



BRACKNELL FOREST LOCAL CLIMATE IMPACTS PROFILE (LCLIP)

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Bracknell Forest Local Climate Impacts Profile (LCLIP)

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EXECUTIVE SUMMARY

- The young and old and other vulnerable groups will be more susceptible to harm from extreme weather.
- Although extreme weather related claims are spread throughout the Borough, flood-related claims are more prominent in the south of Bracknell Town.
- The cost of council insurance claims will increase in the future. Insurance claims for extreme weather will increase over time as a result of rising greenhouse gas concentrations in the atmosphere that will result in more frequent extreme weather events. The cost of insurance will increase as insurance providers incorporate climate change into their premiums.
- The abundance and severity of fire incidents throughout the Borough (especially woods) will be more problematic through sustained dry periods.
- Hot/wet and hot/dry summers will promote the prevalence of certain pests, indicating that pest control incidents are increasing over time.
- Flooding as a result of heavy rain (storms) or broken pipes (cold snap) are problems that affect the schools infrastructure. Reactive maintenance only temporarily solves persistent extreme weather related problems. Proactive maintenance (implementation of SUDS/ insulation of pipes) will reduce the likelihood of problems with council assets.
- Council wide recommendations to adapt to climate change include:
 - Tailored made climate change projections for appropriate services – Spatial policy, Highways, Environmental Health, Emergency Planning, Drainage, Housing, Property Services, Finance, Admissions and Property.
 - Include extreme weather conditions to appropriate service databases e.g. delay in the collections of bins due to snow on minor roads.
 - Improve extreme weather communication between service user and service provider e.g. schools inform transport providers that their services are not needed before fleet is mobilised.
 - Incorporate climate change into appropriate council policies when policies are renewed.
 - Better inter-service communication concerning climate change impacts e.g. design of school grounds (Admissions and Property) and its contractual maintenance (Landscape Services).
- Departmental recommendations to adapt to climate change include:
 - ECC: Awareness and access to environmental data to appropriate staff such as flooding, drainage problem summaries to planners, facilitation of SUDS, climate change resistance to be included in future highways management, move towards specification and design aimed at providing sustainable/low maintenance landscapes, incorporate climate change into woodland/tree policy, housing, arts, leisure and library strategies.
 - CS: climate change proof existing and future accommodation, climate change impact to be incorporated into project appraisals and guidance to line managers as to how to manage staff and extreme weather.
 - ASC&H: climate change incorporated where feasible into service provider operations.
 - CYPL: Incorporate climate change adaption into refurbishment and future school design.

1. INTRODUCTION

The purpose of preparing a Local Climate Impacts Profile (LCLIP) is to raise awareness of current vulnerability to weather events in a particular locality. Understanding current vulnerability is an appropriate starting point for the preparation of an adaptation strategy. Appropriate sections/teams have been contacted concerning their operations and the impact of climate change. Through discussion with council officers a series of recommendations have been put forth.

The LCLIP will feed into measuring progress against NI 188 Adapting to Climate Change. The LCLIP findings will be disseminated amongst the Climate Change Working Group and the Climate Change Partnership. This should provide the catalyst for further action within the authority and amongst Local Strategic Partnership (LSP) partners, specifically to encourage serious resource allocation to the development of an adaptation strategy for Borough and county.

1.1 Vulnerabilities

The IPCC have defined vulnerabilities to climate change:

“The degree to which a system is susceptible to, and unable to cope with, adverse effects of climate change, including climate variability and extremes. Vulnerability is a function of the character, magnitude, and rate of climate change and variation to which a system is exposed, its sensitivity, and its adaptive capacity”¹

Vulnerability is therefore mainly a function of locality and depends upon:

- local physical features (such as topography, rivers, settlements),
- local weather and climate (averages and extremes),
- local socio-economic characteristics (such as dependence on agriculture, tourism or transport links and the presence and extent of particularly vulnerable groups); and,
- the preparedness of the local community to respond both in the short-term and the long-term.

In the context for Bracknell Forest Council the following vulnerability categories are considered:

- Natural Environment: Green spaces
- Built Environment: BFC Assets, Borough Infrastructure, Schools, Heritage sites
- Humans:
 - Adults
 - Learning disability (LD)
 - Mental health
 - Older person (50+)
 - Physical disability
 - Young people
 - Children

¹ Intergovernmental Panel on Climate Change (2001): Annex B: glossary of terms, <http://www.ipcc.ch/pdf/glossary/tar-ipcc-terms-en.pdf>

1.2 Key impacts of climate change (Environment Agency)

Water supply

- increased water demand plus droughts could worsen water supply problems in parts of England
- low summer rainfall may stress protected sites
- saline intrusion to coastal aquifers

Built environment

- flooding
- sewerage system overflow following intense rainfall
- structural damage and subsidence
- heat and air quality problems

Environment

- loss of land and biodiversity to the sea
- low river flows reduce effluent dilution, which increases the likelihood of algal blooms and damage to wetlands and aquatic habitats
- biodiversity losses due to higher water temperatures, poor water quality and eutrophication
- major ecological change in upland areas, wetlands and aquatic habitats
- invasive species
- change in timing of event (biological phenology)

Health

- increase in heat-related summer deaths and more cases of food poisoning and vector- and waterborne diseases
- significantly fewer cold-related deaths (mainly the elderly)
- mental stress to victims of extreme weather events

Agriculture

- water shortages could lead to reduced crop production
- increased costs for irrigation and livestock feed
- intense rainfall and periods of drought would lead to soil damage and erosion
- reduced frost damage, longer growing season

Business and industry

- power cuts due to storm and flood damage
- restrictions on industrial water supply (e.g. for cooling)
- insurance industry – higher payouts for storm damage, flooding and subsidence
- expansion of wave and wind power potential

Transport

- high temperatures can cause damage to road and rail infrastructure and restrictions to navigation on waterways
- gales and flooding during winter will affect all modes of transport and ports, especially in coastal areas
- passenger discomfort in hot weather

Tourism/leisure

- low flow and poor water quality may restrict recreational activities on rivers/lakes
- extreme weather may create problems for conservation of heritage sites (both built and archaeological), especially at coastal sites
- warmer, drier and sunnier summers could benefit domestic summer tourism

2. METHODOLOGY

There is no fixed procedure for conducting an LCLIP. LCLIPs that are undertaken and reported are dependant on the need for change and availability of data.

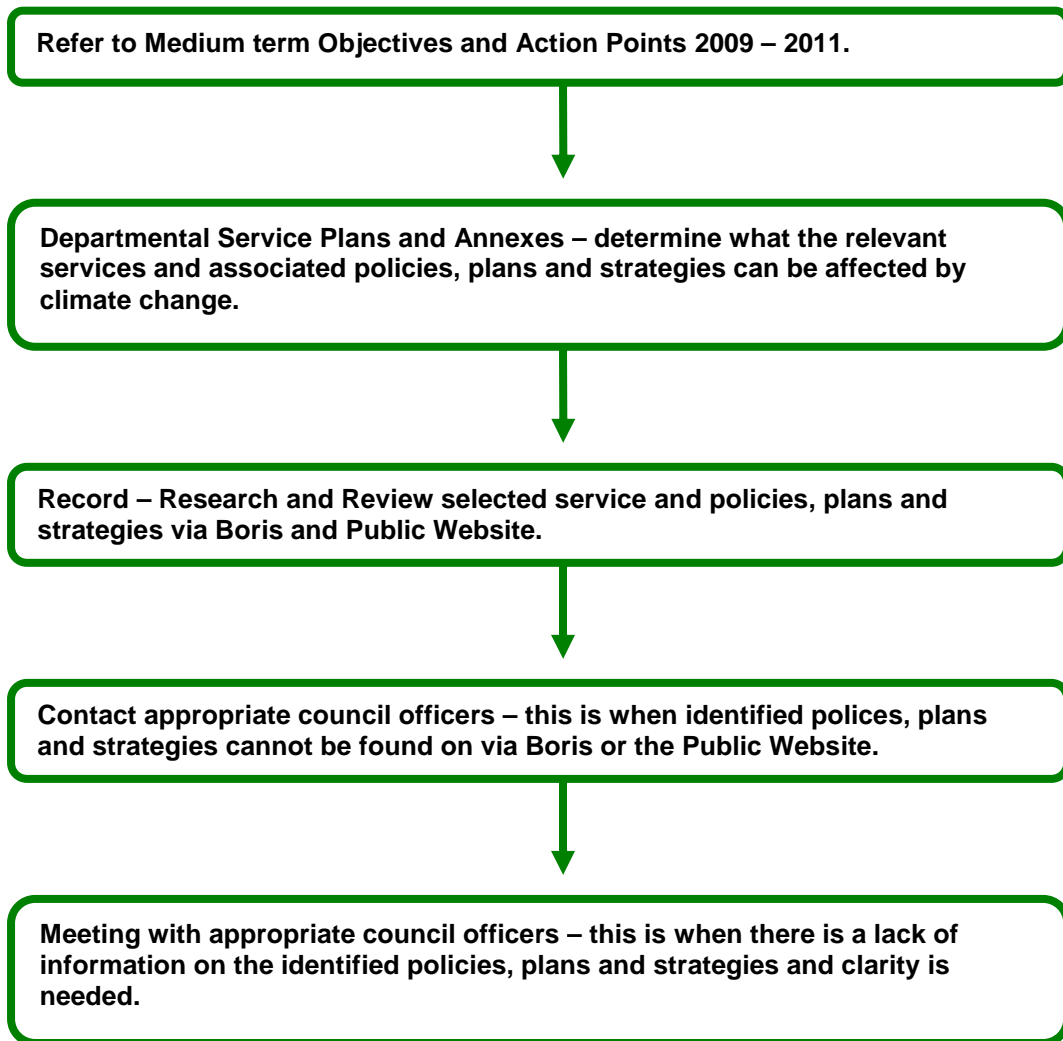
There are 4 basic stages to the process:

- Stage One: Project Planning (developing contacts)
- Stage Two: Research Journalist & Council Sources i.e. Internet, press releases and departmental logs (determining vulnerability)
- Stage Three: Data Analysis (identifying threats & opportunities)
- Stage Four: Outcomes and Further Work (determining potential actions to be taken)

In order to understand current vulnerability, it was necessary to gather information on the following:

- the nature and the magnitude of the consequences of recent weather events;
- the identity of the agency(s) responsible for managing the consequences of events;
- the preparedness of responsible agencies to deal with the consequences of local weather events;
- the details of the weather events and impacts that caused these consequences;
- together, this information has allowed an initial judgement on what were significant consequences for BFC and its locality.

The report will also identify key polices, addressing the possibility of amending existing council policies, plans and strategies to factor in climate change. If amendments are not possible then solutions are considered (refer to flow chart on next page).



3. RESULTS

3.1 Insurance claims data analysis

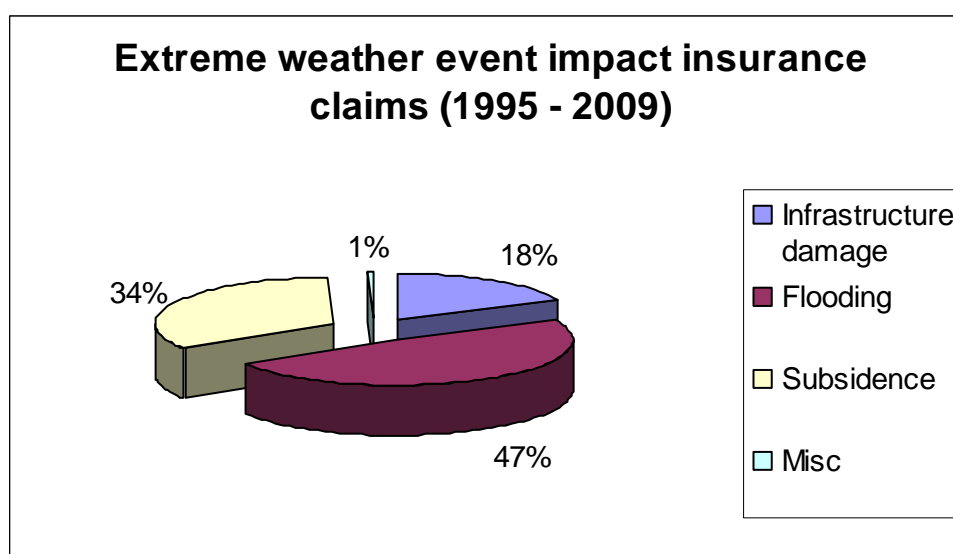


Figure 3.1.1: Extreme weather event impact claim insurance claims

As indicated by the pie chart almost half the claims (47%) were flooding related and a third (34%) were subsidence related. It is important to note that these claims are do not reflect the entire Borough population, only those that pursued finances from the Council for losses incurred during extreme weather (storms, heatwaves and cold snaps).

Extreme Weather Event	Impact	Years
Storm	Flooding	May 00, Aug 04, Jul 07, May 09
Heatwave	Drought/Subsidence	Jun – Jul 03, Jun – Jul 06
Cold snap	Infrastructure damage ²	Dec 95, Dec 00, Dec 08, Feb 09
Miscellaneous	Braziers lane	2000/2001

Table 1.1 Breakdown of extreme weather event, impact, and years from 1995 – 2009.

Flooding

The flooding as a result of the storm in 2000 yielded 69 claims. One of these 69 claims yielded 62 claims from tenanted properties. A majority of these were previously owned by the council and now owned by Bracknell Forest Homes.

Subsidence

2003 & 2006 were classed as event years for subsidence.

Infrastructure damage

Although the cold snap in Dec 2000 cost more in repairs in comparison to Dec 2008, the cold snap in Dec 2008 coupled with the cold snap in Feb 2009 cost more in repairs within the budget year. It is important to note that the repairs for Braziers lane due to the cold snap in 2000 came out of funds over several budget years. Although sometimes the cause of insurance claims may not be linked to environmental changes but, as a direct result of a defect with the associated infrastructure, irrespective of this, unpredictable changes in temperature will exacerbate infrastructure damage.

² Include burst pipes, roads, property damage and personal injury (falling over on icy ground, car damage by potholes)

Extreme Weather Event Insurance Claims (1995-2009)

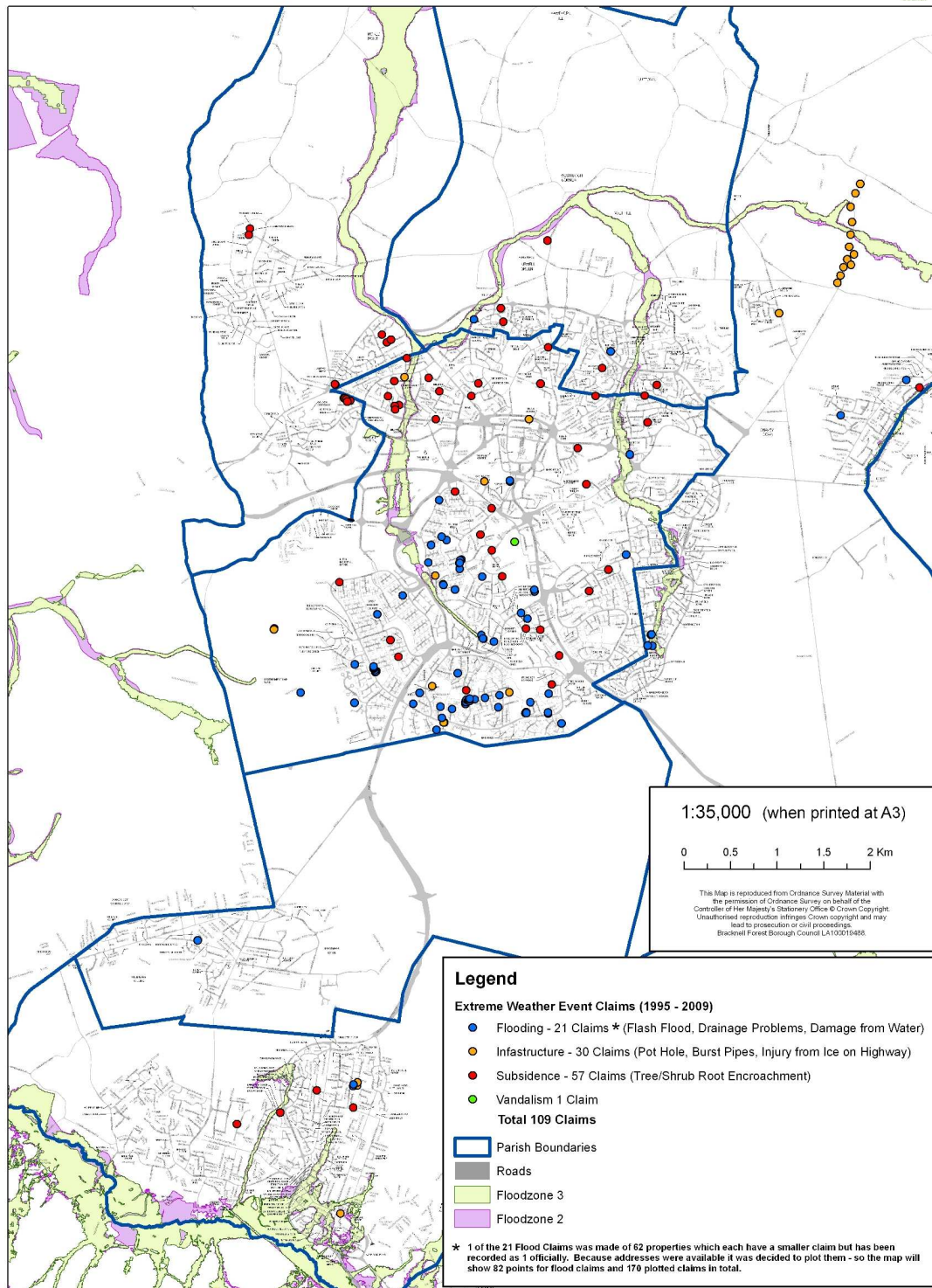


Figure 3.3.2: Distribution and types of extreme weather related claims including flood zones (1995 – 2009).

As shown by Figure 3.3.2 there is no specific pattern of subsidence throughout the Borough but there have been several claims in:

- Priestwood & Garth (Farleywood & Priestwood)
- Temple Park in Binfield

The presence of shrinkable clay sub soils combined with sustained dry periods is the most likely reason for subsidence in these areas.

Surface water flooding is common to the south of Bracknell Town with claims in Great Hollands, Wildridings, Birch Hill & Hanworth. This is due to the hydro-geological characteristics (as there is a change in the geology from the north to south across the Borough), topography and development. The north is predominantly London Clay (low permeability) and the south of the Borough consists of straddle gravels, sands and other alluvium deposits (high permeability)³.

The total cost of works over the claim period amounted to £694,202.23 and the total council contribution amounted to £127,311.34⁴. These extreme weather event impact claims are predicted to increase and have many social, environmental and economic implications. A rise in global temperatures could lead to more expensive and harder to obtain property insurance in the UK and throughout the world⁵.

- In the UK, the average annual insured losses from river flooding and flash floods could rise by 14% to £633 million, based on a four-degree rise in global temperatures which could occur as early as 2060. The average annual windstorm losses could rise by 25% to £827 million, due to changes in 'storm tracks', along which cyclones travel.
- The insured cost of extreme flood losses occurring on average once every 100 years in Great Britain could rise by 30% to £5.4 billion. The costs of windstorms occurring on average once every 100 years could rise by 14% to £7.3 billion.
- Wales and the south west region of the UK could be most badly affected. In the south west, average annual flood and wind damage insured losses could rise by 29% and 24% respectively.

Additionally, UNEP FI has recommended that the financial sector should recognise the reality of climate change and mainstream it into all business processes. It is a decision factor for business planning and strategies, portfolio management, and at individual transaction level⁶.

³ Contaminated Land Inspection Strategy, Revised Edition. Bracknell Forest Council, 2008.

⁴ Compilation Data derived from Insurance Officer, analysed by EDO and map generated by GIS Technician Allan. Amounted claims refer to accepted and pending claims. NB most figures were available but not all.

⁵ Dailey et al. The Financial Risks of Climate Change, *ABI Research Paper*, No. 19, (2009).

⁶ Adaptation and Vulnerability to Climate Change: The role of the finance sector, November 2006. CEO briefing, UNEP Finance Initiative.

3.2 Fire analysis

3.2.1 Background

Royal Berkshire Fire and Rescue provided Secondary fires Bravo records from 03 February 1998 to 25 July 2009 1564. Secondary fires Bravo are all vegetation fires affecting grass, heath, trees & woods. Additional details recorded included station, address, time of call, incident type and closure details. In total there were 300+ incident types of fire recorded. Many of these incident types were the same but were recorded inconsistently. There were also numerous closure details. Due to classification inconsistencies, a majority of these records were reclassified and this greatly improved the outcome of the analysis and results

3.2.2 Findings

Appendix B displays the range and number of incident types from 1998 to 2009. Appendix C graphically illustrates selected data from Appendix B. The data clearly shows in 2003 the highest peak in all types of incident reports. The highest reported incident type in 2003 was woods on fire. This coincides with the 2003 Heatwave in the UK and throughout Europe. The second peak type of incident reports was of woods on fire, grass fires and bushes on fire in 2006. This also coincides with the 2006 Heatwave in the UK and throughout Europe.

Only a minority of the fire incidents that were recorded were not classed as deliberate, accidental or malicious. Appendix D displays the severity of the fire closure details over the time period specified. Appendix E graphically illustrates selected data from Appendix D. The data clearly shows in 2003 there is generally a peak in all closure details. The highest reported closure detail in 2003 was secondary fire Bravo 3 accidental. The second highest reported closure detail in 2003 was Secondary Fire Bravo 3 Deliberate. This coincides with the 2003 Heatwave in the UK and throughout Europe⁷. The second peak type of closure details in 2006 was of secondary fire Bravo 3 accidental and secondary fire Bravo 3 deliberate, respectively. This also coincides with the 2006 Heatwave in the UK and throughout Europe⁸.

The information indicates that generally the use of hose reels were required during fire fighting, especially through heatwaves. It should be noted that there have been some changes to how data has been recorded since 1998 and from April 2010 onwards⁹. For instance, after 1999 there is a significant drop in fires recorded as malicious. Irrespective of these changes in recording Accidental, Deliberate or Malicious, the severity of the secondary fires Bravo cannot be questioned.

Appendix F illustrates the total number of fires over the specified time period. This reveals that there is only one peak; the 2003 Heatwave.

No specific pattern can easily be distinguished but the graph gives an indication that there is a stable period of fires, around 150 reported fires for a few years before a peak and then a stabilisation period before dropping to low reports of fires. Within the last 40 years heatwaves in the UK have steadily been increasing; 1911, 1976, 1990, 2003 and 2006¹⁰. In 2003, there were 152,700 grassland and heathland fires

⁷ 2003 Heatwave: http://en.wikipedia.org/wiki/2003_European_heat_wave

⁸ 2006 Heatwave: http://en.wikipedia.org/wiki/2006_European_heat_wave

⁹ Anne Eatwell, Royal Berkshire Fire and Rescue

¹⁰ LCLIP Stage One

recorded in the UK, the highest since the peak of 174,600 fires attended in 1995 (both years experienced hot dry summers). In contrast, there were 65,700 fires in 2002 and just 40,900 fires in 1998 (due to wetter weather conditions)¹¹. Due to the limited data it is difficult to determine the frequency of heatwaves and high incidences of fires in the Borough but a crude estimate could be every 8 -10 years.

3.2.3 Remarks

The results and analysis strongly indicate that there are peaks in secondary fires Bravo during sustained dry periods (Heatwaves) and this is attributed to climate change. This is due to the increase of heatwaves over the last 40 years in the UK. UNEP FI has stated that extreme monthly temperatures that used to occur once every hundred years in the UK now happen every twenty years. Twenty-year events have become six-year ones and ten-year events recur every four years¹².

The highest reported incident types for secondary fires Bravo were woods on fire, grass fires and bushes on fire, respectively. The highest reported closure details were secondary fire Bravo 3 accidental, secondary fire Bravo 3 deliberate and secondary fire Bravo 2 deliberate, respectively. Generally, the use of hose reels was required during fire fighting. There is a strong likelihood that when the next heatwave occurs, Bracknell Forest would expect similar recorded fires. There is insufficient data to predict the next heatwave and consequent peak in fires but the data does suggest an 8-10 year cycle.

¹¹ Fire Statistics, United Kingdom, 2003. ODPM, London.

¹² Adaptation and Vulnerability to Climate Change: The role of the finance sector, November 2006. CEO briefing, UNEP Finance Initiative.

3.3 Flooding

Flood zones 2 and 3 are prominent throughout the Borough (refer to Appendix J for definitions).

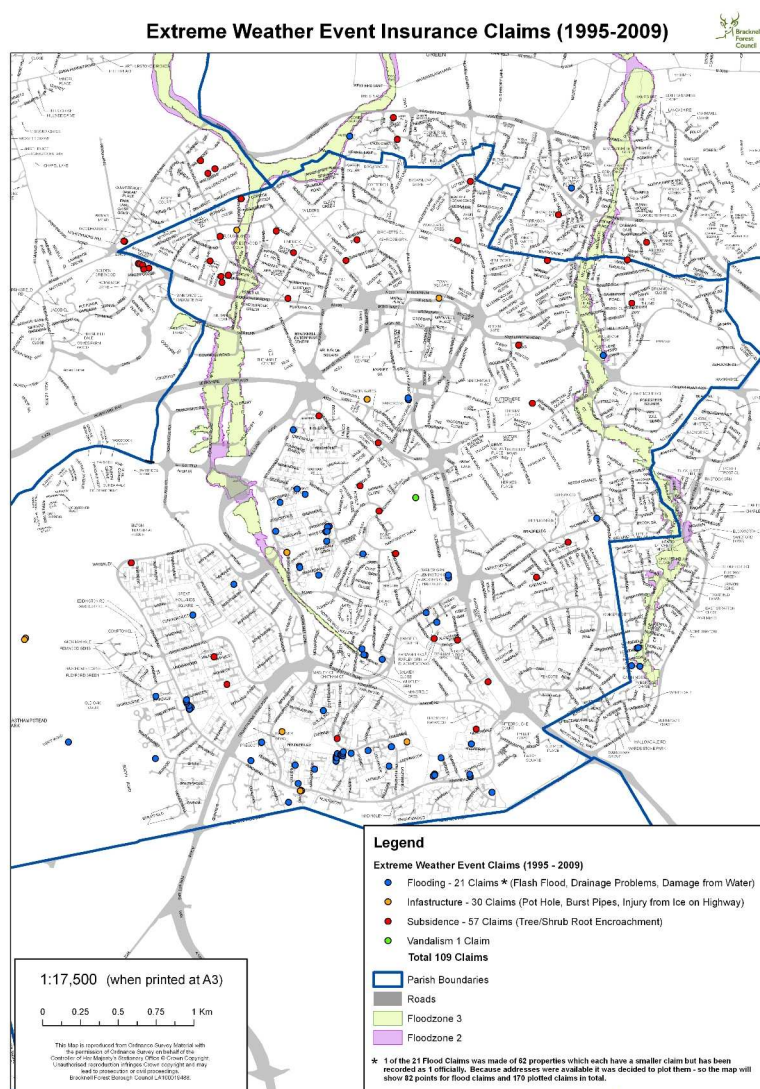


Figure 3.3.1: Flood zones 2 & 3 in Bracknell Town

The map indicates that at least 8 key areas of Bracknell Town reside within flood zones 2 & 3.

- Temple Park (NE)
- Priestwood
- Western Industrial Estate
- Southern Industrial Estate
- Wildridings
- Forest Park
- Bullbrook
- Whitegrove

Flooding also coincided with insurance claims at the beginning of flood zones 2 & 3 (Milton close and Southwick court).

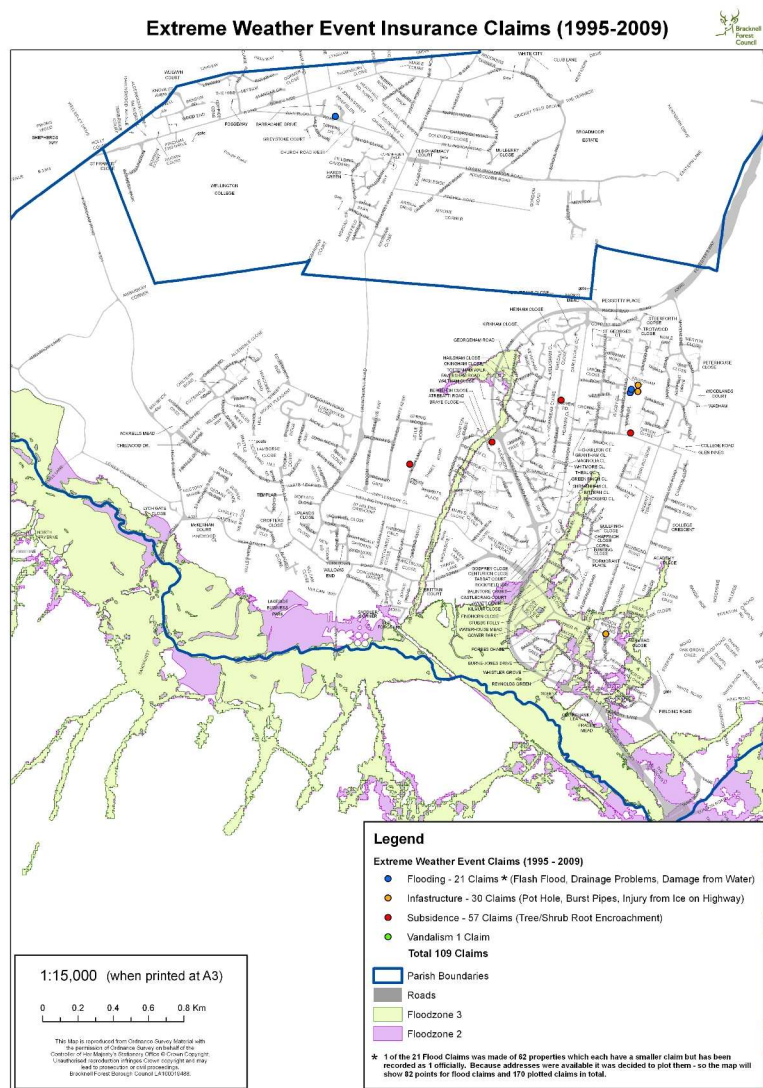


Figure 3.3.2: Flood zones 2 & 3 in Sandhurst Town

Sandhurst school grounds get saturated quite easily, every time there is heavy rain this affects the school's Astroturf and the school playing field. Also, all the main buildings have flat roofs which often lead to problems related to drainage¹³. Flooding in the Borough is mostly due to surface water flooding not fluvial.

¹³ Anecdotal evidence provided by Sandhurst School site controller, December 2009.

3.4 Pest control task data analysis

3.4.1 Background

The Operational Support Team (Environment and Public Protection) provided worksheet task analysis forms (annually and spring/summer) from 1996 to 2009. For data consistency the analysis was performed from 1996 to 2008.

3.4.2 Findings

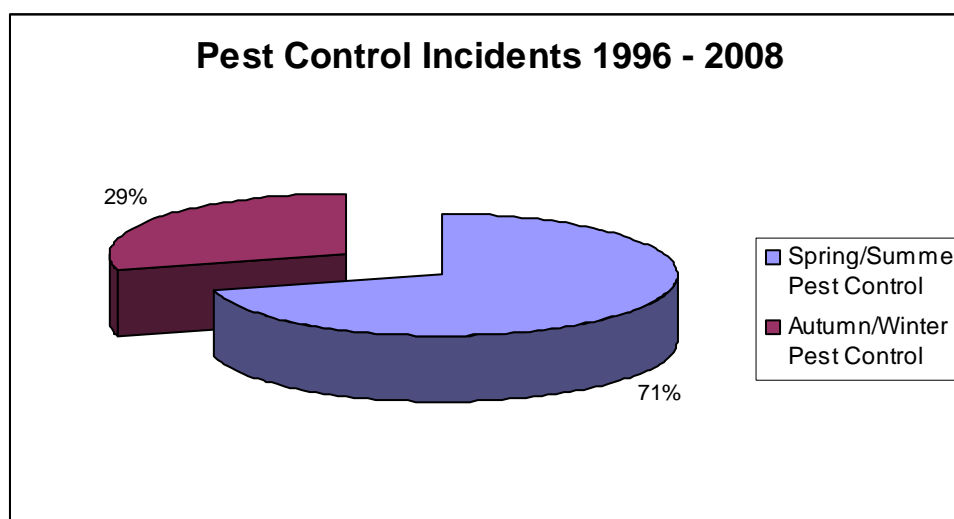


Figure 3.4.1: Combined seasonal pest control tasks from 1996 to 2008.

Figure 3.3.1 clearly indicates that a high proportion of pest control issues occur during the warmer months.

Appendix G displays the sub totals for the combined seasons and the total pest control incidents from 1996 to 2008. The spring/summer peaks and total pest control incidents occur during 1997, 2000, 2002, 2004, and 2007 wet and warm spring/summers¹⁴. The highest peak is in 2007, this coincides with high rainfall during spring/summer throughout the UK, leading to flooding in some parts of the country.

Appendix H displays the main pest control task categories from 1996 to 2008. The data clearly indicates that wasp pest control incidents have peaked during years of the wet and warm spring/summers. Rat pest control incidents generally peaked during years of warm and dry spring/summers. For instance, the 2003 heatwave, Spanish plume event in June 2005 and the 2007 heatwave followed by heavy rainfall.

Although these common pest populations fluctuate yearly, the overall trend suggests an increase in these pest populations over time due to wetter and milder winters as a result of climate change¹⁵.

The Chartered Institute of Environmental Health (CIEH) have stated that temperature and other climatic factors can increase rodent populations and associated pathogens/infectious diseases. Other pests will become common such as ticks, flies and mosquitoes. Regional studies show that tick populations are increasing. Ticks

¹⁴ BBC Yearly Weather Reviews.

¹⁵ Climate Change and its Health Implications, Issue 1: Version 2, November 2008. Chartered Institute of Environmental Health (CIEH), London.

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dwell predominantly in woodlands and meadows with hosts such as deer, small mammals, rodents and birds. Woodland amounts to 20% of the land cover of Bracknell Forest¹⁶. It may be prudent to plan to raise public awareness of these health issues in the future.

¹⁶ Bracknell Forest Biodiversity Action Plan 2006 – 2011. Bracknell Forest Borough Council, 2006.

3.5 Case Study Examples

3.5.1 Bracknell Storm 2000

A small band of heavy rain channelled through Bracknell, 2000. The path of the storm went through the Hanworth Estate, South Hill Park, Mansfield Crescent, Milton Close and Mill Pond. Due to the strength of the water it damaged the road surface towards the end of the storm path. As indicated by the claims data this resulted in 69 claims of property damage amounting to £134,897.62.

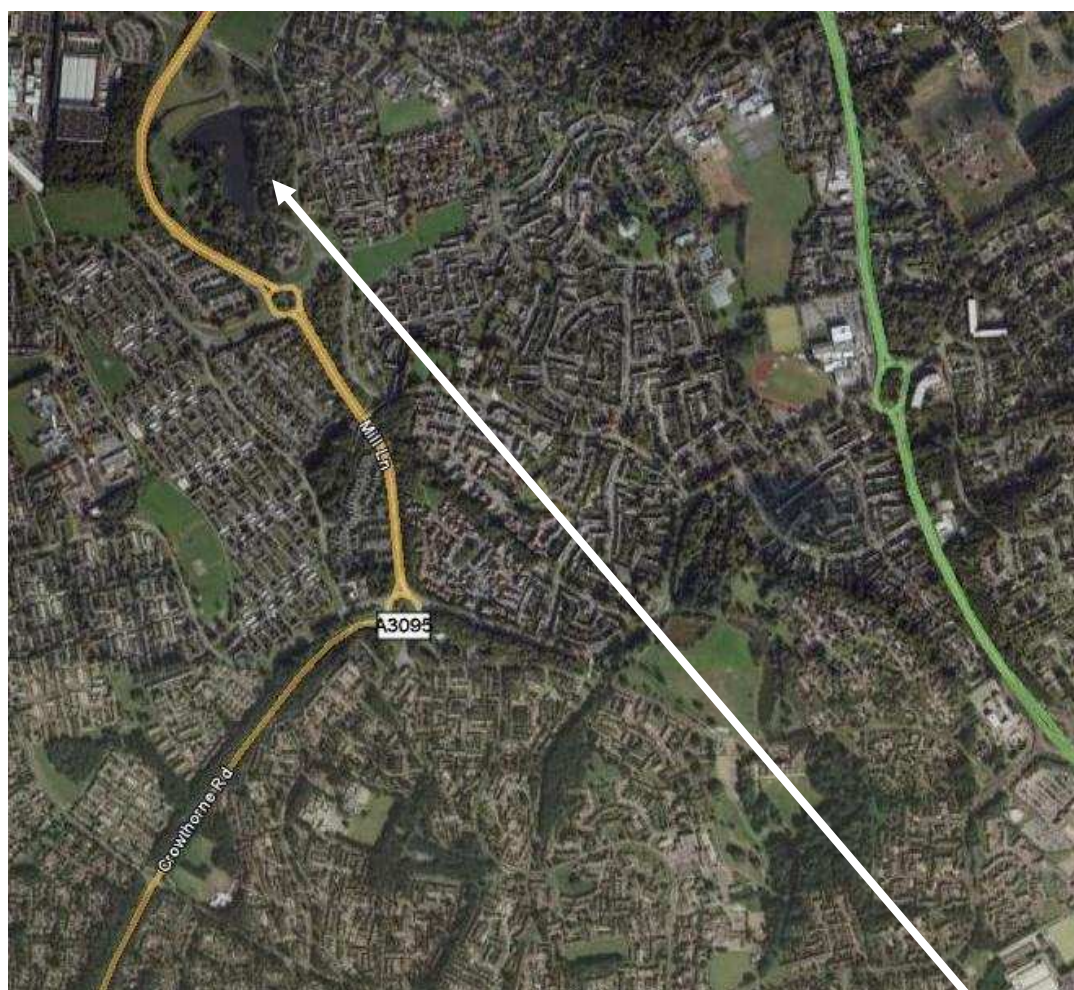


Figure 3.5.1: The general path (SE – NW) of the Bracknell Storm, 2000.

3.5.2 Heatwave 2003

Wildmoor Heath: It was noted that there was a large fire on Wildmoor Heath that burnt the central area of the heath. The fire spread was exacerbated by the change in wind direction. Rangers had to:

- Assist the Fire Service
- Ensure public safety
- Ensure the safe movement of cattle off the land

The Devil's Highway: There was a major fire of the Devil's Highway that resulted in a large area of pine loss for the Crown Estate in 2003. This also resulted in a deep-seated fire that raged for several months¹⁷.

3.5.3 Storms 2007

Wooden Hill Primary: One of the most recent major floods for the school occurred in 2007; the school hall and the nursery were damaged due to heavy rains. From 08/11/04 – 05/08/09 there were 13 reactive maintenance call outs due to leakages and water related problems.

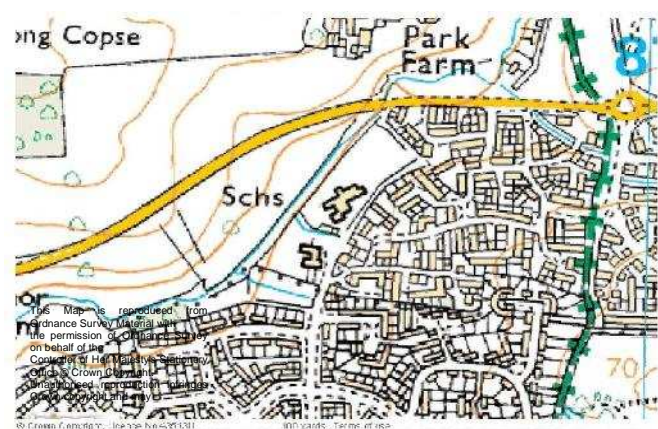


Previously rain water used to drain in between part of the building that led to flooding of the nursery. The chances of the nursery flooding should now be reduced as the roof is now sloped towards the perimeter of the building. Also, there is improved guttering and drainage and it is hoped that this should help reduce the likelihood of flooding.

Figure 3.5.2: OS map of Wooden Hill Primary School Area

The school procured a drainage survey which revealed that some of the catchpits were blocked and consequently flushed. Many of the classrooms are above manholes and catchpits that reduce and channel the flow of water away from the area underneath them. The front of the school still floods due to the topography of the area (as indicated by the figure 3.5.2) and the run off from the nearby housing estate. Appendix I states that flooding occurs regularly when there is heavy rain.

Kennel Lane: As indicated by figure 3.5.3, the school is located within a natural dip of land. In 2007 the school received 2 inches of rain within a day resulting in the nearby Cut spreading 15m horizontally and consequently flooding the school.



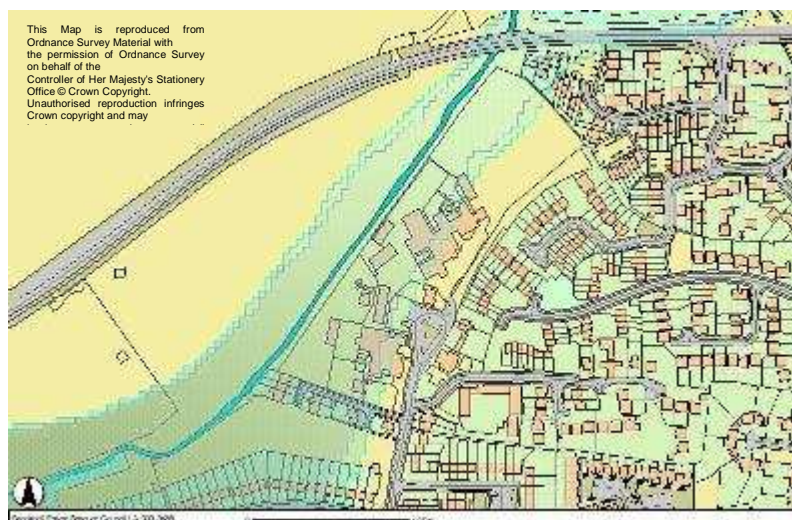
Floodwater fed into three primary school classrooms and then spread to eight classrooms. The two sealed manhole covers could not be restrained due the water pressure. The floodwater overloaded the foul sewer network resulting in contaminating two thirds of the primary school.

Figure 3.5.3: OS map of Kennel Lane School Area

¹⁷ Anecdotal evidence provided by Senior Countryside Ranger, November 2009.

The resultant damage meant that it took 3-4 weeks to clear out the school and cost £48,875.61 to rectify. Fortunately this occurred at the end of the summer term and so there was minimal disruption to the teaching timetable. However, after the incident the response took longer than expected. This was due to:

- A perceived lack of communication, guidance and support from the Council to cope with the situation.
- Delay due to procurement procedures e.g. works over £10,000 need three tenders and checking by BFC.
- Billing query e.g. post flood cleaning contract for school.
- No guidance on local contractors e.g. carpet fitters from Newcastle.



As indicated by the GIS map the school is located within flood zone 2 & 3. The school also flooded due to the topography of the area and the run off from the nearby housing estate.

Figure 3.5.4: BFC GIS Map of Kennel Lane School Area

The school has now invested in flood gates as a mitigation measure and flood watch checks during heavy or consistent rain by the site controller to determine if the River Cut has burst its banks¹⁸.

¹⁸ Anecdotal evidence provided by Kennel Lane Site Controller, November 2009.

Ranelagh School: Every time there is heavy or prolonged rain this leads to hotspot flooding and, to address this, the school has bought a pump to remove excess water from the school grounds. Drains are easily overloaded due to root obstruction in the drainage network. There is clearly nowhere for the water to effectively drain.



As shown on the school image the school buildings in the North-West of the school have flat roofs. During bouts of heavy rain like in 2007 the roof will fill up and overflow. The rainwater seeps through the building causing damage to the ceiling, plastering & electrical supply. This requires adequate funds from the maintenance budget.

Figure 3.5.5: Aerial photograph of Ranelagh Secondary School

It is hoped that much of the flat-roofed buildings will be replaced when the school is given the capital for rebuild. It is uncertain whether the Diocese of Oxford has factored in Sustainable Urban Drainage Systems and water attenuation techniques for surface water management for the school.

Mill Pond: Although this is a balancing pond and designed to overflow during periods of heavy rain this but ultimately causes disruption to the surrounding transport network.



Figure 3.5.6: Photograph of Ellesfield Avenue near Mill Pond, July 2007

3.5.4 Cold Snaps



Owlsmoor Primary: Burst water pipes caused damage to the primary school and part of it had to close for a week in January, 2009. The junior building at Owlsmoor Primary School had been out of use for a week after two water pipes split when they froze in the cold snap. Damage from leaking pipes caused a ceiling to collapse, another ceiling had to be replaced and children's books were ruined in the flooding. This flooded the majority of the classrooms in the years four, five and six block.

It should be noted that there is a correlation between the heating being turned off/low and burst pipes. The temperature is controlled to reduce costs – yet this has sometimes proven to be a false economy as the pipes have burst. However, where sudden cold snaps occur and the time/temperature settings of heating are adequate during that period, the consequences cannot be anticipated.

Figure 3.5.6: Waste from infrastructure damage at Owlsmoor Primary School

The February 2009 cold snap led to 34 and 27 school closures on 02/02/09 and 03/02/09, respectively. School closures were mainly due to staff not being able to get to work. The December 2009 snow led to 7 school closures and 2 late starts on 18/12/09. Fortunately this was on the last day of term.

3.6 Climate Change Impact Feedback

The relevant council officers were contacted concerning their operations and the impact of climate change. The purpose of engaging with different services (council sections/teams) was to determine if climate change has an impact on their operations and if adaptations work are necessary. These have been listed from the main departments within the council.

Environment, Culture & Communities

Service	Findings	Recommendations
Spatial Policy	It is uncertain whether climate change adaptation has factored into future spatial policy. Climate projections are needed to better assist the spatial policy section to incorporate this into their appropriate working documents.	<ul style="list-style-type: none"> Climate projections raising awareness for Spatial Policy. Develop a Sustainable Water Strategy (including a sustainable urban drainage system).
Transport Development	A predicted increase (Climate Change Projections 2009) in rainfall per annum could lead to greater accidents, droughts and severe wind could lead to damages to the traffic infrastructure. It is uncertain whether climate change has been factored in to accident estimates. The local safety scheme programme outlines improvements like” Improved visibility, signing, lining and possible anti-skid surfacing.”	Determine if climate change risk and adaptations can be incorporated into to future transport development strategies and facilitate.
Landscape	<p>Landscape Services are aware of the predicted increase in growth as result of a higher CO₂ concentration in the atmosphere and more rain could result in less available mowing time during peak periods, difficult working conditions and more prolific plant growth generally. Ultimately it is envisioned that these issues raised will increase the maintenance cost and the appropriate budget will have to be allocated to achieve the standard the council wants to set. This needs to be considered alongside other budget pressures such as increased health and safety requirements to provide the required traffic management for working on certain sites adjacent to the Highway. In some cases a static lane closure is required for the landscape crew to access and maintain verges and green central reservations this is expensive and can also result in traffic congestion. Where possible such hazards to Landscape Services staff tasked with the maintenance of the landscape should be designed out or considerably reduced in new schemes through careful and sustainable planting choices and consideration of the eventual maintenance regime.</p> <p>School grounds represent a large part of the Boroughs landscape and are an</p>	Support Landscape Services by moving towards sustainable maintenance specification on new landscape schemes. MTO4 should be changed from ‘raising standards of landscape maintenance’ to ‘maintaining appropriate standards for landscape maintenance’.

	important client of Landscape Services. It is uncertain if the Boroughs school's have considered the impacts of climate change in planning, adapting and budgeting for landscape maintenance of school grounds in the future i.e. planting of shade trees, longer growing seasons etc.	
Waste	<p>Climate change has been mentioned the Joint Waste Management Strategy but there is no indication of impacts to operational aspects.</p> <p>A new waste collection contract is being tendered and it is envisaged that climate change impacts will be factored into to their operations.</p>	<ul style="list-style-type: none"> Investigate the possibility of a review of the Joint Waste Management Strategy (with the agreement of the re3 partnership) to determine the affect of climate change to operations and to incorporate adaption to climate change. Determine if climate change can be factored into waste operations (if not already being factored in (with the agreement of the re3 partnership).
Highways	The Highways Asset Management Plan (HAMP) is in the process of being re-written. This provides an ideal opportunity to incorporate climate change mitigation and adaption into the plan.	<ul style="list-style-type: none"> Distribute Highways Agency adaptation and mitigation information to the Highways Section and to be included in the HAMP consultation process. Gritting of minor roads that lead to schools to reduce traffic and reduce the likelihood of staff getting to work.
Environmental Health	There is no evidence to suggest that climate change has been factored into environmental health. There are several predicted health impacts of climate change as stipulated by the Chartered Institute of Environmental Health. These include temperature related deaths, an increase in food poisoning, potential for an increase in vector borne diseases i.e. Lyme disease, the spread of water borne diseases after flooding and injuries sustained through strong winds. The HPA has stated that there may be an increase in Legionnaires' disease due to climate change.	Distribute environmental health and climate change information (Chartered Institute of Environmental Health) to Environmental Health section and collate response. Support the section in embedding climate change, if need be.
Emergency Planning	<p>Emergency planning receives early warning and flash warnings from the Met Office and flood warnings from the Environment Agency. Council services (including chief executive and directors) receive severe weather warnings from the Met Office via e mail.</p> <ul style="list-style-type: none"> Admissions & Property (Performance & Resources) 	<ul style="list-style-type: none"> GIS Flood mapping data to be utilised by appropriate officers throughout the council (Planning, Housing etc). On the Emergency Planning GIS there is 'susceptible areas' data from the EA. Determine if this data could be used in

	<ul style="list-style-type: none"> • Adult & Commissioning • Children's Social Care • Communication & Marketing • Customer services • Forest Care • Highway Asset Management • Landscape services • Parks & Countryside (Rangers) • Ringway (Highway Maintenance Contractor) • Schools • Traffic and Safety <p>Bracknell Forest scored 15% for NI 37 Awareness of civil protection arrangements in the local area in 2008 (Place survey 2008/9). With a score of 15%, awareness of civil protection arrangements in the local area (NI 37) amongst Bracknell Forest residents is in line with the All England average and other neighbouring authorities.</p> <p>Emergency planning have produced booklets and leaflets that have been distributed to the public (and available online) concerning emergency preparedness.</p> <p>A Flood Risk Management Group has recently been established and Emergency Planning section is in the process of developing Flood Mapping on GIS. Also, the NHS has drawn up a Heatwave plan and this is being coordinated between the relevant council services (Adult social care & health lead on this in BFC).</p>	<p>conjunction with flood zone data to determine areas more likely to be affected by surface water flooding.</p>
Drainage	<p>It should be noted that reports of flooding are not accurate source of flooding data. Sometimes these will be temporary and long term. Consequently initial call outs are not entirely accurate.</p> <p>The drainage infrastructure in Bracknell Forest is several decades old. Initial climate projections strongly suggest more rainfall in the UK for the immediate future. This poses a problem for surface water drainage in Bracknell Forest. It would be too costly and take too long for the drainage infrastructure in the Borough to be replaced. Even if this was to be the case this would only transport surface water problems into</p>	<ul style="list-style-type: none"> • Developing better water attenuation systems in the Borough. • Implementation of Sustainable Urban Drainage Systems (SUDS) on appropriate sites. • Better spatial planning can mitigate the affects of flooding and drainage failure. • Determine entry fields to drainage database to verify long term flooding.

	the neighbouring Boroughs.	
Leisure	<p>The sports event organiser conducts extensive risk assessments; this factors in weather and extreme weather. The organisers are responsible for the infrastructure and the teachers/adults attending with the children are responsible for their health and well being.</p> <p>Weather extremes (heavy snowfall) can affect the productivity of leisure sites and reduced hours of opening. Some money has been set aside for buying ploughs to be temporarily fixed tractors to clear snow. Algal blooms may become more frequent on sites with free standing water (Horseshoe Lake). Warmer weather may also have a positive affect i.e. more outdoor team building events at EPCC.</p>	<ul style="list-style-type: none"> • Sports event organiser to be provided with climate projections summary or a practical guide to cope with climate change. • Senior management and site mangers to consider the effect of climate change on their operations.
Arts Heritage & Libraries	<p>The Heritage Strategy is in the process of being re-written. A climate change preliminary report and SWOT analysis has been submitted via the consultation process. An example of how climate change can affect heritage is increased extremes of wetting and drying can heighten the risk of ground subsidence and accelerate decay of stonework and thus pose a threat to many historic buildings.</p> <p>Bracknell Forest libraries are of 1960/1970's construction apart from Ascot Heath (circa 1870's). Libraries host a variety of activities (extended schools, community events, arts/heritage promotion etc). For example, the Northern Parishes Arts Week was held in Binfield and Whitegrove Libraries. The Libraries Modernisation Review (Oct 09) will outline the future of libraries and potential for co-location. Co – location could also be applied to other council buildings and services.</p>	<ul style="list-style-type: none"> • Determine how much climate change has been incorporated in the new Heritage strategy. • Research how libraries could be adapted to climate change.
Parks and Countryside (including the Tree Service)	<p>The Green Spaces Strategy (GSS) refers to how green infrastructure can mitigate/adapt to climate change. A12 from the GSS Action plan states that BFC will “engage utility companies and statutory agencies to secure provision of and implement improvements to land drainage features such as balancing ponds to ensure that they operate effectively; alongside providing for biodiversity, landscape and recreation”.</p> <p>The service has stated a commitment to identifying sites at risk from climate change. Provisional risk sites have been identified as Wildmoor Heath, Caesars Camp, Bill Hill and Shepherd Meadow. Also, to include climate change in appropriate site management plans.</p>	<ul style="list-style-type: none"> • Monitor and assist P&C, if need be. • Support the woodland strategy and incorporate climate change. • In the long term, review of current tree policy and effectively integrate climate change.

	<p>There are sites that have balancing ponds but it is unknown whether the proposed surface water management plan has been taken into consideration. BFBC have taken a 99 year lease on South Hill Park's balancing ponds. If this is successful, this could be rolled out throughout the Borough. New parks and countryside sites that will be adopted are Wykery Copse, Jennets Park and Big Wood. This will lead to increase in operational costs for the team. New sites should design in tolerance to extreme weather.</p> <p>The service is in the process of drawing up a woodland strategy.</p>	
Housing options	<p>There is sufficient work that supports the drive for carbon reduction in the Borough for households but there is no evidence in the current Bracknell Forest Housing Strategy (BFHS) of climate change been considered or factored in.</p> <p>There is no evidence to suggest that carbon reduction and adaption to climate change has been considered or factored into the Housing Association (Bracknell Forest Homes) operations.</p>	<ul style="list-style-type: none"> • Research, support and incorporate climate change adaptation into the current BFHS and its sub – strategies, the Private Sector Housing Strategy (PSHS), Empty Homes Strategy (EHS) and Homeless Strategy. • Determine if climate change adaptation can be factored into housing association operations and assist in new policies, if need be.
Performance & Resources	<p>Short term sickness varies with the age of the workforce. The younger personnel tend to have a majority of problems with illnesses and the older workforce not so affected. Long tern sickness is more of an issue with older staff suffering from depression and cancer.</p>	<ul style="list-style-type: none"> • Further research on the climate change and the effect on young person's health.

Adult Social Care & Health

Service	Findings	Recommendations
Adults and Commissioning	There is the move away from prescriptive care to personalised care. The service user gets money allocated (like a benefit) and then they can choose to use this money on what care they need.	Give climate change information for service providers.

Children, Young People & Learning

Service	Findings	Recommendations
Admissions and Property	<p>A majority of the schools are pre 1960's construction. At some point in time these schools will be refurbished or reconstructed via different government programmes.</p> <p>The main programmes are:</p> <ul style="list-style-type: none"> • Building schools for the future (BSF) • Primary capital strategy for change (primary) • Children centre programme • Rest of capital programme <p>BSF has carbon reduction incorporated into it via sustainability. None of the programmes have included climate change adaption.</p> <p>School reactive maintenance should record weather related damage and failures.</p>	<ul style="list-style-type: none"> • Better incorporate and support climate change adaptation into future school design. • Determine if proactive maintenance is possible. • Support alternatives to air conditioning during heatwaves. • Incorporate extreme weather affects on school infrastructure and reasons for school closure.

Corporate Services

Service	Findings	Recommendations
Finance	<p>The Capital Strategy is a key element of Bracknell Forest’s medium term financial strategy and planning process but does not factor in how climate change will affect the strategy. Capital expenditure is defined as “all expenditure on the acquisition, creation or enhancement of tangible fixed assets” and is set out in The Local Government (Capital Finance and Accounting) Regulations 2003 (as amended). This does not directly mention climate change; it is possible to incorporate this as adaption through enhancement of tangible fixed assets. Enhancement should include climate change adaptation.</p> <p>The project appraisal sheet (Capital Strategy 2008) does not include climate change impact as a factor and water could be included with energy (i.e. energy and water management issues).</p> <p>The Strategic Risk Management Group meets quarterly and oversees all aspects of strategic risk affecting the Council. This includes reviewing the Strategic Risk Register (SRR) and Health and Safety and Emergency Planning. The SRR sets out the key risks that could potentially impact on delivery of the Council’s Medium Term Objectives. There is potential for the SRR, Service Plans and new proposals put forth to DMT to incorporate climate change risk into it.</p>	<ul style="list-style-type: none"> • Determine if climate change can be included in the project appraisal sheet. • Amend energy management issues to include water. • Incorporate climate change impact and adaptation into project appraisal sheets for the capital planning process. • Determine what climate projections will be required for capital planning process. • Include surface water flooding into other desirable schemes. • Incorporate climate change into SRAP • Include climate change as a risk factor in Risk Management. • Determine if Invest to Save can be used for climate change adaptation works. • Incorporate climate change impact risk into appropriate risks on the strategic risk register. • Incorporate climate change impact risk into service plans. • Incorporate climate change impact risk into DMT proposal forms.
Property Services	<p>The following targets have been set concerning water in buildings:</p> <ul style="list-style-type: none"> • Establish water monitoring and targeting system for all Council premises • Provide quarterly water reports to departmental management teams • Investigate feasibility of dual flush toilets and time controlled taps • Include water consumption data in annual energy report • Reduce water consumption & leakage by 5% <p>Monthly water consumption reports are produced for corporate buildings (TS, EHH, &</p>	<ul style="list-style-type: none"> • Determine who is responsible for leading these targets for non corporate sites, determine feasibility and administer. • Determine if climate change will affect the staff productivity after relocation. • Incorporate climate change risk and adaptation (refer to Climate impacts on the built environment, UKCIP website) into the

	<p>SH), coral reef and Bracknell Leisure Centre.</p> <p>Although climate change is mentioned in the Accommodation Strategy there is no evidence to suggest that has been factored into the property portfolio.</p> <p>The current asset management plan states that it manages its asset base to ensure that assets are fit for purpose. Climate change will undoubtedly affect future assets.</p>	<p>asset management planning process for the 2012 – 2014 Corporate Asset Management Plan.</p> <ul style="list-style-type: none"> • Refer to Appendix J. • Incorporate climate change adaption into future council builds. • Facilities manager to consider climate change risk to operations. • Determine if climate change adaptation into the Asset Management Groups Terms of Reference.
HR	<p>At present there is no guidance to line managers concerning climate change for their teams and employees.</p>	<ul style="list-style-type: none"> • Provide general guidance notes for line managers concerning climate change so teams can determine impact on their working practices and employees.
ITM	<p>Sometimes transport has arrived at school premises that have been closed due to extreme weather events.</p>	<ul style="list-style-type: none"> • Develop better communication between schools and transport to improve fleet management.

3.7 Key Findings from Climate Change Feedback

- Tailor made climate change projections need to be available for key operational teams for future operational planning.
- Climate change information should be disseminated to teams to allow them to develop climate change adaptation and incorporate this into their appropriate operations and strategies.
- Key green spaces sites have been identified for as potential vulnerable to climate change impact. If adaptation works are required, these need to be effectively monitored, managed and reported.
- Key heritage need to be identified as potentially at risk from climate change.
- Reducing BFC property portfolio and co-location of services is a more efficient use of BFC resources but future accommodation use needs to be climate change proof.
- Climate change adaptation needs to be incorporated into new corporate and school design.
- Climate change does represent a risk to tangible fixed assets consequently this needs to be embedded into business planning, strategies, portfolio and strategic risk management.

3.8 Comments on Data Sources

The main problems with the quantitative data analysis for LCLIP are:

- fragmented data: held at different departments
- lack of electronic data: records that are available are in hard copy or people's memory
- data inconsistencies i.e. recording and timescales vary

4. CONCLUSION

The report shows that there are key vulnerabilities within the Borough to climate change but there is the potential for adaptation. The key geographical vulnerabilities are stated below.

- Random flooding of the south of Bracknell Town.
- Overflow of the balancing ponds at South Hill Park and Mill pond and the damage and disruption of nearby housing estates and transport networks.
- School infrastructure is susceptible to flood damage from cold snaps & storms.
- The young and old and other vulnerable groups will be more susceptible to harm from extreme weather.
- Forest fires are more likely during sustained dry periods.
- Four green spaces have been identified as priority sites to be protected against climate change; Wildmoor Heath, Caesars Camp, Bill Hill and Shepherd Meadow.
- Three future green spaces have the potential (once in the P&C green space portfolio) to be adapted to climate change.

It would seem that there is suitable emergency preparedness of the local community to respond to extreme weather both in the short-term and the long-term.

- Business continuity factors in including extreme weather to essential services in the Borough.
- Some major stakeholders have factored in the effects of climate change to their work e.g. PCT Heatwave Plan.
- Early flash warnings are distributed to appropriate council teams to ensure operations still function.
- Leaflets and booklets distributed and available concerning emergency preparedness to the public.

However, emergency preparedness can only make the community deal with the effect of extreme weather when it occurs; it cannot negate it. Future developments within the Borough coupled with climate change are most likely to exacerbate incidents of surface water flooding and associated financial claims.

There are several council wide and departmental recommendations that have been put forward for consideration that should centralise and efficiently incorporate climate change impact and adaptations into council operations. In order to support key officers and operations in adapting to climate change relevant information must be incorporated into operational management. This should also include tailor-made climate change projections to allow operational teams to factor in long term climate change and extreme weather events into their productivity/delivery of services and better data management to monitor the effect of extreme weather on productivity/delivery of services.

Due to the current economic situation some of these adaptation actions may have to be delayed until appropriate financial and human resources can be allocated. However, irrespective of these challenges medium term objectives need to factor in climate change to move towards building the Borough's adaptive capacity. One example is moving towards a specification and design aimed at providing sustainable/low maintenance landscapes in the Borough. It is not enough just have climate change factored into service delivery plans and targets, this needs to be

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considered within the Council's whole policy framework from top (MTO's) to bottom (action plans) and from senior management to junior officers.

Appendix A – Sources of data

Council Data

Area	Team	Access	Detail
Air Quality	Environmental Protection Team	Public Website (Progress Reports)	Readings date back to 2000 but there are only a few years of reports.
Green space maintenance	Parks and Countryside	I Drive	Only within the last few years 6 monthly site inspections of parks and countryside sites have been recorded electronically. Hard copies dating back 20 years are located back at Westmorland Park and the Look Out.
Roads	Highways	TBA	TBA
Nuisance	Commercial, Environmental Health	M3 Database	Data goes back 10 years.
Claims	Insurance	Database	Records date back to 1991 and are electronic.
Reactive maintenance	Property	Database	Database of reactive maintenance goes back 10 years. The calls are logged by a service centre and generally don't specify cause, any such information on an order would be incidental.

Sources of non – Council Data

Area	Access	Detail
Bracknell Forest Homes	Vault	In 2008 Bracknell Forest's housing stock was transferred to a housing association Bracknell Forest Homes. All the premises have records dating back many years but this information is only accessible via hard copy. Paper copies (per house/sheltered housing) held in vault (only non confidential – data to be analysed).
Royal Berkshire Fire and Rescue	Electronic	The service keeps an electronic record of all reported fire incidents throughout the Borough and is analysed through the CADIS system

Internet Sources of Information: Bracknell

Date	Duration	Type	Consequence	Impact	Environmental Data	Action	Extra Info & Sources
1947	?	Severe winds and rain	Flooding	Damage to property and Infrastructure.	?	?	Sources: http://reading-hip.epixtech.co.uk/ipac20/ipac.jsp?session=1E16S68068937.19&menu=search&aspect=subtab14&npp=10&ipp=20&pp=20&profile=reading_1&ri=6&source=~!reading_test&index=.SW&term=illustrations+floods&aspect=subtab14&x=13&y=14#focus http://www.tomcanning.co.uk/REP/albums/1947/index.html
22/09/1919	?	Cold Snap	Snow and heavy sea storms.	Illness due rapid change in temperature. Destruction of crops.	Min Temp 0C	Unknown	Source: http://www.ukweatherworld.co.uk/forum/forums/thread-view.asp?tid=21931&posts=10
07/1976	2m	Heatwave	Drought	Hot, dry weather lead to devastating heath and forest fires that broke out in parts of Southern England. 50,000 trees were destroyed at Hurn Forest in Dorset. Crops were badly hit, with £500 million worth of crops failing. Food prices subsequently increased by 12%. Widespread	Max Temp 35.9C		http://en.wikipedia.org/wiki/1976_United_Kingdom_heat_wave

				water rationing and public standpipes in some affected areas. Reservoirs were at an extremely low level, as were some rivers. In the last week of August, severe thunderstorms brought rain to some places for the first time in weeks.			
16/10/1987	1d	Storm	Superficial damage to buildings and vehicles. Tress fallen.	Sporadic damage across the Borough.	Max Temp 17C	Unknown	Source: Chris Vaal
08/1990	1m	Heatwave	Drought		Max Temp 37.1C		
11/10/1993	1m	Prolonged rain		Towns and villages in central and southern England braced themselves for a second wave of gale force winds, torrential rain and severe flooding. It rained in Bracknell, Berkshire, every day since 19 September, subjecting the Met Office itself to the longest unrelieved wet spell in the country - 24 days.		Unknown	http://www.independent.co.uk/news/uk/second-wave-of-deluge-threatens-chaos-flooding-closes-141-roads-and-hits-crops-as-a-further-downpour-is-forecast-mary-braid-reports-1510588.html
07/05/2000	1d	Rain & Hail Storm	Localised flooding and temporary lake formation.	Local small lake and several underpasses were flooded in the Great Hollands, Birch Hill, South Hill Park areas, with some properties flooded requiring fire brigade assistance.	65mm in 1hr	Unknown	The whole area is a naturally low-lying region, which before the development of this part of Bracknell (from 1970 onwards) would have been part of the Windsor Forest - all 'older' established habitation being at higher elevations of Easthampstead and Bracknell itself. The

							<p>building of underpasses also helps to 'funnel' large quantities of water through and to inhabited areas. The poor drainage was not helped by the large quantities of hail that blocked drains.</p> <p>Source: http://www.booty.org.uk/booty.weather/metinfo/wxdata/Storm.htm</p> <p>http://www.bbc.co.uk/weather/features/flooding_past.shtml</p>
01/2003	?	Heavy Rain	Flooding	Traffic delays on A329(M) and A321 due to flooding because of blocking of drains and road bridge closures outside Bracknell Forest.			<p>Source: http://www.bbc.co.uk/berkshire/have_your_say/floods.shtml</p>
01/08/2003	1m	Heat wave	Possible deaths and transport disruptions.	National disruption.	36.1 C 14.2 mm	Unknown	<p>Source: http://en.wikipedia.org/wiki/2003_European_heat_wave#United_Kingdom</p>
05/08/2004	1d	Rain & Hail Storm	Flooding	<p>A series of flash floods. Fire fighters from Bracknell and Wokingham Road battled to clear up the aftermath of the storm, which saw huge hailstones fall on the town.</p> <p>Shop workers from Curry's in the Peel Centre had to be evacuated after water gushed into the front of the store and safety fears were</p>	28.2 C	Unknown	<p>Source: http://www.booty.org.uk/booty.weather/metinfo/wxdata/BKNLrain_storm_2004_AUG_05.htm</p>

				heightened when police noticed electrical power points had been soaked.			
06//2007	1m	Drought	Water shortages.		87mm 06/07 Max Temp 26.6C	South East Water 17km pipe stretching from Bray Water Treatment Works to Surrey Hill service reservoir in Swinley Forest.	Along the way the pipe has to stretch under the A322 Bracknell Road. Source: http://www.bracknellnews.co.uk/articles/1/721 http://weatherfamily.org/bracknell/wxarchive.htm ! http://www.tomcanning.co.uk/REP/albums/
20/07/2007	Wee kend	Heavy Rain	Flooding	Areas affected by flooding were Station Hill, Mansfield Crescent, Bullbrook Drive, Wellington Road, The Brambles, Beckford Avenue, Moss End, Yeovil Road, Ellesfield Avenue and Priestwood Terrace. Several homes on Bullbrook Drive, Bracknell, had to be refitted after water poured into them.	70.4m m 20/07/0 7 Max Temp 24.8C	Re – evaluation of emergency response of Fire Brigade.	Sources: http://www.getbracknell.co.uk/news/s/2013027_flooding_misery_across_bracknell_forest http://weatherfamily.org/bracknell/SUM0707.TXT Total rainfall : 150mm http://weatherfamily.org/bracknell/wxarchive.htm !
10/04/2008	1w	Strong winds	Tree Fall	A Bracknell Forest resident, who had been suffering from Multiple Sclerosis for 35 years, woke up in the early hours of 07/04/10 when a	60mph	Unknown	Source: http://www.getbracknell.co.uk

				tree toppled on to the roof of his Howard Close home. The tree also caused about £5,000 worth of damaged to the 58-year-old's Vauxhall Zafira. There were no major incidents were reported following the gale-force winds, several trees have been uprooted in the area.			co.uk/news/s/2023810_disabled_man_left_hou_sebound_after_storms
03/06/2008	1w	Heavy Rain	Flooding	Bullbrook Drive, Bracknell and surrounding area.	26.9m m	Faster response from Fire Service	Source: http://www.getbracknell.co.uk/news/s/2029517_wet_a_shock http://weatherfamily.org/bracknell/SUM0805.TXT http://weatherfamily.org/bracknell/SUM0806.TXT Total May: 79.3mm
03/06/2008	1w	Heavy Rain	Flooding	Cattle were left stranded when heavy rain meant the field where they were grazing was flooded with sewage water, in the field off Cricketers Lane, Forest Road. Bad weather lead to the drains bursting at the end of the field in Winkfield Row. Possible safety concerns were raised for children given the field's proximity to the nearby Lambrook Haileybury school.	See above	Unknown	See above Additional Sources: http://www.bracknellnews.co.uk/articles/1/3103
30/12/2008	7d	Cold Snap	Flooding	Burst water pipes at Owlsmoor School (Sandhurst) and Meadowvale (Bracknell). Damage to school infrastructure and disruption to the management of the school.	16d of rain Min Temp	School Repairs	Source: http://www.getbracknell.co.uk/news/education/s/2042599_owlsmoor_primary_school_building_

					-4.9C Min Temp -7.3C (06/01/ 2009)		devastated by burst pipes http://www.getbracknell.co.uk/news/s/2042344_schools_closures_latest?related_link http://weatherfamily.org/bracknell/wxarchive.html ! Total: 60.2mm
12/02/2009	?	Heavy rain & snow	Flooding	Traffic delays by floods, melted snow and icy roads caused havoc around the area with Arborfield, Burghfield, Theale, Mortimer, Swallowfield, Shinfield, Sindlesham and Winnersh under water. Some of the most serious flooding was at the Showcase roundabout between the A329M and Winnersh Triangle business park.	18d of rain 8.0mm Min Temp 7.1C	Unknown	Sources: www.bracknellnews.co.uk/articles/1/9511/ http://www.getwokingham.co.uk/news/s/2044853_cars_stuck_in_world_of_water http://www.getwokingham.co.uk/news/s/2047520_council_to_pay_for_cars_damaged_in_floods Total: 96.6 mm 02/2009 http://weatherfamily.org/bracknell/wxarchive.html ! Min Temp -6.1C 02/2009

11/05/2009	?	Heavy rain	Flooding	The flood-prone Three Legged Cross pub (500-year-old venue, RG42 6AE) in Forest Road which is close to the River Cut, has flooded time and time again in the last year and will be put up for sale by owner Enterprise Inns. Estimated cost £85,000 to repair all the flood damage.”			Source: http://www.getbracknell.co.uk/news/s/2050449_the_three_legged_cross_up_for_sale
02/07/2009	1w	Heat wave	Heath Fires	<p>Temperatures above 30C in the town, firefighters/ health care workers have seen an increase in call-outs during the heatwave. Carelessness with cigarettes and camp fires are creating more than a problem. The sun hitting litter at different angles can start fires.</p> <p>An out of control barbecue in Nuptown Lane, Winkfield, on Monday night had to make the gas-fired grill safe. No-one was injured by the blaze but an outhouse in the family’s garden was damaged. Firefighters were also called to a small grass fire in woodland off New Forest Ride in Forest Park on Monday.</p> <p>Other hotspots included the Devil’s Highway, the grounds of Wellington College in Crowthorne and the Englemere Pond area off London Road in Ascot.</p>			
05/07/2009	1d	Heatwave	Heath Fire	Fire covering around 10,000 square metres on Heathland off Bracknell Road in Crowthorne. It took 10 crews, including firefighters from Bracknell, Reading and Windsor, all night to get the fire under control. A fire service spokesman described the blaze as a “deep seated heath fire in a forestry area covering 100m by 100m”. “It			Source: http://www.getbracknell.co.uk/news/s/2053736_fire_crews_tackle_heat_h_blaze

				looks as if it started out as two fires which have met in the middle.”			
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Appendix B – Range and number of fire incident types

Incidents	1998 ¹⁹	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009 ²⁰	Sub Total
Bin on Fire	0	1	1	2	2	4	0	2	2	0	0	1	15
Bonfires	2	0	3	0	2	4	2	3	2	2	1	2	23
Bushes on fire	11	7	9	15	9	32	10	6	19	18	6	13	154
Car fire	1	0	0	1	2	0	0	0	0	0	0	0	4
Embankment fire	1	0	1	2	2	0	1	0	0	0	0	3	10
Fence on fire	0	2	0	0	1	4	0	3	2	1	1	1	15
Field fires	1	5	2	3	3	6	3	3	6	1	1	3	42
Fire in open	0	0	2	0	0	0	0	0	0	0	0	1	3
Fire in underpass	1	0	0	0	3	1	1	1	2	0	0	0	9
Fire in woods	3	3	0	3	3	10	4	5	2	2	1	2	37
Forest fires	2	0	1	0	1	2	1	1	1	1	1	1	12
General Fires	1	3	7	6	3	1	1	4	1	0	0	3	29
Grass Fires	23	21	18	21	25	49	24	21	28	14	4	20	283
Garage Fire	0	0	0	1	0	3	0	0	0	0	0	0	3
Hay bales on fire	0	1	0	1	1	1	0	0	0	0	0	0	4
Heath Fires	1	1	0	2	0	5	5	2	0	0	1	2	19
Leaves on Fire	0	0	0	0	0	5	1	2	2	3	0	0	13
Logs on Fire	1	0	0	1	0	2	3	0	1	0	0	1	9
Mattresses on Fire	0	0	0	2	0	0	0	0	0	0	0	0	2
Miscellaneous fires	1	3	0	1	1	2	0	2	5	2	1	2	20
Peat fire	1	0	0	0	0	0	0	2	0	1	0	0	4

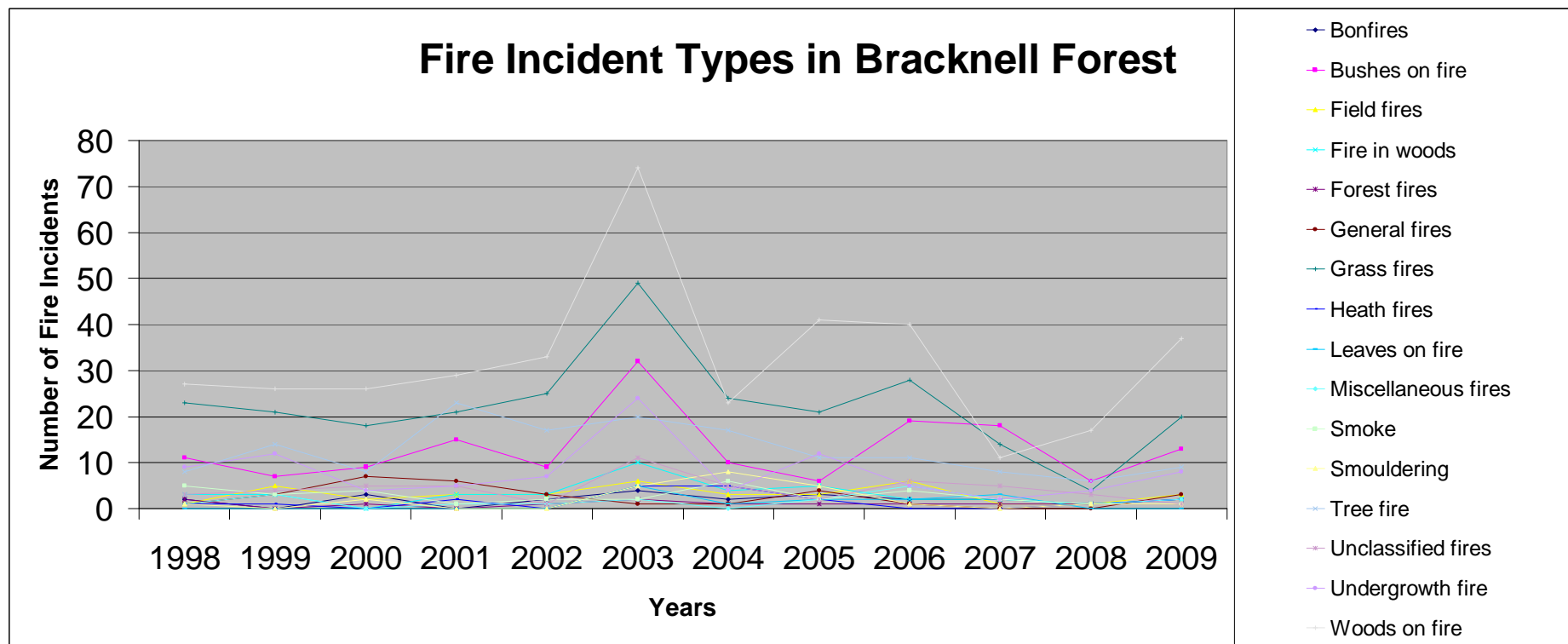
¹⁹ From the 3rd February only.

²⁰ Until the 25th of July only.

Environmental Development Officer
Climate Change Working Group

Shrubs on fire	0	0	0	0	0	0	1	2	1	0	1	0	5
Smell	1	0	0	0	0	0	0	0	1	0	0	0	2
Smoke	5	3	4	1	2	2	6	2	4	2	1	1	33
Smouldering	1	0	2	0	0	5	8	5	1	0	1	1	23
Tree fire	8	14	8	23	17	20	17	11	11	8	6	9	152
Trees on fire	2	1	0	1	0	1	0	1	1	0	0	0	7
Unclassified Fires	3	4	5	5	1	11	5	2	6	5	3	1	51
Undergrowth Fire	9	12	4	5	7	24	4	12	5	2	4	8	96
Woods on fire	27	26	26	29	33	74	23	41	40	11	17	37	384
Total Fires	118	111	94	136	135	296	133	140	155	75	56	114	

Appendix C

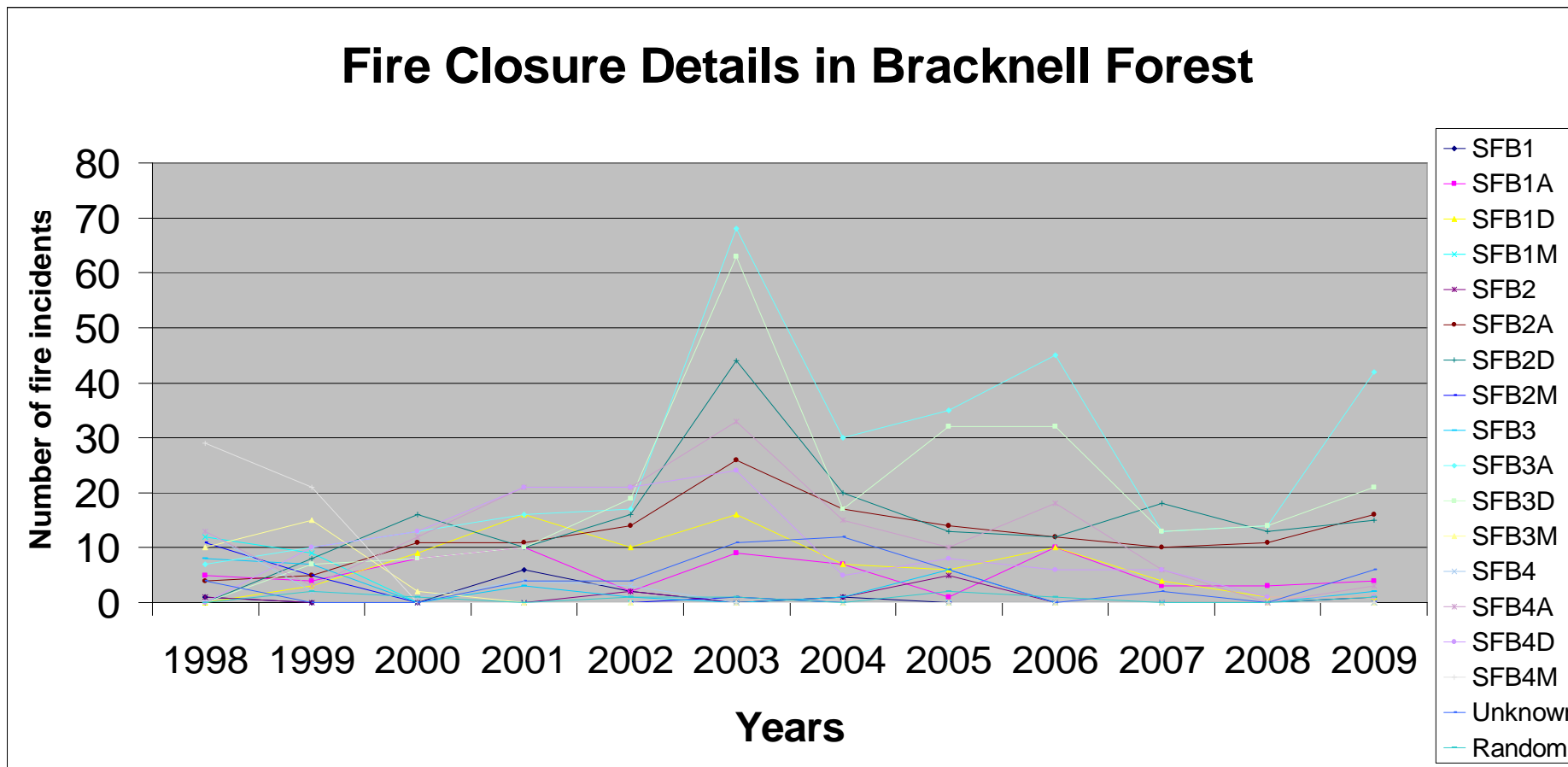


Appendix D – Severity of fire closure details over time

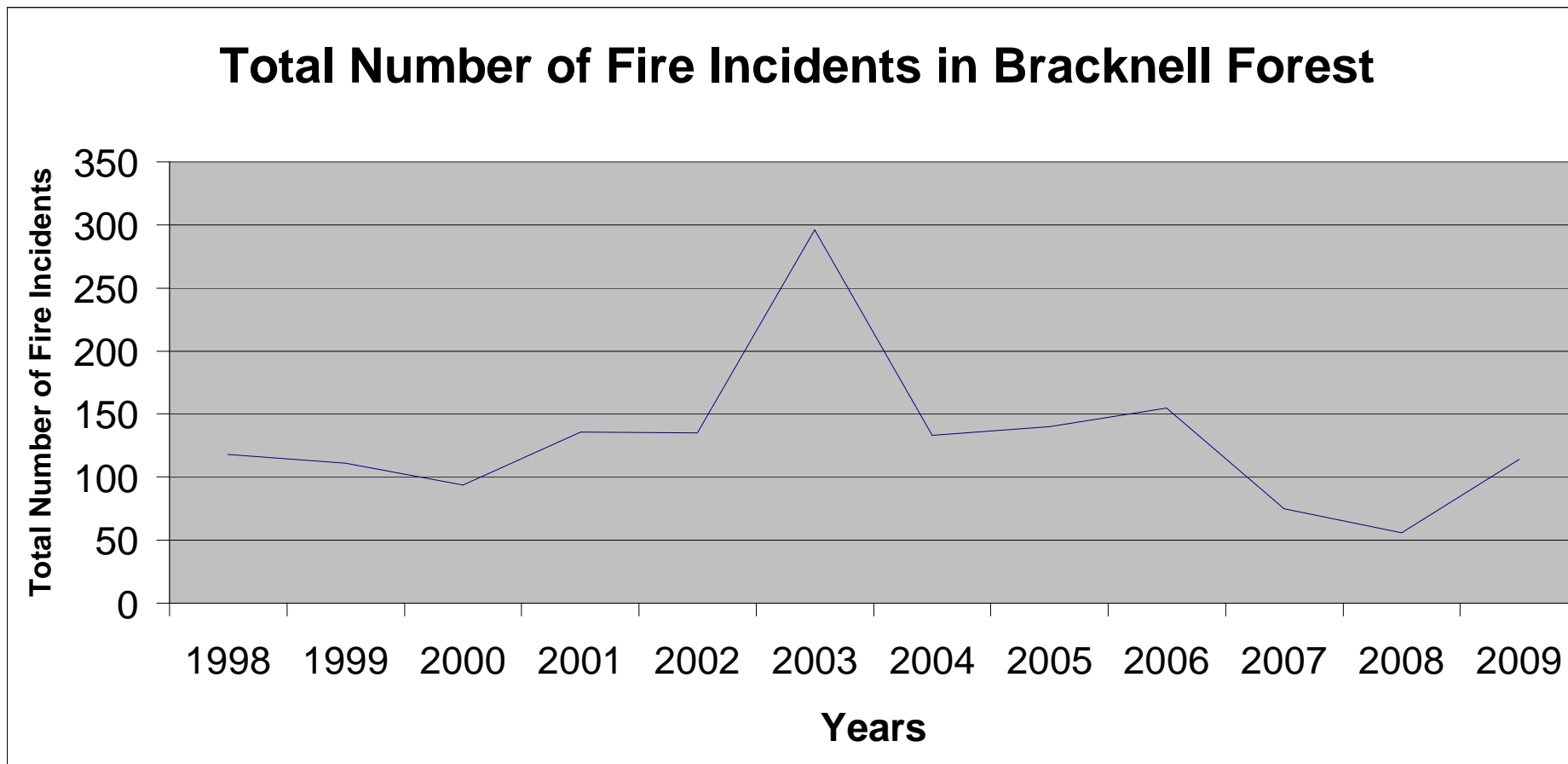
Closure Detail	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	Sub Total
SFB1	1	0	0	6	2	0	1	0	0	0	0	1	11
SFB1A	5	4	8	10	2	9	7	1	10	3	3	4	66
SFB1D	0	3	9	16	10	16	7	6	10	4	1	1	83
SFB1M	12	9	0	0	0	0	0	0	0	0	0	0	21
SFB2	1	0	0	0	2	0	1	5	0	0	0	0	9
SFB2A	4	5	11	11	14	26	17	14	12	10	11	16	154
SFB2D	0	8	16	10	16	44	20	13	12	18	13	15	185
SFB2M	11	5	0	0	0	1	0	0	0	0	0	0	17
SFB3	8	7	0	3	1	0	1	6	0	0	0	2	28
SFB3A	7	10	13	16	17	68	30	35	45	13	14	42	321
SFB3D	0	7	8	10	19	63	17	32	32	13	14	21	236
SFB3M	10	15	2	0	0	0	0	0	0	0	0	0	27
SFB4	13	2	1	4	3	0	0	0	0	0	0	0	23
SFB4A	13	3	12	21	21	33	15	10	18	6	0	3	155
SFB4D	0	10	13	21	21	24	5	8	6	6	1	1	117
SFB4M	29	21	0	0	0	0	0	0	0	0	0	0	50
Unknown	4	0	0	4	4	11	12	6	0	2	0	6	49
Random	0	2	1	0	1	1	0	2	1	0	0	1	9

Closure Detail	Definition	Description
SFB1	Secondary Fire Bravo (Grassland) One	No fire fighting action
SFB2	Secondary Fire Bravo (Grassland)Two	Fire fighting no hose reels or main jets
SFB3	Secondary Fire Bravo (Grassland)Three	Fire fighting hose reels no main jets
SFB4	Secondary Fire Bravo (Grassland)Four	Fire fighting main jets
A	Accidental	
D	Deliberate	
M	Malicious	

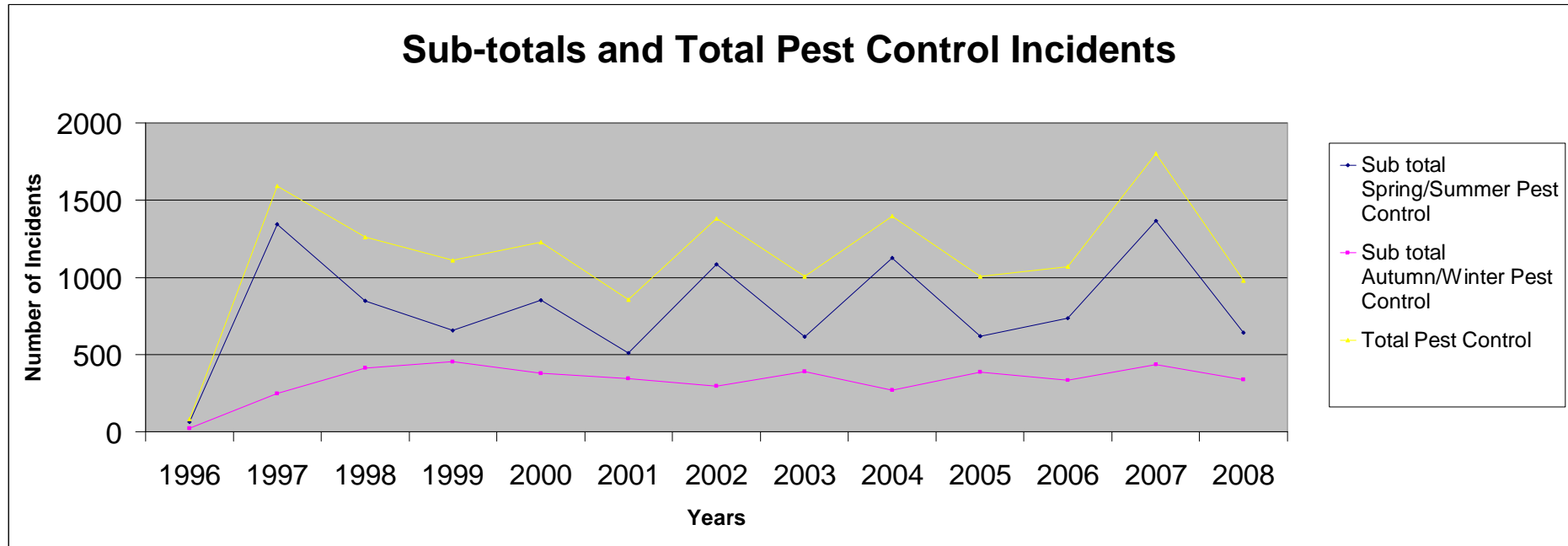
Appendix E



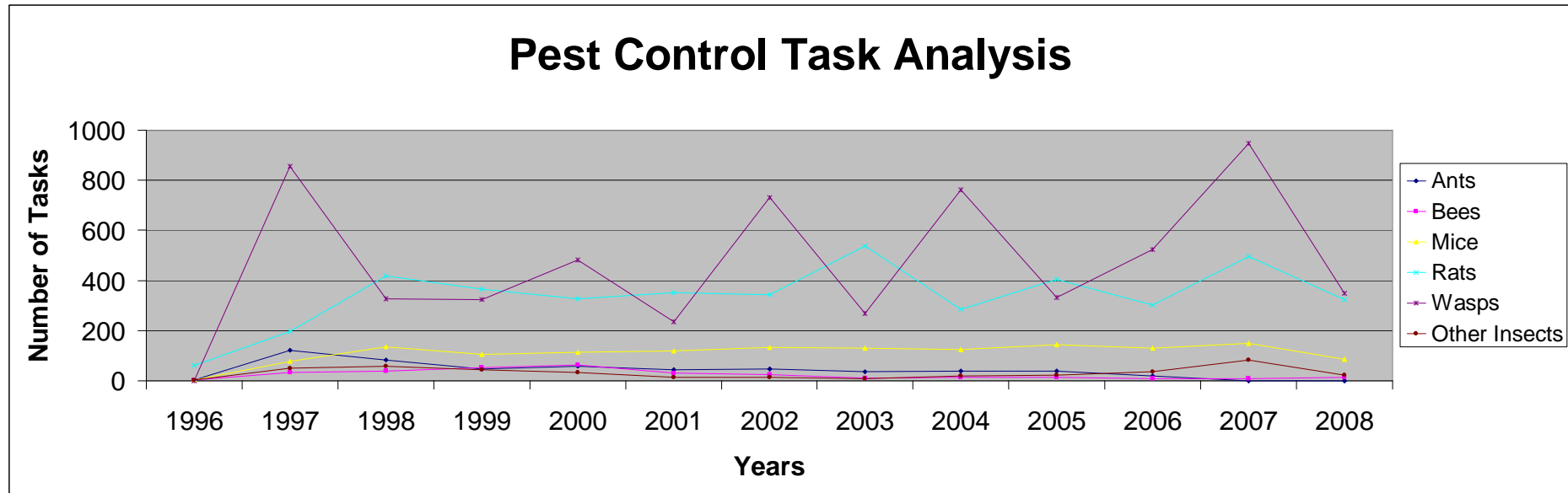
Appendix F



Appendix G



Appendix H



Appendix I: School Records

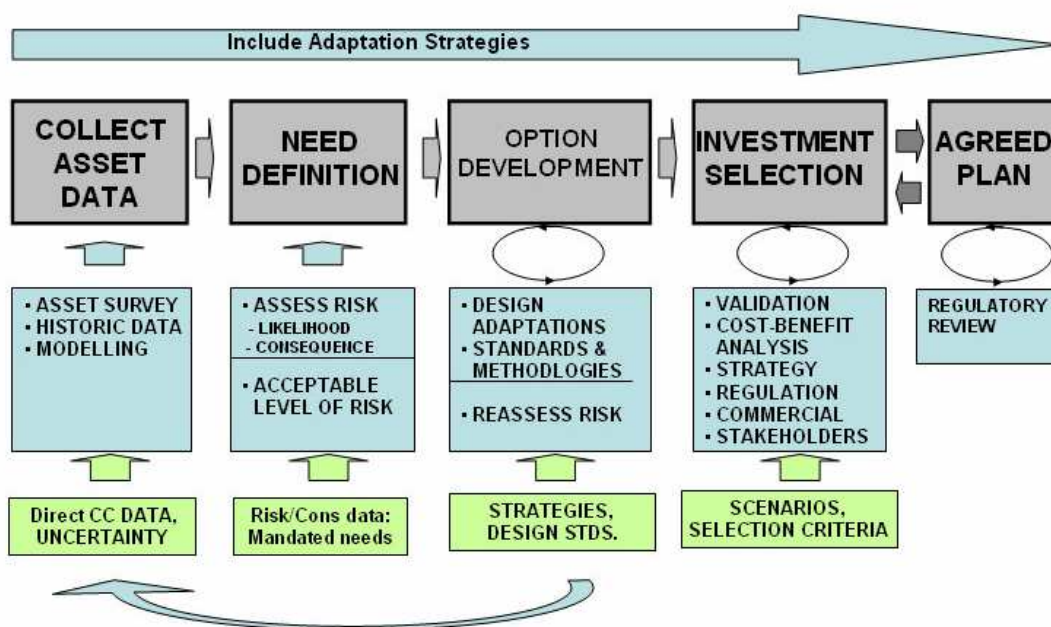
Wooden Hill Primary School

Bracknell Forest Borough Council Reactive Maintenance Book		A 23526
Name of establishment	WOODEN HILL	Reported by C. SWALLOW/BUSAR
Establishment to Enter Details		Name C SWALLOW
Fault	WATER THROUGH NURSERY DOOR SUITE ROOF	Contact on site D WESTON
Give Details: Location Building / Floor / Roof / Room / Element / Fault	← GULLY DUE WE HING HANG LAIN	Date 12/16/08
Contractor to Enter Details in Full (Full description of work with quantities required)		On completion of the work, fill in this section and hand top copy to the contractor
Dates on Site	Work done/Contractor Name/Return visit needed & any comments	Signed (site controller to sign)
	unblock down ppe and gully grid.	Print name
		Contractor/Sub Contractor Name: WOL
		Date work completed 12/06/08
		Signed B. HARTNELL
		Print name B. HARTNELL

Appendix J



Incorporation of Climate Change Adaptation Strategies into Asset Management Plans



1

This flow chart was derived from Water UK²¹.

²¹ A Climate Change Adaptation Approach for Asset Management Planning V1.0, November 2007. MWH, Colorado USA.

Appendix K – Flood zone definitions

Zone 1: Low Probability Definition

This zone comprises land assessed as having a less than 1 in 1000 annual probability of river or sea flooding in any year (<0.1%).

Appropriate uses

All uses of land are appropriate in this zone.

FRA requirements

For development proposals on sites comprising one hectare or above the vulnerability to flooding from other sources as well as from river and sea flooding, and the potential to increase flood risk elsewhere through the addition of hard surfaces and the effect of the new development on surface water run-off, should be incorporated in a FRA. This need only be brief unless the factors above or other local considerations require particular attention.

Policy aims

In this zone, developers and local authorities should seek opportunities to reduce the overall level of flood risk in the area and beyond through the layout and form of the development, and the appropriate application of sustainable drainage techniques.

Zone 2 Medium Probability Definition

This zone comprises land assessed as having between a 1 in 100 and 1 in 1000 annual probability of river flooding (1% - 0.1%) or between a 1 in 200 and 1 in 1000 annual probability of sea flooding (0.5% - 0.1%) in any year.

Appropriate uses

The water-compatible, less vulnerable and more vulnerable uses of land and essential infrastructure are appropriate in this zone. Subject to the Sequential Test being applied, the highly vulnerable uses are only appropriate in this zone if the Exception Test is passed.

FRA requirements

All development proposals in this zone should be accompanied by a FRA.

Policy aims

In this zone, developers and local authorities should seek opportunities to reduce the overall level of flood risk in the area through the layout and form of the development, and the appropriate application of sustainable drainage techniques.

Zone 3a High Probability Definition

This zone comprises land assessed as having a 1 in 100 or greater annual probability of river flooding (>1%) or a 1 in 200 or greater annual probability of flooding from the sea (>0.5%) in any year.

Appropriate uses

The water-compatible and less vulnerable uses of land are appropriate in this zone. The highly vulnerable uses should not be permitted in this zone. The more vulnerable and essential infrastructure uses should only be permitted in this zone if the

Exception Test is passed. Essential infrastructure permitted in this zone should be designed and constructed to remain operational and safe for users in times of flood.

FRA requirements

All development proposals in this zone should be accompanied by a FRA.

Policy aims

In this zone, developers and local authorities should seek opportunities to:

- i. reduce the overall level of flood risk in the area through the layout and form of the development and the appropriate application of sustainable drainage techniques;
- ii. relocate existing development to land in zones with a lower probability of flooding; and
- iii. create space for flooding to occur by restoring functional floodplain and flood flow pathways and by identifying, allocating and safeguarding open space for flood storage.

Zone 3b The Functional Floodplain Definition

This zone comprises land where water has to flow or be stored in times of flood. SFRAs should identify this Flood Zone (land which would flood with an annual probability of 1 in 20 (5%) or greater in any year or is designed to flood in an extreme (0.1%) flood, or at another probability to be agreed between the LPA and the Environment Agency, including water conveyance routes).

Appropriate uses

Only the water-compatible uses and the essential infrastructure that has to be there should be permitted in this zone. It should be designed and constructed to:

- remain operational and safe for users in times of flood;
- result in no net loss of floodplain storage;
- not impede water flows; and
- not increase flood risk elsewhere.

Essential infrastructure in this zone should pass the Exception Test.

FRA requirements

All development proposals in this zone should be accompanied by a FRA.

Policy aims

In this zone, developers and local authorities should seek opportunities to:

- i. reduce the overall level of flood risk in the area through the layout and form of the development and the appropriate application of sustainable drainage techniques; and
- ii. relocate existing development to land with a lower probability of flooding.

Appendix L – Glossary of Terms

ASCH	Adult Social Care & Health
BFC	Bracknell Forest Council
CS	Corporate Services
CYPL	Children, Young People & Learning
ECC	Environment, Culture and Communities
FRA	Flood Risk Assessment
GIS	Geographical Information System
IPCC	Intergovernmental Panel on Climate Change
LCLIP	Local Climate Impacts Profile
LD	Learning Disability
MTO	Medium Term Objective
SUDS	Sustainable Urban Drainage System
TBA	To Be Advised
UNEP FI	United Nations Environment Programme Finance Initiative