YORKSHIRE AND HUMBER CLIMATE CHANGE ADAPTATION STUDY

LOCAL AREA REPORT:

CITY OF KINGSTON UPON HULL

Location	
Description of District	The city is located on the northern banks of the River Humber estuary. It is a small urban district surrounded by the larger East Riding of Yorkshire.
Future Climate Projections	The results of the modelling carried out for the Yorkshire and Humber Regional Climate Change Adaptation Study suggest that the following changes are likely by 2050: • Annual average daily mean temperature for the district rising by 1.9˚C; • The long term average maximum winter temperature will increase from 14.4˚C to 15.6˚C; • There will be an increase in the intensity of short and longer rainfall events (1, 2, 5 and 10-day); • Summer rainfall will reduce by 24% and winter rainfall is to increase by 17%; and • Winter average wind speeds will increase marginally. These figures relate to the nearest modelled cell, which was Hull.

Key Impacts and Adaptation Actions

Although principally a regional / sub-regional study, there are a range of issues that are of particular relevance to the City of Kingston-on-Hull. These are set out below, using the same 'sector' headings as the main report. These points are not the only issues for consideration, however, as sub-regional and regional reports, as well as the thematic or sectoral areas of the website, do cover other issues relevant to this local authority area.

Flooding

Key Impacts

- Greater rainfall leading to increasing and more frequent flood problems for local properties, businesses and infrastructure;
- Increasing potential for tidal flood impacts with rising sea levels;
- Particular surface water flooding problems due to low-lying areas across Kingston upon Hull, and exacerbated by the more frequent tide-locking of drainage outfalls due to increased tidal levels; and
- Increased flooding to critical infrastructure and services (Ambulance, Fire and Police stations all at significant risk).

Key Adaptations

- Concentrate improvements to tidal flood defences to maintain an appropriate standard for local populations;
- Produce multi-agency response plans to co-ordinate responses during extreme events and ensure clear access routes are kept available;
- Improve current drainage design standards to incorporate future climate changes, and strategically plan and implement system improvements across the drainage network; and
- Protect critical infrastructure and emergency services to ensure continuation of service, or relocate away from flood risk areas;

Coastal Erosion

Key Impacts

- Increased rates of inter-tidal salt marsh recession at some locations within the Humber Estuary, in many cases leading to the progressive 'squeezing' of inter-tidal habitats; and
- Increased risk of overtopping of the Hull Barrier.

Key Adaptations

- Adaptation to inter-tidal salt marsh-edge erosion within the Humber Estuary is inextricably linked with flood risk management decisions. There are limited opportunities for salt marsh re-creation since flood risk management will mainly involve maintenance or improvements to existing flood defence structures due to the urban and industrial nature of the frontage, leading to continued coastal squeeze.

Groundwater and Minewater

Key Impacts

- Risk to Chalk groundwater resource due to declining groundwater levels and increased drought;
- Impact on river flows, particularly River Hull, due to reduction in spring flow from Chalk; and
- Risk of saline intrusion from Humber Estuary especially during periods of drought as over abstraction leads to migration of saline water further inland.

Key Adaptations

- Continued monitoring and careful exploitation of the Chalk aquifer; and
- Assessment of saline intrusion and possible constraint of groundwater abstractions during periods of drought.

Business and Economy

Key Impacts

- As fish species currently targetted by local boats become unavailable or uneconomic they are likely to be replaced by other warmer-water species, the attractiveness of which will depend upon market changes;
- Increased flooding in urbanised and developed areas, combined with increasing temperatures, will increase the risk of contamination within the food and drink industries (and in particular the fish processing sector); and
- Industrial processes, and in particular those requiring large amounts of water may be impacted by water shortages. Heavy users may find limitations imposed in order to balance industrial and other needs, which could reduce process efficiency and output and increase costs.

Key Adaptations

- Promote and circulate research into the likely effects of climate change on local fisheries species, and ensure long-term investment decisions account for a potentially changing catch. Drive and share research on changing markets to ensure and enable early adaptation. Require that development and support programmes, especially where publicly or industry-supported, are climate adapted;

- Although standards are very high already there may be an increased demand on audit and quality control, and new processes and equipment may be required for food and drink industries. Urban heating and flooding can also be ameliorated through the use of shade trees in urban areas. Flooding impacts on distribution and retail parks should be addressed as a priority before development, with surface water management plans and sustainable drainage systems, designed to cope with future water flows;
- Build climate adaptation into regular process reviews, and programme any necessary adaptations (for instance to improve water efficiency) into maintenance and upgrade cycles; and
- To limit impacts on agriculture in the wider region, initiate, develop and review pest management strategies, in particular associated with the ports, to ensure the early identification and treatment of any species or conditions which may negatively affect the region's habitats, agriculture, or human health.

Public and Voluntary Services

Key Impacts

- Indoor air temperatures are likely to rise in the summer months, particularly in urban areas (urban heat island effect) and where there is less relief from cooling overnight, due to radiation of heat from materials that have absorbed solar incidence throughout the day;
- The drying out of soils followed by heavy rainfall could lead to increased risk of subsidence and slope instability, together with inundation and/or erosion of low lying coastal facilities.

Key Adaptations

- A set-aside maintenance and repair budget for school buildings and public service offices, developed through adapting current budgetary mechanisms, would ease the costs of any damage that is incurred as a result of climate impacts;
- Review built assets and resource availability and location to ensure resilience to future demands; and
- Ensure full participation in regional resilience forums and regional flood groups and undertake precautionary as well as adaptive measures recommended, in addition to reviewing risk registers.

Infrastructure and Utilities

Key Impacts

- Increased number of traffic accidents delays on major highways caused by increased winter rainfall and winter average wind speeds;
- Increased frequency of flooding from urban drainage and sewer systems in Hull, especially in winter;

- Increased blockage of drains, culverts and gullies;
- Mechanical operations within the water distribution grid could be affected by climate-related disruption to power supplies;
- Loss of telecommunications during severe weather incidents due to lack of connectivity with national grid; and
- Increased frequency of flooding to sections of the rail line to/from Hull.

Key Adaptations

- Weather and travel warnings issued to users of principal roads during storm events and anticipate increased resource requirements for emergency responses;
- Capital programs should consider improved sewer and drainage design;
- Re-evaluate resources and approaches for inspection and clearance of drain, culvert and gulley blockages;
- Increased awareness of inter-dependencies between critical infrastructures, leading to improved resilience planning;
- Back-up telecommunications link with national grid; and
- Consider increased flood defence to rail line and/or relocation of sections of line in the longer-term.

Biodiversity

Key Impacts

- Urban green space, brown field sites, and features of the urban landscape are likely to become more important refuges for species with a loss of productive soil and shifts in climate space of species.

Key Adaptations

- Wherever possible allow natural processes to continue, and therefore adaptation to change to occur naturally; and
- An overall expansion in habitat types currently suffering from isolation or fragmentation, to improve habitat permeability and work towards a total increase and improved value of urban and industrial areas as refuges and sustainers of species.

Health and Welfare

Key Impacts

- Impacts upon mental and physical health due to increasing temperatures, particularly in areas of deprivation; and
- Coastal and fluvial flooding attributable to sea level rise and increased seasonality and intensity of rainfall.

Key Adaptations

- Urban design to minimise heat island effect as much as possible;
- Raising awareness, educating and building community resilience to climate change and its likely impacts; and
- Continuing to tackle social and economic inequalities throughout the city will greatly reduce vulnerability to the impacts of climate change.