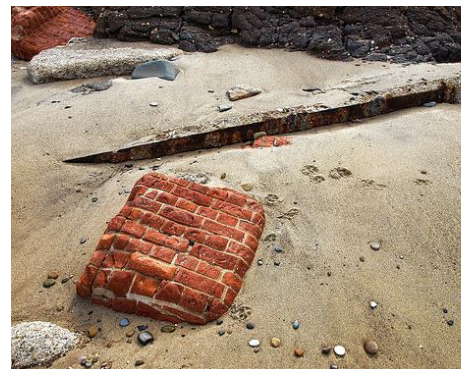


Greater Lincolnshire Local Enterprise Partnership Growth Strategy

A business case for water management – Outputs to support the Growth Strategy (Executive Summary)



Report for Greater Lincolnshire Local Enterprise Partnership

Ricardo-AEA/R/ED59201

Issue Number 1

Date 26/03/2014

Customer:

Greater Lincolnshire Local Enterprise Partnership

Customer reference:

PL.13.054

Confidentiality, copyright & reproduction:

This report is the Copyright of Greater Lincolnshire Local Enterprise Partnership and has been prepared by Ricardo-AEA Ltd under contract to Lincolnshire County Council dated 16/10/2013. The contents of this report may not be reproduced in whole or in part, nor passed to any organisation or person without the specific prior written permission of Greater Lincolnshire Local Enterprise Partnership. Ricardo-AEA Ltd accepts no liability whatsoever to any third party for any loss or damage arising from any interpretation or use of the information contained in this report, or reliance on any views expressed therein.

Contact:

Aaron Burton
Ricardo-AEA Ltd
Gemini Building, Harwell, Didcot, OX11 0QR
t: 01235 75 3701
e: aaron.burton@ricardo-aea.com
Ricardo-AEA is certificated to ISO9001 and ISO14001

Author:

Aaron Burton, Nicole Shamier, Rachel Harris, Shaun Brace

Approved By:

Stuart Ballinger

Date:

26 March 2014

Ricardo-AEA reference:

Ref: ED59201- Issue Number 1

Introduction

Climate change and population growth are increasing pressures on the water environment and the ecosystem services this provides to society and the economy (Figure 1). These pressures can serve to limit economic growth, however taking an integrated water management approach and developing a business case in partnership with a range of stakeholders can support more integrated approaches to enable growth.

Figure 1: Water management pressures (adapted from CIRIA 2013)



Water management has been recognised as a key barrier or enabler to green economic growth in Greater Lincolnshire. The Greater Lincolnshire Local Enterprise Partnership set-up a Water Management Task and Finish Group who commissioned this project to deliver a draft Business Case setting out the growth potential of investment in water management infrastructure and the options to deliver and fund it.

The main objective of this project is to develop “a draft Business Case setting out the growth potential of investment in water management infrastructure and the options to deliver and fund it”. This aims to document and evidence the importance of agri-food, the visitor economy and ports in the GL LEP area, to quantify, where possible, the costs and benefits of water management investments, and to identify key growth sectors (agri- food, visitor, ports, housing etc.) enabled by investment in flood risk and water management infrastructure.

Objectives

The main deliverable of this project is “a draft Business Case setting out the growth potential of investment in water management infrastructure and the options to deliver and fund it”. This will meet the following project objectives set out by the Local Economic Partnership:

- To document the unique water management issues within the GL LEP ‘rural economy’ area
- To document and evidence the importance of agri-food, the visitor economy and ports in the GL LEP area – set in a local, ‘regional’ and national context – largely drawing together existing material, with minimal new research required
- To quantify, where possible, the costs and benefits of water management investments, using existing cost and benefit information from flood risk strategies and planned schemes as outlined by the local authority and Environment Agency and the latest available water resource management plan from Anglian Water.
- To identify key growth sectors (agri- food, visitor, ports, housing) enabled by investment in flood risk and water management infrastructure

- To propose options for integrated water resource management that, in the longer term will deliver water security at farm level, and more strategically via water transfers at catchment level, across the GL LEP area.
- To assess the economic, social and environmental benefits of the provision of coastal flood defences
- To identify funding and delivery partnerships that will be required to deliver investment.

Pressures in Greater Lincolnshire

Coastal Flood Risk

The Greater Lincolnshire coast is of great importance to Greater Lincolnshire's economy, as it is home to a number of tourist hotspots and has a vibrant food manufacturing industry. There are also large areas of land dedicated to agricultural production, with approximately 30% of England's vegetable crops grown in the region. A high proportion of Greater Lincolnshire's most productive land is below sea level, and sea defences in South Holland, along with a desalination programme and drainage infrastructure, have enabled fertile silt land to be used for agriculture. The Great flood and sea surge of 1953, where in Greater Lincolnshire alone 42 people died, engulfed 98,842 acres of farmland, demonstrated the mass area of land that would be lost if flood defences were not maintained.

The defences that were built following the 1953 floods were tested during a storm surge in December 2013. This was the most serious tidal surge in 60 years with major flooding occurring in Greater Lincolnshire. Over 1,400 properties were flooded, 6,800 hectares of agricultural land impacted, and major impacts occurred with closure of Immingham port and damage to broader infrastructure¹.

Surface and groundwater flooding

Flooding from surface water occurs when the local drainage system has reached capacity and cannot manage any additional water. Forecasting surface water flooding is challenging as its occurrence is reliant upon ground water levels, rainfall and local water management infrastructure. The Environment Agency Flood Map for Surface Water (Deep) reports 2.3 – 2.6% of properties in Greater Lincolnshire (3,230 - 4,681 properties) to be at risk from surface water flooding. The county has a history of flooding and in 2007 floods caused damage to 2000 properties throughout the county. In the past flood events from surface water have taken place in Lincoln, Louth, Horncastle, Grantham and Sleaford, whilst Sleaford and Bourne have also suffered from groundwater flooding owing to high ground water levels in the underlying aquifer². Surface water flooding interacts with a number of factors including groundwater flooding.

Sewer flooding occurs when intense rainfall events and surface water overwhelm combined drainage systems. This also has a negative water quality impact linked to combined sewer overflows and when sewer flooding reaches water bodies. Anglian Water is the main water company serving the GL LEP region and is also exploring partnership approaches in their business plan submission to Ofwat, the economic regulator for Water.

Fluvial flooding

Greater Lincolnshire has a vast network of rivers, canals and managed drainage networks. The county's highly productive agricultural land is supported in cultivation by an extensive artificial drainage system. The Internal Drainage Boards maintain 3,800 miles of

¹ <http://www.coastms.co.uk/resources/695ec460-c3ab-4de3-871c-23fb5ef5200e.pdf>

² Preliminary Flood Risk Assessment Report - <http://www.lincolnshire.gov.uk/residents/environment-and-planning/flood-risk-management/assessing-the-risk-of-surface-water-flooding-across-lincolnshire/103044.article?tab=downloads>

watercourses and 286 pumping stations across the Fens. Pumps are required to circulate the water around as much of the land is below the level of the rivers that discharge to the sea. The Environment Agency manages 1,024km of rivers with raised embankments in Greater Lincolnshire.

The Preliminary Flood Risk Assessment did not consider canals and reservoirs a significant risk as a flood source. The interaction of fluvial, coastal, surface and groundwater sources was identified as potentially affecting flooding in the future and could take place anywhere behind raised fluvial and coastal flood defences. Sea level rise will increase the risk of flooding in the county. Drainage systems that have been modified to manage current water levels could be developed to help adapt to climate change. A rise in sea water could impact on rivers inland as a result of interactions with drains, sewers and smaller watercourses. The PFRA highlighted the need for sustainable drainage to support adaptation to climate change and a need for local studies to establish the likely effects of climate change impacts on Greater Lincolnshire's water.

Water Quality

Good water quality reduces the cost of drinking water treatment and improves the water environment for recreational users, visitors, residents and the local wildlife. There are documented links between water quality and public health, and between river restoration and local development and wellbeing. A location by a good quality water environment elicits higher property prices and therefore increases in council tax revenues.

The Water Framework Directive sets out that by 2015 all water bodies must achieve 'good' status and for surface water 'good' status includes the water bodies overall status including an ecological and chemical element. The Lincolnshire River Basin District (RBD) falls mostly into the Anglian River Basin District (RBD) (82.4%) and partly into the Humber RBD (17.6%).

Greater Lincolnshire has several major aquifers and a large proportion of the county is included in groundwater vulnerable zone with a major aquifer running alongside the coast between the Humber estuary and Skegness, and another aquifer running north to south through central Lincolnshire. Most of Greater Lincolnshire is designated as surface water Nitrate Vulnerable Zone (NVZ) areas and parts are designated as groundwater NVZ areas as shown in **Error! Reference source not found.**³. As such farmers must adhere to rules that address nitrates loss from agriculture⁴. Greater Lincolnshire's growing agricultural industry faces restrictions in fertiliser usage as a method of improving the quality of groundwater which has the potential to increase production costs and reduce profit margins for those involved in the sector⁵.

Water availability

Since water is a major input into production and its supply is statutory to maintain employee health, key to economic growth in any region is the availability and supply of clean water for both domestic and commercial use. Rainfall in Eastern England is low compared to the rest of the country although the number of annual thunderstorms contributes significantly to the regions total annual rainfall⁶.

Agriculture is a major consumer of water in the region and there are over 600 agricultural spray irrigation licences supporting high value arable food production businesses. Over 250 of these include a storage reservoir. A reduction in summer water abstraction needed for irrigating crops has been identified as a threat to the regions' growing agricultural sector⁷.

³ <http://maps.environment-agency.gov.uk/wiyby/wiybyController?topic=nvz&layerGroups=default&lang=e&ep=map&scale=4&x=526275.8125&y=366100.8125#x=514965&y=373840&lg=1.&scale=4>

⁴ Joint Lincolnshire Flood Risk and Drainage Management Strategy: Appendix 4 – Updated Environmental Baseline Information

⁵ Andersons (2011) Future of Food and Farming in Lincolnshire

⁶ <http://www.metoffice.gov.uk/climate/uk/ee/print.html>

⁷ Andersons (2011) Future of Food and Farming in Lincolnshire

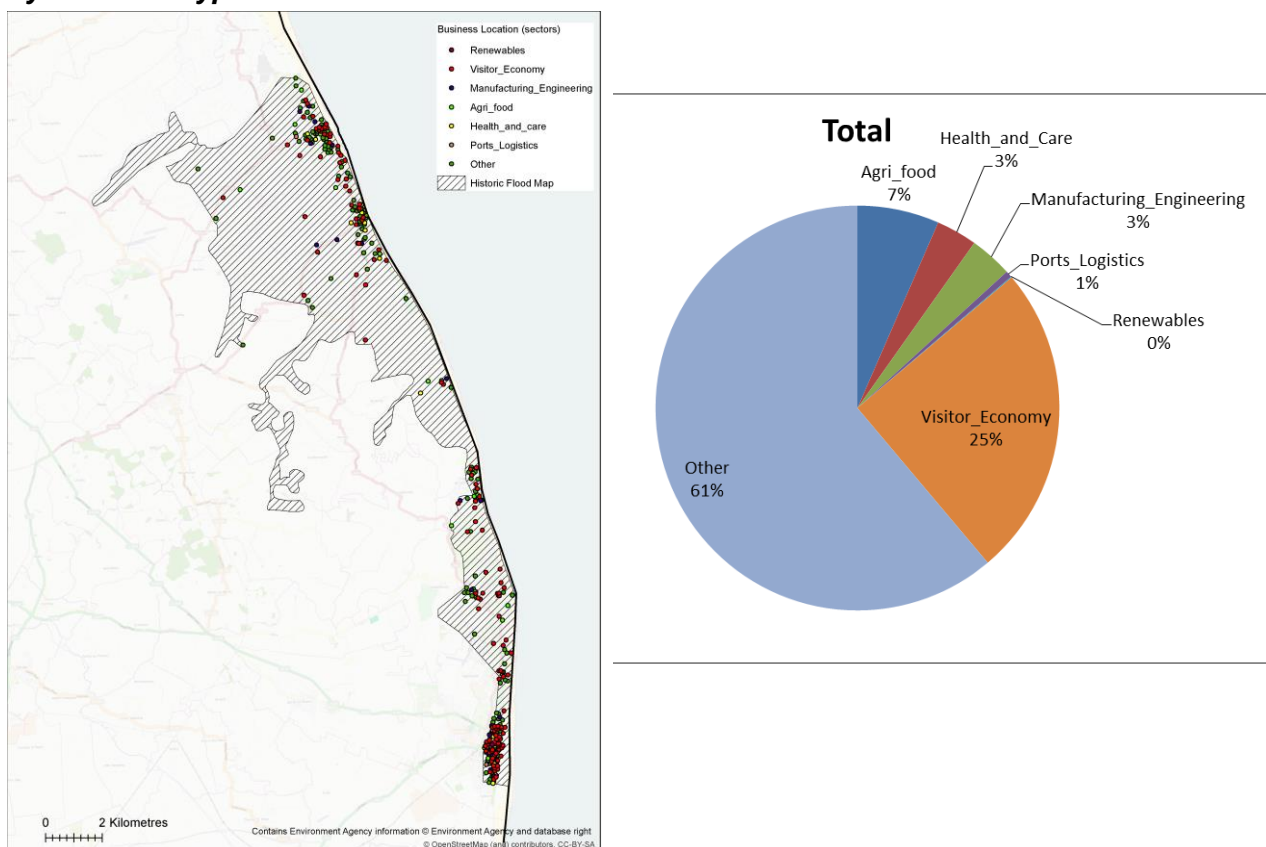
From 2003 and 2013 reservoir levels have not been full and at times have dropped to below 70% with most summers being below 90% full. Considering the 30% decrease in summer precipitation that is expected by 2040, future investment will be needed to ensure reservoir levels remain high enough to support abstraction without negatively impacting on the environment.

Approach

A targeted literature review identified the pressures on water management across flooding, water quality, water availability, and identified the key growth sectors in the region. Based on this literature review and working with stakeholders the major projects proposed to address these and the potential funding gaps were identified.

An analysis of beneficiaries was undertaken to identify businesses and wider stakeholders that would benefit from the proposed projects. Through a geographic information systems (GIS) mapping exercise the properties that would benefit from new schemes were then identified (Figure 2). The major schemes were then analysed in terms of job creation and the wider costs and benefits. Additionally partnership funding options and alternative funding streams have also been identified.

Figure 2 a) Businesses benefiting from Lincshore beach nourishing; b) beneficiaries by business type



Projects to fund

Following the literature review and discussions with the Water Management Task and Finish Group members a range of schemes were identified for business case analysis. The main schemes identified and a summary of the costs and benefits is provided below (full details in the main report):

Project type	Projects	Total Cost	Growth fund contribution	Appraisal period (years)	PV Benefits to business	NPV (Business benefit - Growth Fund Investment)	Business benefit per £ Growth Fund Investment
FCERM	Lincshire Beach Nourishment Scheme (2015-2020) (Coastal)	£28,400,000	£11,200,000	10	£38,209,226	£27,009,226	3.4
	Horncastle (Fluvial and Surface water)	£7,000,000	TBC	100	£19,932,157	TBC	TBC
	Witham catchment (Fluvial and WFD)	£10,000,000	TBC	100	unknown	unknown	unknown
	Boston (Fluvial and Tidal)	£90,200,000	£2,000,000	100	£6,611,616	£4,611,616	3.3
	Ancholme Valley Improvements (Fluvial)	£5,000,000	Up to £5m	100	£64,464,972	£59,464,972	12.9
Non-FCERM capital investment	Fens Waterways Link Opportunities study (WFD/Waterways)	£150,000	£150,000	10	Could lead to £60m of PV benefits on implementation	Could lead to £60m of PV net benefits on implementation	n/a
	Ecosystem Services in the Fens study (WFD)	£100,000	£150,000	10			
	Spalding Waterspace Study Implementation (WFD/Waterways)	£1,200,000	£1,200,000	10			
	Water for wildlife and farming in the Fens (WFD)	£150,000	£150,000	10			
Non-capital	Fens Integrated Access Plan (Tourism)	£560,000	£560,000	10			
	Destination Fens (Tourism)	£50,000	£50,000	10	£11,750,126	£9,690,126	5.7
	TOTAL	£142,810,000	£20,460,000		£140,968,097	£120,508,097	6.9

This study suggests that a £20.5m Growth Fund contribution to 11 environmental infrastructure projects in Greater Lincolnshire could unlock approximately 5,440 FTE jobs in total. This equates to just £3,750 of Growth Fund monies per job. In terms of the benefits to business, this investment could unlock over £120m over 100 years (largely to the visitor-economy sector) which approximates to £7 of business benefits for every £1 contributed.

Conclusions

Extreme weather events are a significant risk to businesses as they can restrict operations. Extreme weather events in Greater Lincolnshire can affect the UK as a whole if not managed appropriately. The ports of Immingham and Grimsby are the largest Ports in the UK by tonnage and East Anglia as a whole supplies around 1/8 of total UK food consumption.

The 2013 Business Continuity Management Survey by the Chartered Management Industry (CMI) asked businesses which disruptions would have a major impact on their business. This year 43% of businesses surveyed said extreme weather would have a significant effect on their business.

During and after a flood, affected businesses slow or shut down operations due to property inundation, the loss of access to site, IT and electricity. For the agricultural sector, this is often worst during harvest time, where a loss of produce has major impacts on a farmer's revenue. During severe flood warnings, particularly in the case of North Sea surges, anticipated ship loads will be rerouted or delayed due to the risks of stormy weather. During a flood, shipping loads cannot be transported where surrounding transport routes are inundated. In some events piers will be damaged, causing several weeks of disrupted production while engineers are consulted and repairs are made.

Meanwhile, water availability for summer spray irrigation of crops is becoming an increasing issue in the Fens. It is likely that a significant number of new winter storage reservoirs will be needed to meet current and future demand.

While there are risks, there are also significant opportunities. There are considerable business benefits from regenerated watersides. A more attractive or accessible site results in a more buoyant visitor economy, meanwhile access to nice water environments improve employee productivity and attracts new staff.

RICARDO-AEA

The Gemini Building
Fermi Avenue
Harwell
Didcot
Oxfordshire
OX11 0QR

Tel: 01235 75 3000
Web: www.ricardo-aea.com