National Indicator 188 – Planning to adapt to climate change

Level 2: Comprehensive risk-based assessment
Summary report

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1. Introduction

National Indicator 188 (NI188) Planning to Adapt to Climate Change is a Local Area Agreement (LAA) target indicator for Northamptonshire. The aim of NI188 is to embed the management of climate risks and opportunities across the local authority and partners services and to take appropriate adaptive actions where required. There are five levels of NI 188, summarised below.

- Level 0 Getting started
- Level 1 Public commitment and completed Local Climate Impacts Profile
- Level 2 Comprehensive risk assessment of climate change on services
- Level 3 Comprehensive ‘adaptation’ action plan
- Level 4 Implementation, monitoring and continuous review of action plan.

The NI 188 target for the Northamptonshire LAA is to achieve:

- Level ONE in 2008-09 (achieved)
- Level TWO in 2009-10 (achieved)
- Level THREE in 2010-11
- Level FOUR in 2011-12

Building on the success of last year’s regional project which enabled the Northamptonshire Partnership to achieve its NI 188 Level ONE target, Climate East Midlands regional partnership has again taken a collaborate approach towards reaching Level TWO.

In order to share information on the risks of climate change to service delivery and identify best practice in areas where adaptation is already taking place, a common methodology was developed regionally for undertaking risk assessments of council services, which have been carried out for main service areas in all local authorities. A validation exercise was then undertaken in each council with those Service Heads / managers responsible for those services deemed higher risk of impact by climate change. The following report summarises the high risks identified during interviews with service representatives at Kettering Borough Council (KBC).

The work has been undertaken by two Northamptonshire Climate Adaptation Project Officers (CAPOs) mainly funded by East Midlands Improvement and Efficiency Partnership, with a contribution from the County Council.

The likelihood and severity of service-specific impacts have been assessed according to UK Climate Projections 2009 (UKCP09) on timescales of 2020, 2050 and 2080. For more information on UKCP09 projections for the East Midlands please visit: http://ukclimateprojections.defra.gov.uk/content/view/2146/680/.

A climate risk assessment has also been undertaken of the ‘objectives’ of the Northamptonshire Sustainable Community Strategy.

Having now completed both a Local Climate Impacts Profile (LCLIP) report and a comprehensive risk assessment, KBC has successfully achieved Level 2 of NI188.
2. Summary of findings at Level 1 of NI188

A Local Climate Impacts Profile (LCLIP) was completed for KBC in 2008 in order to achieve Level 1 of NI188. In order to complete the LCLIP, local newspaper articles were used to identify major weather events that occurred between 1998 and 2008 and their impact on local communities. The most significant of these were highlighted and included in interviews with both council workers and members in order to obtain extra information on the specific impacts to the council and the delivery of its key services.

A total of 10 comprehensive interviews were undertaken, all of which were with council officers in departments including: Environmental Care, Emergency Planning, Properties Services, Insurance, Customer Services, Planning and Facilities.

The media trawl identified just 22 major weather events that occurred between 1998 and 2008. These resulted in a total of 60 weather related incidents that impacted Kettering borough during that time. There were a range of weather types attributed to different incidents, most common being damage and disruption caused by strong mid-latitude depressions, heavy thunderstorms and lightning strikes.

For a full version of the LCLIP report for KBC, please contact the Development Officer.

3. Methodology of Level 2

Level 2 of NI188 requires a comprehensive risk assessment of climate change on council services using UKCP09 projections. In order to determine which services are at highest risk of climate change impacts in the future, an initial assessment was undertaken whereby every function of the council was assessed for its vulnerability to climate change. Criteria such as the service being directly concerned with road networks or dealing with vulnerable people signified higher risk for that particular service. The initial assessment found there to be 18 high risk district council functions, summarised into the following 9 titles:

1. Emergency Planning
2. Corporate Property
3. Arboriculture, Landscapes and Biodiversity & Conservation
4. Planning
5. Environmental Health (Inc. Air Quality, Contaminated Land, Health & Safety and Infectious Diseases, Pest Control)
6. Street Cleansing
7. Council / Social housing (n/a in certain districts)
8. Sports
9. Waste Collection, Recycling and Commercial Waste

A comprehensive risk assessment was undertaken for each of the 9 high risk services listed above, using UKCP09 projections. This was undertaken on a regional basis by CAPOs in order to avoid work being duplicated across the region.

Information obtained within the Climate East Midlands partnership was shared and distributed to CAPOs to use at interviews with service representatives at district and borough councils of Northamptonshire. Interviews served to identify differing levels of risk according to location and degree of preparedness therefore risk scores changed
accordingly (eg. Daventry District Council scored flood risk lower than Northampton Borough Council due to the presence of the River Nene in Northampton). In addition to obtaining risk scores, control measures currently in place within the authority were established as well as potential future adaptation measures.

The risk assessment was completed using a 5x5 matrix - multiplying the severity of consequences by the likelihood to achieve a risk colour and category, as shown below.

<table>
<thead>
<tr>
<th>Likelihood of Occurrence</th>
<th>Almost Certain</th>
<th>Highly Likely</th>
<th>Even Chance</th>
<th>Likely</th>
<th>Rare</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
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<td>25</td>
<td>20</td>
<td>15</td>
<td>10</td>
<td>5</td>
</tr>
</tbody>
</table>

Severity of Consequences

The final scores achieved represent the following categories of risk:

<table>
<thead>
<tr>
<th>CATEGORY</th>
<th>COLOUR</th>
</tr>
</thead>
<tbody>
<tr>
<td>LOW RISK</td>
<td>GREEN</td>
</tr>
<tr>
<td>MEDIUM RISK</td>
<td>YELLOW</td>
</tr>
<tr>
<td>HIGH RISK</td>
<td>AMBER</td>
</tr>
<tr>
<td>VERY HIGH RISK</td>
<td>RED</td>
</tr>
</tbody>
</table>
4. Service areas assessed and key risks identified

In order to highlight the areas of service delivery most at risk of climate change impacts, this report solely provides details of “high” risks and “very high” risks that were identified during interviews with service representatives of the aforementioned 9 high risk services within KBC. More detailed findings of risk assessments are available upon request, including notes obtained during interviews and risks identified which were scored within the “medium” and “low” categories.

4.1 Emergency planning

**Higher temperatures / heatwaves / drought:**

**Very high risks:**
- More uncomfortable living and working conditions causing increased frequency of dehydration and heat stroke among vulnerable groups
- Less water for agriculture leading to loss of food supply

**High risks:**
- Overheating of transport infrastructure leading to structural damage to infrastructure eg. Buckling train tracks and melting roads
- Overheating of transport infrastructure leading to disruption to food supply
- More air conditioning used in buildings increasing the chance of disease outbreak eg. Legionella.
- Change in exotic species' ranges leading to an increase in blue green algae affecting water supply
- Increase in animal diseases eg. Bluetongue, avian flu and foot & mouth - Need for mass vaccination of livestock.
- Increased in adult social care demand leading to increased hospital admissions and increased pressure on care services
- Drier soil conditions leading to structural damage
- Increased subsidence leading to damage / collapse of buildings
- Damage / collapse of mineral workings and disused landfill sites leading to potential methane release
- Health and safety risks

**Milder winters / increased rainfall:**

**Very high risks:**
- Contamination of water and food supply by toxic waste or sewerage due to flooding
- Displaced people need to be placed in temporary housing due to flooding
- Limited access for emergency vehicles due to flooded transport networks

**High risks:**
- Increase in pest species leading to agricultural losses
- Contamination of residences and need for increased waste collection after flood events
- Industrial technical failure eg. substation / sewerage pumping station due to flooding
- Pressure on emergency services leading to shortages of search and rescue equipment during flood events
- Structural damage to roads and flood defences due to erosion and landslides due to flooding
Combined / indirect climatic effects:

**High risks:**
- Loss of telecommunications due to high winds / lightning
- Loss of electricity supply due to high winds / lightning
- Disruption to transport network eg. Bridges / railways / roads
- Disruption to food supplies due to disruption to transport network
- Damage to property due to high winds / tree damage
- Power disruption leading to loss of heating / lighting / power - creating operational problems.

4.2 Corporate Property

**Higher temperatures / heatwaves / drought:**

**Very high risks:**
- Reduced productivity of staff
- Increased heatstroke
- Overheating of IT equipment
- Increased air conditioning required
- Degradation of building materials
- Closure or partial closure of council buildings (if severe degradation takes place)
- Increased sunstroke / sunburn
- Structural damage to buildings due to subsidence

**High risks:**
- Increased legionella (from air conditioning)
- Maintenance and construction work not possible
- Closure or partial closure of council buildings to allow remedial repairs from subsidence
- Closure / partial closure of council buildings due to increased fires

**Milder winters / increased rainfall:**

**Very high risks:**
- Flooding - increased inspection and maintenance costs
- Flooding - disruption to services / utilities
- Inefficient building materials and fixing methods (eg. building cladding materials)

**High risks:**
- Increased insurance claims due to flooding and water damage
- Damage to buildings caused by damp e.g. mould
- Damage to roadways and pavement surface layers - increased maintenance costs and health and safety risks
- Degradation of building materials e.g. shrinkage

**Combined / indirect climatic effects:**

**Very high risks:**
- Increased solar radiation - buildings’ external envelopes are likely to be subject to faster degradation
- Increased solar flare of buildings leading to disruption to power supplies
- Loss of heating, lighting, power, telecommunications due to power disruption

**High risks:**
- Structural damage due to high winds– increased costs / lack of staff
Atmospheric pressure - increased risk from naturally occurring gases e.g. Carbon monoxide, radon, methane – leading to lung cancer
Increased use of property due to climate enforced immigration – increased costs/inspection

4.3 Arboriculture, Landscapes and Biodiversity & Conservation

4.3.1 Arboriculture

Higher temperatures / heatwaves / drought:
Very high risks:
- Increased recognition of the importance of urban trees in reducing urban heat island effect (POSITIVE)

High risks:
- Risk to urban trees due to heat stress
- Increased risk of non-native pests and diseases – need for increased maintenance of trees
- Geographical distribution of trees will change – need to research and plant new species
- Health and safety risks of staff working outdoors
- Damage to trees due to water shortages – increased costs to maintain
- Subsidence on clay soils

Milder winters / increased rainfall:
Very high risks:
- Increased importance of trees in urban areas to reduce surface run off (POSITIVE)

High risks:
- Increased risk of diseases / pests
- Lengthening of growing season – increased maintenance / change in working pattern required
- Damage to urban trees due to intense rain / waterlogged soils

Combined / indirect climatic effects:
High risks:
- Need for increased inspections prior to storm events
- Delays to scheduled work after a storm event

4.3.2 Landscapes

Higher temperatures / heatwaves / drought:
High risks:
- Health and safety risk for people working / playing outdoors from warmer summer temperatures

Combined / indirect climatic effects:
High risks:
- Increase in tree damage and tree falls due to high winds
4.3.3 Biodiversity & Conservation

**Higher temperatures / heatwaves / drought:**
- High risks:
  - Change in geographic distribution of native species - loss of species dependant on milder climate.
  - Loss of wetlands and associated flora and fauna

**Milder winters / increased rainfall:**
- Very high risks:
  - Flooding, contamination and erosion of soils leading to destruction of natural habitats

**Combined / indirect climatic effects:**
- Very high risks:
  - Large ancient trees damaged due to high winds

4.4 Planning

**Higher temperatures / heatwaves / drought:**
- Very high risks:
  - Increased risk of road subsidence
  - Drier summers increase risk of foundation subsidence
- High risks:
  - Increased outdoor recreation
  - Increased heat stress among vulnerable and public
  - Increased risk of road surface damage eg. melting
  - Increase in rate of vegetation growth / length of growing season extended affecting road verges.
  - Fewer water supplies

**Milder winters / increased rainfall:**
- Very high risks:
  - Increased risk of flooding in areas located on floodplains – affecting homes / roads
  - Increased risk of erosion from flooding
  - Increased rainfall intensity affecting infrastructure eg. embankments and bridges
  - Increased debris from intense rainfall / flooding eg. sediment washing into and blocking gullies.
- High risks:
  - Increased risk of flood disruption on building sites
  - Increased damp problems
  - Reduced risk of frost – reduced need to deal with ice (POSITIVE)

**Combined / indirect climatic effects**
- High risks:
  - Damage to infrastructure from falling trees
4.5 Environmental Health (Inc. Air Quality, Contaminated Land, Health & Safety and Infectious Diseases, Pest Control)

4.5.1 Air Quality

**Higher temperatures / heatwaves / drought:**
- High risks:
  - Changes to air pollution
  - Increased stress on natural systems
  - Increased photochemical smog and ozone leading to respiratory problems
  - Increased photochemical smog and ozone leading to damage to plant tissue, stress on organisms and increased pathogenesis
  - Air pollutant impact on vegetation will increase on already stressed vegetation
  - Ability to implement meaningful air pollution control by Local Authority

**Milder winters / increased rainfall:**
- Very high risks:
  - Increased photochemical smog and ozone leading to respiratory problems
- High risks:
  - Increased photochemical smog and ozone leading to damage to plant tissue, stress on organisms and increased pathogenesis
  - Poor air quality in stagnant conditions

4.5.2 Contaminated Land

**Milder winters / increased rainfall:**
- High risks:
  - Erosion of bunds and capping layers
  - Increased leachate production in winter months (increased treatment and disposal costs).

4.5.3 Health & Safety and Infectious Diseases

**Higher temperatures / heatwaves / drought:**
- Very high risks:
  - Contamination of private water supplies
- High risks:
  - Infectious disease / food poisoning leading to deaths within high risk groups, including young and elderly
  - Impact on human health
  - Increase in staff time required to investigate incidents
  - Increase in notifications of infectious disease outbreaks
  - Increase in food poisoning and infectious diseases from visits abroad
  - Hot working conditions – impact on human health and productivity
  - Water shortage - food businesses unable to trade due to failure in supply

**Milder winters / increased rainfall:**
- High risks:
  - No winter decline in infectious diseases
• Reduced likelihood of slips, trips and falls due to reduced frost, snow and ice (POSITIVE)
• Contamination of private water supplies due to flooding

4.5.4 Pest Control

Higher temperatures / heatwaves / drought:
High risks:
• Increased number of insects – increased callouts / demand for service

4.6 Street Cleansing

Higher temperatures / heatwaves / drought:
Very high risks:
• Lower staff productivity
High risks:
• Staff may suffer from health problems such as sunburn, heat stroke and dehydration
• Vehicles may overheat
• Can't fill street cleaning vehicles due to water shortage.

Milder winters / increased rainfall:
Very high risks:
• Detritus left on the streets after a flood event.
• Lengthening of the growing season.
• Possible increase in staff absences due to sickness e.g. prolonged seasonal colds and flu.
• Increased demand for services to clear up leaves.
High risks:
• Roads flooded, transport disruptions.
• Roads remain passable due to reduce frost, snow and ice leading to fewer transport disruptions (POSITIVE)

Combined / indirect climatic effects:
Very high risks:
• Delays to scheduled work after a storm event
High risks:
• Bins could get blown over and litter get blown about
• Damage to property from a lightning strike.
• Wear and tear on vehicles

4.7 Sports

Higher temperatures / heatwaves / drought:
High risks:
• Increased number of visitors at rural venues (POSITIVE)
• Drying grass pitches
• Increased need to maintain lake quality so that activities can take place (e.g. prevent eutrophication-type symptoms and reduce invasive plant species)
• Greater chance of fire on areas of dry and parched land
Milder winters / increased rainfall:
High risks:
- Buildings flooded leading to closure of centres
- Unpredictable fluctuation of lake levels. All lake events cancelled if levels too high or water is too choppy.
- Damage to playing surfaces limiting accessibility limited. When conditions are unsafe events are called off.
- Reduced number of visitors
- Reduced accessibility around sports centres leading to reduced visitor numbers

4.8 Waste Collection, Recycling and Commercial Waste

Higher temperatures / heatwaves / drought:
High risks:
- Increased odour and vermin nuisance from mixed or segregated putrescibles with potentially greater health risks from pathogens and bioaerosols.
- Reduced outdoor and indoor workers productivity, extreme temperatures could put workers at risk of heat stress
- UV radiation will increase the risk to outdoor workers from sunburn and other skin conditions associated with over exposure.
- Increase risk of diseases being transmitted e.g. water borne and food poisoning type ailments due to increased pathogen activity and bioaerosol releases.
- Unable to wash refuse and recycling vehicles

Milder winters / increased rainfall:
Very high risks:
- Increased risk of disruption of collections and supporting infrastructure from intense rainfall or flooding
- Possible increase in staff absences due to sickness e.g. prolonged seasonal colds / flu

High risks:
- Heavy rain or flooding could disperse waste awaiting collection.
- Waste becomes saturated due to the increased rainfall / flooding.
- Staff diverted from usual duties to help with sand bagging during flood events

Combined / indirect climatic effects:
Very high risks:
- Possible increases in the frequency and intensity of higher winds may lead to more problems with windblown waste and debris.
- Recycling bins and boxes may be blown over due to being quite light.

High risks:
- Increased wear and tear on vehicles
5. Examples of adaptation measures already in place

As part of the comprehensive risk assessment process, consideration was also given to identifying some adaptation measures that are already in place within KBC. Examples of these are listed below:

- Sports services provide water and shading for participants and spectators of events
- Alternative indoor sports available if outdoor weather conditions signify a health and safety risk
- Waste management team have changed collection times
- Waste collection vehicles have fridges

6. Potential future adaptation measures

As part of the NI188 process, potential adaptive responses have been considered in order to reduce the risks of climate change impacts on council services in the future. The following adaptation measures have been suggested by service representatives within KBC:

- Change type of clothing worn in hotter conditions for outdoor workers e.g. T-shirts / hats / lighter trousers
- Seasonal bedding with drought tolerant species.
- Improve building design
- Site new developments on extensions and urban areas
- Change method of collection of green waste to reduce risk of combustion in heat
- Provide shaded areas in schools / day care centres / workplaces etc.
- Buildings to be sited and designed to minimise solar gain during summer
- Re-examine road structural design / use different materials on roads
- Ensure foundations are resilient to subsidence
- Need for slower growing plants / revise land management schedule
- Consider supply and demand of water when choosing location of new developments. Minimise water consumption in buildings by measures such as rainwater harvesting / recycling.
- Provide recreational areas / green spaces
- Need for planning to take into account flood zones / locate new developments in areas at low risk / promote adequate flood defences with Environment Agency
- Reduce flood risk to and from new development through location, layout and design, incorporating sustainable drainage systems (SUDS).
- Relocate / flood proof important routes.
- Provide permeable surfaces for pavements, driveways, footpaths, car parking areas and access roads.
- Ensure that drainage systems can cope with more intense rainfall
- Plan routes / re-site infrastructure
- Build away from large trees to reduce risk to buildings during high winds
7. Summary of findings at Level 2 of NI188

The findings of this comprehensive risk assessment of the potential impacts of climate change on council services have enabled the priority risks for Kettering Borough Council to be identified.

The major implications regarding potential impact of climate change for the council to consider now are around longer-term investment decision-making. For example if the council was intending to invest in new buildings, or if consideration was being given to contracting or commissioning services over a long time period, then investment in measures or design features which help mitigate the potential impacts of climate change (higher summer temperatures and increased likelihood of flooding) could save the authority money in the future.

There are also a number of generic impacts that affect every service within the council such as overheating in the workplace in higher summer temperatures and disruption to service delivery due to flooding. Adaptation to risks such as these is therefore of critical importance in order to ensure business continuity in the future. This report provides a greater understanding of specific risks which are likely to affect council services financially and logistically. The severity and likelihood of potential impacts has been assessed by service representatives that have past experience of certain climatic events affecting service delivery.

Information gathered during interviews with service representatives allow KBC to acknowledge progress that has already been made towards adapting to climate change. Certain high risks, however, have no adaptation measures in place which must be addressed to minimise the severity and likelihood of future climatic events affecting services.

This report has begun to identify adaptive options in order to reduce levels of risk. In order to examine adaptive options in more detail, a more comprehensive action plan will be developed for priority risk areas to achieve Level 3 of NI188.

The NI188 Level 3 project will help identify best practice of climate change adaptation measures on a national basis, which will help inform the development of ‘adaptation plans’ for each council in Northamptonshire.

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March 2010
For more information on NI188 – Adapting to Climate Change and for the detailed risk assessments - please contact:

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