential damage and toilets being temporarily unusable	Medium
	Housing	Burst pipes	Frost/Ice/Snow	Extended cold spell	Financial issues clean-ups	Low
	Public Protection	Sections of highway network impassable due to snow/ice	Frost/Ice/Snow	Extended cold spell	Many services not able to function (loss of income). Staff unable to access work (Registrars for weddings, sampling to labs etc). Hinders access to calls. Reputational and financial risk	High
	Public Protection	Accidents	Frost/Ice/Snow	Extended cold spell	Service demand increase for investigating accidents	Medium
	Regeneration & Planning	Sections of highway network impassable	Frost/Ice/Snow	Extended cold spell	Some services not able to function. Staff unable to access work. Loss of income via closed tourism attractions	Medium
	Regeneration & Planning	sections of highway network impassable	Frost/Ice/Snow	Extended cold spell	Health hazard (delivery of meals on wheels service)	Medium
	Regeneration & Planning	frozen reservoirs	Frost/Ice/Snow	Extended cold spell	Public claims against LA	Medium
	Regeneration & Planning	Burst pipes	Frost/Ice/Snow	Extended cold spell	Damage to buildings/roads/footways. Cost implications	Medium
	Social Services	Sections of highway network impassable due to snow/ice cutting buildings off	Frost/Ice/Snow	Extended cold spell	Review of transport arrangement to day centre could be required. Review of provision methods such as lunchtime meals provided via MOW or carers in an individuals home	Medium
	Social Services	Staff and clients unable to access buildings	Frost/Ice/Snow	Extended cold spell	Residents unable to access services	Medium

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	Social Services	Increase with slips, trips and falls with staff	Frost/Ice/Snow	Extended cold spell	Impact on resources and could result in increased Delayed Transfer of Care (DToC)	Medium
	Community and Leisure (Parks)	Trees blown down	Storm/High Winds	More violent storms	Damage to infrastructure, public and property e.g. buildings, head stone memorials	High
	Community and Leisure	Structural damage to buildings/pavilions by trees and wall collapse	Storm/High Winds	More violent storms	Damage to buildings causing disruption. Cost, staff and public risk	low
	Community and Leisure (Waste)	Blown litter	Storm/High Winds	More violent storms	Health hazard, time and cost to clear it	low
	Community and Leisure (Waste)	Bins blowing around	Storm/High Winds	More violent storms	Costs for replacements	low
	Community and Leisure (Cleaning)	Weather stopping work e.g. delay in window cleaning	Storm/High Winds	More violent storms	Windy conditions prevent window cleaning activity	low
	Corporate (ICT)	Trees blown down during high winds resulting in no power	Storm/High Winds	More violent storms	Closure of buildings	Medium
	Education	Trees blown down	Storm/High Winds	More violent storms	Damage to infrastructure, public and property	High
	Education	Structural damage to buildings	Storm/High Winds	More violent storms	Damage to / closure of buildings causing disruption. Cost, staff and public risk	Low
	Education	Slates blown off roofs	Storm/High Winds	More violent storms	Health hazard, time and cost	Medium
	Education	Chimney stacks and lighting columns affected	Storm/High Winds	More violent storms	Health hazard, time and cost	Medium
	Engineering & Transport	Debris collecting on bridges and culverts	Storm/High winds	More violent storms		Medium
	Engineering & Transport	Damage to buildings	Storm/High winds	More violent storms	Damage to buildings causing disruption	Low
	Engineering & Transport	Trees blown down	Storm/High winds	More violent storms	Damage to infrastructure	High

Caerphilly County Borough Council, Local Climate Impacts Profile (LCLIP)

	Housing	Structural damage to buildings	Storm/High Winds	More violent storms	Damage to buildings causing disruption. Cost, staff and public risk	Low
	Housing	Trees being damaged or blown down	Storm/High Winds	More violent storms	Damage to buildings people and property	Medium
	Public Protection	Damage to buildings	Storm/High Winds	More violent storms		Medium
	Public Protection	Accidents	Storm/High Winds	More violent storms	Service demand increase for investigating dangerous structures under emergency planning	low
	Public Protection	No power	Storm/High Winds	More violent storms	Closure of buildings, no access to calls from vulnerable residents...	Medium
	Regeneration & Planning (C & L)	Trees blown down	Storm/High Winds	More violent storms	Damage to infrastructure, public and property e.g. buildings	High
	Regeneration & Planning	Structural damage to buildings	Storm/High Winds	More violent storms	Damage to buildings causing disruption. Cost, staff and public risk	Medium
	Social Services	Power lines go down	Storm/High Winds	More violent storms	Impact communication	Low
	Community and Leisure (Sport & Leisure)	Discomfort in gym	High Temperatures	Hotter summers	A/C is expensive	Medium
	Community and Leisure (Parks)	Large impact on fine turf areas when in highest use by public	High Temperatures	Hotter summers	Loss of facilities. Could lead to changes in sports use patterns	Medium
	Community and Leisure (Parks)	Damage to floral displays and newly planted tree stock	High Temperatures	Hotter summers	Loss of stock	Medium
	Community and Leisure (Parks)	Increased risk of grass fires in parks and woodland areas	High Temperatures	Drier summers	Loss of stock and risk to public and surrounding properties	High
	Community and Leisure	Staff health with possible heat exhaustion for those working on site	High Temperatures	Hotter summers	Demand for A/C in older fleet vehicles. May need to change the number and timing of collections. Need correct PPE	High
	Community and Leisure	Health problems in summer through decaying of waste	High Temperatures	Hotter summers	Potential disease and pest problems in hot weather	High



Caerphilly County Borough Council, Local Climate Impacts Profile (LCLIP)

	(Waste)					
	Community and Leisure	Significant damage to fine turf areas	High Temperatures	Hotter summers	Loss of facilities or changes in use patterns. Longer term public health and well being issues	Medium
	Corporate (Property)	Buildings becoming uncomfortable in hot weather	High Temp Heat Wave Drought	Hotter summers	Consideration may need to be given to working hours, cooling measures, potential closure	High
	Corporate	Data centres becoming too hot	High Temp Heat Wave Drought	Hotter summers	operational issues in service delivery	Low
	Corporate	Water shortages	High Temp Heat Wave Drought	Drier summers	Major issue in buildings, may need to temporarily close offices	Medium
	Education	Buildings become hot	High Temperatures	Hotter summers	Discomfort in schools, libraries etc	High
	Education	Insufficient shade in school playgrounds/ grounds	High Temperatures	Hotter summers	Health issues for pupils and staff	High
	Engineering & Transport	Problems with bridge deck joints	High Temperatures	Hotter Summers		Low
	Engineering & Transport	Surface dressing melting	High Temperatures	Hotter Summers		Low
	Engineering & Transport	Canal levels low	High Temp Heat Wave Drought	Drier Summers	Fish death, increased algal growth	Medium
	Engineering & Transport	Blocked culverts and drains	High Temp Heat Wave Drought	Drier Summers	Lack of rain reduces natural cleaning of drains and culverts could result in flooding and/or odours	Medium
	Housing	Soils drying out could lead to problems from trees such as subsidence and structural cracking	High Temp Heat Wave Drought	Hotter summers	Financial issues	Low
	Housing	Homes become too warm in hot weather	High Temp Heat Wave Drought	Hotter summers	Health issues for vulnerable residents	Medium
	Public Protection	Mountain fires	High Temperatures	Hotter summers	Staff unable to access locations (e.g. Llechwen Hall for weddings)	Medium

Caerphilly County Borough Council, Local Climate Impacts Profile (LCLIP)

	Public Protection	Blue green algae blooms in Caerphilly Castle moat	High Temperatures	Hotter summers	Blue green algae can cause severe health problems to humans.	High
	Public Protection	Increase in pests and disease	High Temperatures	Hotter summers		High
	Public Protection	More noise / ASB	High Temperatures	Hotter summers		Medium
	Public Protection	Water shortage issues	High Temp Heat Wave Drought	Drier summers	Potential problem with food premises	Medium
	Regeneration & Planning (C & L)	Tree disease and death	High Temp Heat Wave Drought	Hotter summers	Loss of planting schemes	High
	Regeneration & Planning (C & L)	Health issues for staff working outside in high temperatures	High Temp Heat Wave Drought	Hotter summers	Staff working outside may be affected by high temperatures	High
	Regeneration & Planning (C & L)	Increased risk of fires within countryside	High Temp Heat Wave Drought	Hotter summers	Loss of amenities.	High
	Regeneration & Planning (C & L)	Effect on existing habitats and species	High Temperatures	Hotter summers	Loss of important habitats and species potentially	High
	Social Services	Health issues with vulnerable residents	High Temperatures	Hotter summers	Fans to be provided with fluids increased for residents	Medium
	Social Services	Staff health issues with possible heat exhaustion	High Temperatures	Hotter summers	Fans and additional fluids to be provided	Medium
	Engineering & Transport	Delay in contracts due to nesting birds	Early Spring	Milder winters	Nesting birds prevented commencement of work on site in February	Low

## **Summary of impacts**

### **Excessive rainfall/flooding events**

40% of the severe weather events identified in the media research were related to excessive rainfall or flooding. This correlates with the number of impacts identified in the Service interviews, with 43 of the 128 impacts identified (33%) relating to excessive rainfall or flooding. Of the 43 impacts identified, 13 were assessed as being of high priority.

Particular incidences of excessive rainfall were identified in October 2005, December 2006, November 2007, January 2008 and June 2012.

The Authority has various systems in place to identify and prepare for events of heavy rainfall. Severe weather warnings are received and sent to relevant staff. Services initiate plans and procedures to deal with the predicted events. Historically there have been very few problems with flash flooding. The disruption is usually very short term with localised flooding being caused either by blocked drains or because the capacity of the systems are unable to cope with the increased volumes of water resulting from heavy storms.

A Flood Risk Management Strategy is in place. Areas within the county borough where flooding from watercourses is possible have been identified and measures are either in place or being developed in partnership with Natural Resources Wales (NRW).

The major issue for the Authority is the effect of excessive rain on the aging infrastructure with reducing maintenance budgets. The potential for culverts to collapse has been identified as a particular issue, especially if, as predicted, excessive rainfall becomes more prevalent. The renewal of drainage infrastructure is likely to be a very time consuming and expensive issue.

Budgeting for emergency works is an important issue particularly where infrastructure failure, such as a culvert collapse, place severe strain on Service budgets. There have been several incidences where repair costs have exceeded £200,000.

### **Localised flooding of highways**

Localised flooding of highways was identified 5 times during the Service interviews, but none were assessed as being high priority. The impact is generally related to staff not being able to get to their place of work or to residents not being able to access buildings.

The disruption is usually very short term with localised flooding being caused either by blocked drains or because the capacity of the systems are unable to cope with the increased volumes of water resulting from heavy storms.

No major incidents were identified where flooding had caused the closure of sections of the highway network for an extended period.

Systems are in place to proactively clean culverts. There is the potential for increased disruption if the budgets for this proactive work are reduced.

### **Delays in work or contracts**

Excessive rain delaying work or contracts was identified as an impact 3 times but none were assessed as high priority

### **Cancellation of events**

The Tourism Section identified the cancellation of events as a high priority impact.

Although outside the study period, Tourism identified that in 2014, the Proms in the Park event was cancelled due to a leaking roof on the main stage. The Authority still had to cover the costs of the event resulting in a £40,000 loss. The event was to be broadcast UK wide, and the cancellation caused significant reputational damage.

Tourism events such as the Big Cheese often take place in parks where excessive rainfall can make conditions very difficult, with fields becoming waterlogged preventing vehicles from accessing them to bring in marquees of equipment, and also resulting in muddy conditions which reduce the number of visitors.

### **Flooding of specific sports pitches or pavilions**

Flooding of specific sports pitches or pavilions was identified 4 times 2 of which were identified as high priority. Many of the Authority's pitches are located on flood plains and are therefore liable to flood. This can cause damage to pavilions and make pitches unplayable. This will result in the cancellation of matches and results in lost revenue. Two wet summers in a row in 2012 and 2013 has had a significant affect on the number of people playing cricket.

The need for more all weather pitches was highlighted by Leisure Services as an important issue, however these are very expensive to install.

### **Damage to drainage systems and structures**

The damage caused by excessive rainfall to drainage systems and structures was identified 9 times, with 5 of those being assessed as high priority. Most Services with substantial land holdings identified this as an issue. There is significant vulnerability of culverts to excessive rainfall, particularly to scouring. Many are aging and there is the potential that they may collapse. A major culvert collapse in 2009, cost in excess of £200,000 to repair.

There have been recent examples of landslips due to heavy rain. These can be extremely disruptive and expensive to repair. Sustained rainfall caused a landslip at Fothergills Road, New Tredegar which cost in excess of £1m to repair.

Heavy rainfall washed out a section of the Sirhowy Valley Walk in 2009, which cost the Authority £200,000 to repair.

### **Leachate and Sewer overflow**

Leachate from closed landfill sites and sewer overflow as a result of heavy rain were identified as high priority, by Public Services, due to their potential to cause public health issues.

### **Damp in homes with cavity wall insulation**

The housing teams have identified that more frequent and heavier rain could expose weaknesses in the fabric of the building stock. Cavity wall insulation could become saturated if the render is damaged and is not repaired. This may increase the cases of

rain penetrating external walls and bridging the cavity via the insulation material, transferring moisture to internal walls, causing damp.

The removal of cavity wall insulation can be a very expensive operation. The cost of work to 70 properties at Rowan Place, Rhymney rose from £600,000 to £4m due to this issue.

### **Reservoir and canal overflow**

The Countryside & Landscape section manages several reservoirs. Whilst it undertakes regular monitoring, additional pressure is placed on dams during periods of heavy rainfall.

With the canals there are limited outfalls and water levels need to be managed carefully when heavy rain is predicted.

## **Frost, ice, snow and cold**

28% of the severe weather events identified in the media research were related to frost, ice, snow and low temperatures. This correlates with the number of impacts identified in the Service interviews, with 32 of the 128 impacts identified (25%) relating to frost, ice, snow and low temperatures. Of the 32 impacts identified, 3 were assessed as being of high priority.

Particular incidences of frost, ice, snow and low temperatures were identified in December 2009, January and December 2010 and January 2013.

Generally, good systems are in place for snow or freezing conditions, with advanced warning and emergency procedures. The Authority has a Winter Preparedness Action Plan and Business Continuity Plan which identify critical services, our most vulnerable residents and how key functions are maintained. This includes, for instance, the provision for Countryside & Landscape staff with 4 x 4 vehicles to support the delivery of meals on wheels to the most vulnerable.

The Authority is currently considering the case for more flexible ways of working, including home working, agile working, alternative ways of working and changes to working practices. The pace of this change is being driven by financial and other considerations, which are forcing the agenda more quickly than climate change concerns. However, an increase in home working, agile working, linked to asset management considerations such as the closure of some buildings, particularly those that are most vulnerable or least resilient in a changing climate, will make the Authority more resilient to climate change.

It is predicted that winters will become warmer and wetter, so in theory many of the issues identified will become less prevalent, although some predictions are that weather systems may become “blocked” over the UK. If a cold weather system became blocked over the UK we may experience an extended period of very low temperatures.

Of the 32 impacts identified, exactly half (16), were related to the highway network being impassable in snow/ice, preventing staff from getting to work or residents from accessing services. Two of these impacts were assessed as high priority. One related to services being able to get to our most vulnerable residents. The other related to the statutory requirement that the Registrars need to attend weddings.

Slippery surfaces causing accidents accounts for 3 impacts, with burst pipes accounting for a further 3. Delays in contracts and refuse vehicles not being able to complete their rounds account for a further 2.

The other high priority relates to the collapse of structures such as retaining walls. This was identified as a particular issue when the ground is saturated and freezing then causes greater damage.

## **Storms and high winds**

16% of the severe weather events identified in the media research were related to storms or high winds. This matches the number of impacts identified in the Service interviews, with 21 of the 128 impacts identified (16%) relating to storms or high winds.

Particular incidences of storms or high winds were identified in December 2006, January 2009, January 2012 and December 2013

Systems are in place to identify when storms and high winds are likely to reach Caerphilly County Borough. Generally it was felt that our buildings are in good condition and not particularly vulnerable to storms and high winds. However concern was expressed that we do not currently have a comprehensive approach to surveying and identifying trees that may be vulnerable, and undertaking work to make them safer. A reduction in resources in this area in recent years was highlighted as a concern.

Of the 21 impacts identified, 4 were assessed as being of high priority.

Eight of the impacts from storms and high winds relate to damage to buildings. Historically, damage has been minor, and with improved construction and monitoring none of these impacts were assessed as high priority.

Six impacts were related to trees. All 4 of the impacts assessed as high priority in the storms/high winds category relate to damage to trees. Many Services with significant land holdings identified the risk of damage to trees from high winds as an issue. It was identified that as many trees are under stress from the changing climate and disease that this will make the situation worse. Ash dieback, Phytophthora in larch and stress to beech and hawthorn all mean that many trees in the county borough may be vulnerable in high winds.

Two impacts related to power lines being brought down and 3 impacts related to litter.

If as predicted storms and high winds become more common and more severe this will become an increasingly important issue.

## **High temperatures heat-wave and drought**

16% of the severe weather events identified in the media research were related to high temperature, heat-wave or drought. 30 of the 128 impacts (23%) identified in the Service interviews related to high temperature, heat-wave or drought.

Caerphilly experienced very high temperatures during the summers of 2003 and 2006, with temperatures ranging between 30°C and 35°C over prolonged periods.

Of the 30 impacts identified, 12 were assessed as being of high priority. This reflects the fact that we have not experienced many hot summers recently, and as a consequence our systems have not been developed to prepare and deal with this.

Services are however aware of the likelihood of hotter drier summers, and are aware that they need to start considering and planning for them.

Particular concern was expressed for employees and school pupils who may be outside during the hottest periods of days during heat-waves.

Some buildings become very uncomfortable in hot weather. This is likely to get worse if the anticipated changes to climate happen. There are no specified maximum temperatures that buildings should be below to be appropriate for staff. Working practices do alter in hot weather but policies may need to change to reflect this if there are more extremes of heat in the summer. Home working, more flexible working or agile working could be considered although the home environment may also become too hot.

### **High temperatures in buildings**

High temperatures in buildings was identified 6 times as an impact, of which 2 were assessed as high priority. It was identified that there is no upper limit at which buildings should not be used. As a result there is no monitoring of the upper temperatures in buildings, or analysis of how they perform in hot weather. It was identified that some buildings do become very uncomfortable in hot weather. This is likely to get worse if the anticipated changes to climate happen. It would be useful to put in place monitoring of temperatures in buildings particularly those known to become very hot, or those which accommodate vulnerable people.

Consideration may need to be given to working hours, cooling measures, even potential closures in extreme heat. It is likely that as the Authority changes with asset management and alternative ways of working that this will reduce our vulnerability. This however should be actively factored in to consideration of potential changes.

### **Staff/pupils outside in hot weather**

The impact on staff working outside, or pupils being outside in hot weather was identified as an issue 4 times and assessed as being a high priority 3 times. This largely reflects the fact that this is seen as a potential issue, but that currently there are not comprehensive procedures in place to manage this.

This was specifically identified in Services such as refuse collection and countryside management where the work currently requires staff to be outside at the hottest times of the day.

### **Fires**

Grass and bracken fires were identified as an impact 3 times, and as a priority twice. Fires are already a significant issue for the Authority, and this is likely to become worse if, as predicted, we see hotter drier summers.

### **Water shortages**

Water shortages, or if no water were available in buildings would be an issue, which may require contingency planning

### **Loss of new planting areas**

Within the countryside service there have been examples of the loss of new planting schemes due to drying out. Watering new planting may need to be considered, or changing to more drought tolerant species.

### **Other environmental impacts**

Low river levels results in less oxygen in the water, this may result in the death of vulnerable species. The top of the River Rhymney has a good selection of invertebrates that are used to colonise further down the river. If these are lost it will be more difficult for the river to recover after a drought. Dry summers affect beech/hawthorn growth and other habitats but its true extent is unknown at this stage.

Milder winters and warmer summers may result in an increase in invasive species that may threaten human health and the native flora and fauna.

Blue green algae, which is a major health concern, is more prevalent in hotter weather.

### **Infrastructure**

The effect of high temperature on infrastructure such as road or path surfaces has been identified by Engineering Services, who are monitoring the issue.

## **Next stage of the process**

The completion and approval of the LCLIP will mean that Part 1 of the Welsh Government's statutory guidance will be complete. The next step, set out in Part 2, is for those impacts identified as being of high priority, to go forward for further investigation, vulnerability assessment and risk assessment.

**Part 2: Investigating.** This involves refining the climate change impacts identified in Part 1, and identifying levels of sensitivity and adaptive capacity. It also includes a climate change risk assessment that explores the likelihood and consequence of each impact and provides your organisation with a list of prioritised impacts to develop actions for in Part 3.

This part includes:

### **2.1: A Closer Look at What Climate Change Means for your Organisation - Refining the impacts**

The first step in refining the impacts is for the organisation and its core partners to consider and agree the scale of the work. Is the priority to take a high-level look at impacts affecting the organisation as a whole? Or should initial efforts focus on assessing detailed impacts for specific departments/service areas/types of infrastructure/assets/communities?

The guidance identifies that there is no right or wrong answer to this question; both approaches are viable and in some cases organisations choose to assess top level



impacts alongside work looking at more detailed impacts for specific areas of concern or interest.

## **2.2: Assessing your Organisation's Current Vulnerability to Climate Change**

Once the impacts that are considered to be particularly important and relevant to the organisation, have been identified, a vulnerability assessment should be undertaken to identify those impacts that the organisation/community/asset/infrastructure is least able to cope with. Information generated by the vulnerability assessment can also help to identify actions.

In the context of preparing for a changing climate, vulnerability is defined as:

*'The extent to which a system is susceptible to, or unable to cope with, adverse effects of climate change, including climate variability and extremes. It depends not only on a system's sensitivity but also on its adaptive capacity'.* [UKCIP 2003]

Involving relevant stakeholders is likely to make any vulnerability assessment more complete.

Assessing vulnerability involves four steps:

1. Listing impacts and affected departments, services and communities.
2. Assessing sensitivity.
3. Assessing adaptive capacity.
4. Assigning a vulnerability rating.

## **2.3: Undertaking a Climate Change Risk Assessment**

After the vulnerability assessment, those departments/services/communities that returned the highest scores are most vulnerable to the impacts of climate change. These are the areas of most pressing concern for the organisation, and the organisation may wish to explore them further and carry out a risk assessment.

A risk assessment involves assessing the likelihood and consequence of risks and helps to prioritise them.

### **Scale of the work**

A recommendation on the scale of the work, as required as part of 2.1 above, is included in the recommendations section of this report. Broadly it recommends a twin track approach, with some high level issues such as a review of key policies, and some further work on specific impacts relating to individual Service areas, being taken forward.

## Conclusions

The preparation of this LCLIP has identified that there is a good understanding of climate change issues across the senior officers who were interviewed, in the Authority. Services are aware that the climate is changing, with many services considering and planning to adapt to the changes they are seeing. The levels of understanding of other employees was not assessed as part of this work

Across the Authority existing systems are in place which compliment and enable the adaptation work. These systems include Business Continuity, Emergency Planning, Major Incident Plan, Corporate Risk Assessment, as well as the individual Service Plans. Very few examples were identified where severe weather events had major impacts on the way the Authority operates.

The study identified that the Authority is changing in response to external factors including the financial climate and new legislation. These are driving changes at a quicker rate than the natural adaptation of the organisation to climate change.

It was commented that we have very traditional approaches to working and to risk management, which may restrict our ability to be flexible in response to climate change and other factors affecting the Authority

Some work is being done between Services to align various plans, in particular 21<sup>st</sup> Century Schools, Asset Management and the Local Development Plan. This work is already providing tangible benefits and is facilitating a more holistic approach to issues

The county borough's changing demographics, resulting in an increase in the number of older and more vulnerable residents, will make it increasingly difficult to ensure that they are prioritised in severe weather events.

### **Risk**

Any changes in climate that result in services not being delivered will have a reputational risk, especially if this impacted on our most vulnerable residents. Operational failures, such as failure to pay staff or suppliers would be damaging, although this is very low risk.

Buildings being seen as not fit for purpose in extreme weather could be a reputational risk, especially if this relates to new buildings.

### **Better understanding of the issues**

The work has identified that further assessment and a better understanding of the impacts and implications is needed for some issues.

We do not have a comprehensive picture of how our various buildings react in extreme heat conditions. Some buildings become very uncomfortable in hot weather. This is likely to get worse if the anticipate changes to climate happen.

The effect of climate change on our trees, biodiversity and landscape were identified as areas where we do not fully understand the likely impacts

### **Policies and procedures**

Some policies, which have been developed to cover the whole authority, were highlighted as having the potential to reduce our overall ability to either react quickly or to maximise our effectiveness in severe weather. Policies highlighted included the employment policies, the inclement weather policy and procurement policies.

Many of the responses that the organisation is considering in light of the current financial climate and legislation were identified as having the potential to make the organisation more resilient to climate change. The rationalisation of buildings, changes to HR policies to enable more flexible or home working, may all enable us to deal better with severe weather events. Climate change adaptation issues are being factored into the overall change process that the Authority is currently going through.

### **Costs**

The work has highlighted that some Services have incurred substantial costs dealing with weather related events. These are generally funded from individual Service budgets, as part of the day to day work of the Service. As a consequence these costs are often not recorded separately and it is therefore difficult to identify the true cost of climate related issues.

Unpredictability was identified as a major issue which has cost and programming implications. Services commented that it is likely that some form of severe weather will impact on their work, but this could be heavy snow, high winds or flooding, but it is impossible to make provision for every possible event.

There are potential financial issues if more frequent emergency works are required by services, such culvert collapses / landslips / flooding etc due to excessive rain. The vulnerability of aging infrastructure was identified as a key issue.

There may be an increase in the cost of insurance as extreme weather events occur and claims are submitted.

The LCLIP has highlighted a number of areas where the Local Authority has been affected by extreme weather. These have been highlighted and included within the individual Service area reports.

## Recommendations

Part 2 of the Welsh Government guidance recommends that each organisation should consider the scale of the future work.

This should include considering whether the priority is to take a high-level look at impacts affecting the organisation as a whole, or focusing on assessing detailed impacts for specific departments/service areas/types of infrastructure/assets/communities.

This report recommends a twin track approach, with some high level issues such as a review of key policies, being combined with some further work on specific impacts relating to individual Service areas.

This report identifies a total of 14 recommendations are divided into two areas:

- Existing work and reviews where consideration of climate change adaptation issues should be included. This includes 5 recommendations under 3 headings:
  - Strategies and Plans
  - Review of policies and procedures
  - Financial considerations
- Specific additional work on climate adaptation issues. This includes 9 service specific recommendations

### Existing work and reviews where consideration of climate change adaptation issues should be included

#### Strategies and plans

The work associated with preparing this LCLIP has identified research and information which could be used to inform policies plans and strategies at a strategic and service level.

Climate change adaptation related work is identified in various plans across the Authority. This is useful in terms of ensuring integration, however in some cases this is effectively duplication. Some excellent work is being done by some services to align various plans, in particular 21<sup>st</sup> Century Schools, Asset Management and the Local Development Plan. This work is already providing tangible benefits and is facilitating a more holistic approach to issues

**Recommendation 1:** The potential benefits, should be considered, of including climate change adaptation issues in new strategies and plans including the Single Integrated Plan, Local Development Plan and Service Plans.

**Recommendation 2:** There should be greater emphasis on aligning plans to ensure a more joined up holistic approach, and reducing duplication.

## Reviews of policies and procedures

The Authority is changing rapidly in response to factors such as the changing financial climate and new legislation. These changes are driving change at a faster rate than the natural adaptation of the organisation to climate change.

The changing climate adds to the case for considering more flexible ways of working and working practices.

Some policies, which have been developed to cover the whole Authority, were highlighted as having the potential to reduce the ability of the organisation to either react quickly or to maximise their effectiveness in severe weather. Policies highlighted included some employment policies, the inclement weather policy, and some procurement policies.

**Recommendation 3:** Where policies and procedures are being reviewed, climate change adaptation issues should be factored in to the reviews.

**Recommendation 4:** When HR policies are being reviewed, the benefits of including issues related to climate change adaptation, should be considered. Potential areas include:

- Inclement weather
- Flexible working/home working
- Agile working
- Outdoor staff working in hot weather
- Schools policies for pupils in hot weather

## Financial considerations

There will be potential financial issues if more frequent emergency works are required by services, for events such as culvert collapses or landslips etc. due to excessive rain.

Unpredictability was identified as a major issue which has cost and programming implications. Depending on the degree of impact of climate change and patterns of impact, the risk ranges from short periods of total loss of continuity to other periods of partial loss/reduction but over longer periods of time. It is likely that some form of severe weather will impact on the Division, but this could be heavy snow, high winds or flooding, it is impossible to make provision for every possible event.

**Recommendation 5:** Consideration should be given to the potential for a more strategic use of capital programmes or central contingency funds. This should include assessing the benefits of additional funding for preventative work,

## Specific additional work on climate adaptation issues

### Collecting data relating to the impacts of climate change

The systematic gathering and storing of data pertaining to severe weather events and their consequences for service delivery would provide a useful aid to understanding the impacts and costs. This will be particularly important where a business case may be required to progress specific work.

**Recommendation 6:** Systems should be put in place to gather data on key impacts of climate change.

### **Remote access for staff to their work systems**

If employees cannot access their place of work, and they do not have remote access to their work systems this poses a risk. There are opportunities here for ICT to contribute to making the Authority more resilient through access to systems from home, facilitating agile and flexible working etc. ICT are already looking at this, but this should be seen as a priority.

**Recommendation 7:** ICT prioritise assessing opportunities for increasing the remote access of staff to their work systems

### **Procurement**

A considerable amount of work has been undertaken by Procurement Services on sustainability, however there are no specific clauses relating to climate change in procurement documentation. This may need to be reviewed if market forces do not respond appropriately to any changes in climate.

**Recommendation 8:** Consideration should be given to assessing which goods and services could be affected by climate change, and how vulnerable they may

### **Property**

Some buildings become very uncomfortable in hot weather. This is likely to get worse if the anticipated changes to climate happen.

**Recommendation 9:** Consider our various buildings and how they would react in extreme heat conditions. Some buildings may require more detailed investigations if they are shown to react badly in high temperatures

### **School grounds**

The Authority has undertaken work to provide shade in schools. Much of this work has been driven by the Foundation Phase, which requires more outdoor teaching. It is not clear whether or not all schools have sufficient shade should we get prolonged periods of high temperature.

**Recommendation 10:** Consider assessing the provision of shade in school playgrounds/grounds to cope with extended periods of hot weather.

### **Trees**

Trees being blown down by more severe storms, was identified by several Services. This issue is likely to become more prevalent with more severe storms and more stresses placed on trees by the hotter drier weather and more pests and diseases. The current staff provision is struggling to cope with existing demands which limits their ability to undertake proactive survey and preventative work.

**Recommendation 11:** The current provision of tree services should be reviewed in the light of the increasing vulnerability of trees as a result of climate change. More proactive and preventative work should be considered

### **Biodiversity**

It is not clear how climate change will impact on the current biodiversity and the landscape of the county borough. There is a need to understand the effect of climate change on existing habitats and species. Disease and pests are becoming more prevalent resulting in loss of existing species. New species are appearing as the climate changes.

**Recommendation 12:** Consider undertaking, or commissioning, work to assess the effects of climate change on our landscapes and biodiversity

### **Parks, Sports & Leisure**

The effects of climate change on our sports pitches were highlighted. This results in a loss of revenue through cancellations, and in less people remaining active.

**Recommendation 13:** Consider undertaking a more detailed assessment of the issue, and potentially developing a business case for increasing the number of 3G pitches.

### **Infrastructure & Engineering**

Excessive rainfall causing drainage and culvert damage was identified as one of the main severe weather issues, especially as we have an aging infrastructure.

**Recommendation 14:** Consider reviewing our current approach to surveying, maintenance and preventative work relating to our drainage systems and culverts, to assess any potential vulnerabilities and resourcing issues

## Appendix 1. EXTREME WEATHER EVENTS 2003 – 2013

Date	Extreme Weather Event
<b>2003</b>	
02/01/03	Excessive Rainfall/Flooding
09/01/03	Frost/ice/snow/low temperature
01/03/03	High winds
15/04/03	High Temperature/Heat-wave/Drought
04/08/03	High Temperature/Heat-wave/Drought
08/09/03	High Temperature/Heat-wave/Drought
<b>2004</b>	
27/02/04	Frost/ice/snow/low temperature
04/08/04	High Temperature/Heat-wave/Drought
23/08/04	Excessive Rainfall/Flooding
07/09/04	High Temperature/Heat-wave/Drought
<b>2005</b>	
08/01/05	High winds
24/02/05	Frost/ice/snow/low temperature
19/04/05	Excessive rainfall/flooding
25/05/05	Excessive rainfall/flooding
19/06/05	High Temperature/Heat-wave/Drought
07/07/05	Excessive rainfall/flooding
28/09/05	Excessive rainfall/flooding
11/10/05	Excessive rainfall/flooding
27/10/05	High Temperature/Heat-wave/Drought
07/11/05	Excessive rainfall/flooding
24/11/05	Excessive rainfall/flooding
25/11/05	Frost/ice/snow/low temperature
<b>2006</b>	
01/03/06	Frost/ice/snow/low temperature
19/03/06	Excessive rainfall/flooding
27/05/06	High Temperature/Heat-wave/Drought
03/07/06	High Temperature/Heat-wave/Drought
29/07/06	High Temperature/Heat-wave/Drought
17/08/06	Excessive rainfall/flooding
05/12/06	Excessive rainfall/flooding
07/12/06	High winds
<b>2007</b>	
11/01/07	Excessive rainfall/flooding
18/01/07	High winds
09/02/07	Frost/ice/snow/low temperature
06/03/07	Excessive rainfall/flooding
05/05/07	High Temperature/Heat-wave/Drought
15/06/07	Excessive rainfall/flooding
20/06/07	High winds



20/07/07	Excessive rainfall/flooding
19/11/07	Excessive rainfall/flooding
06/12/07	Excessive rainfall/flooding
<b>2008</b>	
11/01/08	Excessive rainfall/flooding
10/03/08	High winds
10/05/08	Excessive rainfall/flooding
04/07/08	High winds
05/09/08	Excessive rainfall/flooding
05/10/08	Excessive rainfall/flooding
<b>2009</b>	
05/01/09	Frost/ice/snow/low temperature
18/01/09	High Winds
04/02/09	Frost/ice/snow/low temperature
09/02/09	Frost/ice/snow/low temperature
06/06/09	Excessive rainfall/flooding
21/07/09	Excessive rainfall/flooding
28/11/09	Excessive rainfall/flooding
15/12/09	Frost/ice/snow/low temperature
23/12/09	Frost/ice/snow/low temperature
29/12/09	Frost/ice/snow/low temperature
<b>2010</b>	
02/01/10	Frost/ice/snow/low temperature
05/01/10	Frost/ice/snow/low temperature
12/01/10	Frost/ice/snow/low temperature
14/01/10	Frost/ice/snow/low temperature
20/01/10	Frost/ice/snow/low temperature
12/05/10	Excessive rainfall/flooding
08/06/10	Excessive rainfall/flooding
30/11/10	Frost/ice/snow/low temperature
14/12/10	Frost/ice/snow/low temperature
20/12/10	Frost/ice/snow/low temperature
<b>2011</b>	
12/01/11	Excessive rainfall/flooding
17/05/11	High Temperature/Heat-wave/Drought
12/09/11	High Winds
13/12/11	Frost/ice/snow/low temperature
<b>2012</b>	
04/01/12	High winds
16/04/12	High Temperature/Heat-wave/Drought
29/04/12	High Winds
25/05/12	High Temperature/Heat-wave/Drought
06/06/12	Excessive rainfall/flooding
03/07/12	Excessive rainfall/flooding
31/10/12	Excessive rainfall/flooding

<b>2013</b>	
02/01/13	Excessive rainfall/flooding
16/01/13	Frost/ice/snow/low temperature
19/01/13	Frost/ice/snow/low temperature
21/01/13	Frost/ice/snow/low temperature
30/01/13	Excessive rainfall/flooding
22/03/13	Frost/ice/snow
19/07/13	High Temperature/Heat-wave/Drought
27/07/13	Excessive rainfall/flooding
16/09/13	Excessive rainfall/flooding
02/11/13	High Winds
18/12/13	High Winds
31/12/13	High Winds

## Appendix 2. The Welsh Declaration on Climate Change and Energy Efficiency – April 2006

### *The Welsh Commitment on Climate Change and Energy Efficiency*

*Caerphilly County Borough Council recognises that Climate Change is likely to be one of the key drivers of change in our communities this century*

#### **We recognise that**

- There is growing evidence that damaging climate change is occurring and that it will have long lasting effects on the UK's economy, environment and society
- Carbon dioxide emissions from fossil fuel use are a prime contributor to climate change. Improved energy efficiency and green sources of energy will therefore play a fundamental role in combating climate change.
- Local authorities need to play their full part at local level, leading and delivering the Welsh response to climate change within the UK Climate Change Programme

#### **We welcome the**

- Emissions targets and programmes for delivering change agreed by central government and the national Assembly as set out in the UK Climate Change programme
- Social, economic and environmental benefits likely to derive from combating climate change
- Recognition of a need for change by many sectors especially government and business
- Opportunity for local authorities to lead the response at local level by helping
  - Encourage local residents and businesses to reduce their energy costs
  - Reduce transport congestion
  - Improve the local environment
  - Deal with fuel poverty within our communities
- Additional powers under the Local Government Act 2000 that will allow us to address the social, economic and environmental well being of our communities
- Opportunity to improve the energy efficiency of our housing stock and public buildings

#### **We commit our Council to**

- Work with the National Assembly and central government at local level to deliver the UK climate change programme in Wales.
- Include consideration of climate change issues within Community Strategies
- Make a public declaration, in line with agreed targets with the WAG, to: -
  - Deliver a significant reduction in greenhouse gas emissions
  - Improve energy efficiency in council buildings and homes
  - Increase the use of "green" energy from renewable sources
- Encourage local residents and businesses to take action to reduce emissions of greenhouse gases and where appropriate publicise their actions
- Work with key building operators e.g. health authorities, businesses and development bodies to seek ways to adapt to potential effects of climate change on our communities
- Encourage the development of practical, economically viable, sustainable energy
- Encourage production of combined heat and electricity from these sources eg bio-mass
- Encourage local manufacture of energy efficient equipment for producing heat & power
- Monitor the progress of our plan against the actions needed and publish the results
- Take the necessary action to rectify any deviation from the plan where required

Leader of the Council

WLGA Spokesperson for the Environment	Leader of the Welsh Local Government association	Minister for the Environment Planning and the Countryside National Assembly for Wales	Minister for Economic Development & Transport National Assembly for Wales
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