

A photograph of a flooded road. In the foreground, a dark-colored car is partially submerged in water, with only its roof and windows visible. In the background, a white car is also stuck in the water. The road is surrounded by trees and some signs in the distance. The overall scene suggests a significant weather event or flooding.

Climate Change: Adaptation Action Plan

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Climate Change Adaptation

1. Process
2. Development of Action Plan
3. Implementation
4. Results of LCLIP
5. Next Steps



Mitigation and Adaptation

- **Climate Change Inevitable**

- **Mitigation**

- Addresses causes
 - Aim to reduce greenhouse gas emissions
 - Global deferred benefit

- **Adaptation**

- Addresses symptoms
 - Minimises adverse effects
 - Take advantage of beneficial effects
 - Local immediate benefit



- **Adaptation Complementary to Mitigation**

UK Risk Overview

Seasonal

- Hotter, drier summers
- Milder, wetter winters

Extremes

- More frequent extreme high temperatures
- More frequent heavy storm events
- Significant decrease in summer soil moisture content
- Summer water shortages
- Possible higher wind speeds
- Sea level rise and increases in storm surge height



Leicester: Climate Change Targets

- 1990 UK's first Environment City
- 1994 Council Energy Reduction Target
- 1999 EMAS Accreditation
- 2003 Leicester Climate Change Strategy
- 2006 Nottingham Declaration
- 2007 LCC Climate Change Mitigation Action Plan
- 2008 LCC Climate Change Adaptation Action Plan
- National Indicators 185, 186 and 188

Early Adaptation Advantages

- Offset adverse impacts
- Ensure future development and infrastructure is '**climate resilient**'
- Raise awareness and understanding of Climate Change
- Economic benefits
- Competitive advantage

Process : Early Stages

- **Initial presentation to Senior Managers**
 - Explain Adaptation
 - Future Scenarios UKCIP 02
 - Impact on Service Delivery
 - Name Key Officers
- **Research**
 - Best practice guidance UKCIP
 - Desk Based Research
 - Case Studies

Process: Detailed Discussion

Identification of likely risks to LCC services and infrastructure

- Key officer interviews
- Review of existing records relating to weather related incidences
- Widespread consultation

Risk 1: Energy

- Increased risk of storm damage to energy distribution network
 - Power lines
- Increased risk of flooding to threaten infrastructure
 - Sub-stations on floodplains
- Availability of supply
 - Increased demand for summer cooling



Risk 2: Health

- Increase in heat related illness
 - Heat stroke, dehydration
 - Care Homes
- Increase in sun related illness
 - Skin cancers, eye damage and sunburn
 - Manual Workers
- Increase in air pollution related illness
 - Asthma/pulmonary disease
- Increased extreme weather injuries
 - Breaks/fractures etc
- Increase in vector/ water borne disease
 - Malaria, lymes disease, diarrhoea
- Increased food poisoning
 - Environmental Health



Risk 3: Planning

- Increased risk of flooding
 - Service provision
 - Drainage systems overwhelmed
- Increased subsidence and heave risk
 - Public buildings and housing stock
- Increase thermal discomfort
 - Urban Heat Island
 - Productivity
- Increase in winter storm damage
 - infrastructure
- Summer water shortages
 - Standpipes



Risk 4: Environment

- Increased risk of flooding
 - Fluvial and pluvial
- Summer water shortages
 - Decrease in river water quality
 - Increase in pollutants
- Species and habitat loss
 - Flora and fauna
 - Increase in pest species
- Lengthening in growing season
 - Maintenance requirements
- Increase in winter storm damage
 - Trees and infrastructure



Risk 5: Transport

- Increased risk of flooding to threaten infrastructure
 - Erosion, Inundation
- Hotter summer temperatures disrupting transportation
 - Rails buckling, road surfaces melting, bridges expanding
- Thermal discomfort on public transport
 - Buses and trains
- Subsidence
 - Soil Subsidence and heave



Opportunities

- Agricultural diversification
 - Longer growing season
 - Warmer climate
- Less winter transport disruption
 - Reduced demand for winter treatment salting and gritting
- Reduced demand for winter heating
 - Less cold related illnesses
- Tourism and leisure opportunities
 - Outdoor-oriented lifestyle
 - Health benefits
- Opportunities to develop renewables
 - Wind, wave, photovoltaic's etc



Process: Quantify Risk

- **Develop Risk Register**

- Identify risks

- Who's affected?
 - What the impact would be?
 - What the consequences would be?
 - What the probability was?

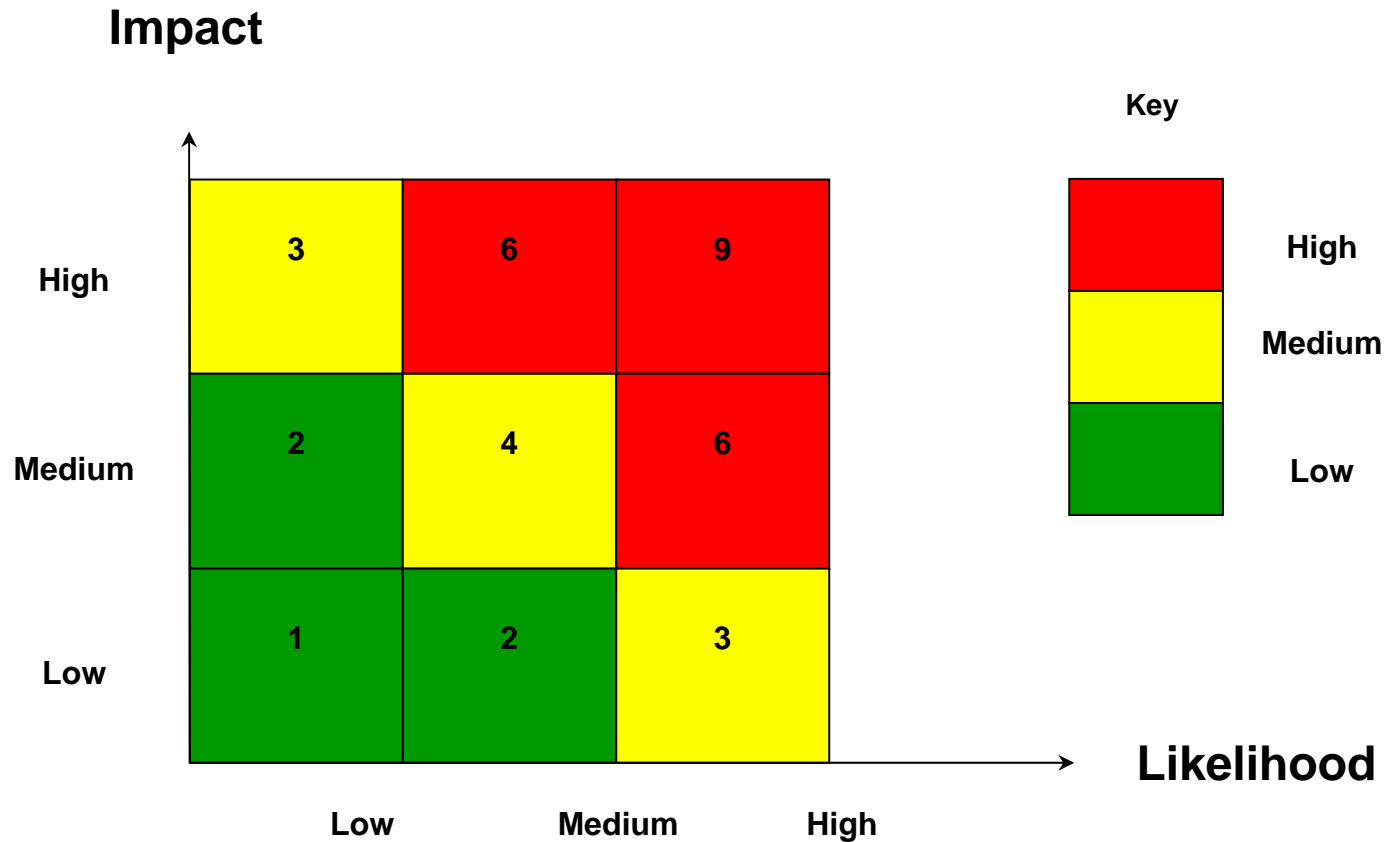
- Group risks

- Like areas

- Rank risks

- LCC Risk Management Framework
 - Impact
 - Probability

Process: LCC Risk Matrix



Process: LCC Level of Influence

- **EMAS**

- LCC Influence over risks identified
 - Low , Medium or High
- EMAS to manage action plan

- **Overall Risk Rating**

- Impact, Probability, Influence
- Total score between 1- 27

- **Opportunity Register**

- Energy, Transport, Green space, Health

Process: LCC Adaptation Action Plan - Key Areas

- **3 Significant Effects**
 - Flash Flooding
 - Summer Heatwaves and Prolonged Periods of Increased Summer Temperatures
 - Reduced Summer Water Availability
- **5 key issues identified with LCC influence**
 - Road Network Flooding
 - Urban Heat Island Effect
 - Future Development of the Built Environment
 - Subsidence – Soil Moisture
 - Subsidence – Trees

Process: Objectives & Actions

- Objectives set to reduce the impact of the Significant Effect
- Actions developed to meet the Objective

Example –

– Significant Effect 1:

– Flash Flooding

– Objective:

– Reduce the risk and impact of flooding across the city wide road network

– Action:

– Review maintenance regimes for gully clearance

Process: Actions

- **Actions**

- Named officer
- Timescale
- Resource requirements
- Progress to date

- **Monitoring**

- Managed within the EMAS Action Programme
- Annual Report to Cabinet
- External verification
- Internal Audit

- **Review**

- Immigration, Water shortages, Health issues

LCC Adaptation Action Plan

Combination of Actions includes both;

- Building adaptive capacity to create resilience
 - Plans, processes, policies
 - SPD Climate Change
- Delivering practical actions
 - Physical – increasing gully clearance and tree maintenance
 - Installation of green roofs
 - May also be temporal e.g. school calendar

Barriers to Overcome

- Lack of awareness and urgency
- Information gaps
- Scepticism
- Short term planning
- Lack of guidance
- Conflicting priorities across departments
- Possible conflict with mitigation agenda
- Finances

Implementation

Since adoption in June 2008

- SPD Climate Change
- Increase in tree planting
- Mapping drainage network
- Recording flood hotspots
- Sustainable construction standard

Local Climate Impact profile: LCLIP

Survey completed September 2008

Key findings;

- Overall cost to Leicester City Council 2000-8 £3.56m
- Storms and high winds £966,400 (tree damages £879,000)
- Heavy rain and flash flooding £956,732
- Subsidence £408,067 - public liability claims; tree roots
- Heat wave periods in 2003 and 2006 increased mortality rates amongst elderly
- Snow storms and ice have £368,523 - damage to private vehicle and pedestrian injuries; potholes

Next steps

- City Wide Mitigation and Adaptation Action Plan
 - November 2008
- UK CIP 08 climate change scenarios
 - Spring 2009



Any questions?

Thank you
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