



Spatial planning and future flood risk: the Lincolnshire Coastal Study

Nikki van Dijk
Atkins Ltd


Plan Design Enable



Overview of presentation



- Introduction to the Lincolnshire Coastal Study
- Approach
 - Flood hazard scenarios
 - Socio-economic scenarios
 - Stakeholder engagement
- Outcomes
 - Principles of sustainable spatial development in the study area
 - Spatial development options
- Challenges for climate change adaptation in deltaic areas



2

Introduction to Lincolnshire Coastal Study

ATKINS



3



Background to Study

ATKINS

- Need to reconcile present and future flood risk with the need for development and economic regeneration
- Recognised by Review Panel of East Midlands Regional Plan (2007)
 - No new development (beyond existing commitments) in the three coastal districts until a coastal strategy is agreed
- Aim – to develop Principles for spatial development which would allow communities to develop and have a viable and prosperous future
- Coastal Study Group set up to oversee project

5

Flood hazard scenarios

ATKINS

- Tidal and estuary flooding
- Environment Agency flood hazard data mapped
- 1 in 200 year event and 1 in 1000 year event
- Two types of flood event:
 - Overtopping - defences remain intact, water flows over the top
 - Breaching - a section of the defence fails, water passes through a gap
- Present day (2006) and future (2115)



6

Climate change

ATKINS

- Three future flood scenarios developed.
 - Flood hazard in 2115, based on Defra's (2006) recommended allowance for sea level rise (1.13m)
 - Lower sensitivity around the 2115 scenario (0.55m)
 - Upper sensitivity around the 2115 scenario (1.6m)
- Defra (2006) allowance based on UKCIP02 scenarios

7

Flood hazard scenarios - consequence

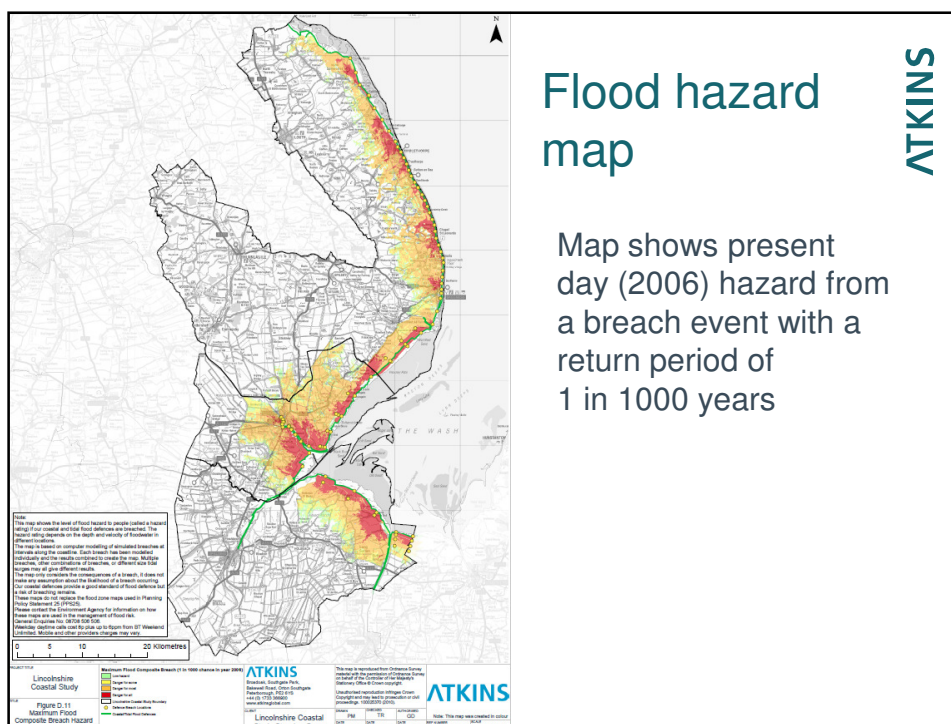
ATKINS

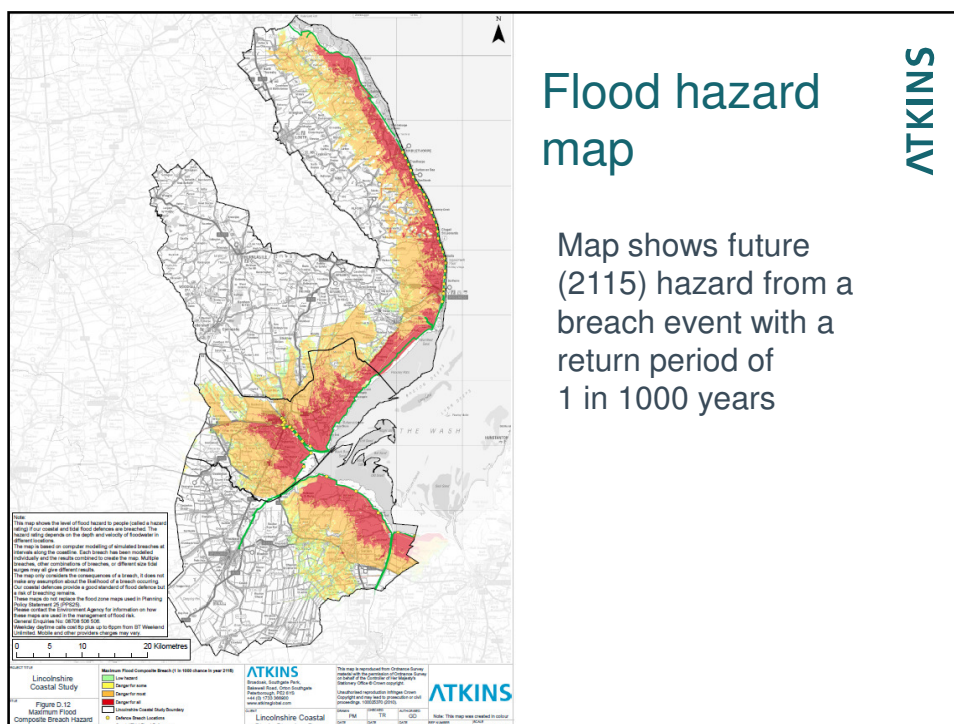
- Hazard rather than risk
- Risk - function of the probability of an event occurring and the consequences of that event
- Breach modelling assesses the *consequence* of breaches: no assessment of the probability of a breach occurring
- Precautionary principle: absence of information regarding defence breach probability
- Further work being undertaken by the Environment Agency: recommend that the findings of the Coastal Study are re-evaluated in the light of this work

Flood hazard mapping: hazard zones

Degree of hazard	Hazard rating	Colour on map	Description of flood water	Description of hazard
None	Little or no hazard	White	Outside of modelled flood extent	Little or no hazard (from coastal flooding)
Low	Low Hazard	Green	Shallow flowing or deep standing water	Caution, low hazard to people
Moderate	Danger to some	Yellow	Fast flowing or deep standing water	Hazard to the vulnerable e.g. children, the elderly and the infirm
Significant	Danger for most	Orange	Fast flowing and deep water with some debris	Hazard to most, including the general public
Extreme	Danger for all	Red	Fast flowing deep water with significant debris	Extreme hazard, danger to all, including the emergency services

Source: Defra and the Environment Agency 2008





Socio-economic scenarios

- Three scenarios:
 - Conventional Development - broadly follows current trends
 - National Enterprise - national security focussed
 - Green - environment focussed
- Qualitative descriptions of how society, the economy and the environment may evolve
- Quantitative estimates:
 - Population
 - Housing numbers
 - Land requirements
- Population projections diverge but household numbers relatively consistent

Principles – key points

ATKINS

- Primary principle - to increase the safety of people by reducing the number of people at risk of flood hazard in the Study Area.
- Red, orange and yellow zones:
 - Major development will be business or employment related
 - Exceptionally, development to meet local housing needs may continue
- Green zone:
 - Major development may be permitted in the green zone

Principles – key points (cont'd)

ATKINS

- All zones:
 - New and replacement community buildings may be permitted
 - New caravan sites or extensions to existing sites may be allowed for short-let tourist use between the months of April and September
 - Development of buildings and infrastructure explicitly for use in emergencies may be permitted

Lessons from the Lincolnshire Coastal Study

ATKINS

- Use of hazard maps in spatial planning - benefits in terms of information, but challenges in terms of application
- Communication of uncertainties and reluctance of some stakeholders to adopt the precautionary principle
- Partnership working and stakeholder engagement required to achieve consensus on Principles
- Need to think beyond the traditionally short timescales of the planning process - the scenario approach
- Need to consider how existing plans and policies can deliver climate change adaptation – local policy making required for delivery

17

Adaptation challenges in deltaic areas

ATKINS

- Competing and conflicting interests at the coast – trade-offs between need for socio-economic regeneration and flood risk
- Overcoming a 'develop and defend' attitude
- Recognising the difference between local and national priorities – may change in future e.g. increasing importance of Lincolnshire for food production
- De-coupling economic regeneration from housing growth – dominant paradigm is that market housing is required for regeneration
- Gaps in national policy:
 - Recognising significant changes in residual flood risk, not just in shoreline position
 - Probability of defence failure and use of precautionary principle

18

www.lincolnshire.gov.uk

Nikki van Dijk

Environmental Scientist

Climate Change and Environmental Futures

Nikki.vandijk@atkinsglobal.com