Report of the Director of Places

Decision to be taken after:
5 November 2012

NORTH LINCOLNSHIRE COUNCIL

HIGHWAYS AND NEIGHBOURHOODS CABINET MEMBER

ADOPTION OF THE MUNICIPAL WASTE MANAGEMENT STRATEGY

1. OBJECT AND KEY ISSUES OF THE REPORT

1.1 To adopt a Municipal Waste Management Strategy (MWMS) for North Lincolnshire.

1.2 The key issues of the report are:

- The Cabinet Member approved a review of the existing draft MWMS in January of this year.
- A Sustainability Appraisal (SA) and Strategic Environmental Assessment (SEA) have also been completed and considered by Cabinet.
- Following consultation, a SEA Implementation document was drafted. It is appended to this report.
- The completed MWMS is now formally adopted and a copy uploaded onto the council website.

2. BACKGROUND INFORMATION

2.1 A draft MWMS for North Lincolnshire was produced in 2008. This followed the publication of the first National Waste Strategy for England. Significant stakeholder consultation was undertaken. The outcomes were incorporated into the document.

2.2 The draft strategy included an assessment of options for treating residual municipal waste. This is waste that cannot be reused, recycled or composted. New analytical tools for calculating the environmental impact of various waste treatment technologies have enabled an update of the original assessment.

2.3 The government undertook a Waste Review in 2011. As a result, we refreshed the draft MWMS taking into account the changed priorities both locally and nationally. These included:

- legislative changes relating to the Landfill Allowance Trading Scheme (LATS)
- the transposition of the European Framework Directive on Waste into UK law
- diminished growth in the volumes of household waste requiring treatment.

2.4 High recycling performance (51.8%) achieved in 2011/12 exceeded the original target set by the draft MWMS. Further, more challenging targets were required. Waste prevention strategies are also included in the refreshed document.

2.5 The process of refreshing the MWMS included the drafting of a Sustainability Appraisal (SA) report. Also a Strategic Environmental Assessment (SEA) report. Both documents are required by the SEA Regulations. These were commented upon by statutory consultees. These include the Environment Agency, English Heritage and English Nature.

2.6 A SEA Implementation report was drafted. This describes how responses received during consultation have been taken into account. Also how we intend to carry out monitoring during the implementation of the MWMS. This is appended. This document along with the MWMS, the SA and SEA documents now need publishing as part of the formal adoption of the Strategy.

3. OPTIONS FOR CONSIDERATION

3.1 Option 1: The refreshed MWMS for North Lincolnshire is adopted and published. This is the recommended option.

3.2 Option 2: The refreshed MWMS is not adopted.

4. ANALYSIS OF OPTIONS

4.1 The adoption and publication of the refreshed MWMS is necessary to inform our management of the 100,000 tonnes of municipal waste collected by the council each year. This is a statutory responsibility.

4.2 The strategy also helps in developing a long term solution for dealing with the residual waste that cannot be reused, recycled or composted. Failure to adopt the refreshed strategy may compromise the council's ability to complete this task.

5. RESOURCE IMPLICATIONS (FINANCIAL, STAFFING, PROPERTY, IT)

5.1 The evaluation of options for treating residual waste explored within the MWMS includes an assessment of the resource implications of each.

5.2 The approval of the recommendation in this report to publish and adopt the MWMS will have no specific resource implications.

6. OTHER IMPLICATIONS (STATUTORY, ENVIRONMENTAL, DIVERSITY, SECTION 17 - CRIME AND DISORDER, RISK AND OTHER)

6.1 The SEA Implementation report describes how environmental considerations are integrated into the MWMS. The SA and SEA reports were prompted by regulations.

7. OUTCOMES OF CONSULTATION

7.1 Extensive resident consultation was a feature of the original draft MWMS. The comments of the statutory consultees in relation to the SA and SEA documents were incorporated within the final MWMS document where necessary.

7.2 A final draft of the MWMS document was uploaded onto the council's website for information, only two comments were forthcoming. Neither of these required a response. Copies of the documents were also deposited in the respective offices of the two main political parties at the Civic Centre. No comments were received.

8. RECOMMENDATIONS

8.1 That the refreshed Municipal Waste Management Strategy is formally adopted and published.

DIRECTOR OF PLACES

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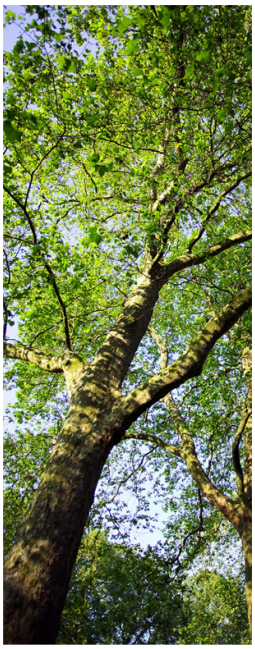
Date: 3 September 2012

Background Papers used in the preparation of this report
Waste Review 2011


Municipal Waste Management Strategy

SA/SEA Environmental Report

03 September 2012
North Lincolnshire Council

Mott MacDonald

Municipal Waste Management Strategy

SA/SEA Environmental Report

03 September 2012

North Lincolnshire Council

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Issue and revision record

Revision	Date	Originator	Checker	Approver	Description
A	07.06.12	D. Elphick H. Dick	Kevin Leather	D. Dray	Draft for Issue
B	03.09.12	D. Elphick H. Dick	D. Dray	S. Martin	Final version, revised post-consultation for formal adoption by the Council

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Content

Abbreviations

AD	Anaerobic Digestion
AQMA	Air Quality Management Area
ATT	Advanced Thermal Treatment
BAP	Biodiversity Action Plan
BEO	Best Environmental Option
BPEO	Best Practicable Environmental Option
CA	Civic Amenity
CAMS	Catchment Abstraction Management Strategy
CEEQUAL	Civil Engineering Environmental Quality Assessment & Awards Scheme
CH4	Methane
CFMP	Catchment Flood Management Plan
CO2	Carbon dioxide
DCLG	Department of Communities and Local Government
DEFRA	Department for Environment, Food and Rural Affairs
DPD	Development Plan Document
EA	Environment Agency
EfW	Energy from Waste
EOA	Environmental Option Assessment
EIA	Environmental Impact Assessment
GWP	Global warming potential
HRC/HWRC	Household Recycling Centre/ Household Waste Recycling Centre
IED	Industrial Emission Directive
IVC	In-Vessel Composting
JSNA	Joint Strategy Needs Assessment
LAQM	Local Air Quality Management
LDF	Local Development Framework
MBT	Mechanical Biological Treatment
MHT	Mechanical Heat Treatment
MSW	Municipal Solid Waste
NIA	Nature Improvement Area
NLC	North Lincolnshire Council
NO2	Nitrogen dioxide
NOx	Nitrous oxide
NPPF	National Planning Policy Framework
OJEU	Official Journal of the European

ONS	Office for National Statistics
PET	Polyethylene terephthalate
PM	Particulate Matter
PPS	Planning Policy Statement
RSS	Regional Spatial Strategy
SA	Sustainability Appraisal
SAC	Special Area of Conservation
SEA	Strategic Environmental Assessment
SOx	Sulphur oxides
SM	Scheduled Monument
SPA	Special Protection Area
SSSI	Site of Special Scientific Interest
WID	Waste Incineration Directive
WRATE	Waste and Resources Assessment Tool for the Environment

Glossary

Anaerobic Digestion (AD)	Anaerobic Digestion is a complex biochemical process for the treatment of biodegradable waste which takes place in a vessel in the absence of oxygen and results mainly in the formation of a carbon dioxide and methane gas mixture known as "Biogas", used to provide electrical power generation and heat, and a solid (digestate) and liquid residue.
Advanced Thermal Treatment	A type of Energy from Waste treatment. Is the process of creating energy in the form of electricity and/or heat from the thermal degradation of waste materials through advanced conversion, which heats the waste in an oxygen starved environment to produce a syngas which can be combusted. Examples are gasification and pyrolysis.
Autoclave/ Mechanical Heat Treatment	This uses heat, steam and pressure to process waste. Waste autoclaves process waste either in batches or in continuous-flow processes. Can provide very clean recyclable materials.
Baseline	A description of the present and future state of an area, in the absence of any development, taking into account changes resulting from natural events and from other human activities.
Consultation Body	An authority which because of its environmental responsibilities is likely to be concerned by the effects of implementing plans and programmes and must be consulted under the SEA Directive. The Consultation Bodies designated in the SEA Regulations are Natural England, English Heritage and the Environment Agency.
Climate Change Adaptation	Involves adjustments to natural or human systems in response to actual or expected climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities.
Climate Change Mitigation	Involves taking action to reduce the impact of human activity on the climate system, primarily through reducing greenhouse gas emissions.
Energy from Waste (EfW)	EfW is the process of creating energy in the form of electricity and/or heat from the thermal degradation of waste materials. This can include either a traditional combustion of the waste in air or advanced conversion, which heats the waste in an oxygen starved environment to produce a syngas which can be combusted.
National Planning Policy Framework (NPPF)	Published in March 2012, this consolidated all policy statements, circulars and guidance documents into a single document. Technical Guidance document has also been produced, although guidance on waste management facilities has not yet been published.
Indicator	A measure of variables over time, often used to measure achievement of objectives.
In-Vessel Composting (IVC)	In-vessel composting embraces a variety of techniques whereby the organic wastes may be composted in an enclosed vessel or tunnel. The advantage of these processes is that they are more controlled than open windrow composting and can be designed to achieve specified temperatures to facilitate pathogen destruction.
Local Development	Sets out, in the form of a ‘portfolio’, the Local Development Documents

Framework (LDF)	which collectively deliver the spatial planning strategy for the area in question. The LDF also includes the Statement of Community Involvement, the Local Development Scheme and the Annual Monitoring Report.
Mechanical Biological Treatment (MBT)	A mechanical biological treatment system is a type of waste processing facility that combines a sorting facility, which often separate recyclates and/or produce a refuse derived fuel, with a form of biological treatment such as composting or anaerobic digestion.
Mitigation Measures	Refers to measures to avoid, reduce or offset significant adverse effects.
Objective	A statement of what is intended, specifying the desired direction of change in trends.
Scoping	The process of deciding the scope and level of detail of an Sustainability Assessment (SA), including the sustainability effects and options which need to be considered, the assessment methods to be used, and the structure and contents of the SA Report.
Strategic Environmental Assessment (SEA)	Generic term used internationally to describe environmental assessment as applied to policies, plans and programmes. In this report, 'SEA' is used to refer to the type of environmental assessment required under the SEA Directive.
SEA Directive	European Directive 2001/42/EC 'on the assessment of the effects of certain plans and programmes on the environment'. Transposed into UK law via The Environmental Assessment of Plans and Programmes Regulations 2004.
Sustainability Appraisal	Generic term used in this report to describe the form of assessment that considers environmental, social and economic effects. However, for this report it is not the formal process associated with the Planning and Compulsory Purchase Act 2004.
Sustainability Appraisal Framework	This is the objectives and criteria developed for the project.
Sustainability Objectives	These are specific objectives that have been developed for this project. They are also part of the SA Framework, against which the project objectives and design have been tested for the purposes of this SA.
WRATE	WRATE stands for "Waste and Resources Assessment Tool for the Environment" and is the Environment Agency's Life-Cycle Analysis tool for measuring the impact on the environment of waste management systems. It consists of an extensive database of processes, materials, receptacles and vehicles which can be pieced together using a graphic interface to build up a model of the waste management system.

Non Technical Summary

Introduction

Mott MacDonald was commissioned by North Lincolnshire Council to undertake an integrated Sustainability Appraisal (SA) and Strategic Environmental Assessment (SEA) of the North Lincolnshire Municipal Waste Management Strategy (MWMS). The two documents have been developed in parallel with each other, with the process of integrating the two starting at an early stage in the development of the final MWMS.

The two documents should therefore be read together, and the MWMS document is included as Appendix E of this document.

The MWMS document has been developed from the Draft MWMS which was produced in 2008. The changes in the SEA Directive requirements since then have been incorporated into the new strategy .New data regarding the waste management market and new tools for the assessment of waste management technologies such as WRATE have been used in the development of the strategy.

This has been used to inform the assessment process for the development of the preferred options. The whole process together with the Action Plans that are a part of the MWMS have been used as the basis of the SEA/SA assessment.

Throughout the process the key stakeholders have been consulted, these include the statutory consultees together with the Council's technical teams and the broader stakeholder base which includes the elected members, and a number of consultations over a considerable p[period of time with the residents of North Lincolnshire Council. In this way the strategy has been developed to ensure the 'buy-in' of the Council and its stakeholder base.

The SA/SEA has been undertaken which followed the requirements of the European Union Directive 2001/42/EC, commonly known as the SEA Directive and resulting Regulations.

The North Lincolnshire MWMS SEA Scoping Report was sent out for formal consultation in April 2012 to the three statutory consultees (the Environment Agency, Natural England and English Heritage). Comments received have been taken into consideration in preparation of the SA Report and the MWMS.

Municipal Waste Management Strategy Context

The MWMS document that this document assesses was developed from a draft document produced in 2008. Within this is an environmental options appraisal based upon guidelines for best practicable options assessment. Within this are the key environmental topics and indicators specified by the SEA directive. These have been assessed using

Scoping Results

The scoping process identified the relevant plans and programmes at International, National, Regional and Local level and their implications for the SA/SEA and MWMS. Scoping has also set the environmental, social and economic baseline context the MWMS area, and identified key sustainability challenges and opportunities.

An SA/SEA Framework consisting of sustainability objectives and indicators was developed for the North Lincolnshire MWMS SA/SEA. The sustainability objectives were produced by Mott MacDonald and North Lincolnshire Council. They are based on the SEA Directive topics, the North Lincolnshire LDF Initial Sustainability Appraisal Objectives and the North Lincolnshire Municipal Waste Management objectives. The MWMS objectives are;

- To develop a more sustainable system of waste management, promoting waste prevention in the first instance, encouraging re-use and recycling, and minimising the quantity of waste disposed of without recovering value from it;
- To ensure that “Value for Money” principles are applied, and to secure an economic, efficient and effective waste management service;
- To meet the challenging targets set by Government to recover value from waste and to move towards a ‘zero waste’ system by 2020.
- To meet the Council’s need to reduce its carbon footprint.
- To work in partnership with others in the provision of the service, including government, other local authorities, private and community sectors; and
- To meet the increasing expectations of residents, and to seek to engage the wider community via the Council’s Strategic Partnership arrangements.

Assessment Results

North Lincolnshire Council took a number of factors into account when determining the preferred strategic option for the MWMS. These include the SA/SEA, policy fit, funding

availability and contribution to the overarching priorities of North Lincolnshire Council and its partners. The preferred options for residual waste treatment, organic waste treatment and recycling have been developed taking into account the needs of the residual waste management service, the organic waste management service and the recycling service offered by the council. The environmental impact of each of these has been assessed individually and as a whole in developing the strategy.

This has been done by integrating the SEA/SA methodology with the Environmental Options Appraisal of the MWMS document. Each option has been scored against a weighted matrix which evaluated the SEA objectives against a range of data including the baseline dataset available, and outlined within this document. Together with detailed studies using mass flow modelling, cost modelling and WRATE analysis to further inform the scoring process, the preferred options which were the result of the EOA appraisal (and the subsequent action plan) have been evaluated using the methodology presented in this document.

Conclusions and Recommendations

As the SA/SEA process has been integrated into the process of developing the strategy from an early stage, and the methodology employed for evaluating the overall environmental impact incorporated into the Environmental Options Appraisal process, the preferred options developed have been developed upon a Best Environmental Option (BEO) basis.

The preferred options, therefore, have been designed to mitigate the main impacts of the waste management system. The improvement in overall performance has been shown on the studies compared with the chosen baseline (based upon the landfill of materials) within this document and the MWMS document.

The studies conducted have provided an evidence base which can provide an empirical basis for the evaluation of many of the impacts of the MWMS. The two documents together can provide a means of bench-marking that can be employed in the future through the updating of the WRATE studies, for instance, and the monitoring of the impact on the indicators developed in the monitoring section of this document.

The results of the SEA/SA evaluation show that the implementation of the action plan developed in the MWMS will have a major impact on the improvement of the overall performance of the council's waste management activities. This will be through;

- the diversion of large quantities of residual waste from landfill
- the use of the residual waste stream as a potential source of energy, a proportion of which will be renewable

- improvements in the recycling system including improvements to the network of Household Recycling Centres (HRCs)
- Diversion of organic waste form landfill through the development of the kerbside collection system for household organic wastes, and their treatment in a dedicated facility.
- The organic waste treatment facility will employ anaerobic digestion as the preferred technology. This will generate renewable energy in the form of a biogas which can; produce heat and electricity, be injected into the gas grid, or provide a fuel for the council's fleet of vehicles potentially

The greatest improvement in environmental impact will be realised in the improvement in greenhouse gas emissions, and the reduced impact on resource depletion. There will also be potential opportunities for employment, and a reduction in waste related incidents of fly tipping and other waste related offences.

With respect to the impact on land resources the strategy will mitigate against the impacts associated with the landfill of waste materials, including a reduction in landtake and the management of contaminated land.

There may be some negative impacts on indicators such as the emission of certain categories of greenhouse gases and other chemicals; the negative impact is small, particularly when compared to the overall gains in the use of resources and the reduction in carbon emissions. It is likely that further mitigations against these may be available through the lifespan of the project with advances in technology.

Where possible negative impacts have been identified, such as with the location of facilities, which can result on negative impacts on heritage assets for instance, these have been mitigated through the use of a) the preferred options identified in the EOA studies within the MWMS and b) the employment of conditions within the planning process which will mitigate the impacts. Chiefly this includes the use of brown field development land and other suitable sites identified in the draft waste and minerals plan and also identified in documents such as the regional spatial strategy (RSS) documents, although these have no statutory basis now as such. They do, however, provide an evidence base for future decision making.

Another means of reducing the impact of the MWMS implementation is through the use of the procurement process.

By including mitigation and enhancement measures within the contract requirements and the evaluation of submissions, the award of the contracts for managing the council's

waste can be integrated into the development of the contractor's solutions to ensure a high standard of environmental performance.

Many of the impacts to the environment as a whole are controlled through statutory measures such as the licensing and permitting of facilities and the monitoring of emissions, the monitoring of habitat loss, waste generation, resource use and the disturbance to heritage assets.

In addition to these safeguards, which are intrinsic to the implementation of the strategy, a number of mitigation and enhancement measures have suggested as a result of the assessment. The measures that are suggested within this document should be should be taken forward when the Action Plan outlined in the MWMS is implemented.

Monitoring the significant sustainability effects of implementing the MWMS is an essential ongoing element of the SA/SEA process. Monitoring ensures that the identified SA/SEA objectives are being achieved, allows early identification of unforeseen adverse effects and thus appropriate remedial action can be taken. Monitoring will be an important requirement to measure performance and ensure the MWMS is being successfully implemented. Monitoring proposals have been developed based in the SA/SEA indicators and focus on predicted significant affects.

Many of the indicators such as the impact on greenhouse gas emissions, resource depletion, the impact on air and water from the processes employed together with the toxicological effect on the aquatic environment and human health can be measured and monitored through the use of the WRATE lifecycle analysis tool. These studies can build upon those undertaken during the development of the strategy's Environmental Options Appraisal.

1. Introduction

1.1 Terms of Reference

Mott MacDonald was commissioned by North Lincolnshire Council to undertake an integrated Sustainability Appraisal (SA) and Strategic Environmental Assessment (SEA) of the North Lincolnshire Municipal Waste Management Strategy (MWMS).

The SA/SEA was undertaken in accordance with the requirements of the European Union Directive 2001/42/EC, commonly known as the SEA Directive and resulting Regulations.

The report should be read in conjunction with the North Lincolnshire MWMS Document (Appendix E).

The SA Report is being sent to a number of organisations to obtain their views, including the Environment Agency, Natural England, English Heritage, other key stakeholders and the public. The views of all of these have been incorporated into the final version of this document.

1.2 Purpose of SA/SEA and the SA Report

This SA Report is required as an output of the appraisal process by Article 5(1) of the SEA Directive'. The report presents information on the effects of the MWMS, which forms the basis for the formal consultation. This report also includes the results of the feedback from statutory consultees regarding the SEA scoping report submitted in April 2012 (Appendix A) and the studies conducted in the development of the MWMS.

1.3 Structure and Components that make up the SA Report

1.3.1 Structure of the SA Report

The SA Report has been structured into the following Chapters:

- Chapter 1: Introduction – sets out the terms of reference for the project, purpose of the SA/SEA, components in the SA Report that are required by the SEA Directive and any limitations of the SA/SEA;
- Chapter 2: Approach to the SA/SEA – details the legislative requirements for SA and SEA, the project team and timetable, the methodology used and scoping consultation results;
- Chapter 3: MWMS Context – presents information about the context and process of the MWMS, and its objectives and priorities;
- Chapter 4: Stage A Scoping Results – presents information from the Scoping Report including the review of plans and programmes, baseline information, evolution of the baseline, key challenges and opportunities, and the SA/SEA Framework;
- Chapter 5: Development and Appraisal of the MWMS options – details the strategic options considered for MWMS, an assessment of the options, and the preferred options for each service type;
- Chapter 6: Appraisal of the MWMS – presents the results of the assessment of the MWMS, the assessment workshop methodology, and any assumptions, risk or uncertainties encountered in the assessment;
- Chapter 7: SA/SEA Mitigation and Enhancement – details the mitigation and enhancement measures proposed for the MWMS as a result of the assessment;
- Chapter 8: Conclusions and Recommendations – provides an overall conclusions to the SA/SEA, and sets out recommendations to be taken forward into the MWMS;

- Chapter 9: Implementation and Monitoring – describes the implementation of the MWMS in relation to other plans and the project level, and sets out proposals for monitoring the effects of implementing the MWMS.

1.3.2 Components that make up the SA Report

This SA Report incorporates the requirements for an Environmental Report as required by the SEA Directive. Table 1.1 indicates where specific requirements of the Strategic Environmental Assessment (SEA) Directive can be found within this report.

Table 1.1: SEA Directive Requirements Checklist

Environmental Report Requirements		Section of the Report
a.	an outline of the contents, main objectives of the plan or programme and relationship with other relevant plans and programmes;	Chapter 3
b.	the relevant aspects of the current state of the environment and the likely evolution thereof without implementation of the plan or programme;	Chapter 4, Section 4.2 and 4.3
c.	the environmental characteristics of areas likely to be significantly affected;	Chapter 4, Section 4.3
d.	any existing environmental problems which are relevant to the plan or programme including, in particular, those relating to any areas of a particular environmental importance, such as areas designated pursuant to Directives 79/409/EEC and 92/43/EEC;	Chapter 4, Section 4.2
e.	the environmental protection objectives, established at international, Community or Member State level, which are relevant to the plan or programme and the way those objectives and any environmental considerations have been taken into account during its preparation;	Chapter 4, Section 4.1 and Appendix B
f.	the likely significant effects on the environment, including on issues such as biodiversity, population, human health, fauna, flora, soil, water, air, climatic factors, material assets, cultural heritage including architectural and archaeological heritage, landscape and the interrelationship between the above factors;	Chapter 6 and Appendix C
g.	the measures envisaged to prevent, reduce and as fully as possible offset any significant adverse effects on the environment of implementing the plan or programme;	Chapter 7
h.	an outline of the reasons for selecting the alternatives dealt with, and a description of how the assessment was undertaken including any difficulties (such as technical deficiencies or lack of know-how) encountered in compiling the required information;	Chapter 5 and Chapter 6
i.	a description of the measures envisaged concerning monitoring in accordance with Article 10;	Chapter 9
j.	a non-technical summary of the information provided under the above headings.	Prior to Chapter 1 Introduction

1.4 Limitations of the SA/SEA

North Lincolnshire Council and Mott MacDonald have relied on published data and information provided by North Lincolnshire Council and other organisations in the production of this SA/SEA Report. The compiled baseline data has been used to provide a 'snapshot' of current key issues associated with the MWMS.

A number of specialists, who were not previously involved in the development of the MWMS, have been involved with the production of this SA/SEA Report and more specifically in the appraisal of the alternatives to ensure that an independent view has been provided.

2. Approach to the SA/SEA

2.1 Strategic Environmental Assessment Legislative Requirements

An SEA is required for the North Lincolnshire MWMS under the European Union Directive 2001/42/EC, more commonly known as the SEA Directive. The Directive was transposed into UK law via the Environmental Assessment of Plans and Programmes Regulations 2004. This requires an assessment of the effects of certain plans and programmes on the environment.

Some of the key objectives of the SEA process are: to provide for a high level of protection of the environment and to contribute to the integration of environmental considerations. These will be included in the preparation and adoption of plans with a view to promoting sustainable development. The SEA also works to inform the decision-making process through the identification and assessment of the significant and cumulative effects a plan or programme will have on the environment at the strategic level and to enable consultation on the potential effects with a wide range of stakeholders.

2.2 Sustainability Appraisal Legislative Requirements

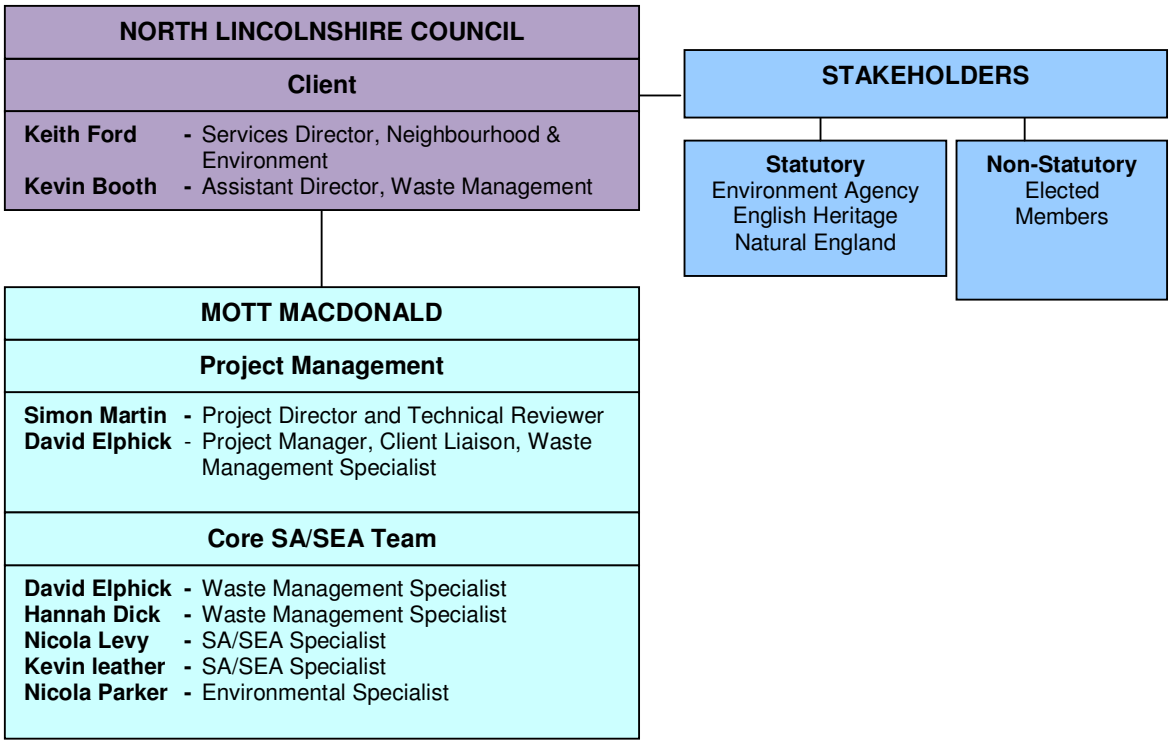
In addition to the SEA Directive, the Planning and Compulsory Purchase Act 2004 has introduced a wider requirement for a SA to be undertaken for a range of planning policy documents.

SA is a generic term used to describe the form of assessment that considers the social, environmental and economic effects of implementing a particular planning policy document. It is considered by the UK Government that the implementation of the SA process helps local planning authorities to fulfil the objective of contributing to the achievement of sustainable development when preparing their plans.

2.3 SA/SEA Project Team

The SA/SEA project team for the North Lincolnshire MWMS consists of waste and recycling officers from North Lincolnshire Council and sustainability specialists and environmental planning consultants from Mott MacDonald. It was felt that it is important in the sustainability appraisal process to include both people who are involved in the production and development of the MWMS as well as consultants, who can contribute a more independent view to the sustainability appraisal exercise.

Figure 2.1: SA/SEA Team Organogram



2.4 North Lincolnshire Municipal Waste Management Strategy SA/SEA Timetable

Table 2.1 below establishes who carried out/will carry out each stage of the SA/SEA process. It also incorporates the SA/SEA and MWMS process timetables into an integrated programme.

Table 2.1: North Lincolnshire MWMS SA/SEA Timetable

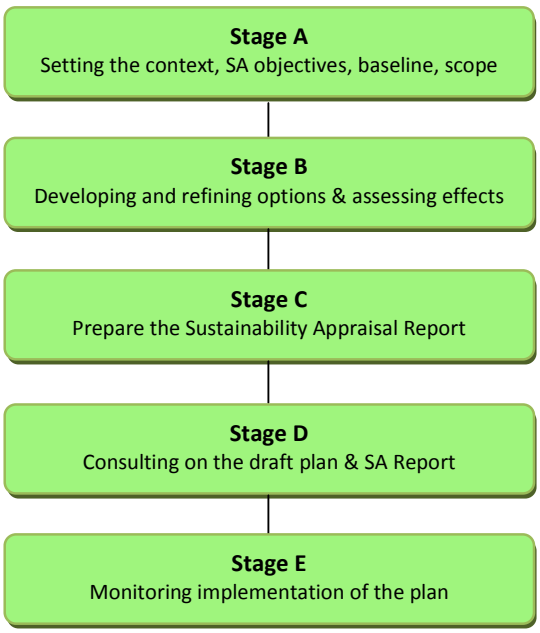
MWMS Process	Sustainability Appraisal Stage	Who carried / will carry this out	When
Evidence Gathering	**A: Setting the context and objectives, establishing the baseline and deciding on the scope**		
	A1: Identifying other relevant plans, programmes, and sustainability objectives	MM Consultancy Team with input from North Lincolnshire Council	Jan/Feb 2012
	A2: Collecting baseline information	MM Consultancy Team with input from North Lincolnshire	Jan/Feb 2012

MWMS Process	Sustainability Appraisal Stage	Who carried / will carry this out	When
		Council	
	A3: Identifying sustainability issues and problems	MM Consultancy Team with input from North Lincolnshire Council	Jan/Feb 2012
	A4: Developing the SA/SEA Framework	MM Consultancy Team with input from North Lincolnshire Council	Jan/Feb 2012
	A5: Consulting on the scope of the SA/SEA	North Lincolnshire Council / MM Consultancy Team	Feb/ March 2012
Preparation of draft MWMS	**Stage B: Developing and refining options and assessing effects**		
	B1: Testing the MWMS objectives against the SA/SEA Framework	MM Consultancy Team with input from North Lincolnshire Council	March 2012
	B2: Developing the MWMS Options	North Lincolnshire Council / MM Consultancy Team	March 2012
	B3: Predicting the effects of the draft MWMS	MM Consultancy Team/ North Lincolnshire Council	March 2012
	B4: Evaluating the effects of the draft MWMS	MM Consultancy Team/ North Lincolnshire Council	March 2012
	B5: Considering ways of mitigating adverse effects and maximising beneficial effects	MM Consultancy Team with input from North Lincolnshire Council	March 2012
	B6: Proposing measures to monitor the significant effects of implementing the MWMS	MM Consultancy Team with input from North Lincolnshire Council	March 2012
	Stage C: Preparing the SA Report		
	C1:Preparing the SA Report	MM Consultancy Team with input from North Lincolnshire Council	May/ June 2012
Public participation on draft MWMS	**Stage D: Consulting on the draft MWMS and SA Report**		
	D1: Consultation on the draft MWMS and SA Report	North Lincolnshire Council / MM Consultancy Team	June 2012
Representations and finalise MWMS	D2: Appraising significant changes	MM Consultancy Team with input from North Lincolnshire Council	June 2012
Adoption	D3: Making decisions and providing information	MM Consultancy Team with input from North Lincolnshire Council	July 2012
Implementing, monitoring and review	**Stage E: Monitoring the significant effects of implementing the MWMS**		
	E1: Finalising aims and methods for monitoring	North Lincolnshire Council	TBC
	E2: Responding to adverse effects	North Lincolnshire Council	TBC

2.5 SA/SEA Methodology

The SEA was carried out in accordance with the DCLG Guidance 'A Practical Guide to the Strategic Environmental Assessment Directive' (September 2005) and will meet the requirements of the SEA Directive (and resulting SEA Regulations). This process is set out below.

Figure 2.2: SA/SEA Process



2.6 Scoping Consultation Results

The North Lincolnshire MWMS Scoping Report was sent out for formal consultation in April 2012 to the three designated bodies with environmental responsibilities, as stated in the DCLG Guidance – the Environment Agency, Natural England and English Heritage. Comments were received from each of the consultees, and have been taken into consideration in preparation of the SA Report and the MWMS. The comments received have been recorded in Appendix A.

3. Municipal Waste Management Strategy Context

3.1 Municipal Waste Management Strategy Process

A draft of the current North Lincolnshire MWMS was developed in 2008. This included an environmental options appraisal based on the relevant SEA legislation of the time. The final version of this MWMS to be adopted is intended to finalise and update this document, and covers the period until 2026.

The MWMS has been assessed using tools, SEA guidance and information that were not available to the Council in 2008 and has completed the process of assessing the options available for residual waste treatment. Since then, the Council has conducted procurement projects for residual, organic and recycling collection services. This means that there is a much greater knowledge base from which to assess the options as studies have been conducted on key topics such as: the costs of the various waste treatment technologies and their 'pitfalls', the markets for the output, and a range of other technical, legal and financial issues, all of which have been studied in depth during the last four years.

New tools that were not available in 2008, such as the Environment Agency's Waste and Resources Assessment Tool for the Environment (WRATE) life-cycle analysis tool, have been used in this strategy to assess the options available much more accurately than had been the case previously. The MWMS presents a detailed assessment of the options available using the life-cycle methodology, and this, together with a range of other decision-making tools, has informed the Council on which options to follow in the short, medium and long-term.

An Environmental Options Appraisal (EOA) was carried out, which was based on the latest guidelines for Sustainable Environmental Assessments (SEA), so that all of the key Environmental, Socio-Economic and Technical factors have been included in the appraisal. Therefore, the Council is confident that the Strategy meets the sustainability needs of the wider community and minimises all associated impacts.

The objectives of the MWMS are as follows:

- To develop a more sustainable system of waste management, promoting waste prevention in the first instance, encouraging re-use and recycling, and minimising the quantity of waste disposed of without recovering value from it;
- To ensure that "Value for Money" principles are applied, and to secure an economic, efficient and effective waste management service;
- To meet the challenging targets set by Government to recover value from waste and to move towards a 'zero waste' system by 2020.
- To meet the Council's need to reduce its carbon footprint.
- To work in partnership with others in the provision of the service, including government, other local authorities, private and community sectors; and
- To meet the increasing expectations of residents, and to seek to engage the wider community via the Council's Strategic Partnership arrangements.

3.2 Municipal Waste Management Strategy Objectives

The objectives of North Lincolnshire's MWMS have been developed over a number of years through a continuous process involving consultation with the Public and the Council's Members and Officers. They have been updated to reflect the changing demands on waste management system, and are:

- To develop a more sustainable system of waste management, promoting waste prevention in the first instance, encouraging re-use and recycling, and minimising the quantity of waste disposed of without recovering value from it;
- To ensure that "Value for Money" principles are applied, and to secure an economic, efficient and effective waste management service;
- To meet the challenging targets set by Government to recover value from waste and to move towards a 'zero waste' system by 2020.
- To meet the Council's need to reduce its carbon footprint.
- To work in partnership with others in the provision of the service, including government, other local authorities, private and community sectors; and
- To meet the increasing expectations of residents, and to seek to engage the wider community via the Council's Strategic Partnership arrangements.

3.2.1 Preferred Options

The preferred options developed in the MWMS for residual waste treatment are;
- MBT
- Advanced Thermal treatment
- Energy from Waste

All of these should be based locally to minimise transport impacts and gain other benefits such as employment opportunities. Proposals based outside of the county have been assessed and eliminated on the basis of their poor environmental performance. This has been partially due to the relative weightings of the assessment criteria which have been developed as a part of the SEA/SA process

These have been assessed against a 'long list' using the methodology outlined in Section 5.2.1 using the full EOA methodology. The preferred options for Recycling and Organic waste treatment are;
- Enhanced Recyclables Collection, including the collection of food wastes from the kerbside
- Anaerobic Digestion preferably using a 'wet' digestion process.

These have been identified using WRATE analysis and other studies of the limited number of practical options available. These have been assessed as providing the greatest reduction in greenhouse gas emissions, the greatest utilisation of resources, and also the potential to generate renewable electricity from food wastes.

4. Stage A - Scoping Results

4.1 Relationship with other Policies, Plans and Programmes

4.1.1 Introduction

The key International, National, Regional and Local policy documents relating to the North Lincolnshire Municipal Waste Strategy have been reviewed and their implications for the SEA have been assessed, in order to comply with Annex 1(a) of the SEA Directive and Task A1 of the DCLG Guidance. The findings are detailed in a Policy Register in the SEA/SA Scoping Report. The documents reviewed are provided below. The SEA/SA Scoping Report that was issued to the statutory consultees in April 2012 contains more detail with regard to the policies.

Table 4.1: Plan and programme review

Pertinent Plan/Policy and Legislation
International
Waste Framework Directive (75/442/EEC)
Landfill Directive (1999/31/EEC)
Air Quality Directive (2008/50/EEC
EC Water Framework Directive (2000/60/EEC)
EU Industrial Emissions Directive (2010/75/EU)
Directive on the incineration of waste (2000/76/EC)
National
Natural Environment White Paper (2011)
National Planning Policy Framework (2011)
Planning Policy Statement (PPS) 10: Planning for Sustainable Waste Management (2011)- still relevant until replaced in 2013
Climate Change Act (2008)
Waste Strategy for England (2007)
Government Review of Waste Policy in England (2011)
Waste (England and Wales) Regulations 2011
Environment Agency Groundwater Protection: Policy and Practice (GP3), Part 4- Legislation and Policies (particularly Part 4, solid waste management)
Sustainable Communities Plan – Sustainable Communities: Building for the Future (2003)
Regional
Regional Spatial Strategy for Yorkshire and Humber Regional Spatial Strategy (RSS) – adopted May 2008
Environmental report on the revocation of the Yorkshire and Humber Plan
Yorkshire and Humber Environmental Enhancement Strategy 2008 – 2013
Shoreline Management Plan 3: Flamborough Head to Gibraltar Point
River Basin Management Plan, Humber River Basin District (2009)
Lincolnshire Biodiversity Action Plan
Green Infrastructure Strategy
Grimsby and Ancholme Catchment Flood Management Plan (CFMP)

Pertinent Plan/Policy and Legislation
River Trent CFMP
Grimsby, Ancholme and Louth Catchment Abstraction Management Strategy (CAMS)
Lower Trent and Erewash CAMS
Idle and Torne CAMS
Water company resource management plans
Local
North Lincolnshire Core Strategy DPD (Adopted June 2011)
North Lincolnshire Local Plan (Adopted May 2003)
Supplementary Planning Guidance for Industrial Development (Adopted May 2003)
North Lincolnshire Strategic Plan 2009 – 2012 (Published May 2009)
Local Transport Plan 2011 to 2026
North Lincolnshire Council's Municipal Waste Strategy 2008 – 2025 (September 2008)
Sustainable Community Strategy 2006
North Lincolnshire Rights of Way Improvement Plan

4.1.2 Key environmental findings of review

4.1.2.1 Biodiversity and geodiversity

The North Lincolnshire MWMS and associated development of waste sites should aim to protect and wherever possible enhance the existing wildlife habitats and provide new areas for wildlife as opportunities arise. Through development of Brownfield sites for location of waste infrastructure this can assist to reduce the pressure of development on Greenfield sites in accordance with North Lincolnshire Core Strategy DPD (adopted 2011) and Yorkshire and Humber Environmental Enhancement Strategy 2008 – 2013.

4.1.2.2 Population and human health

The North Lincolnshire MWMS should aim to encourage action in the local communities to take pride in the area. Positive engagement should be encouraged between the Council and the local community to encourage behavioural change. This could result in the development of recycling and reuse initiatives, reduction in fly tipping of urban and rural areas and along road networks, and the protection of the natural environment. The engagement will take account of the Sustainable Community Strategy (2006).

Initiatives should also include difficult to manage wastes such as household hazardous materials that are generated and can include: asbestos, solvents, clinical wastes etc. to ensure appropriate handling and disposal procedures.

Encouraging pride in the local community could assist in reducing the amount of anti social behaviour/crime levels present in these urban areas. Measures should be implemented to make a step toward increasing the attractiveness of urban area with North Lincolnshire in accordance with Regional Spatial Strategy for Yorkshire and Humber (2008).

4.1.2.3 Land resources

The North Lincolnshire MWMS should aim to make the best of previously developed land in accordance with Supplementary Planning Guidance for Industrial Development (Adopted May 2003) and North Lincolnshire Core Strategy DPD (Adopted June 2011). In addition, the Strategy should promote increased levels of recycling within the communities involved and reduce the demand on natural resources. The North Lincolnshire MWMS will encourage waste management practice in accordance with PPS 10: Planning for Sustainable Waste Management (2011) and the Waste Strategy for England (2007).

4.1.2.4 Water and flood risk

The development of any new waste sites in accordance with the North Lincolnshire MWMS should be designed to withstand demands from climate change and flood risk in accordance with the NPPF and its technical guidance. The developments must be undertaken in line with relevant and recent Environment Agency guidance on the increasing intensity and frequency of storms and water level rise.

4.1.2.5 Air quality

The North Lincolnshire MWMS should maintain air quality at its current levels in accordance with the EC Directive on Air quality (2008), the NPPF, the Air Quality Strategy in England, Scotland, Wales and Northern Ireland: 2007 and the North Lincolnshire Local Transport Plan (2011 to 2026). There may be opportunities to improve air quality locally through increased recycling efforts, reducing the need for waste related transport movements and through lower emitting waste management options, in accordance with the measures outlined within the EU Directive on Industrial Emissions (2010).

4.1.2.6 Climate change

The impact on climate change will benefit from the underlying principle of the MWMS to reduce the amount of material disposed of waste to landfill.

Other considerations with respect to climate change include the use of sustainable energy sources and the consideration of energy efficiency during construction, implemented in accordance with the NPPF. In addition, the development of the waste sites should be designed to adapt to climate change (climate proofing), defences should be able to withstand the rising water levels, severe weather events and increase in flood events associated with climate change, in accordance with the Climate Change Act: 2008,

4.1.2.7 Material assets

The North Lincolnshire MWMS will seek to further minimise waste management costs and increase efficiencies through the entire lifecycle of the process. Where possible, the North Lincolnshire MWMS will seek to ensure that municipal solid waste is treated within the area of its origin in accordance with the Waste Framework Directive, PPS 10: Planning for Sustainable Waste Management (2011) and the Waste Strategy for England (2007). Any changes to these such as the revision of the MWMS for England in 2012 will be incorporated.

4.1.2.8 Conservation & Heritage

North Lincolnshire has a rich historic environment. The North Lincolnshire MWMS should aim to safeguard those elements which contribute to the significance of these assets in line with the NPPF. .

4.1.2.9 Landscape

The North Lincolnshire MWMS should seek to safeguard and enhance landscapes that contribute to the distinctive character of the Region and avoid loss of trees and of open space including greenspace, allotments, playing pitches and green corridors, wherever possible in accordance with the NPPF.

4.2 Baseline Conditions and Key Challenges and Opportunities

4.2.1 Introduction - Environmental, Social and Economic Conditions and Issues

This section presents the environmental, social and economic baseline conditions for North Lincolnshire split into topics. Under each topic is a description of the current baseline situation and key issues, constraints and opportunities for the MWMS. As required by the SEA Directive, Section 4.3 details the likely future evolution of the baseline without the implementation of any MWMS measures.

4.2.2 Biodiversity and geodiversity

North Lincolnshire contains a diverse range of ecological habitats, due in part to underlying geology and soils in the area and the influence of its location near to the Humber Estuary and river Humber.

The area contains habitats that have been afforded both national and international recognition and a summary of these is provided below.

There are approximately 29 Sites of Special Scientific Interest (SSSI) within the North Lincolnshire area, 2 Special Areas of Conservation (SAC) and 2 Special Protection Areas (SPA) (North Lincolnshire Core Strategy, 2011).

In addition to the above designations, the Humber Estuary is a designated Ramsar site. The estuary holds a diverse array of habitats (component of habitats of inter-tidal mudflats and sandflats and coastal salt marsh) and the associated saline lagoons, sand dunes and standing waters. The site is also of national importance for the geological interest at South Ferriby Cliff (Late Pleistocene sediments) and for the coastal geomorphology of Spurn.

The Humber Estuary site qualifies under **Article 4.1** of the Directive (79/409/EEC) by supporting populations of European importance of the following species listed on Annex I of the Directive: (www.jncc.defra.gov.uk)

During the breeding season

- Little Tern *Sterna albifrons*, 63 pairs representing at least 2.6% of the breeding population in Great Britain
- Marsh Harrier *Circus aeruginosus*, 11 pairs representing at least 6.9% of the breeding population in Great Britain (Count as at 1995)

Over winter

- Bar-tailed Godwit *Limosa lapponica*, 1,593 individuals representing at least 3.0% of the wintering population in Great Britain (5 year peak mean 1991/2 - 1995/6)
- Bittern *Botaurus stellaris*, 2 individuals representing at least 2.0% of the wintering population in Great Britain (5 year mean 91/2-95/6)

- Golden Plover *Pluvialis apricaria*, 29,235 individuals representing at least 11.7% of the wintering population in Great Britain (5 year peak mean 1991/2 - 1995/6)
- Hen Harrier *Circus cyaneus*, 20 individuals representing at least 2.7% of the wintering population in Great Britain (5 year peak mean 1984/5-1988/9)

This site also qualifies under **Article 4.2** of the Directive (79/409/EEC) by supporting populations of European importance of the following migratory species:

On passage
- Redshank *Tringa totanus*, 5,212 individuals representing at least 2.9% of the Eastern Atlantic - wintering population (5 year peak mean 1991/2 - 1995/6)
- Sanderling *Calidris alba*, 1,767 individuals representing at least 1.8% of the Eastern Atlantic/Western & Southern Africa - wintering population (2 year mean May 1993 - 1994)

Over winter
- Dunlin *Calidris alpina alpina*, 23,605 individuals representing at least 1.7% of the wintering Northern Siberia/Europe/Western Africa population (5 year peak mean 1991/2 - 1995/6)
- Knot *Calidris canutus*, 33,848 individuals representing at least 9.7% of the wintering Northeastern Canada/Greenland/Iceland/Northwestern Europe population (5 year peak mean 1991/2 - 1995/6)
- Redshank *Tringa totanus*, 4,452 individuals representing at least 3.0% of the wintering Eastern Atlantic - wintering population (5 year peak mean 1991/2 - 1995/6)
- Shelduck *Tadorna tadorna*, 4,083 individuals representing at least 1.4% of the wintering Northwestern Europe population (5 year peak mean 1991/2 - 1995/6)

Assemblage qualification: A wetland of international importance.

The area qualifies under **Article 4.2** of the Directive (79/409/EEC) by regularly supporting at least 20,000 waterfowl.

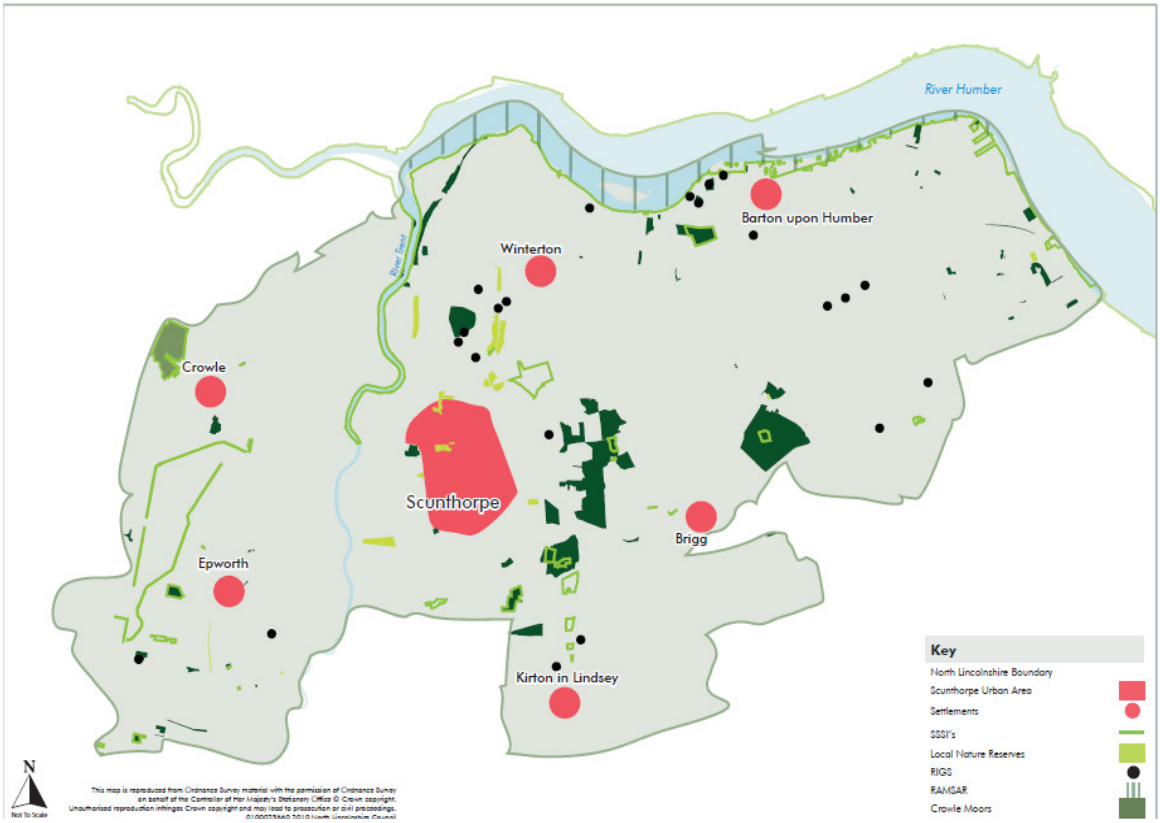
North Lincolnshire contains 2 National Nature Reserves and 10 Local Nature Reserves.

Geological SSSIs of note within North Lincolnshire, as identified on Natural England's Nature on the Map are South Ferriby Chalk Pit, Risby Warren, Nettleton Chalk Pit and Manton Stone Quarry North Lincolnshire has 22 in total. The biodiversity and geodiversity sites within the area are illustrated in .

Also in North Lincolnshire is part of the Humberhead Levels Nature Improvement Area (NIA). NIAs were announced in the Natural Environment White Paper (2011) and are large, discrete areas that will deliver a step change in nature conservation, where a local partnership has a shared vision for their natural environment. The partnership will plan and deliver significant improvements for wildlife and people through the sustainable use of natural resources, restoring and creating wildlife habitats, connecting local sites and joining up local action.

There are also 17 Nature Reserves in North Lincolnshire, which are managed by the Lincolnshire Wildlife Trust. These cover many different types of habitat such as grasslands, woodlands, peatlands and wetlands. Crowle Moor, a peatland, is part of the Humberhead Peatlands National Nature Reserve. Some of these other reserves have SSSI status.

Figure 4.1: Biodiversity and geodiversity sites in North Lincolnshire



Source: North Lincolnshire Core Strategy (2011)

Sustainability Issue

North Lincolnshire has a wide variety of valuable wildlife habitats. Some of these are of international importance to wildfowl and other and other wetland bird species throughout the year as a nesting and breeding site. There are pockets of wildlife rich sites throughout the county, including industrialised areas.

Opportunity: The opportunity exists to ensure that the implementation of the MWMS incorporates landscaping and other measures to encourage biodiversity in the county. The planning process can be used to ensure that if there are detrimental effects, that these are fully mitigated.

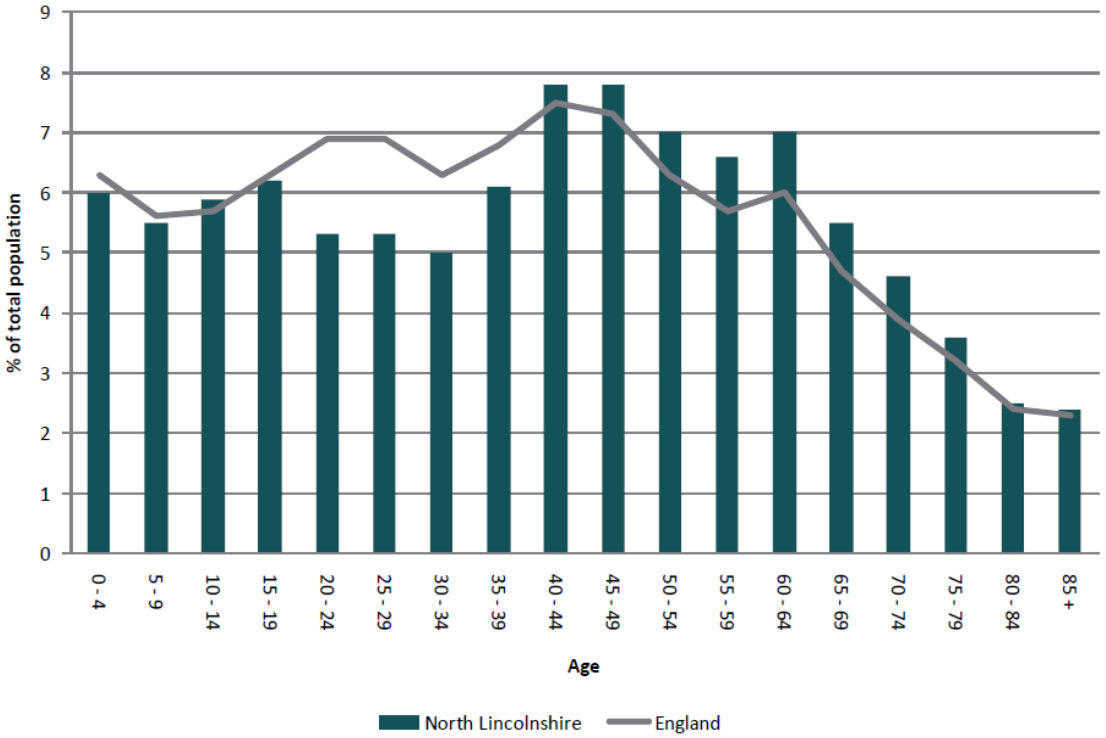
Constraint: There are no constraints that would prevent this in principle, as this can be a stipulation for planning. However, the quality of mitigation may be variable upon implementation.

4.2.3 Population and human health

The population of the North Lincolnshire area in mid 2010 was 161,300 which had increased by 5.4% since the 2001 statistics. The ONS identifies from North Lincolnshire population statistics that there is a population density of 191 people per km^2. The national population density is 401 people per km ^{2} and the density of the Yorkshire and Humber are 344 (ONS, 2011), which demonstrates that this area is relatively sparse in terms of population density.

North Lincolnshire contains a relatively elderly age profile when comparing against the national average and a distinct lack of young professionals. Figure 4.2 identifies that the highest population age bracket for North Lincolnshire is between 45 and 49 with a further peak at 50-64. Some of the age ranges with the lowest levels are the younger ages of the economically active population (20-39).This could be the result of previous industries located in the area being from the primary and secondary sectors of the economy such as trades, personal services, sales, elementary and other occupations. Whereas due to the lack of university facilities in the area there is a lack of job opportunity within the tertiary sector and quaternary sector such as associate and technical services, as a result people move away from the area for these opportunities. This is also evidenced in that the reason for population changes within North Lincolnshire has been due to the birth/death rate and not migration.

Figure 4.2: Population structure within North Lincolnshire in comparison to England

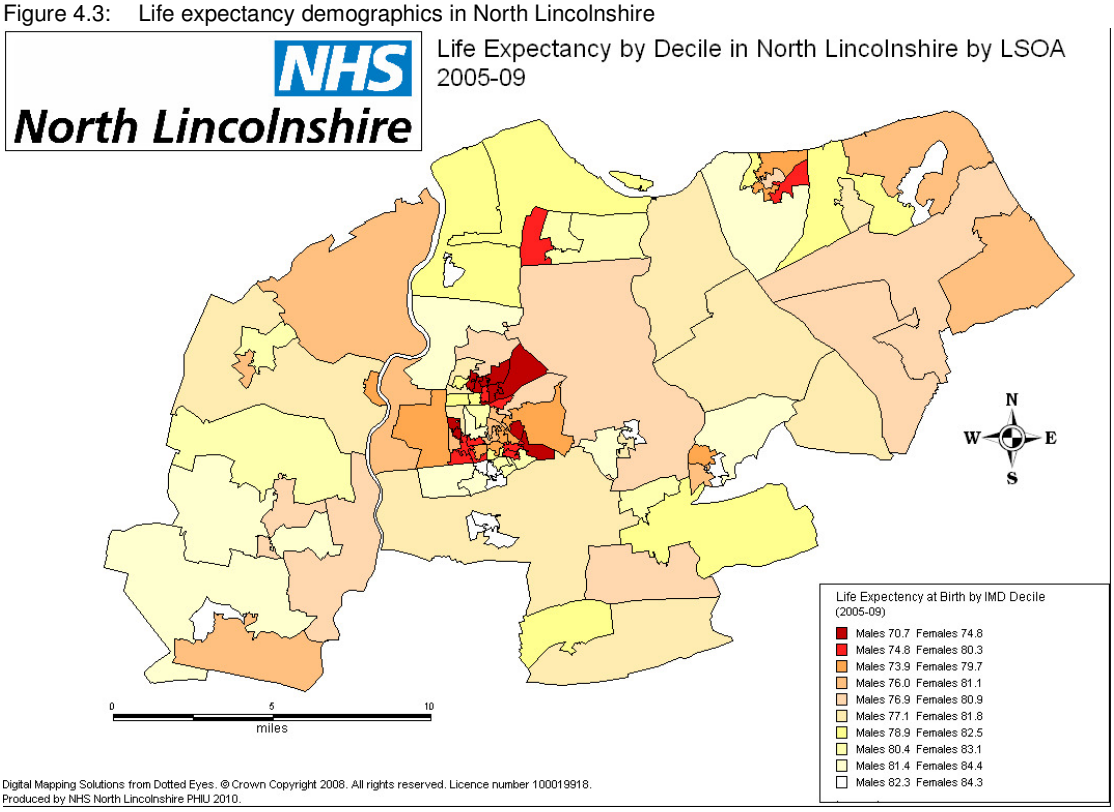


Source: Office of National Statistics (2011)

4.2.3.1 Life expectancy

Life expectancy within North Lincolnshire for 2011 stood at 77.5 years for men and 81.4 years for women. There has been a year on year improvement, but this is still below national life expectancy for England, which when using data from Office of National Statistics: Interim Life Tables 2008-2010, stands at 78.4 for men and 82.4 for women. Life expectancy is linked to health/lifestyle and deprivation. As shown below, the most deprived areas, with lowest life expectancy; tend to be located in the more populous urban areas of North Lincolnshire such as Scunthorpe, whereas life expectancy is highest in the more affluent rural areas of North Lincolnshire. Figure 4.3 shows the distribution of life expectancy within the region.

Figure 4.3: Life expectancy demographics in North Lincolnshire



Source: NHS Factsheet (2011)

4.2.3.2 Deprivation and Health

The Slope Index is a new indicator introduced to replace the Index of Multiple Deprivation Score as a measure of health inequality, and complementing the local measure of health inequality, which was adopted in NHS North Lincolnshire's Strategic Plan in 2009.

Referred to as the 'Slope Index of Inequality' this national indicator measures the difference in life expectancy between our richest and poorest *deciles* (or tenths) of the population over a *five year* pooled period. North Lincolnshire ranked just outside the worst 10% nationally for this measure, for both men and women, with the 3rd widest gap for male life expectancy in the Yorkshire & Humber region, after Kingston upon Hull and Leeds.

Table 4.2 shows the major causes of death in North Lincolnshire, the main contributors being cancer and other causes. Figure 4.4 gives an indication of the lifestyle choices of people within North Lincolnshire in comparison to regional and national trends, as can be seen unhealthy eating and obesity are above national averages.

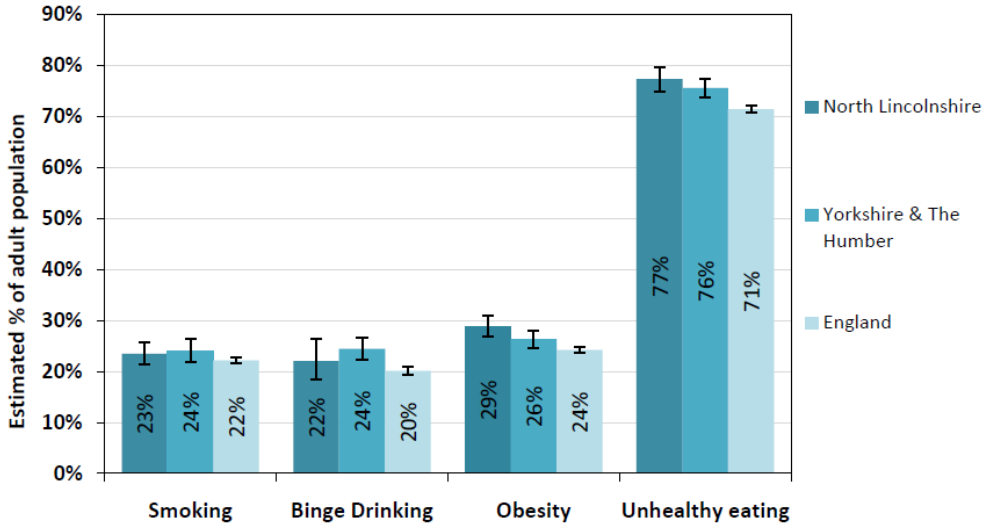
Table 4.2: Average number of deaths per year in North Lincolnshire 2006-2008

Cause of death	Population number	%
Cancer	N = 348	21.1%
Congenital Heart Defects	N = 286	17.2%

Cause of death	Population number	%
Other circulatory	N = 277	16.7%
Respiratory, including COPD	N = 168	10.1%
Pneumonia	N = 74	4.4%
Dementia	N = 46	2.8%
Infectious diseases	N = 36	2.2%
Diabetes mellitus	N = 25	1.5%
Parkinsons	N = 10	0.6%
Alcoholic liver disease	<10	<1%
Progressive neurological	<10	<1%
Road and other land transport accidents	N = 11	0.6%
Other causes	N = 352	21.7%
Total	N = 1650	100%

NHS North Lincolnshire (JSNA 2010)

Figure 4.4: Synthetic lifestyle estimates for adults (2006-2008)



Source: South East Public Health Observatory

Sustainability Issue: North Lincolnshire shows a higher than average incidence of obesity and poor health indicators, many of them associated with the higher than average levels of deprivation in the area.

Opportunity: The opportunity exists to increase employment opportunities by locating new waste management facilities within the County. Also, the opportunity exists for increased education regarding healthy eating through such initiatives as the 'Love Food Hate Waste' campaign.

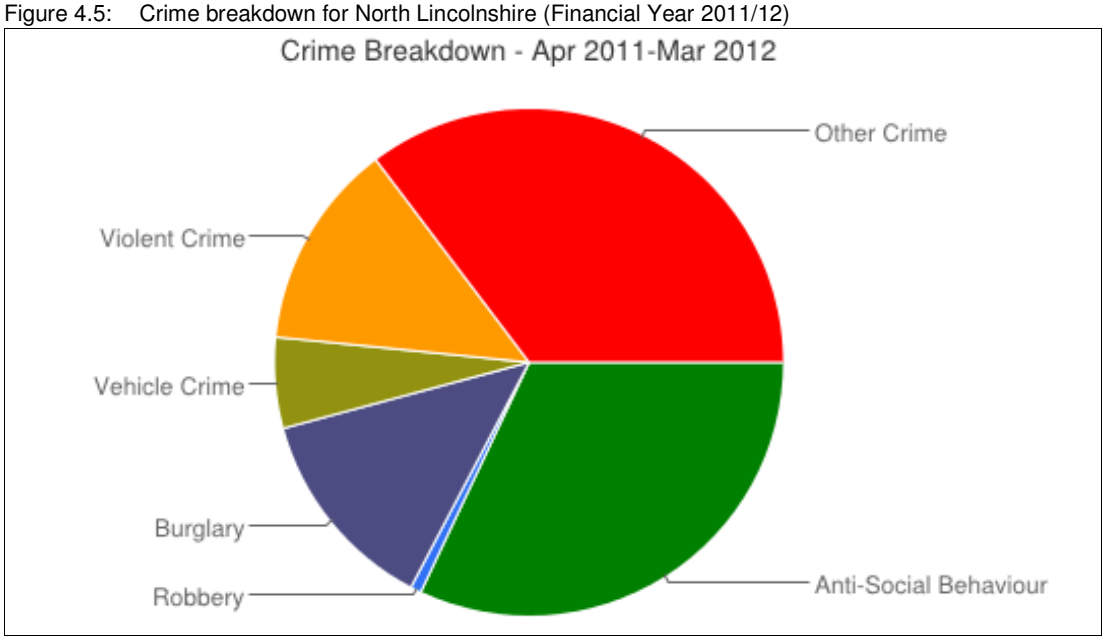
Constraint: The number of employment opportunities that will arise from new waste management facilities will be relatively small. No source of funding has been identified for communications campaigns yet.

4.2.3.3 Crime

Figure 4.5 identifies specific categories of crime affecting North Lincolnshire in 2011 and shows a big percentage attributed to anti-social behaviour. An important form of antisocial behaviour is flytipping, of which there is a range of penalties.

Table 4.3 illustrates the number of recorded incidences in North Lincolnshire 2009-2010. The council has installed a number of fly-tipping surveillance cameras at various locations in a bid to reduce the number of incidences.

Figure 4.5: Crime breakdown for North Lincolnshire (Financial Year 2011/12)



Source: http://www.ukcrimestats.com/Subdivisions/UTA/2591/

Table 4.3: Flytipping incidences reported on the flycapture database by the Local Authorities (2009-2010)

Authority	Total incidents	Total actions taken	Of which:						Successful prosecution orders
			Warning letters	Fixed penalty notices	Statutory notices	Formal cautions	Prosecutions	Injunctions	
North Lincolnshire Council	1082	345	49	1	2	-	23	-	22

Sustainability Issue: Although not a high crime area generally, a significant proportion of recorded crime is anti-social behaviour, which can be waste related, such as fly-tipping and materials theft.

Opportunity: The potential exists to reduce incidents of fly-tipping and other waste related criminal activity through the MWMS. This will take the form of improved communications and education, and ensuring that security is highlighted in the design of new facilities to reduce incidents of metals thefts, for example.

Constraint: Opportunities are limited in number and scope and may not significantly reduce crime in the area.

4.2.4 Land resources

In February 1998, the Government announced a national target that at least 60% of new homes were to be built on previously developed (Brownfield) land by 2008.

In April 1998 DETR (Department of Environment, Transport and the Regions) began construction of the National Land Use Database (NLUD), dividing land use into some 51 categories. It is envisaged that once the amount and location of Brownfield had been established, initiatives could be established and implemented to encourage redevelopment of Brownfield sites. The first stage of the National Land Use Database in North Lincolnshire identified approximately 50 potentially contaminated sites - based on historical use with the potential for regeneration (North Lincolnshire Council, 2001).

Figure 4.6 identifies the amount of previously developed land by land type and region.

Figure 4.6: Previously developed land by land type (regional) 2009

Previously-developed land1 by land type and Government Office Region: England 2009

Government Office Region	Vacant and derelict land: Previously developed vacant land	Vacant and derelict land: Derelict land and buildings	Vacant and derelict land: Vacant buildings	**All vacant and derelict land**	Currently in use: Allocated in a local plan or with with planning permission for any use	Currently in use: Known redevelopment potential but no planning allocation or permission	**All currently in use**	**All previously developed land that is unused or may be available for redevelopment**
								hectares
North East	1,390	1,180	270	**2,840**	900	840	**1,730**	**4,570**
North West	2,980	3,710	720	**7,400**	2,030	2,050	**4,090**	**11,490**
Yorkshire & The Humber	2,270	2,010	990	**5,270**	1,270	940	**2,210**	**7,480**
East Midlands	1,350	1,720	280	**3,350**	1,410	1,190	**2,600**	**5,950**
West Midlands	1,160	1,600	560	**3,320**	860	720	**1,580**	**4,900**
East of England	1,380	1,680	280	**3,340**	1,900	1,590	**3,480**	**6,830**
London	660	270	320	**1,250**	2,130	350	**2,480**	**3,730**
South East	1,430	1,450	410	**3,290**	4,990	1,720	**6,710**	**10,000**
South West	940	2,110	270	**3,320**	1,790	1,860	**3,640**	**6,960**
England	13,570	15,730	4,090	**33,390**	17,270	11,260	**28,530**	**61,920**
								per cent
North East	30	26	6	**62**	20	18	**38**	**100**
North West	26	32	6	**64**	18	18	**36**	**100**
Yorkshire & The Humber	30	27	13	**70**	17	13	**30**	**100**
East Midlands	23	29	5	**56**	24	20	**44**	**100**
West Midlands	24	33	11	**68**	18	15	**32**	**100**
East of England	20	25	4	**49**	28	23	**51**	**100**
London	18	7	9	**34**	57	9	**66**	**100**
South East	14	15	4	**33**	50	17	**67**	**100**
South West	14	30	4	**48**	26	27	**52**	**100**
England	22	25	7	**54**	28	18	**46**	**100**

Source: www.homesandcommunities.co.uk/ourwork/brownfield-land

1Previously-developed land that is unused or may be available for development. See annex B for definition
The estimates in this statistical release are compiled from information on individual sites supplied by Local Authorities in England. They give a snapshot for 31st March 2009.
Please see Previously Developed Land that may be available for development report published on the Homes and Communities website for further details.

The amount of previously developed land that has been vacant or derelict for more than 5 years (NI170) within North Lincolnshire stood at 4.67% in 2008. The location of waste management facilities could provide an opportunity to regenerate these sites; this data was only recorded for 2008, see Table 4.4.

Table 4.4: Previously developed land that has been vacant of derelict for more than 5 years % (N1170)

Period	Performance	Rank	Average
2008	4.67%	In the worst 10%	1.33%

Source: www.oneplace.audit-commission.gov.uk

The following table identifies the % of new homes built on previously developed land in North Lincolnshire. In both situations North Lincolnshire is performing lower that the national average.

Table 4.5: % of new homes built on previously developed land in North Lincolnshire (BV106)

Period	Performance	Direction of travel	Average
2007/08	27%	Deteriorating	89.09%
2006/07	36%	Deteriorating	88.23%
2005/06	42%	Improving	87.25%
2004/05	26%	Deteriorating	83.95%
2003/04	27%	Deteriorating	82.18%

Source: www.oneplace.audit-commission.gov.uk

The Housing and Employment Land Allocations Development Plan Document (DPD) sets out which sites are allocated for future housing development and where new employment opportunities will be located.

Over the next 15 years, enough land is needed for around 13,500 new homes. Some of this can be met from existing sites but more land will be needed. Current planning policy prefers that new housing should be in sustainable locations, avoiding the loss of Greenfield sites, and wherever possible on Brownfield land. Greenfield sites should only be considered where they are in sustainable locations such as on public transport corridors on the edge of existing towns.

There are over 2,000 sites for investigation for potential for contamination from a number of sources within North Lincolnshire. The Core Strategy Development Plan Document should support measures to promote the development of Brownfield land as a priority over other development sites and include the production of a Brownfield site strategy as recommended by latest government guidance. High priority should be given to the development of Brownfield sites for remediation of contamination as well as to assist in regeneration and relieve pressure on the countryside (www.planning.northlincs.gov.uk/planningreports/corestrategy)

In 2001, North Lincolnshire Council undertook a contaminated land inspection strategy which identified that there are certain areas with naturally high levels of metal enriched soils. For instance naturally occurring arsenic has been observed in the soil over the Frodingham iron stone, in addition to elevated natural levels of copper, cadmium and nickel.

The legacy of contamination within North Lincolnshire is a result of historical and current industrial activities. As of 2001 there were 30 industrial sites in North Lincolnshire. These were concentrated in the populated areas of Scunthorpe, Barton, Brigg and Killingholme. Steel manufacture was the dominant industry historically and this gave rise to the formation of ancillary industries associated with the steel manufacturing industries.

Power generation is dominant modern industry that has established itself in North Lincolnshire and is home to five power stations and two major oil refineries, with nine electric power stations commissioned (North Lincolnshire Council, 2001).

A study in 1997 aiming to quantify the number of former and current industrial land uses that could have the potential to contaminate calculated that there were approximately 1021 sites, as shown below.

Table 4.6: Land uses present in North Lincolnshire with the potential to contaminate

Industry type	Number of firms
Steel	33
Electronics	8
Petrochemicals	4
Power station	5
Motor	238
Transport	391
Production	276
Scrapyard	14
Waste transfer	12
Active landfills	30
Ports and wharves	10

Source: North Lincolnshire Council (2001)

4.2.4.1 Recycling and reuse

Recycling and reuse initiatives within North Lincolnshire have seen great improvements since 2008 which is documented in Table 4.7 and which illustrates the diversity of materials recycled and reused within the area from tetrapack and aerosol recycling to textiles and bric-a-brac.

Figures from 2010/11 show that MSW generation in North Lincolnshire was approximately 95,000 tonnes of which 87,000 tonnes were household waste, either collected at the kerbside or taken to Civic Amenity /Household Waste Recycling Centres (CA/HWRC) sites. This roughly equates to a household waste generation rate of 541 kg/capita/year. The current UK average is 464 kg/capita/year.

A combination of wheeled bins and boxes has enabled the separate collection and recycling of around 52% of the household waste stream. Figure 4.7 shows the proportion of municipal solid waste that has been sent for disposal by landfill since 2006/07.

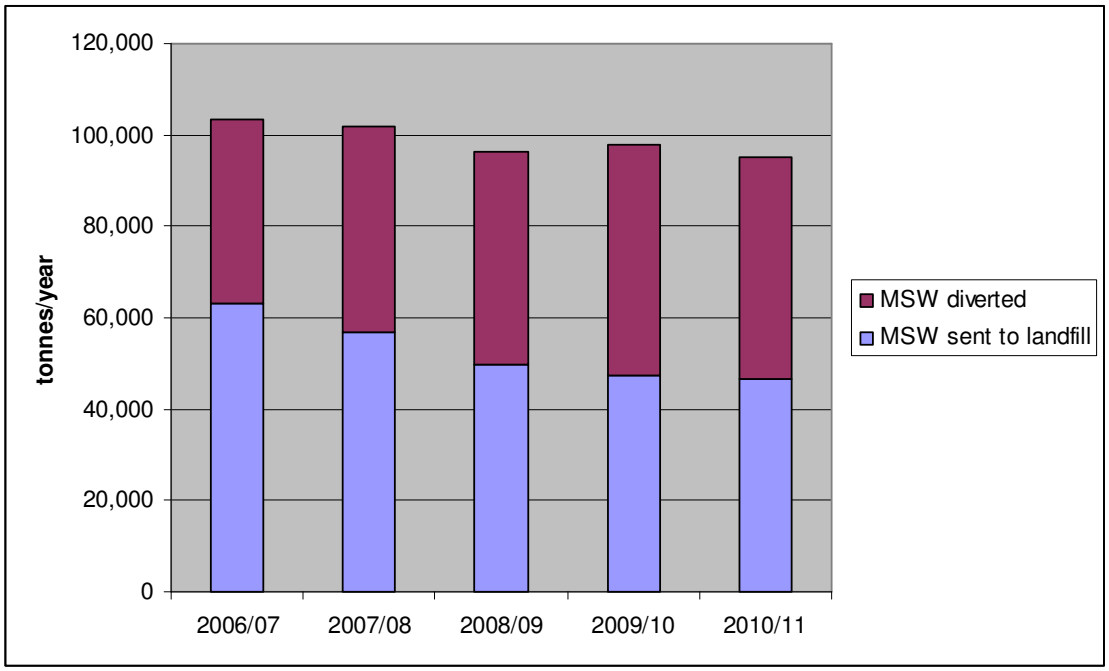
Table 4.7: Recycling and reuse initiatives in North Lincolnshire

Date	Initiative	Applicable properties	Agent	Details
1 April 2008	Free initial 140 residual bin provided to new residents/new properties	All of NLC properties	North Lincolnshire	140 litre green wheeled bin
Nov 2008	Tetrapak Recycling at HRCs	All of NLC properties	3 HRCs Kirton/Broughton/Barnetby	Recycling bank

Date	Initiative	Applicable properties	Agent	Details
Nov 2008	Schools and Office buildings recycling scheme	Schools and Office buildings	Schools and Office buildings	Range of different sized wheeled bins
11/05/2009	Kerbside Burgundy Bin and Brown Bin Recycling - Round 18	3,000 approx	AWC Properties	140 Burgundy and brown wheeled bin
03/07/09	Book/CD/DVD Banks	All of NLC properties	All NLC Household Recycling Centres	Recycling bank
06/08/09	Aerosols accepted in Green Box Scheme	All of NLC properties	North Lincolnshire Properties	Green 38 litre box
Sept 2009	Confidential Waste Collections	Commercial properties	Commercial properties	Confi sac or 180 litre bin
29/09/09	Commercial Glass Recycling	119 Properties	Pubs, Clubs and Restaurants with NLC TWA	240 litre bin with green lid
Jan 2010	Node Recycling	1	Queensway Flats	Node Recycling Bank
01/02/2010	Household batteries accepted in green box	All of NLC properties	North Lincolnshire Properties	Green 38 litre box
01/03/2010	British Heart Foundation Bulky Collection scheme commenced	All of NLC properties	North Lincolnshire Properties	n/a
01/03/2010	Composting Framework - Straights commenced	All of NLC properties	North Lincolnshire Properties	Range of composters/water butts, wormeries
July 2010	Textile bags now collected by Palm/PD for I&G Cohen	All of NLC properties	North Lincolnshire Properties	Red sack
22/11/2010	Bric-a-brac	All of NLC properties	All HRCs	Container/skip
23/11/2010	Paint for re-use	All of NLC properties	Cottage Beck Road HRC	Container/skip
December 2010	Trial Small WEEE kerbside collection (R2TH01, R2TH02. R2FR03. R2FR04)	3300 properties	Brumby and Riddings	Plastic carrier bag
10/01/2011	Household cooking oil rolled out to all HRCs	All of NLC properties	All HRCs	Plastic drum
February 2011	Commercial recycling	Commercial properties	Commercial properties	Range of different sized wheeled bins
09/05/11	Residual waste taken to Biffa landfill from this date	All of NLC properties	North Lincolnshire properties	n/a
16/05/11	Small WEEE Kerbside expansion rollout	All of NLC properties	North Lincolnshire Properties	Plastic carrier bag

Date	Initiative	Applicable properties	Agent	Details
31/05/11	Removal of all uncooked food waste from brown bin	All of NLC properties	North Lincolnshire Properties	Brown bin
01/07/11	Green waste taken to Briers Hill Recycling Ltd from this date	All of NLC properties	North Lincolnshire Properties	Brown bin/HRC green waste

Figure 4.7: Proportions of MSW diverted from and sent to landfill



Source: WasteDataFlow

A reflection of the success of these initiatives is that North Lincolnshire council was awarded the Best Local Authority Recycling Initiative award for its decision to overhaul its waste and recycling container provision to move away from a 'one-size-fits-all' method at the rewards for excellence in recycling and waste management 2011 (http://www.letsrecycle.com/news/latest-news/general/winners-of-awards-for-excellence-2011-announced).

A further testament to the success and flexibility of waste management in North Lincolnshire is that a North Lincolnshire recycling facility ' Continuum Recycling' will recycle the colourless Polyethylene terephthalate (PET) plastic from all clear PET plastic from the Olympic Park at the facility due to open early 2012. This new recycling centre expected to double the current production of food grade recycled PET plastic in the UK from 35,000 tonnes in 2010, to 75,000 in 2012 (www.greenwisebusiness.co.uk).

Recycling and reuse of material can lead to significant savings in energy, indeed producing steel from recycled material saves 75% of the energy needed if steel were to be made from virgin material. In addition, every tonne of paper recycled saves 17 trees. This, in turn, has significant implications for

greenhouse gas emissions and climate change (www.recycle-more.co.uk). The following table identifies CO_2 savings per tonne recycled.

Table 4.8: Savings in carbon dioxide due to recycling

Material	kg carbon dioxide saved per tonne recycled
Paper	1,400
Kitchen waste	223
Garden waste	78
Plastic	1,022
Ferrous metal	1,350
Aluminium	11,036
Glass	584

Sustainability Issue: Land is a resource which is under pressure in the county, from the need to create employment opportunities, and the demands of providing land for new-build housing. The location of waste management facilities will play an important role in this

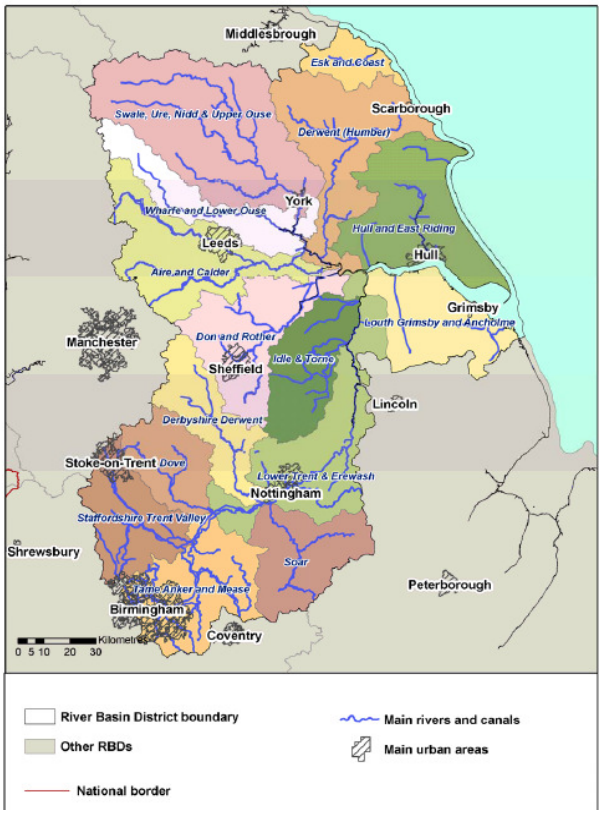
Opportunity: The opportunity arises to utilise the brownfield land which the county possesses a significant amount of, land and other suitable industrial areas identified in the Regional Spatial Strategy and the Waste and Minerals plan, for the location of new waste management facilities. Importantly these will reduce the pressure on landfill in the county.

Constraint: There are no are no major constraints anticipated on this aspiration as it will be delivered through the planning process. However there is a small possibility that a new waste management facility may employ a proportion of 'green-field' land.

4.2.5 Water and flood risk

The North Lincolnshire Unitary Authority is located in the Humber River Basin, which has a catchment extending from Middlesbrough to Birmingham with an area of 26,109 $km^{2.}$ The main catchments of the basin within the North Lincolnshire area are the Lower Trent and Erewash Catchment and the Louth, Grimsby and Ancholme Catchment.

Figure 4.8: Humber river basin district catchments



Source: **Environment Agency** River Basin Management Plan, Humber River Basin District (2009) © Environment Agency copyright and / or database right 2009. All rights reserved

Within the Louth, Grimsby and Ancholme catchment there are 42 river water bodies and two lakes in the catchment. Key present and predicted ecological, chemical and biological parameters for the river and lake water bodies in the catchment are provided below:

Table 4.9: Waterbody status in the Louth, Grimsby and Ancholme catchment

River and lake waterbody	2009	2015
% at good ecological status or potential	23	30
% assessed at good or high biological status (18 assessed)	21	32
% assessed at good chemical status (4 assessed)	50	50
% at good status overall – chemical and ecological	23	30
% improving for one or more element in river		14

Source: **Environment Agency** River Basin Management Plan, Humber River Basin District (2009)

The Lower Trent and Erewash catchment contains 76 river water bodies and nine lakes in the catchments. Key present and predicted ecological, chemical and biological parameters for the river and lake water bodies in the catchment are provided below.

Table 4.10: Waterbody status in the Lower Trent and Erewash catchment

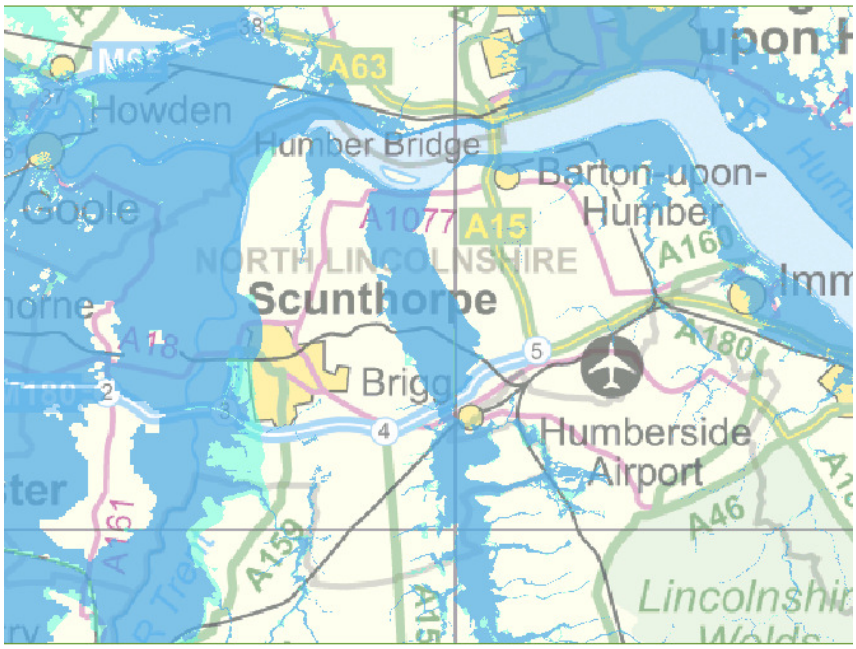
River and lake waterbody	2009	2015
% at good ecological status or potential	5	5
% assessed at good or high biological status (60 assessed)	17	17
% assessed at good chemical status (14 assessed)	86	86
% at good status overall – chemical and ecological	5	5
% improving for one or more element in river		12

Source: **Environment Agency** River Basin Management Plan, Humber River Basin District (2009)

4.2.5.1 Flood risk

The North Lincolnshire area is situated on the southern bank of the Humber Estuary; two major areas of flooding across the area follow the path of the River Trent and the New and Old River Ancholme. The areas of the Old and New River Ancholme have a significant risk of flooding, in accordance with the Environment Agency's flood risk mapping (see), 'significant' means there is a chance of flooding each year greater than 1.3% (1 in 75). Properties located in the flood plain of the River Trent have a 'moderate – significant' risk of flooding depending on location, estimated each year at 1.3% (1 in 75) or less, but greater than 0.5% (1 in 200). This is most likely due to the presence of flood defences along the river.

Figure 4.9: Flood risk mapping of North Lincolnshire



Source: http://maps.environment-agency.gov.uk/wiyby/wiybyController#x=489500&y=410500&lg=1,&scale=5

The four main surface water bodies within the North Lincolnshire Unitary Authority area are the River Humber and associated Humber Estuary, River Trent, New River Ancholme and Old River Ancholme, in addition to numerous becks and land drains within the area. There are a large number of water bodies and

streams that could potentially contribute to an overloading of both the natural and man-made water systems. The Environment Agency's flood defence strategy for the Humber identifies that nearly 400,000 people are at risk from flooding including key industry, business and agriculture and provides a future framework by which to ensure the more than 99% if the people living around the Humber Estuary will continue to have a good level of protection from tidal flooding (Environment Agency, 2008).

In the preparation of any planning application related to changes to existing plants or proposed new ones it will be essential to use the data and guidance Table 1 of the Technical Guidance to the National Planning Policy Framework should be used which refers to our flood map i.e. low, medium, high probability.

Specific flood risk studies will need to be undertaken to assess the project and site-specific risks of any proposal. The draft North Lincolnshire Strategic Flood Risk Assessment (SFRA) refines flood risk in the areas in Figure 4.9. It considers an assessment of flood risk from a wider range of sources taking into account climate change and the presence of defences and defence failure. The SFRA is considered the best available data on flood risk and would be the baseline data for such assessments

4.2.5.2 Groundwater

Groundwater in the North Lincolnshire area is classified as ranging between good and poor in accordance with Environment Agency mapping.

Table 4.11 provides an indication of the status of the groundwater for the two main catchments within the North Lincolnshire area.

Table 4.11: Environment Agency groundwater classification and objectives for catchments in North Lincolnshire

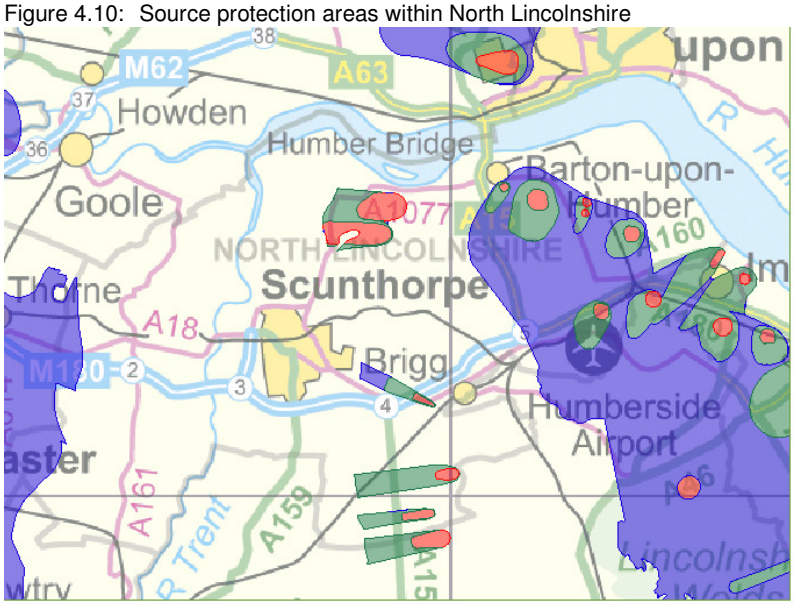
WB ID	WB Name	Area KM	Curr Overall Status	QuantStatus	QuantCert	ChemStatus	ChemCert	Overall Objective	Quantitative Objective	Chemical Objective
GB40401 G301800	Lower Trent Erewash - Magnesian Limestone	51.3806505	Poor	Poor	Uncertain	Good	Uncertain	Good Status by 2027	Good Ecological Status by 2027	Good Chemical Status by 2015
GB40402 G303200	Lower Trent Erewash - Coal Measures	169.0933536	Good	Good	Uncertain	Good	Uncertain	Good Status by 2015	Good Ecological Status by 2015	Good Chemical Status by 2015
GB40401 G301400	Lower Trent Erewash - PT Sandstone Wollaton	154.241547	Poor	Poor	Very Certain	Good	Uncertain	Good Status by 2027	Good Ecological Status by 2027	Good Chemical Status by 2015
GB40402 G990300	Lower Trent Erewash - Secondary Combined	1908.886617	Poor	Good	Uncertain	Fail	Uncertain	Good Status by 2027	Good Ecological Status by 2015	Good Chemical Status by 2027
GB40402 G445800	Grimsby Ancholme Frodingham Ironstone Unit	47.32912073	Poor	Poor	Uncertain	Good	Uncertain	Good Status by 2027	Good Ecological Status by 2027	Good Chemical Status by 2015
GB40401 G401500	Grimsby Ancholme Louth Chalk Unit	905.1724575	Poor	Poor	Uncertain	Fail	Uncertain	Good Status by 2027	Good Ecological Status by 2027	Good Chemical Status by 2027
GB40401 G444600	Grimsby Ancholme Louth Limestone Unit	141.7144702	Poor	Poor	Uncertain	Good	Uncertain	Good Status by 2027	Good Ecological Status by 2027	Good Chemical Status by 2015

Source: http://www.environment-agency.gov.uk/static/documents/Research/Groundwaterclassification_objectives_WFDcycle1.xls (2010)

In addition, all the groundwater bodies identified above are drinking water protected areas. These are of good quality with the exception of the Grimsby, Ancholme and Louth chalk unit which is currently of poor quality and expected to continue as such until 2015 (Environment Agency, 2010).

Presented below are the groundwater's Source Protection Zones that show the risk of contamination from activities that could lead to pollution of the groundwater. The map shows three zones, inner (red), outer (green) and total catchment.

Figure 4.10: Source protection areas within North Lincolnshire



Source: http://www.environment-agency.gov.uk/homeandleisure/37833.aspx

4.2.5.3 Soils and geology

Mapping provided by the British Geological Society (BGS, 2012) identifies the bedrock geology within the Scunthorpe area to comprise mudstone, sandstone, siltstone sedimentary rocks and extending west towards Doncaster, Triassic rocks, mudstone siltstone and sandstone overlain by superficial deposits of windblown sand and gravel. Superficial deposits present on the western boundary of the Unitary Authority are alluvium, clay, silt and sand.

Extending northwards from Scunthorpe to the Humber, bedrock geology consists of limestone, sandstone, siltstone and mudstone with pockets of Inferior Oolite and Great Oolite geology, overlain by superficial glacial sand and gravel and till. Down toward the south of the authority limits, the geology consists of bedrock sandstone and superficial river terrace deposits characteristic of river environments. Toward the east, clay dominates as the bedrock geology overlain by sand blown sand and gravel and glacial sand and gravel. The eastern boundary of the authority area is underlain by white chalk and overlain by till and extending towards the Humber, alluvium, characteristic of the estuarine environment. The Lincolnshire Wolds is a major chalk aquifer classified as highly vulnerable to pollution.

Soils within the area are varied as identified on Soilscapes mapping provided by the Natural Soil Resources Institute and are indicative of the diversity of geological strata present, from east to west soils types typically range from the following:

- Naturally wet, loamy and clayey soils of the coastal flats
- Slightly acid, loams and clays of impeded drainage
- Freely draining, floodplain soils
- Shallow, very acid peat soils over rocks
- Naturally wet, very acid sandy and loamy soils
- Free draining Breckland soils
- Slow permeable, seasonally wet basic loams and clays.

Sustainability Issue

North Lincolnshire is supplied by groundwater resources; some of which are of generally poor quality. Much of the county to the north is low lying and vulnerable to flooding. Despite being known for its heavy industry a significant area of the county is under cultivation, much of which is intensive.

Opportunity: The opportunity exists for the management of the county's municipal wastes to be carried out using technologies which a) reduce the negative impacts from landfill of runoff and other risks, and b) the production of a fertiliser or soil improver through the procurement of a new organic waste treatment facility. The facility could also be designed with water efficiency measures incorporated.

Constraint: The delivery of suitable facilities will be dependent upon the economics of the processes.

4.2.6 Air Quality

The Environment Act 1995 placed a statutory duty on Local Authorities to undertake periodic reviews and assessments of air quality within their boundaries. This should give consideration to the current and future air quality against health based objectives set out in the Government's Air Quality Strategy. Where objectives are not likely to be met by the relevant date, Local Authorities must declare an Air Quality Management Area (AQMA) and develop an action plan.

North Lincolnshire Council initially declared two Air Quality Management Areas (AQMA); the first at Scunthorpe and the second at Low Santon. Both areas were declared "for management" due to the levels of particulate matter <10um (PM10). Table 4.12 shows the current levels of pollutants recorded at the Scunthorpe Town AQMA monitoring station.

Table 4.12: Air quality emissions results at Scunthorpe Town (17.02.2012)

Monitoring site	Running 8 Hour mean Ozone (µgm-3)	Hourly mean Nitrogen dioxide (µgm-3)	Max 15 min mean Sulphur dioxide (µgm-3)	Running 24 Hour mean PM2.5 Particles (µgm-3)	Running 24 Hour mean PM10 Particles (µgm-3 Ref Equiv)	Last updated
Scunthorpe Town Time series Graph	n/m	46 (1 Low)	5 (1 Low)	n/m	16 (1 Low)	17/02/2012 11:00

Source: http://uk-air.defra.gov.uk/latest/currentlevels

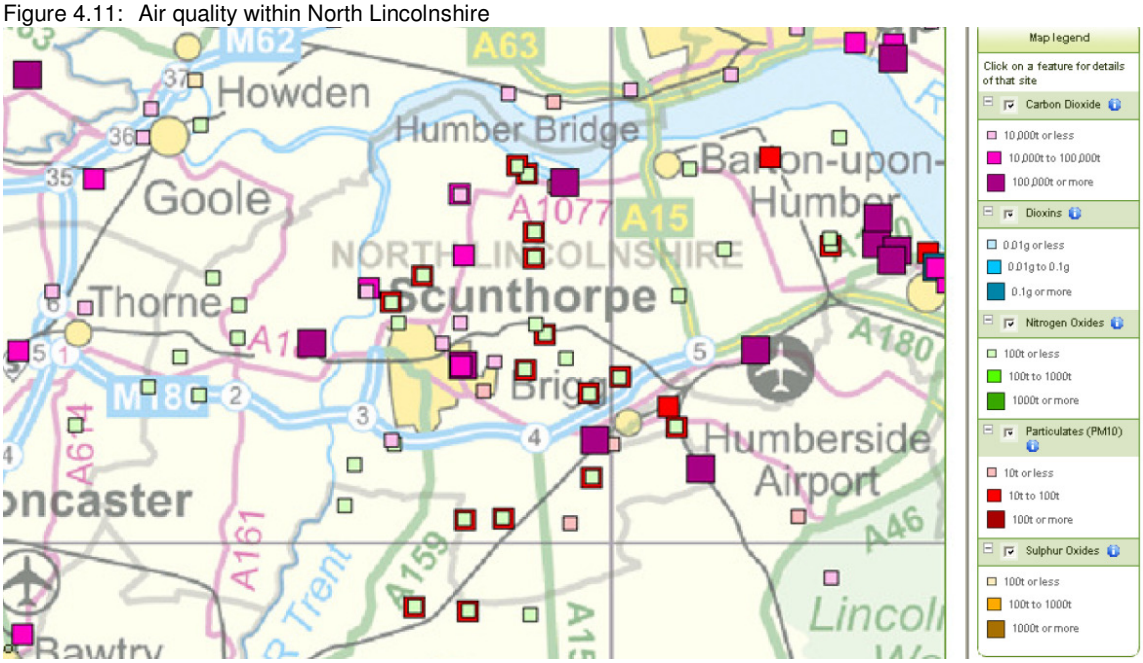
North Lincolnshire Council produced a progress report in 2008 detailing the air quality within the area and a conclusion from this report resulted in the subsequent designation of Low Santon as an AQMA due to annual and daily PM10 objectives being breached in Low Santon. The results for the pre-existing AQMA at Scunthorpe Town met the air quality objective in two of the last three years, whereas the Low Santon site is now fully compliant with the AQMA objectives.

The objectives for the other Local Air Quality Management (LAQM) pollutants are being met in North Lincolnshire. Nitrogen dioxide concentrations have decreased at the Scunthorpe Town and Killingholme monitoring sites, although the concentrations are increasing at Kingsway House. At the main Scunthorpe site the concentration of sulphur dioxide and the number of exceedances of the 15-minute limit value has shown a significant decrease since 1998.

The report also concluded that there had been no significant changes to road traffic so existing monitoring covered any minor changes. There are fourteen active automatic air quality monitoring stations in the North Lincolnshire area and forty five non automatic monitoring sites.

More up to date air quality results within the North Lincolnshire area are also mapped by the Environment Agency for carbon dioxide, dioxins, nitrogen oxides, PM10 and sulphur dioxide. The figure below shows a concentration of these pollutants, particularly carbon dioxide, in the vicinity of Humberside Airport and along the southern bank of the River Humber, towards the coast.

Figure 4.11: Air quality within North Lincolnshire



Source: http://maps.environment-agency.gov.uk/wiyby/wiybyController#x=546769&y=414178&lg=1,2,3,4,5,&scale=5

Sustainability Issue: As the County has large-scale heavy industrial areas together with a number of key highways running through it there are challenges regarding air quality, particularly oxides of nitrogen and particulate matter.

Opportunity: The opportunity exists through the MWMS of improving the overall air quality through reducing transport mileages and adopting waste management technologies that have strictly regulated air emissions.

Constraint: Although emissions will be strictly controlled through legislation such as the Waste Incineration Directive (WID), the amount of some pollutants may be increased, such as some ozone depleting chemicals. Odours may be produced seasonally by the use of the products from organic waste treatment facilities, such as Anaerobic Digestion. WRATE studies undertaken show that the overall net gain from the chosen options is significant compared to the 'do nothing' option, however.

4.2.7 Climate change

The main impacts predicted across the country with respect to climate change, will be hotter, drier summers and milder, wetter winters with an intensification of urban island effects (general temperature warming). There is also the possibility that there will be higher winds and more severe storms, as well as climate events being of a more extreme nature. Hot days will generally have higher temperatures and downpours will be more intense. In addition, there will be greater levels of coastal erosion and greater frequency and height of tidal surges.

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:

- Summer average temperatures are expected to rise by 2.3℃;
- Although rising, winter extreme temperatures are projected to remain below zero;
- Snowfall will reduce by 70% (two snow days) per year;
- Winter rainfall will increase by 17% but average annual rainfall will reduce by 3.5%; and
- Winter average wind speeds will increase marginally.

http://www.adaptyh.co.uk/Download/pdf/North%20Lincolnshire%20Local%20Area%20Report.pdf

The study also indicated that there were a range of issues specific to North Lincolnshire in the event of climate change; these were flooding, coastal erosion, groundwater and mine water, business and economy, public and voluntary services, infrastructure and utilities, biodiversity and health and welfare.

In 2008, Yorkshire Forward undertook a scoping study to determine an understanding of transporting CO_2 from the Yorkshire and Humber Region emitters into offshore storage sites (gas wells in the North Sea coming to the end of their life in the next decade). The study area in the document importantly covered North Lincolnshire and recognised that the area has high individual industrial emitters of CO_2, including oil refineries, steelworks, power stations and port operators. Table 4.13 shows the biggest emitters per kt of CO_2 between 2005 and 2009 and also the biggest emitter to be large industrial installations. However, it also highlights a downward trend.

Table 4.13: Industry specific kt CO_2 emissions estimates

Year	A. Industry and Commercial Electricity	B. Industry and Commercial Gas	C. Large Industrial Installations	D. Industrial and Commercial Other Fuels	E. Agricultural Combustion	F. Diesel Railways	G. Domestic Electricity	H. Domestic Gas	I. Domestic 'Other Fuels'	J. Road Transport (A roads)	K. Road Transport (Motorways)	L. Road Transport (Minor roads)	M. Road Transport Other	N. LULUCF Net Emissions	Total	Population ('000s, mid-year estimate)	Per Capita Emissions (t)
2005	596	172	8,830	115	11	21	159	224	64	184	191	121	2	98	10,787	158	68.3
2006	632	159	9,284	109	10	20	162	215	62	184	190	120	2	92	11,238	159	70.7
2007	528	159	9,365	111	10	20	162	205	61	189	197	123	2	75	11,204	160	70.2
2008	617	149	8,463	101	10	19	153	206	69	182	181	119	1	58	10,328	161	64.4
2009	475	152	5,940	101	10	18	139	185	65	175	170	112	1	58	7,600	161	47.2

Source: AEA 2011

N. LULUCF-Land Use, Land Use Change and Forestry

The national target for greenhouse gas emissions is for a 12.5% reduction to below 1990 levels between 2008-2012 with an aim of achieving 20% cuts by 2010. The Climate Change Act 2008 set a UK target of reducing carbon emissions by at least 80% by 2050 and by at least 40% by 2020 (based against 1990 baseline). The North Lincolnshire Core Strategy outlines how it will achieve the required national reductions of predicted CO_2 emissions by at least 34% in 2020 and 80% in 2050.

The Regional Economic Strategy, 2006 – 2015 contains a headline target challenging the region to, "Reduce greenhouse gas emissions (CO_2 equivalent) by 20 – 25% over the 1990 baseline." If the region is to achieve its target, it will need to cut emissions down to between 65.8 million tonnes and 70.3 million tonnes of CO_2 equivalent by 2015. Core Strategy DPD (2010) (www.planning.northlincs.gov.uk/PlanningReports/CoreStratergy/SusApp/SusAppRep.pdf)

The council signed the Nottingham Declaration on Climate Change in 2003 which required it to develop a Climate Change Action Plan and involved the council making a public pledge to take a lead in tackling the effects of climate change locally. Climate change features in the council's Local Area Agreement and is now a central part of the Comprehensive Area Assessment process under the new key line of enquiry "use of natural resources".

As part of this, North Lincolnshire is currently carrying out a study review to establish it's ecological/carbon footprint.

The Carbon Trust had been providing councils with technical and change management support and guidance through the Local Authority Carbon Management programme to help reduce carbon emissions and deliver financial savings.

The primary focus of the Carbon Management Programme was to reduce emissions under the control of the council such as buildings, vehicle fleets and street lighting. The Carbon Management Plan sets a target for reducing the council's carbon footprint by 33% over the next five years and the effect of achieving this target is that the council's energy costs reduce to £4.7m in the next five years. This represents a 10% decrease on the 2008 baseline costs. The difference between the business as usual scenario and the carbon reduction scenario is £4m in 2013/2014 and £11.5m for the full five years.

Currently North Lincolnshire is placed at the bottom of the National Indicator 186 League (table per capita CO_2 emissions) which is in part due to the area's industrial heritage, but over 25% of the emissions come from the housing stock.

Sustainability Issue:

As the county has a significant proportion of low-lying areas prone to flooding, and therefore vulnerable to rising sea levels, together with a large agricultural base that would be affected by rising temperatures, there is a need to manage the County's carbon footprint and mitigate the County's carbon footprint.

Opportunity: The opportunity presents itself through the MWMS to off-set the carbon production of the County in a number of ways. a) by the diversion of materials from landfill, b) the adoption of technologies that produce electricity or a renewable source of fuel c) waste minimisation and avoidance through the better utilisation of resources d) reducing the transport mileages associated with the treatment of the County's waste.

Constraint: There are no major constraints anticipated in this aspiration. WRATE studies show that there are considerable gains from the adoption of the measures outlined in the MWMS. The magnitude of the gains, however, will depend on available funds and market economics, and the length of delays in which there may be in adopting the strategy.

4.2.8 Material assets

4.2.8.1 Proximity principle

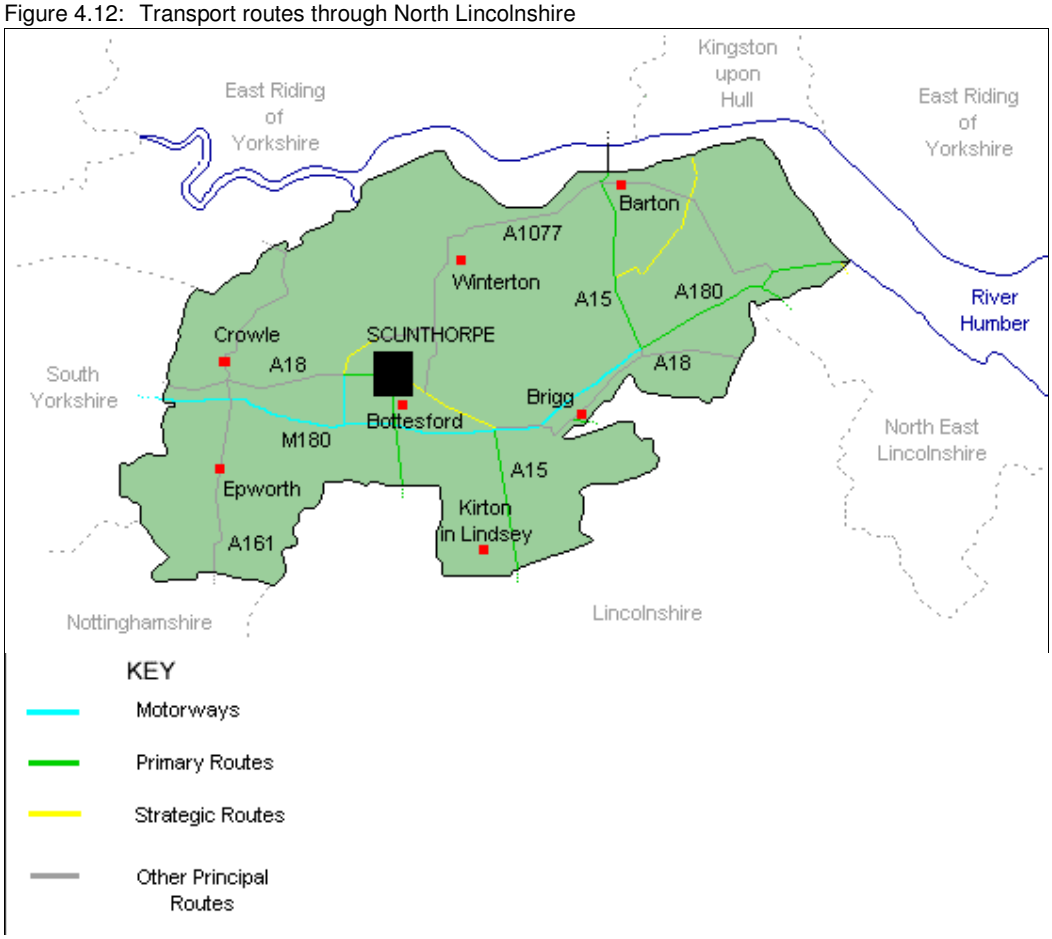
A key message that arose from the Waste Framework Directive (75/442/EC) was the requirement that waste should generally be managed as close as possible to where it is produced in order to limit the environmental impact of transportation and create a more responsible approach to waste generation. demonstrates the relatively low traffic flow in North Lincolnshire compared to average flows. However, there are only a few motorway routes available, largely due to North Lincolnshire's rural nature. When assessing each of the options within the Strategy, ease and ability for the road networks to cope with additional traffic flow from waste management in the local areas will need consideration alongside the siting of the facilities, see for transport routes.

Table 4.14: Estimated traffic flow for all vehicle types (million vehicle kilometres)

Period	Performance	Direction of travel	Average
2008	1,671	Decrease	2,908.83
2007	1,693	Increase	2,934.37
2006	1,646	Increase	2,904.43
2005	1,627	Increase	2,864.71
2004	1,619	Increase	2,857.71

Source: www.oneplace.audit-commission.gov.uk

Figure 4.12: Transport routes through North Lincolnshire



Source: http://www.northlincs.gov.uk/NR/rdonlyres/A7238841-2FA3-4982-A835-1B234C3F3027/19905/NorthLincolnshireContaminatedLandInspectionStrateg.pdf

4.2.8.2 Material resource efficiency

When comparing the MWMS options with a business as usual approach (landfill), landfill is generally outweighed by the other options for material resources because of the limited opportunity for efficiencies and the required amount of land take. The combustion of recovered methane leads to the generation of electricity and avoids the need to produce electricity from non-renewable sources which leads reduced effect on direct environmental burdens. However, the saving from landfilling waste is negligible when in association with the global warming potential (GWP) of methane and other gases fugitively released from the landfill. In comparison, a net benefit can be attributed to the reduction in the use of fossil fuel resulting from the displacement of the coal and gas fired power with power from an EfW plant. In addition, no methane is produced during the EfW process as CO_2 is generated during combustion. This results in a reduced GWP from EfW processes when compared to fugitive emissions from landfill.

EfW releases the CO_2 from combustion of plastics and other fossil fuel derived materials; the use of recovered energy avoids the need to produce electricity from fossil fuels which, as a result, reduces the emissions from activities such as extraction of the fossil fuels. The recovery of ferrous metals from the grate of the EfW plant also displaces the production of virgin material, which again reduces energy

requirements. There is however, a presence of high levels of acidification attributed to an EfW plant and the emission of nitrous oxides (NOx), sulphur oxides (SOx) and halogen based compounds. But the actual level over time has a tendency to decrease due to increased plant efficiencies and reduction in waste going through the system.

There are further opportunities, with the use of MBT, to recover ferrous and non ferrous metals and glass which could lead to the production of raw materials and subsequently reduces use of energy from their extraction.

Within North Lincolnshire there are eight HWRCs. The level of HWRC site provision within North Lincolnshire is amongst the most generous within the UK. At a ratio of 4.96 sites per 100,000 population, the density of provision is over three times the national average of 1.45 sites per 100,000.

There are a number of other operational landfills within the North Lincolnshire area. These include the facility at Roxby operated by BIFFA and the site at West Halton near Winterton operated by WRG. This latter site is permitted to receive both hazardous and non-hazardous waste. Currently MSW from the neighbouring local authorities of the East Riding of Yorkshire, Kingston upon Hull and North East Lincolnshire are received into this site.

4.2.8.3 Public Rights of Way

North Lincolnshire currently has 320 miles of Public Rights of Way. The council provides:

- signposts;
- waymarking ;
- bridges; and
- vegetation clearance.

Maps of these can be found at http://www.northlincs.gov.uk/transport-and-streets/publicrightsofway/definitive-map/

Sustainability Issue

Transport impacts will have an effect on the overall impact of the waste management system. This has been demonstrated in the BEO studies conducted to inform the draft MWMS. Locating plants outside of the County would have a significant negative impact on carbon emissions, ozone emissions and an increase in nuisance due to noise and dust.

Opportunity: the opportunity arises to mitigate these impacts by ensuring that plants are located strategically within the County to utilise the benefits of the proximity principle. This has resulted in the preferred options all being located within the County. This principle can be applied through the procurement process, such as a stipulation for a local solution in the OJEU notice.

Constraint: The main constraint in this particular mitigation lies in the commercial aspects of the procurement process. There is the possibility that the market may not present a solution located within the County.

4.2.9 Conservation & Heritage

North Lincolnshire is rich in archaeological remains with Romano-British periods particularly abundant on the limestone and on the chalk Wolds. Many of the settlements in North Lincolnshire have their origins in the Anglo Saxon period with the area also noted for its fine churches. There are a number of medieval earthworks including several moated sites, village earthworks and fields of ridges and furrow (North Lincolnshire Council, 2001).

As at January 2011, there were 5237 records of all types of historical record, including 44 Scheduled Monuments (SM) and 914 Listed Buildings. The list of SM is provided below:

Table 4.15: List of SM present in North Lincolnshire

Title	Location
St Peter's Church	Barton-upon-Humber, North Lincolnshire
Site of Saxon manor, Tyrwhitt Hall	Barton-upon-Humber, North Lincolnshire
Keadby Lock	Keadby with Althorpe, North Lincolnshire
Roman settlement	Kirmington, North Lincolnshire
Romano-British settlement near Staniwells Farm	Hibaldstow, North Lincolnshire
Money Field Roman site, Dragonby	North Lincolnshire
Roman site 400yds (370m) NE of Worlaby Church	Worlaby, North Lincolnshire
Old Winteringham Roman settlement	Winteringham, North Lincolnshire
Ferriby sluice	South Ferriby, North Lincolnshire
Gainsthorpe medieval rural settlement, including village remains, paddocks and a manorial complex with a fishpond and two dovecotes	Hibaldstow, North Lincolnshire
Round barrow 210m east of Cleatham Hall Farm	Manton, North Lincolnshire
Moated site and fishpond 200m south-east of Melton Hall	Melton Ross, North Lincolnshire
'The Castles' motte and bailey	Barrow upon Humber, North Lincolnshire
Moated site and associated earthworks at Baysgarth Farm	East Halton, North Lincolnshire
North Garth moated site and associated enclosures	North Killingholme, North Lincolnshire
Manor Farm moated site	East Halton, North Lincolnshire
Goxhill Hall moated site, associated drainage system, fishponds and field system	Goxhill, North Lincolnshire
Manor Farm moated site	North Killingholme, North Lincolnshire
Hibaldstow Mill	Hibaldstow, North Lincolnshire
Howe Hill bowl barrow	Wootton, North Lincolnshire
Flixborough Saxon nunnery and site of All Saints medieval church and burial ground	Flixborough, North Lincolnshire
Thornton Abbey Augustinian monastery: gatehouse, precinct, medieval road and bridge, moat, fishponds, post-Dissolution college and school, and house	Thornton Curtis, North Lincolnshire
Romano-British villa at Mount Pleasant Farm	Kirton in Lindsey, North Lincolnshire
Village Cross	Barrow upon Humber, North Lincolnshire
Mowbray Cross, Green Hill, Church Street	Haxey, North Lincolnshire
Market cross at junction of High Street, Low Street and Haxey Lane	Haxey, North Lincolnshire
The Lady Mowbray Stone cross base, east of Church of St Nicholas	Haxey, North Lincolnshire
Raventhorpe medieval settlement earthworks immediately south west of Raventhorpe Farm	Holme, North Lincolnshire
Yarborough Camp large univallate hillfort	Croxton, North Lincolnshire

Title	Location
Julian's Bower turf cut maze	Alkborough, North Lincolnshire
Moated site 285m east of Castlethorpe House	Scawby, North Lincolnshire
Round barrow on Elsham Golf Course, 380m north east of Timaru Farm Cottages	Elsham, North Lincolnshire
Medieval settlement of Croxton	Croxton, North Lincolnshire
Round barrow on Elsham Golf Course, 240m north east of Timaru Farm Cottages	Elsham, North Lincolnshire
Earthwork remains of St Bartholomew's Church, High Risby	Roxby cum Risby, North Lincolnshire
Countess Close moated site	Alkborough, North Lincolnshire
Axholme Carthusian Priory and post-Dissolution garden earthworks, Melwood Park	Owston Ferry, North Lincolnshire
Site of Jacobean manor house and gardens immediately west and south of St Maurice's Church	Horkstow, North Lincolnshire
Roman villa immediately east of Horkstow Hall	Horkstow, North Lincolnshire
Sawcliffe medieval village and moated site	Roxby cum Risby, North Lincolnshire
Kinaird motte and bailey castle	Owston Ferry, North Lincolnshire
Thornholme Augustinian priory	Appleby, North Lincolnshire
Heavy Anti-aircraft gunsite 220m east of West Marsh Cottage	Barrow upon Humber, North Lincolnshire
Heavy Anti-aircraft gunsite, 450m north east of Mere Farm	Winteringham, North Lincolnshire

There are 913 Listed Buildings within North Lincolnshire. The statuses of these are shown in Table 4.16.

Table 4.16: Listed Buildings in North Lincolnshire

Grade of Listed Buildings	Number
Grade I	40
Grade II*	36
Grade II	837
Historic Park and Garden	1 (part of Grade I Brockleby Park, most of which lies in West Lindsey District)

Source: Heritage Counts, 2011

The North Lincolnshire Local Plan (adopted 2003) identifies seventeen conservation areas within the area, these are as follows:

- Alkborough
- Appleby
- Barrow upon Humber
- Barton upon Humber
- Brigg
- Burton upon Stather
- Crowle
- Epworth
- Kirton in Lindsey
- Normanby
- Redbourne
- Saxby all Saints
- Scawby
- Old Crosby, Scunthorpe

- New Frodingham, Scunthorpe
- Winteringham
- Winterton

The "Heritage at Risk Register" identified the following designated heritage assets in North Lincolnshire s being at risk through neglect or decay:

- 2 high-Grade buildings;
- 14 Scheduled Monuments (this equates to 31% of all those in North Lincolnshire);
- 2 Conservation Areas; and
- 3 Listed Places of Worship.

Due to the diverse range and geographical spread of such features, the Strategy should ensure that the siting of waste management facilities and/or transport routes for the movement of waste around the North Lincolnshire area does not detrimentally affect the built heritage or archaeological feature itself or its curtilage/setting.

Sustainability Issue

North Lincolnshire has a wide variety of archaeological and other important built-heritage. It consists of architecturally important buildings and a large range of archaeological sites from the Neolithic to the Post Medieval, together with the potential Industrial-age heritage and other important recent structures such as Second World ware defences.

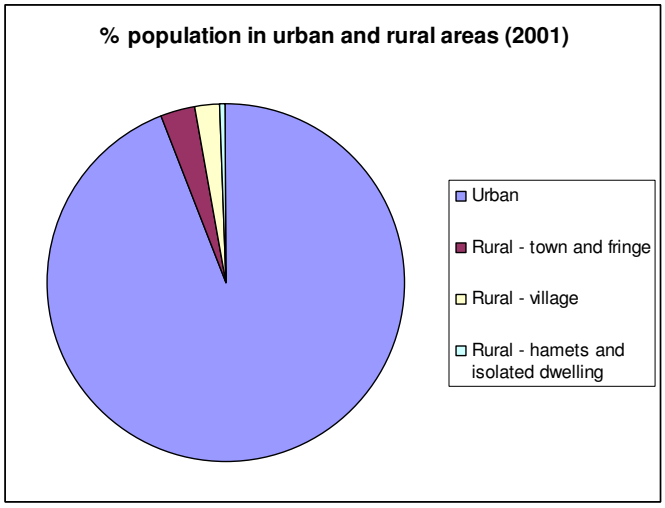
Opportunity: The opportunity presents itself to further protect and enhance these sites through the careful selection of any new site for waste management facilities. This will be implemented through the planning process, and will ensure that any heritage at risk is preserved for future generations

Constraint: Depending on the nature of sites that may be discovered through the site investigation process, excavation may need to be undertaken. However this will ensure that the information and artefacts from any site will be preserved.

4.2.10 Landscape

North Lincolnshire has a predominantly rural landscape with a small number of major urban areas. The urban/rural split of the region is provided in the figure below and historically such settlement patterns have been largely affected by the geography of the area particularly due to the presence of rivers and their floodplains. North Lincolnshire's position along the River Humber assists in giving the area a wide variety of habitats and a rich diversity of species and many of these have been recognised nationally and internationally as identified in Section 4.2.2.

Figure 4.13: Urban/rural classification of North Lincolnshire based on 2001 census statistics



Source: http://www.nelincsdata.net/IAS/Custom/Resources/Core12.pdf

The area is agriculturally rich with pockets of Grade 1 Agricultural Land and large tracts of Grade 2 and 3 which follow the course of the main rivers that flow through the area to the River Humber.

Closely linked to the landscape value of the area is its enhancement potential which can have an effect on community pride and regeneration of an area. As such, development of the Strategy in the area has to be carefully considered to ensure it does not affect landscape value or enhancement potential, or detract from existing assets, species and habitats.

Sustainability Issue North Lincolnshire is a predominantly rural county with concentrations of population in small urban areas, and a number of small villages and market towns. The topography is varied with the flat estuarine and reclaimed areas in the North of the County and the Lincolnshire Wolds running through it.

Opportunity: The opportunity arises to ensure that the MWMS minimises its impact on the landscape through the selection of the sites that are chosen for new waste management facilities. This would be implemented using the planning process, and underpinned by the sites located in the Regional Spatial Strategy and other documents. The county has an advantage in this, compared to other areas, in that it has significant areas suitable for brown-field development

Constraint: The Planning documents identifying the preferred sites have been superseded. However, the precedent exists by which unsuitable sites can be rejected.

4.3 Evolution of the Baseline without the Municipal Waste Management Strategy

The SEA Directive requires that 'the relevant aspects of the current state of the environment and the likely evolution thereof without implementation of the plan or programme are identified'.

Prediction of future trends is difficult because they depend on a wide range of global, national and regional factors and decision-making. A 'Do Nothing' or 'Business as Usual' scenario has been assessed and the results presented in Table 4.17.

- Biodiversity and geodiversity - it is likely that increased development, and climate change effects will result in loss of habitats and species, continued legislation will go some way to reduce impact from development;
- Population and human health – it is likely population will continue to rise within the North Lincolnshire area in accordance with previous trends, development of waste sites in urban areas may have a detrimental impact to human perceptions of health, continued legislation with regard to waste infrastructure and public participation/consultation should reduce this;
- Land resources - increased development is likely to increase the pressure on land resources. The development of waste sites on Brownfield sites could reduce this pressure;
- Water and flood risk - increased development of hard surfacing is likely to cause an increase in run-off and potential contamination. In addition to disruption of flows for surface water and groundwater, increased development on flood plains is likely to increase the risk and severity of flash flood events;
- Air quality - it is likely that increased growth and development of the North Lincolnshire area will lead to increased vehicle use, both due to population increase and congestion leading to localised air quality issues and also due to increased movements due to the need to deal with more waste production. Depending on the location of such facilities this could have just local or regional/national effect. National and local air quality targets and European Emission Standards for new vehicles should contribute to reducing this predicted increase;
- Climate change - it is likely that climate change effects will continue, including increased temperatures, gales, severe storms and flooding;
- Material assets – increased population growth and resulting development is likely to continue to increase the impact to material assets;
- Built heritage and archaeological assets - heritage assets are likely to continue to be preserved through legislation. Development could put pressure on heritage assets and their setting. Heritage assets could also be put at risk through neglect or decay;
- Landscape - it is likely that continued development and changing farming practices will affect the countryside character.

Table 4.17: Evolution of the baseline

Ref	North Lincolnshire MWMS SA/SEA Objectives		
Biodiversity and geodiversity	1	To protect and enhance the biodiversity and geo-diversity of the North Lincolnshire MWMS sites, in particular designated sites and habitat enhancement.	-
Population and human health	2	To facilitate job creation, economic growth and regeneration through investment in the area and protection of local amenity.	-
	3	To promote safe and healthy communities and community involvement, particularly with regard to fly-tipping litter, encourage pride in local community and reducing crime and anti-social behaviour.	
Land resources	4	To ensure prudent use of land and resources in particular in relation to contaminated land remediation and development on Brownfield site.	-
	5	To promote recycling and reuse within the community and encourage sustainable waste management.	
Water and flood risk	6	Protect water quality in line with the Water Framework Directive and minimise the risk from flooding.	0
Air quality	7	To improve and/or retain current air quality in accordance with current legislation.	0
Climate change	8	Mitigate against climate change through reducing, CH4, CO2 and other greenhouse gases, and materials with low embodied carbon.	-
	9	To ensure adaptation and resilience to the impacts of climate change.	

Ref	North Lincolnshire MWMS SA/SEA Objectives	
Material assets	10. To minimise local transport impacts from the transport of waste in accordance with proximity principle and reduction in waste to landfill. 11. To increase the energy efficiency of the waste management process using energy from waste, and energy used from the process for electricity to the grid or to power the site. 12. To further minimise costs of waste management.	-
Built heritage and archaeological assets	13. To protect and enhance built heritage and archaeological assets within the MWMS sites.	0
Landscape	14. To improve or conserve landscapes and townscapes.	-

Note: Positive impacts are shown in green
Negative impacts are shown in orange
Neutral or no significant change in the impact is shown in yellow

The result of the assessment is that the 'do nothing' scenario is extremely detrimental to the environment in many of the most important respects. It demonstrates that it is not a justifiable option.

4.4 Developing the SA/SEA Framework

A key stage in the SEA process is the development of a range of SEA objectives and indicators against which the effects of implementing the North Lincolnshire MWMS can be assessed. Mott MacDonald and NLC have produced a list of SEA objectives. The objectives were developed based on the SEA Directive topics, baseline and key issues for the area, the existing North Lincolnshire MWMS Environmental Assessment objectives, and the North Lincolnshire Core Strategy SA objectives (see Table 4.18).

Table 4.18: Development of SEA objectives

Mott MacDonald North Lincolnshire MWMS SEA Objectives	North Lincolnshire Core Strategy SA Objectives	Existing North Lincolnshire MWMS Environmental Options Assessment Objectives	Relevant SEA Directive Topic
1. To protect and enhance the biodiversity and geo-diversity of the North Lincolnshire MWMS sites, in particular designated sites and habitat enhancement.	• To protect and enhance biodiversity and important wildlife habitats within and outside designated sites • To ensure the protection and enhancement of designated sites including Sites of Special Scientific Interest (SSSI) and Special Protection Areas (SPAs)	----------	Biodiversity and geodiversity

Mott MacDonald North Lincolnshire MWMS SEA Objectives	North Lincolnshire Core Strategy SA Objectives	Existing North Lincolnshire MWMS Environmental Options Assessment Objectives	Relevant SEA Directive Topic
2. To facilitate job creation, economic growth and regeneration through investment in the area and protection of local amenity. 3. To promote safe and healthy communities and community involvement, particularly with regard to fly-tipping litter, encourage pride in local community and reducing crime and anti-social behaviour.	• To tackle poverty, social exclusion and inequality geographically as well as demographically • To enhance skills, qualifications and the overall employability of the population • To reduce crime, the fear of crime and to promote safer neighbourhoods • To improve accessibility to education, employment, recreation, countryside health, community services and cultural facilities for all sectors of the community • To encourage the participation in culture, leisure and recreational activities, including in the Countryside • To maintain and strengthen the local economy to promote future economic prosperity for North Lincolnshire in rural and urban areas • To create vibrant towns and village centres in both rural and urban areas • To increase diversity of employment • To support and improve the economic activity for rural areas through the retention of local Facilities • To promote and enhance opportunities for tourism, particularly in rural areas • To promote healthier communities	• To protect local amenity • To provide local employment opportunities • To provide opportunities for public involvement / education	Population and human health

Mott MacDonald North Lincolnshire MWMS SEA Objectives	North Lincolnshire Core Strategy SA Objectives	Existing North Lincolnshire MWMS Environmental Options Assessment Objectives	Relevant SEA Directive Topic
4. To ensure prudent use of land and resources in particular in relation to contaminated land remediation and development on Brownfield site. 5. To promote recycling and reuse within the community and encourage sustainable waste management.	• To make the best use of previously developed land and existing buildings • To protect local water resources, soil quality and quantity	• To ensure prudent use of land and other resources	Land resources
6. Protect water quality in line with the Water Framework Directive and minimise the risk from flooding.	• To minimise the risk of flooding • To protect local water resources, soil quality and quantity	• To minimise adverse effects on water quality	Water and flood risk
7. To improve and/or retain current air quality in accordance with current legislation.	• To improve air quality • To reduce congestion, particularly around the South Humber Bank Ports	• To minimise air quality impacts	Air quality
8. Mitigate against climate change through reducing, CH4, CO2 and other greenhouse gases, and materials with low embodied carbon. 9. To ensure adaptation and resilience to the impacts of climate change.	• To adapt to the impacts of climate change fro the built and natural environment • To reduce greenhouse gas emissions particularly from transport and waste management related infrastructure	• To reduce greenhouse gas emissions	Climate change

Mott MacDonald North Lincolnshire MWMS SEA Objectives	North Lincolnshire Core Strategy SA Objectives	Existing North Lincolnshire MWMS Environmental Options Assessment Objectives	Relevant SEA Directive Topic
10. To minimise local transport impacts from the transport of waste in accordance with proximity principle and reduction in waste to landfill. 11. To increase the energy efficiency of the waste management process using energy from waste, and energy used from the process for electricity to the grid or to power the site. 12. To further minimise costs of waste management.	• To provide a sufficient and appropriate mix of housing that is affordable, decent and designed to a high standard • To improve public transport provision and promote sustainable modes of transport • To increase energy efficiency and increase the use of renewable energy particularly from wind energy • To reduce generation of waste, the proportion sent to landfill and to increase re-cycling • To promote the use of sustainably sourced products and resources and re-using and recycling products	• To minimise local transport impacts • To minimise costs of waste management • To conform with waste policy • To ensure reliability of delivery	Material assets
13. To conserve those elements which contribute to the significance of heritage assets including their settings.	• To protect and enhance heritage assets including archaeological sites and monuments, historic landscapes, and local townscapes and their settings	----------	Built heritage and archaeological assets
14. To improve or conserve landscapes and townscapes.	• To maintain and enhance the quality of countryside and wider landscape	• To conserve landscapes and townscapes	Landscape

4.5 Developing SA/SEA Indicators

The second part of developing the SEA framework is to develop assessment criteria and indicators for each objective (see Table 4.19). The assessment criteria will be finalised following consultation and used in the appraisal (Stage B of the SEA process).

The indicators will be used as the basis for monitoring the implementation of the North Lincolnshire MWMS. Monitoring proposals and specific indicators chosen will depend on the results of the assessment. Monitoring should be focused where negative effects are identified.

Table 4.19: SEA criteria and indicators

North Lincolnshire MWMS SEA Objectives	Draft Assessment Criteria	Potential Indicators
Biodiversity and geodiversity	Will the Strategy affect statutory or non-statutory ecological or geological sites? Will the Strategy affect protected species and habitats? Will the Strategy result in the loss of habitat? Will the Strategy create new habitat or enhance existing habitat? Will the Strategy affect any Nature Improvement Areas? Will the Strategy include creation of green infrastructure? Will the Strategy increase access to ecological and geological sites?	Condition and extent of designated areas Area of new habitat created or enhanced
Population and human health	Will the Strategy create recreational opportunities? Will the Strategy increase community cohesions and accessibility to assets? Will the Strategy improve community safety, Will the Strategy encourage community involvement e.g. visits to waste management facilities for educational purposes?	Level of crime and anti-social behaviour incidents such as flytipping Number of public / community events Opportunities for school, college university visits, creation of education packs
Land resources	Will contaminated land be remediated where appropriate? Will it lead to pollution caused by opening up contamination pathways? Will the Strategy encourage sustainable waste management such as re-use and recycling?	Contaminated land is remediated, no further contamination, % development of Brownfield land being redeveloped % recycling and re-use
Water and flood risk	Will the Strategy affect groundwater quality? Will the Strategy affect surface water quality? Will the Strategy affect bathing water quality? Will any facilities as a result of the Strategy put unreasonable demand on the water resources in the area? Will it avoid any impacts on water quality and quantity in line with the requirements of the WFD? Will the scheme increase the impermeable surface area? Will it prevent and/or reduce the risk of flooding? Is the development designed to withstand flooding events, e.g. key equipment protected/not placed on ground level?	Current water quality standards maintained and WFD requirements met No additional increase in flood risk from any source Number and severity of flooding incidents Overall water used reduced or been maintained
Air quality	Will air quality be improved or at least see no deterioration?	Air quality targets are met
Climate change	Will the Strategy include choice of materials with low embodied carbon? Will the Strategy contribute to reducing greenhouse gas and carbon emissions? Are the materials chosen resilient to climate	Climate change adaptation measures adopted to ensure developments climate change resilient Waste traffic flow counts and

North Lincolnshire MWMS SEA Objectives	Draft Assessment Criteria	Potential Indicators
	change effects? Does the design of the option take the effects of climate change into consideration? Will it facilitate adaptation to the impacts of climate change, particularly flood risk and erosion? Will the Strategy generate traffic?	destination
Material assets	Will the Strategy facilitate economic growth? Will the Strategy encourage inward investment and business to the area? Will the Strategy increase employment opportunities? Will the Strategy facilitate regeneration of sites Will the Strategy generate traffic? Will the Strategy improve connectivity between areas? Will the Strategy affect any any Public Rights of Way/Public Open Space or create new ones? Will the Strategy facilitate public transport improvements?	Job creation Area of land regenerated Economic output Traffic flow counts
Built heritage and archaeological assets	Will the Strategy cause harm to the significance of heritage assets? Will the Strategy affect the setting of historic assets? Will the Strategy increase access to historic assets?	Access to and condition of cultural heritage assets is maintained
Landscape	Will the visual amenity of the landscape be affected?	Level of landscape affected either positively through enhancement or negatively through degradation

4.6 Compatibility of Municipal Waste Management Strategy and SA/SEA Objectives

In order to demonstrate how the MWMS objectives are compatible with the SEA/SA objectives the two are compared in Table 4.20.

The table indicates how the MWMS SA/SEA objectives support wider waste management objectives and priorities. The full SA/SEA objectives are detailed in Section 4.4, the North Lincolnshire Waste Management priorities in Section 3, and the SEA/SA indicators are detailed in Section 4.5.

The table demonstrates that the MWMS objectives are fully compatible with the SEA/SA objectives, with considerable overlap in some areas. This enables the strategy to be developed with the safeguard built in that no particular aspect is dependent upon the implementation of one key objective.

Table 4.20: Comparison of North Lincolnshire MWMS Objectives with SA/SEA Objectives Strategy Objectives

	To develop a more sustainable system of waste management, promoting waste prevention in the first instance, encouraging re-use and recycling, and minimising the quantity of waste disposed of without recovering value from it;	To ensure that "Value for Money" principles are applied, and to secure an economic, efficient and effective waste management service;	To meet the challenging targets set by Government to recover value from waste and to move towards a 'zero waste' system by 2020.	To meet the Council's need to reduce its carbon footprint.	To work in partnership with others in the provision of the service, including government, other local authorities, private and community sectors; and	To meet the increasing expectations of residents, and to seek to engage the wider community via the Council's Strategic Partnership arrangements.
1. To protect and enhance the biodiversity and geo-diversity of the North Lincolnshire MWMS sites, in particular designated sites and habitat enhancement.	✓				✓	
2. To facilitate job creation, economic growth and regeneration through investment in the area and protection of local amenity.		✓			✓	✓
3. To promote safe and healthy communities and community involvement, particularly with regard to fly-tipping litter, encourage pride in local community and reducing crime and anti-social behaviour.					✓	✓

	To develop a more sustainable system of waste management, promoting waste prevention in the first instance, encouraging re-use and recycling, and minimising the quantity of waste disposed of without recovering value from it;	To ensure that "Value for Money" principles are applied, and to secure an economic, efficient and effective waste management service;	To meet the challenging targets set by Government to recover value from waste and to move towards a 'zero waste' system by 2020.	To meet the Council's need to reduce its carbon footprint.	To work in partnership with others in the provision of the service, including government, other local authorities, private and community sectors; and	To meet the increasing expectations of residents, and to seek to engage the wider community via the Council's Strategic Partnership arrangements.
4. To ensure prudent use of land and resources in particular in relation to contaminated land remediation and development on Brownfield site.	✓				✓	
5. To promote recycling and reuse within the community and encourage sustainable waste management.	✓		✓	✓		✓
6. Protect water quality in line with the Water Framework Directive and minimise the risk from flooding.	✓				✓	✓
7. To improve and/or retain current air quality in accordance with current legislation.	✓			✓	✓	✓
8. Mitigate against climate change through reducing, CH4, CO2 and other greenhouse gases, and materials with low embodied carbon.	✓		✓	✓		✓

	To develop a more sustainable system of waste management, promoting waste prevention in the first instance, encouraging re-use and recycling, and minimising the quantity of waste disposed of without recovering value from it;	To ensure that "Value for Money" principles are applied, and to secure an economic, efficient and effective waste management service;	To meet the challenging targets set by Government to recover value from waste and to move towards a 'zero waste' system by 2020.	To meet the Council's need to reduce its carbon footprint.	To work in partnership with others in the provision of the service, including government, other local authorities, private and community sectors; and	To meet the increasing expectations of residents, and to seek to engage the wider community via the Council's Strategic Partnership arrangements.
9. To ensure adaptation and resilience to the impacts of climate change.	✓		✓		✓	✓
10. To minimise local transport impacts from the transport of waste in accordance with proximity principle and reduction in waste to landfill.	✓	✓		✓	✓	
11. To increase the energy efficiency of the waste management process using energy from waste, and energy used from the process for electricity to the grid or to power the site.	✓			✓	✓	✓
12. To further minimise costs of waste management	✓	✓				✓

	To develop a more sustainable system of waste management, promoting waste prevention in the first instance, encouraging re-use and recycling, and minimising the quantity of waste disposed of without recovering value from it;	To ensure that "Value for Money" principles are applied, and to secure an economic, efficient and effective waste management service;	To meet the challenging targets set by Government to recover value from waste and to move towards a 'zero waste' system by 2020.	To meet the Council's need to reduce its carbon footprint.	To work in partnership with others in the provision of the service, including government, other local authorities, private and community sectors; and	To meet the increasing expectations of residents, and to seek to engage the wider community via the Council's Strategic Partnership arrangements.
13. To protect and enhance built heritage and archaeological assets within the MWMS sites.					✓	✓
14. To improve or conserve landscapes and townscapes.	✓				✓	✓

5. Development and Appraisal of MWMS Preferred Options

This section describes the development of the preferred options for the management of North Lincolnshire's Municipal Solid Waste. The methodology employed has been integrated with the SEA objectives to ensure that an integrated approach has been employed in the development of the strategy. The process of identifying the 'long list' of options was conducted via review of the draft MWMS document, a review of the recent procurement projects by MM together with a series of meetings with key stakeholders within the North Lincolnshire technical team. These were based upon the experience gained through the procurement process since the draft strategy was developed, and the changes to the waste management industry.

This 'long list' was then assessed using the Environmental Options Appraisal methodology outlined below and in the MWMS document. The results of this process determined the preferred options for the treatment of the residual waste produced by the County.

With respect to the Recycling and Organic Waste treatment services, a different approach was undertaken. This is because these two services have demonstrated a) a high level of recycling performance and b) in the case of organic waste treatment the options are limited technically. Therefore the identification of the preferred options here lies in service improvements and the selection of the preferred technology type. These have been compared using the WRATE analysis tool rather than the full EOA methodology. The analysis demonstrates that there are considerable gains compared to the baseline, which in turn shows a considerable benefit compared with the 'do nothing' scenario.

The overall methodology was developed from the one which was used in the 2008 draft MWMS document, to ensure consistency. This was based upon the SEA guidance issued at the time, and has been revised to reflect the changes to SEA guidance since then in the development of the EOA scoring criteria. These were developed together with the weightings by Council and elected members and its technical advisors to reflect the key issues and theri relative importance.

A compatibility check has been undertaken between the statutory SEA criteria, the EOA criteria and the SEA objectives identified in Section 4.5. This is included in Appendix D. The assessment shows full compatibility between the studies.

5.1 Options Development

The assessment of different treatment options can be conducted using an Environmental Options Assessment. The Environmental Option Assessment (EOA) study has been undertaken on the future options for waste management, looking at the whole service, but focusing on the residual waste management options.

Life cycle analysis has been undertaken on the options as part of the assessment process using WRATE. WRATE stands for "Waste and Resources Assessment Tool for the Environment" and is the Environment Agency's Life-Cycle Analysis tool for measuring the impact on the environment of waste management systems. It consists of an extensive database of processes, materials, receptacles and vehicles which can be pieced together using a graphic interface to build up a model of the waste management system. The results from this have been used as the basis for the scores in many of the criteria listed in the EOA.

WRATE can be used to calculate the impact on the environment of the system by determining the quantity of materials and chemicals that are emitted to air, land and water. It also assesses the amount of energy generated or off-set by a process.

The results are calculated for: Global Warming Potential, Eutrophication, Acidification, Human Toxicity, Aquatic Ecotoxicity, and Resource Depletion.

5.1.1 Residual Waste

Seven scenarios, which cover a range of possible treatment/management options for residual wastes have been studied. These options have been developed from those studied in 2005 for the previous MWMS. They are based upon the experience gained over this time from the procurement projects and also the changes that have occurred in the waste management industry in the intervening years, such as greater delivery of facilities, and a greater knowledge of the issues and the markets for the by-products of the processes.

The options are outlined in the table below. They represent examples of all of the main technologies available for the treatment of residual wastes. The definitions also include information that is specific to North Lincolnshire, such as the locations of facilities, which are based on existing or proposed plants.

Table 5.1: Options assessed in the Environmental Options Appraisal

	Scenario	Definition
1	Do nothing	Business as usual: all - materials currently landfilled continue to be landfilled with growth rate proportional to the population growth predicted for the authority
2	Regional EfW	Plant available in neighbouring area within the region
3	Autoclave outside N Lincs	Autoclave with landfilling of fibre produced
4	MBT in N Lincs	Facility built in central location, providing a fuel for a cement kiln, which can be located within the County or elsewhere.
5	Large EfW	Merchant facility outside of the County at maximum practicable distance
6	ATT in N Lincs	Pyrolysis/ Gasification plant built within the county with central location. Capacity in the region of 80,000 tonnes per annum
7	MHT outside N Lincs	Residual waste transported to mechanical heat treatment facility within maximum radius of 50 miles (from centre of the County).

The EOA involved assessing and evaluating the infrastructure required to deliver each of these scenarios against three principal assessment categories:

- Environmental objectives
- Socio-economic objectives
- Operational objectives.

Each of these objectives was further defined by a range of indicators, which provide a quantitative or qualitative measure of the performance of the scenario against that objective. These are shown in Table 5.2. They were based upon the latest guidance regarding the statutory requirements for the SEA. This ensured integration between the strategy and the SEA from the outset, in terms of looking at the same environmental indicators.

Table 5.2: Statutory SEA assessment criteria

SEA Directive Topics	Core Strategy SEA Objectives
Biodiversity	To protect and enhance biodiversity and important wildlife habitats within and outside designated sites
Flora	
Fauna	To ensure the protection and enhancement of designated sites including Sites of Special Scientific Interest (SSSI) and Special Protection Areas (SPAs)
Population	To tackle poverty, social exclusion and inequality geographically as well as demographically
	To enhance skills, qualifications and the overall employability of the population
	To reduce crime, the fear of crime and to promote safer neighbourhoods
	To improve accessibility to education, employment, recreation, countryside health, community services and cultural facilities for all sectors of the community
	To encourage the participation in culture, leisure and recreational activities, including in the Countryside
	To maintain and strengthen the local economy to promote future economic prosperity for North Lincolnshire in rural and urban areas
	To create vibrant towns and village centres in both rural and urban areas
	To increase diversity of employment
	To support and improve the economic activity for rural areas through the retention of local facilities
	To promote and enhance opportunities for tourism, particularly in rural areas
Human Health	To promote healthier communities
Soil	To make the best use of previously developed land and existing buildings
	To protect local water resources, soil quality and quantity
Water	To minimise the risk of flooding
	To protect local water resources, soil quality and quantity
Air	To improve air quality
	To reduce congestion, particularly around the South Humber Bank Ports
Climatic Factors	To adapt to the impacts of climate change fro the built and natural environment
	To reduce greenhouse gas emissions particularly from transport
Material Assets	To provide a sufficient and appropriate mix of housing that is affordable, decent and designed to a high standard
	To improve public transport provision and promote sustainable modes of transport
	To increase energy efficiency and increase the use of renewable energy particularly from wind energy
	To reduce generation of waste, the proportion sent to landfill and to increase re-cycling
	To promote the use of sustainability sourced products and resources and re-using and recycling products
Cultural Heritage (including architectural and archaeological heritage)	To protect and enhance heritage assets including archaeological sites and monuments, historic landscapes, and local townscapes and their settings
Landscape	To maintain and enhance the quality of countryside and wider landscape

These were assessed using a weighted matrix analysis. In this, a score was derived for each criterion and then multiplied by a factor (the weighting) to give an overall score. The weightings used in the study are listed below, together with the data source used for the analysis. For the full data treatment and a description of how the weightings were developed, please refer to Appendix F of the MWMS.

Table 5.3: EOA assessment criteria and weightings

Objective	Criterion	Weighting
1. To ensure prudent use of land and	Resource depletion avoided burden in 1m year	4.8%

Objective	Criterion	Weighting
resources	timescale (WRATE)	
	Land-take (Ha)	2.4%
2. To reduce greenhouse gasses	Emissions of Greenhouse gases (WRATE)	11.8%
3. To minimise air quality impacts	Human toxicity (WRATE)	5.6%
	Air acidification (WRATE)	2.6%
	Ozone depletion (WRATE)	3.7%
	Odour issues (WRATE)	2.7%
	Dust problems (WRATE)	2.8%
4. To conserve landscapes and townscapes	Visual and landscape impacts	4.5%
5. To protect local amenity	Noise	3.6%
	Litter and vermin	2.0%
6. To minimise adverse effects on water quality	Eutrophication (WRATE)	2.6%
	Aquatic ecotoxicology (WRATE)	3.4%
7. To minimise local transport impacts	Transport impact (WRATE GHG)	5.1%
8. To provide employment opportunities	Number of jobs created (includes transport)	2.4%
9. To provide opportunities for local education and participation	Potential for participation in recycling/ composting and waste minimisation	4.0%
10. To minimise costs of waste management	Overall costs (£M)	9.4%
11. To ensure reliability of delivery	Maturity of technology including markets for products and bankability	4.2%
	Technical delivery of the facility including planning/ permitting	6.7%
12. To conform with waste policy	Waste minimisation	5.0%
	Percentage of materials recovered (%)	5.2%
	Percentage of materials recycled/ composted (%)	5.5%
Total		100.0%

The weightings were agreed as part of the development of the MWMS. These have been modified slightly on the basis of the lessons learnt by the Council since the previous document was published. More weight was given to the criteria under heading 11 'To ensure reliability of delivery' and heading 10 'Overall costs'. Where possible, WRATE has been used to provide quantitatively comparable data to underlie the scores. This has reduced the subjective scoring, and made the exercise more robust technically. One of the benefits of using the WRATE program is that the data can be filtered to focus on particular impacts in detail.

5.1.1.1 WRATE Analysis

A model for each of the technology options listed above was built up using the data from a mass flow model. This model was developed for the assessment, together with other information such as the data from composition studies undertaken recently for the Council.

The 'multi criteria analysis' results are shown in Figure 5.1 and the results in WRATE are shown with impacts giving positive numbers and benefits giving negative numbers. This means that the further down the graph a bar goes the better.

Figure 5.1: Multi criteria comparison

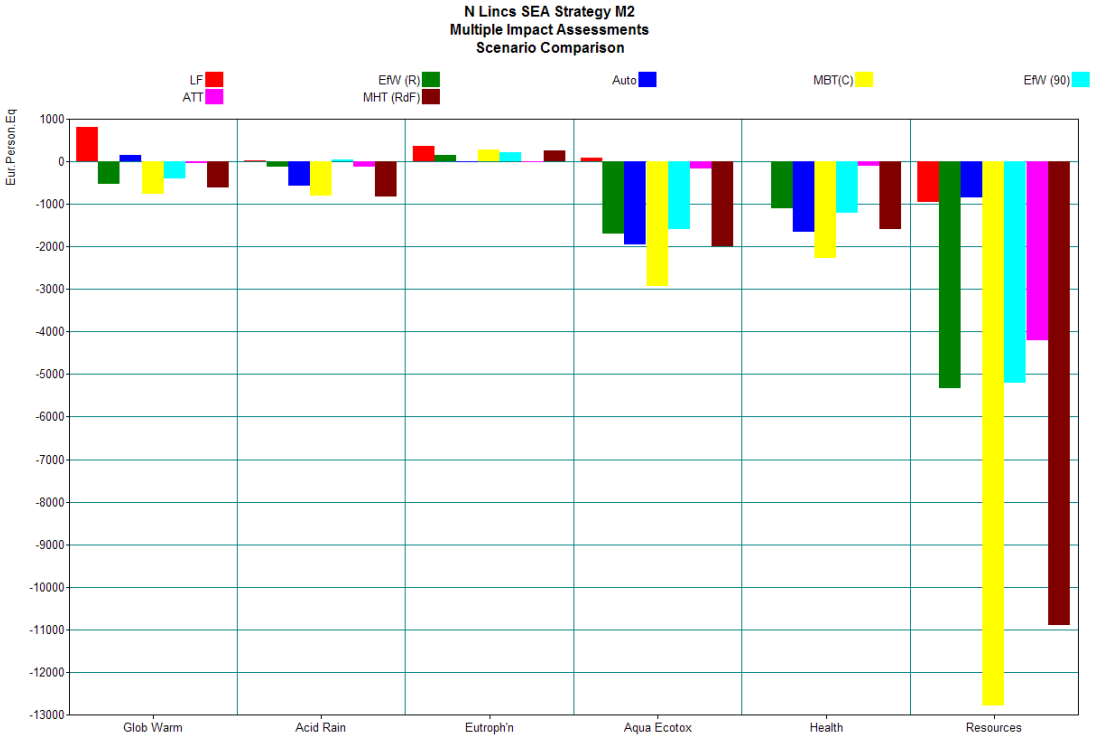


Figure 5.1 shows all of the results for each of the 6 factors together for all seven options. The figures that produced the charts are shown in Table 5.4. They show clearly that there is a considerable benefit from moving away from the use of landfill as the waste disposal option (the red bar on the left of each column).

When comparing each of the options on Global Warming Potential (the left hand column) it can be seen that MBT (Option 4) shows the greatest benefit (least impact), followed by MHT (RDF) (Option 7) and EfW (R) which is Option 2. In terms of the overall WRATE impacts, MBT scores highest in all of the impacts except for acidification and eutrophication, where MHT and Autoclaving are better respectively.

Table 5.4: Normalised residual waste results

Impact Assessment		LF	EfW (R)	Auto	MBT(C)	EfW (90)	ATT	MHT (RDF)
	Unit	Total	Total	Total	Total	Total	Total	Total
Climate Change: GWP 100a	Eur.Person. Eq	787	-517	137	-730	-390	-41	-596
Acidification Potential: Average European	Eur.Person. Eq	22	-129	-558	-775	33	-119	-802

Impact Assessment		LF	EfW (R)	Auto	MBT(C)	EfW (90)	ATT	MHT (RDF)
Eutrophication Potential: Generic	Eur.Person. Eq	350	145	-12	276	213	-11	250
Freshwater Aquatic Ecotoxicity: Faetp Infinite	Eur.Person. Eq	93	-1,625	-1,885	-2,830	-1,535	-152	-1,928
Human Toxicity: htp Infinite	Eur.Person. Eq	-3	-1,069	-1,603	-2,192	-1,168	-94	-1,541

The results are shown in Table 5.5 below. They show that the MBT option scores well compared to the other scenarios modelled, where in this instance a positive score is optimal.

Table 5.5: Final weighted scores

Scenario	1	2	3	4	5	6	7
	LF	EfW (R)	Auto	MBT(C)	EfW (90)	ATT	MHT (RDF)
Environmental	0.10	0.38	0.32	0.50	0.26	0.34	0.38
Socio-economic	0.028315	0.07446	0.069133	0.158	0	0.149168	0.0383244
Operational	0	0.170633	0.0528	0.211339	0.170633	0.177694	0.1239245
Total Score	0.131207	0.62	0.439198	0.865275	0.428437	0.662247	0.5444439

5.1.2 Organic waste treatment

For the organic waste treatment service a similar study using WRATE has been undertaken using data from the composition studies and the mass flow model developed for the assessment. The main options that have been assessed are:

Table 5.6: Organic waste treatment options

	Scenario	Definition
1	'Wet' Anaerobic Digestion	This is a form of anaerobic digestion that uses significant quantities of water during processing. This has the advantage of making the process more efficient at producing biogas, but has the disadvantage in that large volumes of 'digestate' need to be marketed, or dewatered prior to spreading to land
2	In-Vessel Composting	This is a relatively simple aerobic technique which uses an enclosed environment and forced aeration to compost the waste
3	'Dry' Anaerobic Digestion	This process uses less water than wet AD and has the advantage of being able to process a certain amount of woody material which is sometimes used as a bulking agent, which passes through the system
4	Business as usual	This is modelled as being windrow composting of the green and garden wastes with landfill of the food fraction
5	Landfill	This is shown to illustrate the saving in comparison with a 'do nothing' scenario, in reality option 4 is the least that the Council could do and fulfil its obligations

5.1.2.1 Results

The results in Figure 5.2 and Table 5.7 clearly show the benefits of all of the options over the 'do nothing' scenario, particularly in the critical impact of global warming potential and eutrophication. AD shows greater benefits than IVC due to the generation of electricity making the process less impacting on the

environment. IVC shows a slightly worse performance overall than the 'business as usual option'. This is mainly due to the relatively high energy usage of IVCs.

Figure 5.2: WRATE results for the organic waste treatment options

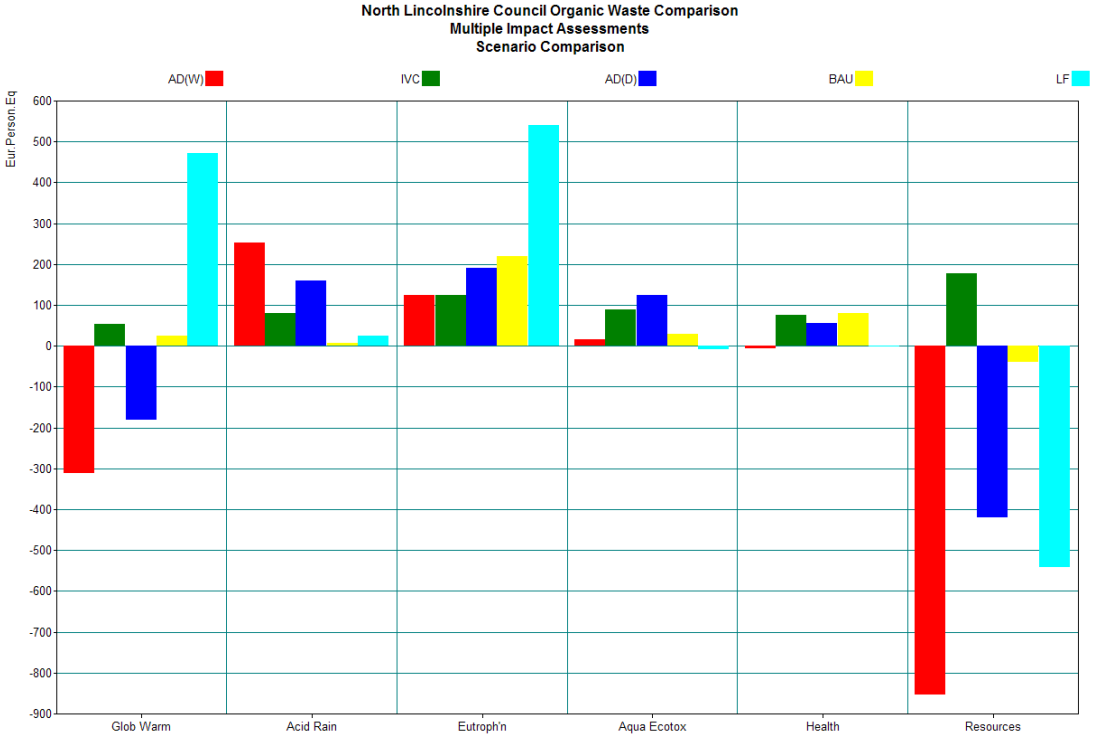


Table 5.7: Normalised organic treatment results

Impact Assessment		AD(W)	IVC	AD(D)	BAU	LF
	Unit	Total	Total	Total	Total	Total
climate change: GWP 100a	Eur.Person. Eq	-312	52.9	-181	23.8	472
acidification potential: average European	Eur.Person. Eq	254	79.4	159	7.42	24.6
eutrophication potential: generic	Eur.Person. Eq	123	124	191	219	540
freshwater aquatic ecotoxicity: FAETP infinite	Eur.Person. Eq	15.5	89.8	124	29.4	-8.75
human toxicity: HTP infinite	Eur.Person. Eq	-7.01	76.3	55.4	80.1	-1.99
resources: depletion of abiotic resources	Eur.Person. Eq	-853	177	-420	-38.3	-541

5.1.3 Recycling

The impact of the recycling system has been assessed using WRATE. This is based on data obtained from wastedataflow that the Council produces for the government, and the mass-flow modelling undertaken as a

part of the study. No major changes to this are envisaged in the life-span of the strategy, so this has been compared with the 'do nothing' scenario of landfilling. Figure 5.3 and Table 5.8 illustrate the improvements that have been made in the Council's management.

Figure 5.3: Recycling WRATE results

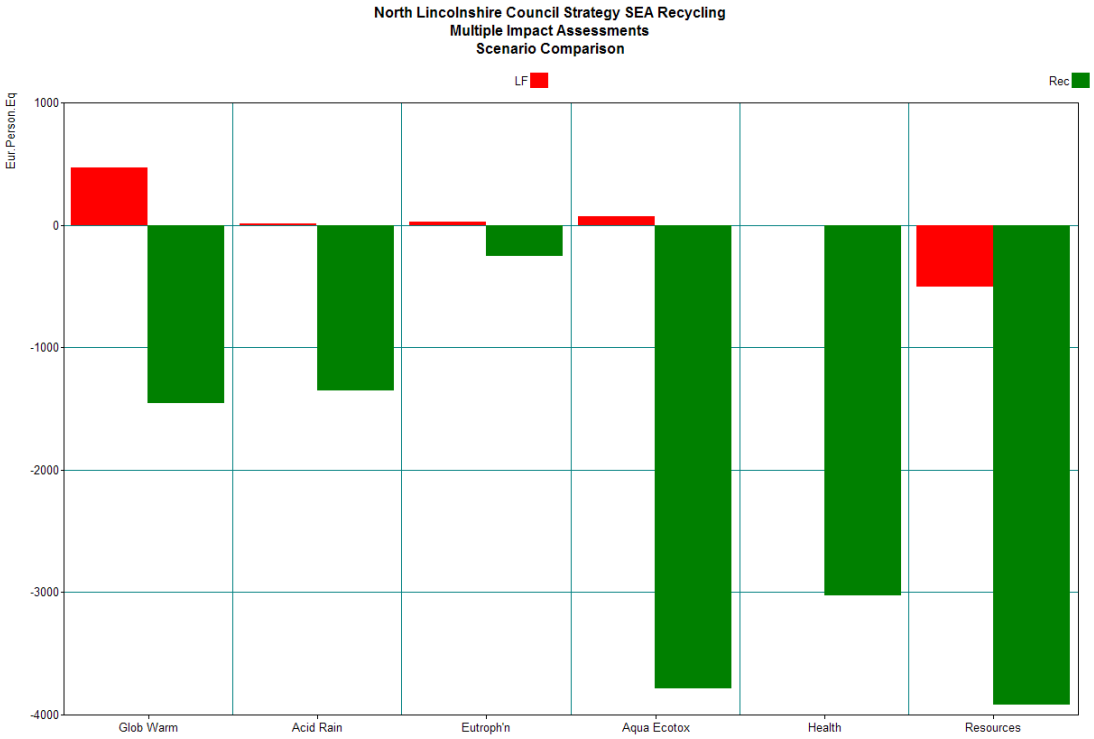


Table 5.8: Normalised WRATE results for recycling

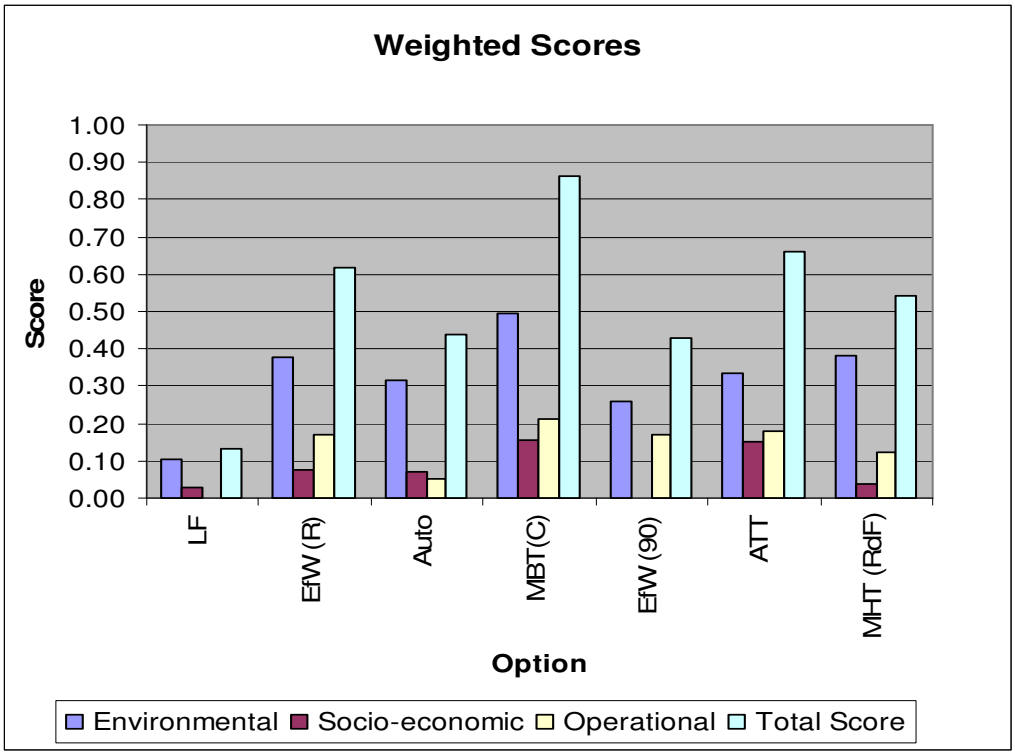
Impact Assessment		LF	Rec
	Unit	Total	Total
climate change: GWP 100a	Eur.Person.Eq	483	-1,495
acidification potential: average European	Eur.Person.Eq	15	-1,390
eutrophication potential: generic	Eur.Person.Eq	31	-260
freshwater aquatic ecotoxicity: FAETP infinite	Eur.Person.Eq	71	-3,902
human toxicity: HTP infinite	Eur.Person.Eq	0	-3,125
resources: depletion of abiotic resources	Eur.Person.Eq	-519	-4,021

5.2 Preferred Strategic Options

5.2.1 Residual Waste

The outcome of the BEO assessment is that the best scoring technology type is MBT based within the Borough. Of the other options, EfW within the region and advanced thermal treatment score highly, a sensitivity analysis indicating that these are difficult to differentiate.

Figure 5.4: Weighted scores for the EOA assessment



It should be noted that all of the major options score significantly higher than the 'do nothing' option of landfill, which in practical terms does not fulfil many of the objectives required and therefore scores very poorly. The assessment shows the benefits of situating plants within the County and gives an indication of the benefits of applying the 'proximity principle' to the choice of waste technology used.

The study also shows that although MBT is the highest scoring option, options which provide a means of generating electricity also score highly, particularly if situated within the Borough. This gives a range of options which are acceptable in practical terms, and which will have demonstrable benefits to the Borough as a whole.

5.2.2 Organic Waste

AD shows greater benefits than IVC due to the generation of electricity making the process less impacting on the environment. IVC shows a slightly worse performance overall than the 'business as usual option'. This is mainly due to the relatively high energy usage of IVCs. Currently food waste is sent to landfill along

with the residual waste element. However, the analysis shows that treatment of the food waste in an AD facility would reduce the environmental impact of the management of the food waste.

5.2.3 Recycling

This EOA assessment has demonstrated that the Council has made environmental improvements by choosing their current recycling strategy over the 'do nothing' scenario of sending all waste to landfill.

5.2.4 Action Plan

Procuring a residual and organic waste treatment services is a high priority in the short-term action plan for the Council. In the case of organic wastes, the green waste element is currently treated by windrow composting, but a substantial quantity of food waste is landfilled with the residual element. Although the LATS system has been abolished there is still a need to secure a solution which allows the Council to gain revenues and other benefits, such as carbon reduction. The EOA assessment shows that these options would reduce the environmental impact of the management of these waste streams. This will, also 'future proof' the Council against any changes to the landfill tax regime.

MBT, EfW and ATT have been taken forward into the SEA assessment for the residual waste treatment options. The AD treatment option for food waste has also been taken forward, along with enhanced kerbside collection to collect food waste separately from the residual waste stream.

6. Appraisal of the Municipal Waste Management Strategy

6.1 Assessment Process

For the assessment of the preferred options from the MWMS a structured approach was adopted. Firstly the options were appraised in draft form by a member of the Mott MacDonald technical team. This assessment was then subjected to a peer review using a number of specialists within the Mott MacDonald waste management team, and SEA teams. The revised assessment was then appraised by the North Lincolnshire Council waste management team before being finalised. In this way the assessment had the input and buy-in from the key members of the technical teams.

The scoring protocol used is shown in Table 6.1;

Table 6.1: Scoring protocol

++	Significant positive effect
+	Marginal positive effect
0	Neutral or no effect
-	Marginal negative effect
- -	Significant negative effect
D	Effect depends on implementation
	Uncertainty over effect

6.2 Appraisal Results

The full appraisal results matrices are presented in Appendix C. Table 6.2 below provides a summary of the appraisal results for each of the five MWMS preferred options for the 3 main services, which have been assessed against the SEA objectives detailed in Section 4.5.

The appraisal has been conducted, for clarity on the preferred options outlined in the MWMS. The 'do nothing' scenario has not been included as a) this has been assessed separately in Section 4.3. b) The results of this show that this is extremely detrimental to the environment in all respects and c) the 'do nothing' option will not be enacted in practice due to statutory considerations regarding the diversion of wastes from landfill and recycling targets. The assessment therefore compares the 'do something' options in a more transparent and relevant manner.

Table 6.2: Assessment table

Topic	Residual Waste			Recycling	Organic waste
	MBT	EfW	ATT	Enhanced Kerbside Collection (Food)	AD
Biodiversity and geo-diversity	0	0	0	0	0
Population and human health	+	+	+	+	+
Land resources	++	++	++	++	++
Water and flood risk	0	0	0	0	0
Air quality	0	-	0	+	-
Climate change	++	++	++	++	++
Material assets	++	++	++	+	++
Built heritage	D	D	D	D	D
Landscape	D	D	D	0	D

Source: Appendix 3

Overall the assessment shows that there are considerable benefits in adopting the measures outlined in the MWMS. These are further evidenced by the results from the WRATE analysis conducted during the Environmental Options Appraisal. It showed that the main benefits lie in reduced carbon footprint, and reduced impact on resources due to enhanced recycling and the recovery of energy. The main areas that may show a small impact lie in air quality, as a result of increases in some ozone depleting chemicals and in the production of odours during the use of digestate generated through anaerobic digestion. However, these are both very small compared to the environmental benefits, and would be strictly regulated through the planning system and via regulations such as the waste incineration directive (WID) and the industrial emissions directive (IED).

6.3 Risks, Uncertainties and Assumptions

The assessment has been undertaken at a high level on strategic policy. There is some degree of uncertainty about the manner in which the measures outlined will be adopted. This is due to the delivery of some of the options being dependent upon the commercial market, and other financial issues such as budgetary constraints. Where the MWMS refers to a collective set of initiatives/actions rather than specific details of individual schemes/actions an assumption about the predicted effects has been taken based on the nature of the collective initiatives/actions.

The assessment has been undertaken by independent consultants with specialist knowledge on the environmental, social and economic aspects of the implementation of waste management strategies. However, because of the nature of the assessment is a high level qualitative assessment a degree of subjectivity remains. The assessment has assumed that all actions listed in the MWMS are adopted in the manner outlined in the Action Plans, and that due consideration is given to the outcome of the SEA/SA appraisal and its recommendations.

7. SA/SEA Mitigation and Enhancement

7.1 Mitigation and Enhancement Measures

Implementation of the MWMS will have both positive and negative effects. Table 7.1 sets out mitigation and enhancement measures that were suggested during the assessment process. Implementation of these measures could further enhance the sustainability performance of the MWMS and help to mitigate against negative effects.

The mitigation and enhancement measures suggested have been grouped according to which waste management option they apply. Many of the suggested measures are detailed measures which should be implemented during construction, operation and maintenance of the proposed schemes/actions. These measures could also be incorporated into the MWMS Action Plan.

Table 7.1: MWMS Delivery

Option	Mitigation/Enhancement
MBT	1) Locate plant on brown field land within the county if possible 2) Ensure that the procurement process highlights high levels of energy production and/or the most beneficial use of fuels 3) Consider using a scheme such as CEEQUAL to ensure a high quality of construction sustainability is adopted for the whole project 4) Provide opportunities for visitors and community engagement, particularly schools and other educational institutions
EfW	1) Locate plant on brown field land within the county if possible 2) Ensure that the procurement process highlights high levels of energy production and/or the most beneficial use of the biogas such as vehicle fuels or gas grid injection 3) Consider using a scheme such as CEEQUAL to ensure a high quality of construction sustainability is adopted for the whole project 4) Provide opportunities for visitors and community engagement, particularly schools and other educational institutions
ATT	1) Locate plant on brown field land within the county if possible 2) Ensure that the procurement process highlights high levels of energy production and/or the most beneficial use of the biogas such as vehicle fuels or gas grid injection 3) Consider using a scheme such as CEEQUAL to ensure a high quality of construction sustainability is adopted for the whole project 4) Provide opportunities for visitors and community engagement, particularly schools and other educational institutions

Option	Mitigation/Enhancement
Enhanced Recycling	1) Ensure that implementation of this option is concurrent with enhanced public awareness, such as 'Love Food Hate Waste' and other similar campaigns 2) Integrate changes with other service changes where possible, to maximise value from communications campaigns
AD	1) Locate plant in areas away from sensitive receptors to avoid nuisance from odours, and within the county if possible. 2) Ensure that the procurement process highlights high levels of energy production and/or the most beneficial use of the biogas such as vehicle fuels or gas grid injection 3) Consider using a scheme such as CEEQUAL to ensure a high quality of construction sustainability is adopted for the whole project 4) Provide opportunities for visitors and community engagement, particularly schools and other educational institutions

8. Conclusions and Recommendations

8.1 Conclusions

The SA/SEA process has been integrated into the development of the MWMS. In particular, the development of the preferred options for the three main services of residual waste treatment, organic waste treatment and recycling have been considered, in addition to the development of an Action Plan. Overall it has demonstrated the predicted effects of implementing the North Lincolnshire MWMS on several levels. At a high level, the impact has been assessed conceptually within this document by using the topics and sustainability issues outlined through the SEA consultation process. These have been developed and integrated into the process that has identified the preferred options within the MWMS document itself. This has been demonstrated, through the use of WRATE studies, which show that the benefits of adopting the measures outlined for the delivery of the residual, recycling and organic waste services will improve their overall environmental impact considerably when compared to a baseline scenario.

Some measures outlined in the MWMS are likely to have some limited negative effects such as for the emission of some ozone depleting chemicals and the possibility of nuisance occurring due to odours. In terms of habitat loss and heritage assets, the overall effect should be neutral as there are a number of measures (mostly statutory) that will ensure that net effect on these is zero.

For issues such as waste generation and resource use, there will be major benefits to the adoption of the measures indicated in the MWMS and action plan. Furthermore, mitigation and enhancement measures have been recommended to help enhance and reduce the predicted effects of implementing the MWMS.

8.2 Recommendations

A number of mitigation and enhancement measures were suggested as a result of the assessment. These are presented in Chapter 7. Measures specific to policy wording within the MWMS have been taken forward into recommendations. The other measures detailed in Chapter 7 should be taken forward for the Action Plan and incorporated in the future implementation of the schemes/actions in the MWMS.

Recommendations for changes to the MWMS document are outlined below. As the two documents have been developed together, the focus is on ensuring that there is greater clarity on the integration of the two documents.

8.2.1 Recommendations for Changes to MWMS Document

Following the review of the MWMS through SEA/SA process there are no major changes recommended. The following minor modifications are proposed:

Recommendation 1: Revise the title of the document i.e. ‘Municipal Waste Management Strategy’

Reason for Recommendation 1: Changes in legislation and definitions means that the correct terminology should be adopted throughout the two documents.

Recommendation 2:	Make reference to the SEA/SA process and Environmental Report in the Executive summary of the strategy document to highlight the process of finalising and adopting the strategy.
Reason for Recommendation 2:	Greater clarity of the relationship with the SEA/SA process
Recommendation 3:	Add paragraph in Introduction explaining SEA/SA integration with study
Reason for Recommendation 3:	Greater integration of the two documents

9. Implementation and Monitoring

9.1 Links to Other Tiers of Plans, Programmes and the Project Level

The North Lincolnshire MWMS helps to deliver and supports several local national plans and waste management targets including those in the Waste Strategy 2007 and its anticipated update and the "Government Review of Waste Policy in England 2011".

The MWMS has been assessed at a high strategic policy level. It should be noted that Specific schemes detailed in the MWMS may be subject to an Environmental Impact Assessment under the Town and Country Planning (Environmental Impact Assessment) (England and Wales) Regulations 1999 (as amended). Requirements for EIA will be determined on a scheme by scheme basis once the scheme is at the stage to be taken forward.

9.2 Proposals for Monitoring

Monitoring the significant sustainability effects of implementing the MWMS is an essential ongoing element of the SA/SEA process. Monitoring ensures that the identified SA/SEA objectives are being achieved, allows early identification of unforeseen adverse effects and, if necessary, allows appropriate remedial action can be taken. Monitoring will be an important requirement to measure performance and ensure the MWMS is being successfully implemented. Indicators and baseline information for each of the SA/SEA objectives is presented in Section 4.5.

Where possible, indicators have been assigned to each of the SEA/SA objectives and the baseline data indicated. Where a specific baseline is not available, a baseline that can be developed during the implementation of the strategy has been suggested. Generally, for other similar SEA/SA studies the development of the baseline data and the indicators have been identified that will ensure that the following impacts will be mitigated;

- A likely breach of international, national or local legislation, recognised guidelines or standards;
- Irreversible damage, with a view to identifying trends before such damage occurs; or,
- Were subject to uncertainty in the SA/SEA and where monitoring would enable prevention or mitigation measures to be taken.

Table 9.1: Monitoring Proposals

North Lincolnshire Waste Management SA/SEA Objective	SA/SEA Indicators	Baseline (and year)	Data Source	Responsibility for Monitoring
1. To protect and enhance the biodiversity and geo-diversity of the North Lincolnshire MWMS sites, in particular designated sites and habitat enhancement.	Improved local biodiversity – proportion of local sites where positive conservation management has been or is being implemented (NI 197) http://www.lincsbiodiversity.org.uk/docs/About_Us/LBP%20Annual%20Review%202008-2009.pdf Condition and extent of designated areas Area of new habitat created or enhanced	29 SSSIs 2 SACs 2 SPAs 2011 Humber Estuary is a designated Ramsar site. Contains 2 National Nature Reserves and 10 Local Nature Reserves. The Humber Estuary site qualifies under Article 4.1 and 4.2 of the Directive (79/409/EEC) by supporting populations of European importance, including migratory species.	North Lincolnshire Core Strategy, 2011	DCLG (North Lincolnshire Council)
	Number and % area of land designated as a SSSI within North Lincolnshire which is: favourable unfavourable recovery unfavourable no change unfavourable declining destroyed / part destroyed	http://www.sssi.naturalengland.org.uk/Special/sssi/report.cfm?category=C,CF Favourable 15 Unfavourable declining 29 Unfavourable no change 11 Unfavourable recovering 63 Destroyed/ Part Destroyed	Natural England, Sites of Scientific Interest Reports and Statistics	Natural England

2. To facilitate job creation, economic growth and regeneration through investment in the area and protection of local amenity. **3. To promote safe and healthy communities and community involvement, particularly with regard to fly-tipping litter, encourage pride in local community and reducing crime and anti-social behaviour.**	Number of incidences of fly-tipping. NI 195 Improved street and environmental cleanliness (levels of litter, detritus, graffiti and fly posting) NI 196 Improved street and environmental cleanliness – fly tipping Defra DSO Level of crime and anti-social behaviour incidents such as fly-tipping Number of public/community events Opportunities for school, college university visits, creation of education packs Job creation	1082 incidences of fly-tipping in 2009-2010, Defra. 1,285 in 2010/11.	flycapture database by the Local Authorities (2009-2010)	North Lincolnshire Council
4. To ensure prudent use of land and resources in particular relation to contaminated land remediation and development on Brownfield sites. **5. To promote recycling and reuse within the community and encourage sustainable waste management.**	Area of brownfield land in North Lincolnshire MSW recycling/composting rate, WasteDafaFlow Household waste generation rate (kg/capita/year) Contaminated land is remediated, no further contamination, % development of Brownfield land being redeveloped Area of land regenerated % recycling and re-use	Areas Outlined in; Waste and Minerals Plan, Draft Development Plan Document 1997: number of former and current industrial land uses that could have the potential to contaminate: approximately 1021 sites. 2010/11 data: household waste generation rate of 541 kg/capita/year. Separate collection and recycling rate is 52%.	2001 North Lincolnshire Council, Land Inspection Strategy. North Lincolnshire Council	North Lincolnshire Council

6. Protect water quality in line with the Water Framework Directive and minimise the risk from flooding.	Waterbody status: percentage at good status overall – chemical and ecological Number of planning permissions granted contrary to Environment Agency advice on flooding and water quality grounds (Major transport applications) (LDF Core indicator E1) Current water quality standards maintained and WFD requirements met No additional increase in flood risk from any source Number and severity of flooding incidents Overall water used reduced or been maintained	Waterbody status of waterbodies in the Louth, Grimsby and Ancholme catchment: 23% Lower Trent and Erewash catchment:5% (2009) 400,000 people are at risk from flooding including key industry, business and agriculture (2008). Groundwater is classified as ranging between good and poor in accordance with EA mapping. Grimsby, Ancholme and Louth chalk unit currently have poor drinking water levels (EA, 2010) Groundwater's Source Protection Zones are shown in Figure 4.10.	LDF Annual Monitoring Reports, North Lincolnshire Council / EA website - high level target 5 development and flood risk Environment Agency River Basin Management Plan, Humber River Basin District (2009)	North Lincolnshire Council
7. To improve and/or retain current air quality in accordance with current legislation.	Number of AQMAs in North Lincolnshire (LTP Indicator 8) Air quality targets are met	2 (2012). See air emissions in Table 4.12.	North Lincolnshire Council website	North Lincolnshire Council
8. Mitigate against climate change through reducing CH4, CO2 and other greenhouse gases, and materials with low embodied carbon. **9. To ensure adaptation and resilience to the impacts of climate change.**	Per capita reduction in CO2 emissions in the local authority area (NI 186) Climate change adaptation measures adopted to ensure developments climate change resilient	The area has high individual industrial emitters of CO2, including oil refineries, steelworks, power stations and port operators (2008). Currently North Lincolnshire is placed at the bottom of the National Indicator 186 League (table per capita CO2 emissions) which is in part due to the area's industrial heritage but over 25% of the emissions come from the housing stock. WRATE studies to determine per capita CO2 form waste management activities (2012)	Places Analysis Tool, DCLG North Lincolnshire Council	DCLG (North Lincolnshire Council) North Lincolnshire Council

10. To minimise local transport impacts from the transport of waste in accordance with proximity principle and reduction in waste to landfill. **11. To increase the energy efficiency of the waste management process using energy from waste, and energy used from the process for the electricity to the grid or to power the site,** **12. To further minimise costs of waste management.**	Waste traffic flow counts and destination	Relatively low traffic flow (see Table 4.15). There are only a minor amount of motorway routes present, largely due to rural nature.	North Lincolnshire Council	North Lincolnshire Council
	Energy efficiency - monitor the energy usage and production of the waste management facilities employed through the contract and monthly data reporting – WRATE studies used as a benchmark for the WMS going forwards (2012)	Current Council energy usage data as reported internally WRATE baseline studies (2012)		
	Costs of wastes management- monitor the transport/ treatment and disposal costs baseline costs outlined in the MWMS documents, and data reported via wastedataflow (2012)	Costs studies in MWMS document – reported cost data to wastedataflow		
13. To conserve those elements which contribute to the significance of heritage assets including their settings.	Access to and condition of cultural heritage assets is maintained	Rights of way database and definitive maps 320 miles of Public Rights of Way (2012)	North Lincolnshire Council	North Lincolnshire Council
	Heritage at Risk Register	Assets in North Lincolnshire s being at risk through neglect or decay: 2 high-Grade buildings; 14 Scheduled Monuments (this equates to 31% of all those in North Lincolnshire); 2 Conservation Areas; and 3 Listed Places of Worship. (2011)	English Heritage	English Heritage

14. To improve or conserve landscapes and townscapes.	Improved street and environmental cleanliness:		Places Analysis Tool, DCLG	DCLG (North Lincolnshire Council)
	litter	4%		
	detritus	7%		
	graffiti	4%		
	fly-posting	0%		
	(NI 195)	(2008/09)		
	Level of landscape affected either positively through enhancement or negatively through degradation (proportion of allocation which are judged at planning application stage as likely to have a neutral or positive impact on the landscape)	1082 incidences of fly-tipping in 2009-2010.		

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Appendices

Appendix A. Scoping Report Comments/ Amendments

Appendix B. Polices, Plans, Programmes and Environmental

Pertinent Plan/Policy and Legislation
International
Waste Framework Directive (75/442/EEC)
Landfill Directive (1999/31/EEC)
Air Quality Directive (2008/50/EEC
EC Water Framework Directive (2000/60/EEC)
EU Industrial Emissions Directive (2010/75/EU)
Directive on the incineration of waste (2000/76/EC)
National
Natural Environment White Paper (2011)
National Planning Policy Framework (2011)
Planning Policy Statement (PPS) 10: Planning for Sustainable Waste Management (2011)- still relevant until replaced in 2013
Climate Change Act (2008)
Waste Strategy for England (2007)
Government Review of Waste Policy in England (2011)
Waste (England and Wales) Regulations 2011
Environment Agency Groundwater Protection: Policy and Practice (GP3), Part 4- Legislation and Policies (particularly Part 4, solid waste management)
Sustainable Communities Plan – Sustainable Communities: Building for the Future (2003)
Regional
Regional Spatial Strategy for Yorkshire and Humber Regional Spatial Strategy (RSS) – adopted May 2008
Environmental report on the revocation of the Yorkshire and Humber Plan
Yorkshire and Humber Environmental Enhancement Strategy 2008 – 2013
Shoreline Management Plan 3: Flamborough Head to Gibraltar Point
River Basin Management Plan, Humber River Basin District (2009)
Lincolnshire Biodiversity Action Plan
Green Infrastructure Strategy
Grimsby and Ancholme Catchment Flood Management Plan (CFMP)
River Trent CFMP
Grimsby, Ancholme and Louth Catchment Abstraction Management Strategy (CAMS)
Lower Trent and Erewash CAMS
Idle and Torne CAMS
Water company resource management plans
Local
North Lincolnshire Core Strategy DPD (Adopted June 2011)
North Lincolnshire Local Plan (Adopted May 2003)
Supplementary Planning Guidance for Industrial Development (Adopted May 2003)
North Lincolnshire Strategic Plan 2009 – 2012 (Published May 2009)

Pertinent Plan/Policy and Legislation
Local Transport Plan 2011 to 2026
North Lincolnshire Council's Municipal Waste Strategy 2008 – 2025 (September 2008)
Sustainable Community Strategy 2006
North Lincolnshire Rights of Way Improvement Plan

Appendix C. Options Appraisal Results

Appendix D. EOA Compatibility Matrices (Section 5)

Table D.1: Compatibility of Tables 5.2 to 5.3

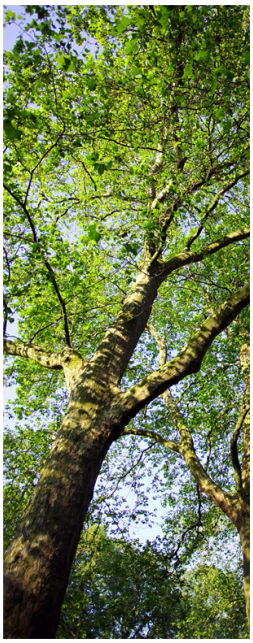
	1. To ensure prudent use of land and resources	2. To reduce greenhouse gasses	3. To minimise air quality impacts	4. To conserve landscapes and townscapes	5. To protect local amenity	6. To minimise adverse effects on water quality	7. To minimise local transport impacts	8. To provide employment opportunities	9. To provide opportunities for local education and participation	10. To minimise costs of waste management	11. To ensure reliability of delivery	12. To conform with waste policy
Biodiversity	✓			✓								✓
Flora	✓			✓								✓
Fauna	✓			✓								✓
Population				✓				✓	✓			✓
Human Health							✓		✓			✓
Soil	✓			✓								✓
Water						✓						✓
Air		✓	✓				✓					✓
Climatic Factors		✓										✓
Material Assets				✓	✓					✓	✓	✓
Cultural Heritage (including architectural and archaeological heritage)					✓						✓	✓
Landscape				✓							✓	✓

Table D.2: Compatibility with the Assessment Matrix (Appendix C and Section 6.2)

	1. To ensure prudent use of land and resources	2. To reduce greenhouse gasses	3. To minimise air quality impacts	4. To conserve landscapes and townscapes	5. To protect local amenity	6. To minimise adverse effects on water quality	7. To minimise local transport impacts	8. To provide employment opportunities	9. To provide opportunities for local education and participation	10. To minimise costs of waste management	11. To ensure reliability of delivery	12. To conform with waste policy
1. To protect and enhance the biodiversity and geo-diversity of the North Lincolnshire MWMS sites, in particular designated sites and habitat enhancement.	✓	✓	✓		✓	✓	✓				✓	✓
2. To facilitate job creation, economic growth and regeneration through investment in the area and protection of local amenity.	✓				✓			✓	✓			✓
3. To promote safe and healthy communities and community involvement, particularly with regard to fly-tipping litter, encourage pride in local community and reducing crime and anti-social behaviour.					✓			✓	✓		✓	✓
4. To ensure prudent use of land and resources in particular in relation to contaminated land remediation and development on Brownfield site.	✓	✓		✓	✓				✓	✓		✓
5. To promote recycling and reuse within the community and encourage sustainable waste management.									✓			✓
6. Protect water quality in line with the Water Framework Directive and minimise the risk from flooding.					✓	✓					✓	✓
7. To improve and/or retain current air quality in accordance with current legislation.			✓				✓				✓	✓
8. Mitigate against climate change through reducing, CH_4, CO_2 and other greenhouse gases, and materials with low embodied carbon.		✓	✓				✓			✓		✓
9. To ensure adaptation and resilience to the impacts of climate change.		✓	✓	✓			✓					✓

	1. To ensure prudent use of land and resources	2. To reduce greenhouse gasses	3. To minimise air quality impacts	4. To conserve landscapes and townscapes	5. To protect local amenity	6. To minimise adverse effects on water quality	7. To minimise local transport impacts	8. To provide employment opportunities	9. To provide opportunities for local education and participation	10. To minimise costs of waste management	11. To ensure reliability of delivery	12. To conform with waste policy
10. To minimise local transport impacts from the transport of waste in accordance with proximity principle and reduction in waste to landfill.		✓					✓					✓
11. To increase the energy efficiency of the waste management process using energy from waste, and energy used from the process for electricity to the grid or to power the site.		✓				✓					✓	✓
12. To further minimise costs of waste management.	✓		✓					✓		✓	✓	✓
13. To protect and enhance built heritage and archaeological assets within the MWMS sites.	✓			✓	✓	✓						✓
14. To improve or conserve landscapes and townscapes.	✓		✓	✓	✓	✓	✓					✓

Appendix E. North Lincolnshire Council MWMS


Municipal Waste Management Strategy

Strategic Environmental Assessment Implementation Document

August 2012
North Lincolnshire Council

Mott MacDonald

Municipal Waste Management Strategy

Strategic Environmental Assessment Implementation Document

August 2012

North Lincolnshire Council

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Content

Executive Summary

The purpose of this document is to describe how the Strategic Environmental Assessment of the North Lincolnshire Municipal Waste Management Strategy (MWMS) document has been incorporated into the strategy itself together with the outcomes of the consultation processes accompanying the development of both documents.

It is intended to demonstrate how the information in the Environmental Report and the responses to consultation have been taken into account during the preparation of the strategy before the final decision is taken to adopt it.

This report also describes how environmental considerations have been integrated into the municipal waste management strategy, and shows how the strategy has evolved in the light of this and the changes and alternatives rejected.

The document also describes how monitoring will be carried out during the implementation of the MWMS. This document, together with the Municipal Waste Management Strategy document and the Strategic Environmental Assessment/ Sustainability Appraisal document will be made available to the public and other stakeholders as part of the Council's formal adoption of the new Municipal Waste Management Strategy.

1. The Environmental Report/ Municipal Waste Management Strategy Relationship

The Environmental Report was conducted to identify the potential impacts to the environment as a result of the adoption of a new Municipal Waste Management Strategy (MWMS) by North Lincolnshire Council. This is intended to establish the way forwards for the Council's delivery of this important service from the present time to the end of 2029/30.

The Council is at a crossroads in terms of the delivery of this service. In recent years it has seen recycling levels rise to just below 50% in 2011 from a level of 22% ten years earlier. This has been the product of fundamental changes to the collection of recyclables by the householders of North Lincolnshire since the implementation of current kerbside recycling system. With ambitious targets set to reach 60% by 2020, there is now a need to develop the residual waste and organic waste services, and to bring about a similar step-change in service provision.

It is vital that the technologies chosen to do this are the right ones for the Council. They should enable the Council to deliver the new services in the most environmentally sustainable manner possible, ensuring that facilities are properly sited, properly sized and treat the Council's wastes in the way that suits the wider stakeholder base and the environment as a whole.

This is the rationale behind developing the new MWMS and the Strategic Environmental Assessment/ Sustainability Appraisal (SEA/SA) study together so that the greatest benefits can be realised by adopting an integrated approach.

1.1 Drafting of the MWMS and SEA/SA documents

The MWMS and the SEA/SA have been developed together in order to enable the assessment of the various waste management options to utilise the latest thinking in the field of sustainability appraisal. The strategy document is a revision of an earlier document that was produced in 2008. The original document used a Best Environmental Option methodology that was based upon the current guidance at the time together with a number of data sources and tools which were used to inform the Environmental Options Appraisal (EOA) process, notably the Life Cycle analysis tool 'WISARD'.

Since this document was produced the guidance for SEA appraisals has expanded the number of topics that are considered, and new tools are available to assess the options available such as WRATE, the Environment Agency's new Life Cycle Analysis tool, which has replaced 'WISARD'.

The new MWMS has been developed using these new tools, taking into account the changes that have taken place in the intervening 5 years to the waste management industry as a whole, and particularly the local market for treatment technologies.

1.2 Consultations

Throughout the development of the MWMS and the SEA/SA there have been a number of consultations at each stage. In addition to the statutory consultations with the Environment Agency, English Heritage and English Nature, considerable discussions have been held within the project group, consisting of the external technical advisors and the technical team, together with authority officers from other departments not involved in the drafting of the documents, elected members and members of the public. The public was engaged by making the MWMS document available for comment, during the 5 week consultation period using the Council's web portal. No responses were received during this consultation.

1.2.1 Scoping Report

At the SEA scoping stage a number of comments were received from statutory consultees in April to May 2012. These related mainly to the sources of information such as the databases held by the statutory bodies on the built heritage, nature conservation and other sources of information. As the information sources are of key importance in monitoring and effecting change in the environment, all of the suggested amendments and additions were incorporated in the Environmental Report, which was developed from the SEA scoping report. A record of the changes made together with the comments was incorporated as Appendix A of the Environmental Report which was the subject of a further period of consultation in July to August 2012.

1.2.2 Environmental Report

The Environmental Report, which was developed from the scoping report, assessed the impacts on the environment of the new MWMS. In developing the document all of the suggestions from the statutory consultees where acted upon, which was acknowledged in the feedback from the second phase of consultation by English Nature and the Environment Agency.

The results of the second stage consultation on the Environmental Report (included in the Appendix of this document) showed that the Environment Agency and Natural England were satisfied that the first stage consultation had been acted upon satisfactorily, with no further feedback from either of these consultees.

It was suggested by English Heritage that the evaluation of the impact should be altered to a score of 'D' meaning that it was their opinion that there was still a small risk that may be apparent due to the manner in which the strategy was developed. It was noted in the original document that the statutory process should provide sufficient protection.

This comment has been taken on board and has been acted upon. The final version of the Environmental Report has included this change to the scoring in Table 6.2 (p75), the full tables provided in Appendix C of the document, and the text elsewhere amended accordingly. It should be noted that this change does not affect the overall strategy document as this has been written from a principle of favouring options that have a minimal impact on all of the impacts to the environment, including on the built environment.

It should also be mentioned that the assessment of the risk to the built environment is small, and that there are a number of measures within the statutory process and in the delivery of the strategy that should help to protect the built environment.

1.3 Environmental Considerations, and their Incorporation in the Municipal Waste Management Strategy

As the two documents, the MWMS and the SEA/SA document have been developed together from the outset, the Environmental Report and the process that gave rise to it have had a considerable influence on the way in which the studies undertaken in the MWMS have been conducted, and on the strategy itself.

The development of the MWMS has been done on the basis of providing a sound evidence base for the decision making process. In order to do this a process of identifying and assessing the various options has been undertaken.

These are described in Chapter 4 of the MWMS and detailed extensively in Appendix F. The methodology derived from the SEA assessment guidance is designed to;

- Identify suitable waste treatment options;
- Assess the options on the basis of best available data sources;
- Evaluate the short listed technical options; and
- Develop a set of Preferred Options, which can be taken forwards in the delivery of the new waste management strategy.

Amongst the tools used, the EOA matrix analysis has been developed to ensure that each of the critical factors to the SEA is considered individually and given its appropriate weighting in the assessment phase.

This has been done by ensuring that there has been buy-in of the key stakeholders in the Council when developing the weightings and assessment criteria.

This means that the development of the MWMS is integrated fully with the SEA/SA assessment process, as they are drawing on the same datasets, are using the same assessment criteria, and the whole process has been tailored to the needs of North Lincolnshire Council in terms of its wider aspirations and specific waste management targets.

The development of the MWMS has been designed to utilise the principles of the SEA/SA process throughout its development. As the waste management system is an ‘environmental system’ as such there is a close relationship between the two, in terms of the tangible effects on the environment of the Council’s waste management services and the ability to measure and predict effects such as emissions to air, landfill of materials and the generation of recyclables.

The opportunity presents itself to ensure that the SEA criteria identified becomes an integral part of the assessment of the options; this approach was taken in the development of the North Lincolnshire MWMS.

1.4 Development of the EOA methodology

The EOA methodology was developed from a standard weighted matrix analysis methodology employed in EOA studies. A key part of this is that all of the criteria being studied are assessed and weighted according to their relative importance. The weightings are derived from stakeholder engagement and other studies such as workshop sessions with the Council's technical staff and elected members.

This ensures that the correct importance is given to the various factors being studied, and means that the preferred options that are derived from the process are capable of fulfilling the needs of the strategy technically and the environment as a whole by mitigating the environmental risks as far as possible.

1.5 Studies Undertaken

1.5.1 WRATE

The Environment Agency's 'WRATE' Life-Cycle Analysis tool has been used to inform the EOA matrix analysis of the options. This software tool allows the environmental impact of the technologies being studied to be calculated. It can therefore provide an empirical basis for the evaluation of; global warming potential, air acidification, aquatic eutrophication, human toxicology, aquatic ecotoxicology and resource depletion.

Other data contained within the WRATE datasets such as the footprint of the technologies has also been used in assessing the land take and other factors that feature in the SEA process. It means that the impacts to air, land and water can be assessed at the same time. This is in addition to other impacts such as socio-economic factors and the way that these impact on the environment as a whole including wildlife and on the built environment in terms of development opportunities and the latent risks that these may have within them to built heritage, for example.

1.5.2 Mass Flow Modelling/ Cost Modelling

Other studies which have been used to assess the waste treatment options are the use of mass flow and costs modelling studies, which have been used to assess the overall socio-economic impact of the new MWMS. The scale of plants and their ability to provide spin-offs in terms of education and employment have also been used to inform the EOA process. These have been substantially influenced by the methodology employed which is based on the SEA/SA process.

1.5.3 Market Studies

The knowledge of the waste management market in the area generally has been incorporated into the development of the strategy. This has included the developments locally since the draft waste management strategy was developed. These have included the development of facilities in and around the County and submissions for planning permission of facilities that may influence the delivery of the strategy, together with the procurement projects that the Council has undertaken in recent years regarding collection, residual and organic waste treatment. In all of these there have been many

issues that have arisen affecting land use issues, nature conservation and the whole range of other environmental impacts including the proximity of plants, regional development and air quality issues.

1.6 EOA Scoring

All of the studies have influenced the EOA scoring methodology. The underlying principle in all of the assessments is that a lower level of environmental impact or risk equates to a higher score (more favourable). As mentioned previously the overall methodology is based upon an established methodology and the weightings of the individual criteria have been established via extensive consultation over a substantial period of time. This is detailed in the MWMS report. The consultations have included the full range of stakeholders, including the public, internal North Lincolnshire staff and the elected members.

The EOA study, together with the other studies, have allowed the identification of preferred options for the treatment, collection and recycling of municipal solid wastes.

Recycling: with respect to recycling it has been identified that the current collection system in operation has played a major role in raising recycling levels to the current high level of performance and that no major changes are anticipated to this service in the life-span of the MWMS, other than the possibility of introducing segregated food waste collection if practicable.

Organic waste: it was identified that the adoption of anaerobic digestion for the treatment of organic wastes would be preferable, but this would be subject to market forces, and the availability of third party waste in the area. It is an option that will be explored in the next few years.

Residual waste: it was identified that this is an area that needs to change substantially with the intention to procure a facility as soon as practicable. The technology options have been identified as being a small energy form waste plant or advanced thermal treatment plant, or the option of developing a mechanical biological treatment plant producing a fuel, which was the highest scoring option overall. The Council has a preference for generating electricity from the chosen option.

Facilities located outside of the County are not favoured for reasons of proximity. Increasing the distance increases the environmental impact on air emissions, noise, nuisance and other impacts, which are greatly reduced by locating the facility in the County. Other favourable factors include the increased employment and general socio-economic factors.

Locating the plant in the County also allows the Council to have a far greater control over planning related and land use issues such as the issues surrounding the site selection of a new facility. These include potential impacts to the built environment and heritage and any effects on wildlife and their mitigation.

2. Monitoring

The monitoring aspect of the Environmental Report was considered satisfactory by the statutory consultees and is reproduced below. All of the key data and resources identified by the statutory consultees have been included, and as an additional measure the Council officers have adopted the principle of using the Council's website as a means of continually monitoring the general feedback regarding the performance of the waste management services.

2.1 Monitoring Methodology

Monitoring the significant sustainability effects of implementing the MWMS is an essential ongoing element of the SA/SEA process. Monitoring ensures that the identified SA/SEA objectives are being achieved, allows early identification of unforeseen adverse effects and, if necessary, allows appropriate remedial action to be taken. Monitoring will be an important requirement to measure performance and ensure the MWMS is being successfully implemented. Indicators and baseline information for each of the SA/SEA objectives is presented in Section 4 of the Environmental Report.

Where possible, indicators have been assigned to each of the SEA/SA objectives and the baseline data indicated. Where a specific baseline is not available, a baseline that can be developed during the implementation of the strategy has been suggested. Generally, for other similar SEA/SA studies the development of the baseline data and the indicators have been identified that will ensure that the following impacts will be mitigated:

- A likely breach of international, national or local legislation, recognised guidelines or standards;
- Irreversible damage, with a view to identifying trends before such damage occurs; or,
- Where subject to uncertainty in the SA/SEA and where monitoring would enable prevention or mitigation measures to be taken.

2.2 Revisions and Amendments Post-Consultation

The consultation process on the SEA/SA document was conducted in accordance with the statutory regulations and included the MWMS and accompanying appendices.

The results of the consultation indicated that there were no specific comments on the monitoring methodology, indicating that this is suitable for the purposes of monitoring the impacts of the MWMS. It was suggested during the consultation process that the Council should endeavour to use the internal stakeholders effectively, such as the planning department. It is intended that all of the Council's assets will be used in delivering the strategy, including internal staff and existing communications, such as the feedback via the Council's website, which has also featured in the consultation on the Environmental Report.

Table 2.1: Monitoring Methodology Table (Table 9.1 in the SEA Environmental Report)

North Lincolnshire Waste Management SA/SEA Objective	SA/SEA Indicators	Baseline (and year)	Data Source	Responsibility for Monitoring
1. To protect and enhance the biodiversity and geo-diversity of the North Lincolnshire MWMS sites, in particular designated sites and habitat enhancement.	Improved local biodiversity – proportion of local sites where positive conservation management has been or is being implemented (NI 197) http://www.lincsbiodiversity.org.uk/docs/About_Us/LBP%20Annual%20Review%202008-2009.pdf Condition and extent of designated areas Area of new habitat created or enhanced	29 SSSIs 2 SACs 2 SPAs 2011 Humber Estuary is a designated Ramsar site. Contains 2 National Nature Reserves and 10 Local Nature Reserves. The Humber Estuary site qualifies under Article 4.1 and 4.2 of the Directive (79/409/EEC) by supporting populations of European importance, including migratory species.	North Lincolnshire Core Strategy, 2011	DCLG (North Lincolnshire Council)
	Number and % area of land designated as a SSSI within North Lincolnshire which is: favourable unfavourable recovery unfavourable no change unfavourable declining destroyed / part destroyed	http://www.sssi.naturalengland.org.uk/Special/sssi/report.cfm?category=C,CF Favourable 15 Unfavourable declining 29 Unfavourable no change 11 Unfavourable recovering 63 Destroyed/ Part Destroyed XX	Natural England, Sites of Scientific Interest Reports and Statistics	Natural England

2. To facilitate job creation, economic growth and regeneration through investment in the area and protection of local amenity. **3. To promote safe and healthy communities and community involvement, particularly with regard to fly-tipping litter, encourage pride in local community and reducing crime and anti-social behaviour.**	Number of incidences of fly-tipping. NI 195 Improved street and environmental cleanliness (levels of litter, detritus, graffiti and fly posting) NI 196 Improved street and environmental cleanliness – fly tipping Defra DSO Level of crime and anti-social behaviour incidents such as fly-tipping Number of public/community events Opportunities for school, college university visits, creation of education packs Job creation	1082 incidences of fly-tipping in 2009-2010, Defra. 1,285 in 2010/11.	flycapture database by the Local Authorities (2009-2010)	North Lincolnshire Council
4. To ensure prudent use of land and resources in particular relation to contaminated land remediation and development on Brownfield sites. **5. To promote recycling and reuse within the community and encourage sustainable waste management.**	Area of brownfield land in North Lincolnshire MSW recycling/composting rate, WasteDafaFlow Household waste generation rate (kg/capita/year) Contaminated land is remediated, no further contamination, % development of Brownfield land being redeveloped Area of land regenerated % recycling and re-use	Areas Outlined in; Waste and Minerals Plan, Draft Development Plan Document 1997: number of former and current industrial land uses that could have the potential to contaminate: approximately 1021 sites. 2010/11 data: household waste generation rate of 541 kg/capita/year. Separate collection and recycling rate is 52%.	2001 North Lincolnshire Council, Land Inspection Strategy. North Lincolnshire Council	North Lincolnshire Council

6. Protect water quality in line with the Water Framework Directive and minimise the risk from flooding.	Waterbody status: percentage at good status overall – chemical and ecological Number of planning permissions granted contrary to Environment Agency advice on flooding and water quality grounds (Major transport applications) (LDF Core indicator E1) Current water quality standards maintained and WFD requirements met No additional increase in flood risk from any source Number and severity of flooding incidents Overall water used reduced or been maintained	Waterbody status of waterbodies in the Louth, Grimsby and Ancholme catchment: 23% Lower Trent and Erewash catchment:5% (2009) 400,000 people are at risk from flooding including key industry, business and agriculture (2008). Groundwater is classified as ranging between good and poor in accordance with EA mapping. Grimsby, Ancholme and Louth chalk unit currently have poor drinking water levels (EA, 2010) Groundwater's Source Protection Zones are shown in Figure 4.10 of the Environmental Report	LDF Annual Monitoring Reports, North Lincolnshire Council / EA website - high level target 5 development and flood risk Environment Agency River Basin Management Plan, Humber River Basin District (2009)	North Lincolnshire Council
7. To improve and/or retain current air quality in accordance with current legislation.	Number of AQMAs in North Lincolnshire (LTP Indicator 8) Air quality targets are met	2 (2012). See air emissions in**Error! Reference source not found.**. of the Environmental Report.	North Lincolnshire Council website	North Lincolnshire Council
8. Mitigate against climate change through reducing CH4, CO2 and other greenhouse gases, and materials with low embodied carbon. **9. To ensure adaptation and resilience to the impacts of climate change.**	Per capita reduction in CO2 emissions in the local authority area (NI 186) Climate change adaptation measures adopted to ensure developments climate change resilient	The area has high individual industrial emitters of CO2, including oil refineries, steelworks, power stations and port operators (2008). Currently North Lincolnshire is placed at the bottom of the National Indicator 186 League (table per capita CO2 emissions) which is in part due to the area's industrial heritage but over 25% of the emissions come from the housing stock. WRATE studies to determine per capita CO2 form waste management activities (2012)	Places Analysis Tool, DCLG North Lincolnshire Council	DCLG (North Lincolnshire Council) North Lincolnshire Council

10. To minimise local transport impacts from the transport of waste in accordance with proximity principle and reduction in waste to landfill. **11. To increase the energy efficiency of the waste management process using energy from waste, and energy used from the process for the electricity to the grid or to power the site,** **12. To further minimise costs of waste management.**	Waste traffic flow counts and destination	Relatively low traffic flow (see Table 4.15). There are only a minor amount of motorway routes present, largely due to rural nature.	North Lincolnshire Council	North Lincolnshire Council
	Energy efficiency - monitor the energy usage and production of the waste management facilities employed through the contract and monthly data reporting – WRATE studies used as a benchmark for the WMS going forwards (2012)	Current Council energy usage data as reported internally WRATE baseline studies (2012)		
	Costs of wastes management- monitor the transport/ treatment and disposal costs baseline costs outlined in the MWMS documents, and data reported via wastedataflow (2012)	Costs studies in MWMS document – reported cost data to wastedataflow		
13. To conserve those elements which contribute to the significance of heritage assets including their settings.	Access to and condition of cultural heritage assets is maintained	Rights of way database and definitive maps 320 miles of Public Rights of Way (2012)	North Lincolnshire Council	North Lincolnshire Council
	Heritage at Risk Register	Assets in North Lincolnshire s being at risk through neglect or decay: 2 high-Grade buildings; 14 Scheduled Monuments (this equates to 31% of all those in North Lincolnshire); 2 Conservation Areas; and 3 Listed Places of Worship. (2011)	English Heritage	English Heritage

14. To improve or conserve landscapes and townscapes.	Improved street and environmental cleanliness:		Places Analysis Tool, DCLG	DCLG (North Lincolnshire Council)
	litter	4%		
	detritus	7%		
	graffiti	4%		
	fly-posting	0%		
	(NI 195)	(2008/09)		
	Level of landscape affected either positively through enhancement or negatively through degradation (proportion of allocation which are judged at planning application stage as likely to have a neutral or positive impact on the landscape)	1082 incidences of fly-tipping in 2009-2010.		

3. Conclusions

- The new municipal waste management strategy has been developed using SEA/SA methodology as a basis for the development of critical aspects such as the technology choice and the technology elimination process via the EOA methodology.
- The studies underpinning this process have drawn from or added level of assessment to the data required by the statutory consultees, and identified in the scoping report for the SEA/SA document
- Together, the new MWMS and the SEA/SA documents provide an evidence base and a methodology for developing the future solid municipal waste management services in the County. This is founded on the principles of sustainability.
- The development and implementation of the new waste management services based upon the MWMS will seek to minimise the impacts on the environment at each stage of delivery and will seek the opinions of all relevant stakeholders at key stages.

Topic	North Lincolnshire Waste Strategy SEA Objectives		Residual Waste (1) MBT	Residual Waste (2) EfW	Residual Waste (3) ATT	Recycling Enhanced Kerbside Collection (Food)	Organic waste AD
Biodiversity and geodiversity	1. To protect and enhance the biodiversity and geo-diversity of the North Lincolnshire waste strategy sites, in particular designated sites and habitat enhancement.	Score	0	0	0	0	0
		Comment	This option will have no detrimental impact on bio – or geo - diversity as these impacts will be managed through planning requirements specified by the N Lincs planning authority. Reference will be made to all key data available on sensitive areas when siting plants and any impacts mitigated.	This option will have no detrimental impact on bio – or geo - diversity as these impacts will be managed through planning requirements specified by the N Lincs planning authority Reference will be made to all key data available on sensitive areas when siting plants and any impacts mitigated.	This option will have no detrimental impact on bio – or geo - diversity as these impacts will be managed through planning requirements specified by the N Lincs planning authority Reference will also be made to all key data available on sensitive areas when siting plants and any impacts mitigated.	This option will have no impact on the bio or geo-diversity of the waste management system as it will not depend on the construction of additional facilities.	This option will have no detrimental impact on bio – or geo diversity as these impacts will be managed through planning requirements specified by the N Lincs planning authority Reference will be made to data available on sensitive areas when siting plants and any impacts mitigated.
Population and human health	2. To facilitate job creation, economic growth and regeneration through investment in the area and protection of local amenity. 3. To promote safe and healthy communities and community involvement, particularly with regard to fly-tipping litter, encourage pride in local community and reducing crime and anti-social behaviour.	Score	+	+	+	+	+
		Comment	The preferred facility will be located within the county, as part of the measures to reduce overall impact. It will therefore provide opportunities for local employment during construction operation and decommissioning. Increased landfill diversion rates should increase 'civic pride' in the waste management	The preferred facility will be located within the county, as part of the measures to reduce overall impact. It will therefore provide opportunities for local employment during construction operation and decommissioning. Increased landfill diversion rates should increase 'civic pride' in the waste management	The preferred facility will be located within the county, as part of the measures to reduce overall impact. It will therefore provide opportunities for local employment during construction operation and decommissioning. Increased landfill diversion rates should increase 'civic pride' in the waste management	This option will have no impact on the level of employment, but will contribute to the overall positive impacts of the recycling system on the community as a whole through the delivery of new service via communications and education campaigns allied to it.	The preferred facility will be located within the county, as part of the measures to reduce overall impact. It will therefore provide opportunities for local employment during construction operation and decommissioning. In addition there will be opportunities for community engagement throughout the

			service	service	service		lifespan of the project focusing on better management of food resources.
Land resources	4. To ensure prudent use of land and resources in particular in relation to contaminated land remediation and development on Brownfield site. 5. To promote recycling and reuse within the community and encourage sustainable waste management.	Score	++	++	++	++	++
		Comment	Plant will be located on designated areas of land within the county. These are mainly brownfield sites and areas identified within the M+WP	Plant will be located on designated areas of land within the county. These are mainly brownfield sites and areas identified within the M+WP	Plant will be located on designated areas of land within the county. These are mainly brownfield sites and areas identified within the M+WP	Plant will be located on designated areas of land within the county. These are mainly brownfield sites and areas identified within the M+WP	Plant will be located on designated areas of land within the county. These are mainly brownfield sites and areas identified within the M+WP
Water and flood risk	6. Protect water quality in line with the Water Framework Directive and minimise the risk from flooding.	Score	0	0	0	0	0
		Comment	All water related issues will be addressed through the planning process, and the requirement for good design during procurement the plants should therefore have no detrimental impact on water resources.	All water related issues will be addressed through the planning process, and the requirement for good design during procurement the plants should therefore have no detrimental impact on water resources.	All water related issues will be addressed through the planning process, and the requirement for good design during procurement the plants should therefore have no detrimental impact on water resources	No plants will be constructed - no additional risk to water quality or flooding will therefore arise from this option. Logistics of delivery will not impact on water resources.	All water related issues will be addressed through the planning process, and the requirement for good design during procurement the plants should therefore have no detrimental impact on water resources.
Air quality	7. To improve and/or retain current air quality in accordance with current legislation.	Score	0	-	0	+	-
		Comment	Overall air emissions will be low due to nature of the plant. Large proportion of wastes diverted from landfill, so reduction in methane generation WRATE studies	Emissions of greenhouse gases, HCL, dioxins, PCDDs will be kept within limits specified by WID – the waste incineration directive, which sets stringent limits for these.	Although similar to EfW the process chemistry and process control results in much lower emissions of the same types of chemicals in option (2). Large proportion of wastes diverted	This option will result in a reduction in waste to Landfill and therefore mitigate against odours, and dust from landfills.	There may be some risk of odours during the use of digestate when spread to land, however this will be on agricultural land already using similar organic fertilisers/

			also show benefits in terms of reduced ozone depletion	Large proportion of wastes diverted from landfill, so reduction in methane generation WRATE studies also show benefits in terms of reduced ozone depletion	from landfill, so reduction in methane generation WRATE studies also show benefits in terms of reduced ozone depletion		manures, so overall impact small.
Climate change	8. Mitigate against climate change through reducing, CH4, CO2 and other greenhouse gases, and materials with low embodied carbon. 9. To ensure adaptation and resilience to the impacts of climate change.	Score	++	++	++	++	++
		Comment	This option will produce a fuel off-setting the need for fossil fuels in cement kilns or EfW. A proportion of this will be green energy. Also recyclables. It will also divert a large proportion of residual waste from landfill reducing greatly the Methane generation due to this. A proportion of the input materials will be recycled further reducing the overall carbon footprint	This option will produce electricity, a proportion of which is 'green' due to biodegradable content. It will also divert a large proportion of residual waste from landfill reducing greatly the Methane generation due to this.	This option will produce electricity, a proportion of which is 'green' due to biodegradable content, and qualifies for ROCs It will also divert a large proportion of residual waste from landfill reducing greatly the Methane generation due to this.	This option will divert organic materials away from landfill reducing production of methane. The materials will then be utilised probably by AD which will further mitigate the impacts, and help off-set the council's energy requirements.	This option will produce a renewable form of energy from food wastes which will be diverted from landfill, and will help to off=set the council's electricity requirements. This will also have the effect of greatly reducing the methane generated by the management of the organic fraction of the municipal solid waste.
Material assets	10. To minimise local transport impacts from the transport of waste in accordance with proximity principle and reduction in waste to landfill. 11. To increase the energy efficiency of the waste management process using energy from	Score	++	++	++	+	++
		Comment	Option chosen is for locally located site within the county to reduce traffic movements and mileage. A fuel will be produced which can either be used	Option chosen is for locally located site within the county to reduce traffic movements and mileage. Electricity productions will off-set the council's	Option chosen is for locally located site within the county to reduce traffic movements and mileage. Electricity productions will off-set the council's	This option will result in the diversion of materials form landfill and enhance the efficiency of the waste management system as a whole	Option chosen is for locally located site within the county to reduce traffic movements and mileage. A fuel will be produced which can either be used

	waste, and energy used from the process for electricity to the grid or to power the site. 12. To further minimise costs of waste management.		to offset carbon based fuels in cement kilns or off-set the council's energy demands through the generation of electricity. The electricity generation will have a revenue associated with it which can flow back to the authority	energy demands through the generation of electricity. The electricity generation will have a revenue associated with it which can flow back to the authority	energy demands through the generation of electricity. The electricity generation will have a revenue associated with it which can flow back to the authority		to offset carbon based fuels in cement kilns or off-set the council's energy demands through the generation of electricity. The electricity generation will have a revenue associated with it which can flow back to the authority
Built heritage and archaeological assets	13. To protect and enhance built heritage and archaeological assets within the waste strategy sites.	Score	D	D	D	D	D
		Comment	There should be little or no risk to archaeological/ built l heritage. However there may be some residual small risk due to the implementation of specific projects. These risks should be mitigated as far as possible through the requirements of the planning process requiring archaeological and other surveys. Damage will therefore be mitigated or avoided where possible; heritage should be preserved where practicable. Sites have been identified specifically to manage this type of risk	There should be little or no risk to archaeological/ built l heritage. However there may be some residual small risk due to the implementation of specific projects. These risks should be mitigated as far as possible through the requirements of the planning process requiring archaeological and other surveys. Damage will therefore be mitigated or avoided where possible; heritage should be preserved where practicable. Sites have been identified specifically to manage this type of risk	There should be little or no risk to archaeological/ built l heritage. However there may be some residual small risk due to the implementation of specific projects. These risks should be mitigated as far as possible through the requirements of the planning process requiring archaeological and other surveys. Damage will therefore be mitigated or avoided where possible; heritage should be preserved where practicable. Sites have been identified specifically to manage this type of risk	This option will have no impact on the built environment or archaeological assets unless exceptional circumstances are involved. However, there may be some residual small risk due to the implementation of specific projects. These risks should be mitigated as far as possible through the requirements of the planning process requiring archaeological and other surveys. Damage will therefore be mitigated or avoided where possible; heritage should be preserved where practicable. Sites	There should be little or no risk to archaeological/ built l heritage. However there may be some residual small risk due to the implementation of specific projects. These risks should be mitigated as far as possible through the requirements of the planning process requiring archaeological and other surveys. Damage will therefore be mitigated or avoided where possible; heritage should be preserved where practicable. Sites have been identified specifically to manage this type of risk

						have been identified specifically to manage this type of risk	
Landscape	14. To improve or conserve landscapes and townscapes.	Score	D	D	D	0	D
		Comment	Any effect on the landscape will be small if managed through the planning process and the choice of site. There may be a marginal visual impact however. Building is of the large industrial unit type.	Any effect on the landscape will be small if managed through the planning process and the choice of site. There may be a visual impact however, due to building size and stack height	Any effect on the landscape will be small if managed through the planning process and the choice of site. There may be a small visual impact however, due to building size and stack height	This option will be neutral for townscapes. No additional buildings will be necessary, so no overall impact on landscapes.	Any effect on the landscape will be small if managed through the planning process and the choice of site. There may be a marginal visual impact however. Buildings similar to waste water treatment plant-type facilities.

++	Significant positive effect
+	Marginal positive effect
0	Neutral or no effect
-	Marginal negative effect
- -	Significant negative effect
D	Effect depends on implementation
?	Uncertainty over effect

Mott MacDonald North Lincolnshire Waste Strategy SEA Objectives	North Lincolnshire Core Strategy SA Objectives	Existing North Lincolnshire Waste Strategy Environmental Options Assessment Objectives	Relevant SEA Directive Topic
	To protect and enhance biodiversity and important wildlife habitats within and outside designated sites To ensure the protection and enhancement of designated sites including Sites of Special Scientific Interest (SSSI) and Special Protection Areas (SPAs)	----------	Biodiversity and geodiversity
	To tackle poverty, social exclusion and inequality geographically as well as demographically To enhance skills, qualifications and the overall employability of the population To reduce crime, the fear of crime and to promote safer neighbourhoods To improve accessibility to education, employment, recreation, countryside health, community services and cultural facilities for all sectors of the community To encourage the participation in culture, leisure and recreational activities, including in the Countryside To maintain and strengthen the local economy to promote	To protect local amenity To provide local employment opportunities To provide opportunities for public involvement / education	Population and human health

Mott MacDonald North Lincolnshire Waste Strategy SEA Objectives	North Lincolnshire Core Strategy SA Objectives	Existing North Lincolnshire Waste Strategy Environmental Options Assessment Objectives	Relevant SEA Directive Topic
	future economic prosperity for North Lincolnshire in rural and urban areas		
	To create vibrant towns and village centres in both rural and urban areas		
	To increase diversity of employment		
	To support and improve the economic activity for rural areas through the retention of local Facilities		
	To promote and enhance opportunities for tourism, particularly in rural areas		
	To promote healthier communities		
	To make the best use of previously developed land and existing buildings	To ensure prudent use of land and other resources	Land resources
	To protect local water resources, soil quality and quantity		
	To minimise the risk of flooding	To minimise adverse effects on water quality	Water and flood risk
	To protect local water resources, soil quality and quantity		
	To improve air quality	To minimise air quality	Air quality

Mott MacDonald North Lincolnshire Waste Strategy SEA Objectives	North Lincolnshire Core Strategy SA Objectives	Existing North Lincolnshire Waste Strategy Environmental Options Assessment Objectives	Relevant SEA Directive Topic
		impacts	
	To reduce congestion, particularly around the South Humber Bank Ports		
	To adapt to the impacts of climate change fro the built and natural environment	To reduce greenhouse gas emissions	Climate change
	To reduce greenhouse gas emissions particularly from transport and waste management related infrastructure		
	To provide a sufficient and appropriate mix of housing that is affordable, decent and designed to a high standard	To minimise local transport impacts	Material assets
	To improve public transport provision and promote sustainable modes of transport	To minimise costs of waste management	
	To increase energy efficiency and increase the use of renewable energy particularly from wind energy	To conform with waste policy	
	To reduce generation of waste, the proportion sent to landfill and to increase re-cycling	To ensure reliability of delivery	
	To promote the use of sustainably sourced products and resources and re-using and recycling products		
	To protect and enhance	----------	Built heritage and

Mott MacDonald North Lincolnshire Waste Strategy SEA Objectives	North Lincolnshire Core Strategy SA Objectives	Existing North Lincolnshire Waste Strategy Environmental Options Assessment Objectives	Relevant SEA Directive Topic
	heritage assets including archaeological sites and monuments, historic landscapes, and local townscapes and their settings		archaeological assets
	To maintain and enhance the quality of countryside and wider landscape	To conserve landscapes and townscapes	Landscape