# Strategic Environmental Assessment of the Staffordshire and Stoke-on-Trent Joint Municipal Waste Management Strategy

**Report**

**July 2007**
**SLR Ref: 402-1395-00001**

solutions for today's environment

## DOCUMENT ISSUE REGISTER

| | | | |
|---|---|---|---|
| **Project Title** | Strategic Environmental Assessment of the Staffordshire and Stoke-on-Trent JMWMS | **Job Number** | 402.1395.00001 |
| | | **Phase Number** | 002 |
| **Client** | Staffordshire County Council and Stoke-on-Trent City Council | **Client Contact** | Ian Benson |

**The Following Documents are issued by SLR Consulting Limited:**

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Day** | 15 | | | | | | | | | |
| **Month** | 06 | | | | | | | | | |
| **Year** | 07 | | | | | | | | | |

| **Document Reference** | **Title** | **Reason for Issue** | **Revision Number (x = pre revision issue)** | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | F | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |

| **Reason for Issue:** | |
|---|---|
| P | Preliminary |
| A | Approval |
| C | Comments |
| D | Draft |
| F | Final |
| S | Issue Sheet Only |
| I | Information |
| Z | Other (State) |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **No. of Copies** | | | | | | | | | |
| **E-mail** | ✓ | | | | | | | | |
| **Disk** | | | | | | | | | |

## EXECUTIVE SUMMARY

This Environmental Report sets out the results of a Strategic Environmental Assessment (SEA) of the draft Joint Municipal Waste Management Strategy (JMWMS) for Staffordshire and Stoke-on-Trent. The JMWMS will be a fundamental document outlining the framework for how municipal waste will be managed in Staffordshire and Stoke-on-Trent up to the year 2020, although the residual treatment options will serve to manage waste beyond this time period. This document sets out the results of the SEA, highlighting any likely significant impacts of implementing the JMWMS and of the waste management options considered as part of its development.

### *SEA Process*

Defra guidance proposes five stages to the SEA process, comprising:

- Stage A: The first stage requires the preparation of an SEA Scoping report[1] which outlines all relevant plans, programmes and environmental protection objectives, together with the impacts the proposed waste management strategy may contribute.
- Stage B: The waste management options are also developed and fed into the draft strategy
- Stage C: The strategy produced is assessed in terms of the environmental impacts and this stage will form part of the environmental report. At this point the Environmental Report is sent out for public consultation, to be presented in conjunction with the draft strategy.
- Stage D: Assess the results of the consultation and develop a monitoring programme which attempts to mitigate any significant or adverse impacts on the environment.
- Stage E: Finally, monitor the environmental performance of the plan to determine whether the anticipated effects (positive and negative) have become reality; and consider how adverse effects could be responded to.

This report represents Stage C above, Stages A and B having already been completed through the production of a scoping report.

### *Environmental Report*

The SEA Directive requires that an Environmental Report (this report) is prepared as part of the SEA process. This report will measure the likely significant effects on the environment of implementing the waste strategy options, and this will be achieved through assessment all of the alternatives considered and evaluated against the SEA appraisal criteria (as outlined below and in Section 3). In addition, the objectives and policy requirements of the strategy are also assessed against the SEA criteria (as outlined in Section 1).

### *Key Environmental and Sustainability Issues*

The SEA process assesses the JMWMS against a number if key environmental and sustainability issues, which included those relating to;

- population and human health;
- biodiversity, flora and fauna;
- material assets;
- soil;
- water;
- air;
- climatic factors; and

[1] Staffordshire and Stoke-on-Trent Strategic Environmental Assessment: Scoping Report (SLR Consulting, January 2007)

- cultural heritage and landscape

A review of the available environmental baseline data is also presented within this report in the form of a series of GIS (Graphic Information Systems) maps (as shown in Section 2) on specific issues relating to MSW infrastructure which includes the following information;

- dwellings and settlements;
- designated nature conservation sites;
- landscape Character Areas;
- designated archaeological sites;
- the historic environment;
- main rivers and floodplains;
- groundwater source protection areas;
- quality of agricultural land; and
- green belt

The environmental baseline can be used to monitor changes with time.

***Sustainable Development Objectives***
***(Relevant to the Joint Municipal Waste Management Strategy and Options Assessment Process)***

As part of the JMWMS process an options appraisal was developed for the long term (to the year 2020) management of the County and City's municipal solid waste (MSW). The options assessment was developed as a three step process; minimisation, recycling and composting; and residual treatment.

Tier one and two of the options assessment model the improvement of waste minimisation and recycling at different rates, all of which are an improvement on the baseline (do nothing scenario) and therefore are all consistent with the sustainability objectives.

Tier 3 of the waste management options assessment considers a number of options for residual treatment which include the following;

- **Baseline Option –** "180,000 tonnes to Stoke EfW and remaining residual to landfill"
- **Anaerobic Digestion (AD) –** "maintain tonnage to Stoke EfW and remaining residual to AD"
- **Autoclave Option –** "maintain tonnage to Stoke EfW and remaining residual to Autoclave"
- **Energy from Waste Option –** "maintain tonnage to Stoke EfW and remaining residual to EfW"
- **Mechanical Biological Treatment (with Bio stabilisation) –** "maintain tonnage to Stoke EfW and remaining residual to MBT (bio stabilisation)"
- **Mechanical Biological Treatment (with RDF[2]) Option –** "maintain tonnage to Stoke EfW and remaining residual to MBT (RDF)"

Each option has been assessed against 21 sustainability indicators to generate overall performance scores which are then assessed against the SEA Environmental Objectives, the results of which are presented in Section 4 of this report.

The assessment results (see Section 4; Tables 4-2 and 4-3) are based upon the quantitative life-cycle assessment results. As a result, measuring the impacts of the Tier 2 and Tier 3

[2] Refuse Derived Fuel

options against the SEA objectives is perhaps more robust than other more subjective assessments.

The results of the Tier 2, recycling and composting (see Section 4; Table 4-2) targets are assessed against the baseline (do nothing) scenario and indicate mainly positive impacts and an overall preference to higher recycling and composting rates. These results largely reflect the outcome of the options assessment process. The only negative impacts are classed as negligible and relate to potential noise impacts and increased waste kilometres which are associated with increased recycling activity. These negative impacts are offset by the major positive impacts associated with increased recycling and an overall reduction of waste to landfill.

The Tier 3, residual treatment options are also assessed against the SEA objectives (see Section 4; Table 4-3). The five residual treatment technologies all score higher overall than the baseline (do nothing) option, however, unlike the recycling and composting impacts, the scores of the residual treatment options can vary considerably.

Anaerobic digestion, Autoclave and Energy from Waste (EfW) options generally score the highest. This is largely due to lower landtake and lower CO2 emissions than both of the MBT (Mechanical Biological Treatment) options, although overall, all treatment options score higher than the baseline (landfill) option.

In conclusion therefore the assessment of SEA objectives against the residual treatment options selected in Tier 3 demonstrate compatibility with the options assessment process conducted for the JMWMS

***SEA Assessment of Waste Strategy Objectives***

The JMWMS for Staffordshire and Stoke-on-Trent has not been produced in isolation and as with the options assessment process, the overarching waste strategy objectives have also been appraised against the SEA objectives. The purpose of the appraisal is to identify any positive or negative impacts of implementing the strategy, measure the severity of the impacts (whether positive or negative) and to recommend mitigating negative impacts and enhancing positive impacts.

The overall conclusions of the SEA objectives assessed against the JMWMS objectives is very positive as there appears to be no major or minor negative impacts or incompatibilities emerging from the strategy compared with the key environmental criteria considered. At this strategic level however it is difficult to conduct a more specific or quantitative assessments as the waste strategy objectives are a more strategic level than the SEA indicators, thus making quantifiable scoring more difficult than the options assessment process.

The SEA criteria should however be given closer consideration at the time when the strategy is implemented and going forward through the monitoring stages of the SEA process to ensure none of the adverse impacts highlighted within the Scoping Report and this Environmental Report are employed.

***Monitoring Implementation***

As part of the SEA the Environment Report also makes recommendations for ways in which the JMWMS can reduce or mitigate the expected negative impacts as identified within this report.

Following a period of consultation the on the SEA Environmental Report and any modifications to the assessment a monitoring plan will be produced to measure the

environmental effects of the strategy. The plan will specifically address any of the adverse impacts highlighted as part of the SEA Environmental Report with additional scope for expansion following comments or views from the consultation exercise.

## CONTENTS

# 1 INTRODUCTION

## 1.1 Introduction to SEA

Strategic Environmental Assessment (SEA) is a process to ensure that significant environmental effects arising from policies, plans and programmes are identified, assessed, mitigated, communicated to decision-makers and monitored. The SEA process also ensures that opportunities for public involvement are provided.

SEA has become an important instrument to help to achieve sustainable development in public planning and policy making.

SEA is a generic tool which can be used in a variety of situations. A particular form of SEA is being introduced by the European Union Directive 2001/42/EC[3] which requires national, regional and local authorities in Member States to carry out strategic environmental assessments on certain plans and programmes that they promote.

The latest Department for Environment, Food and Rural Affairs (DEFRA) guidance[4] identifies that municipal waste strategies, as plans with significant environmental impacts, will require an accompanying SEA to ensure that the environmental and social impacts are thoroughly assessed. With this guidance in mind, Staffordshire County Council and Stoke-on-Trent City Council (referred to as Staffordshire and Stoke-on-Trent herein) has commissioned SLR Consulting Limited (SLR) to conduct a SEA on their draft Joint Municipal Waste Management Strategy (JMWMS).

## 1.2 SEA Process

Defra guidance proposes five stages to the SEA process, comprising:

- Stage A: The first stage requires the preparation of an SEA Scoping report[5] which outlines all relevant plans, programmes and environmental protection objectives, together with the impacts the proposed waste management strategy may contribute.
- Stage B: The waste management options are also developed and fed into the draft strategy
- Stage C: The strategy produced is assessed in terms of the environmental impacts and this stage will form part of the environmental report. At this point the Environmental Report is sent out for public consultation, to be presented in conjunction with the draft strategy.
- Stage D: Assess the results of the consultation and develop a monitoring programme which attempts to mitigate any significant or adverse impacts on the environment.
- Stage E: Finally, monitor the environmental performance of the plan to determine whether the anticipated effects (positive and negative) have become reality; and consider how adverse effects could be responded to.

### *1.2.1 Scoping Report*

The purpose of the scoping report is to set out the proposed scope of the SEA process and the subsequent Environmental Report that will be produced.

[3] European Union Directive 2001/42/EC of the European Parliament and of the Council on the Assessment of the Effects of Certain Plans and Programmes on the Environment. 27 June 2001.
[4] A Practice Guidance for the Development of Municipal Waste Management Strategies. November 2005.
[5] Staffordshire and Stoke-onTrent Strategic Environmental Assessment: Scoping Report (SLR Consulting, January 2007)

Staffordshire and Stoke has already completed the Scoping report stage of the SEA process. In line with the requirements of the SEA Directive, the views of the statutory consultation bodies (Environment Agency, English Heritage and Natural England[6]) have been sought on this scoping report and the responses used to inform this Environmental Report which will accompany the final draft of the JMWMS. The scoping report was issued for a five week minimum statutory consultation period. Responses to the scoping report consultation are detailed in section 1.5 of this report.

In addition to the above statutory consultation bodies, comments from Staffordshire and Stoke-on-Trent Council Planners were also sought, as it is of importance that the planners are involved in the JMWMS development process from an early stage. Involvement of the planning departments in the JMWMS ensures integration of the waste planning and strategy development process. It also informs the ongoing development of the parallel development plan and associated sustainability assessment work[7].

The scoping report has addressed the following:

- **Reviewing Relevant Plans:** Identification of plans and programmes relevant to the joint Staffordshire and Stoke-on-Trent MWMS;
- **Establishing Objectives and Assessment Criteria:** Setting out of proposed waste related environmental objectives and indicators against which development and progress of the JMWMS will be measured;
- **Establishing the Baseline:** Setting out of the environmental baseline information required to assess and monitor the above objectives and indicators;
- **Identifying Issues:** Identification of specific waste related environmental issues; and
- **Presenting Viable Options:** Presentation of the strategic options and alternatives under consideration.

### *1.2.2 Options Assessment*

As part of the development of the draft waste strategy a range of waste management options for waste prevention, recycling and residual treatment have been developed and assessed. The aim of this process is to enable an assessment of potential waste management solutions for the County and City when compared to a range of sustainability indicators.

The assessment process is designed to be auditable, consistent and robust. It has assisted in the identification of a preferred waste management option(s) for all municipal wastes arising in Staffordshire and Stoke-on-Trent for the long term (i.e. to the year 2020). Section 8 of the SEA scoping report details the strategic options and alternatives considered as part of the waste strategy, although in brief they included:

- Tier 1: Waste minimisation and re-use;
- Tier 2: Recycling and Composting Options
    - Option 0 “Do Nothing”;
    - Option 1 “45% household recycling by 2020”;
    - Option 2 “50% household recycling by 2020”; and
    - Option 3 “55% household recycling by 2020”
- Tier 3: Residual Treatment Options
    - Anaerobic Digestion;

[6] Previously English Nature and the Countryside Agency
[7] SLR has met with Matt Griffin (Staffordshire County Council) and appointed consultants Capita Symonds who are respectively developing the Staffordshire and Stoke DPD and associated SA (November 2006)

- Autoclave;
- Energy from Waste;
- Mechanical Biological Treatment (Biostabilisation); and
- Mechanical Biological Treatment (RDF[8])

An assessment methodology following Government guidance has been applied, to provide an assessment of a range of viable waste management options in the year 2020, the assessment year. The options appraisal for the draft strategy is set against a different although in parts overlapping set of criteria to the SEA. Section 1.3 of this report details the overarching headline objectives of strategy.

### *1.2.3 Environmental Report and Monitoring*

The SEA Directive requires that an Environmental Report (this report) is prepared as part of the SEA process and is comprised of the following parts;

- **Section 1** of this report introduces the SEA process and overarching waste strategy objectives;
- **Section 2** of this report provides detailed information of Staffordshire and Stoke-on-Trent's environmental baseline data in GIS format and which help to inform the SEA environmental objectives;
- **Section 3** of this report outlines the SEA objectives for Staffordshire and Stoke-on-Trent against which the JMWMS options and objectives will be developed with and measured against;
- **Section 4** of this report details the waste management options assessment process as detailed in the JMWMS and measures the impacts of the options against the SEA objectives (outlined in Stage 3);
- **Section 5** of this report assess the overarching JMWMS objectives (as outlined in Section 1) against the SEA objectives (outlined in Section 3) to ensure compatibility; and finally
- **Section 6** of this report presents a summary of the assessment and provides recommendations for mitigation of any potentially adverse effects raised by the assessment.

This report will measure the likely significant effects on the environment of implementing the waste strategy options, and this will be achieved through assessment all of the alternatives considered and evaluated against the SEA appraisal criteria as outlined in Section 3. In addition, the objectives and policy requirements of the strategy are also assessed against the SEA criteria.

[8] Refuse Derived Fuel

### 1.3 Staffordshire and Stoke-on-Trent Joint Municipal Waste Management Strategy

The Draft Joint Municipal Waste Management Strategy (JMWMS) has been prepared by SLR on behalf of, and in association with Staffordshire County Council (as waste disposal and planning authority), Stoke-on-Trent City Council (as waste collection, disposal and planning authority) and the eight Staffordshire Borough / District Councils (as waste collection authorities).

The overarching objectives within the JMWMS are principally:

- **Waste minimisation:** Reducing the overall tonnage of waste (produced per household) through a variety of waste minimisation and re-use schemes
- **Increased recycling:** Delivering on a combined household recycling and composting target of 55% (equivalent to 50% of all MSW)
- **Waste as a resource:** wherever practicable, managing waste as a potential resource and as close as possible to point of origin
- **Recovering benefit from all remaining MSW:** Sending approximately 50% of all MSW for recovery
- **Zero waste to Landfill:** Minimising all forms of waste to landfill through increased recycling followed by maximum recovery of all remaining residual waste, thus placing landfill as the last and final option

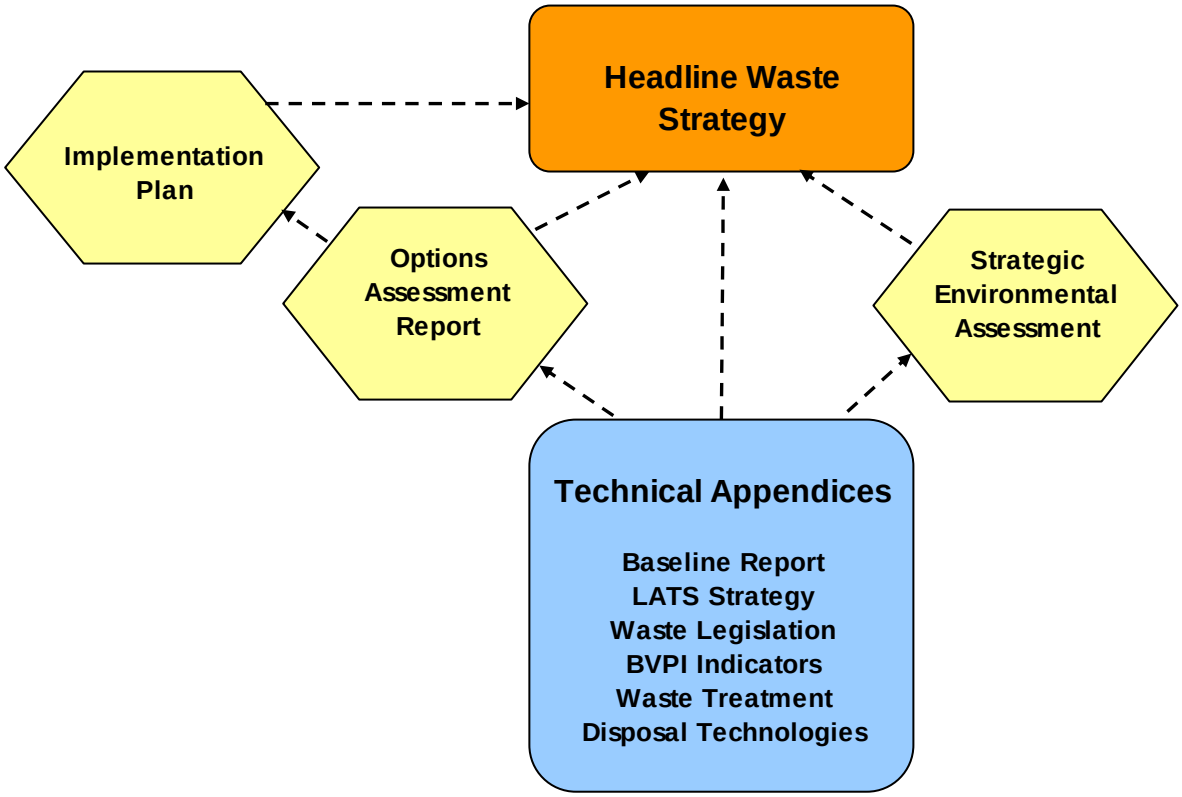
The principal driver for the targets and objectives outlined in this strategy is derived from the European Landfill Directive which places a duty on member states to decrease the quantities of biodegradable municipal waste sent to landfill.

Whilst the strategy is centered on the need to meet the Landfill Directive targets it's wider remit has the intention of;

- **Sustainability:** Achieving **sustainable management of all waste** arising in Staffordshire and Stoke-on-Trent through emphasis on the **reduction, re-use, recycling and recovery of waste**;
- **Working together:** Developing effective **co-operation and joint working** between local authorities, businesses and residents on the benefits of waste minimisation and increased recycling and recovery of waste

The objectives outlined above have been developed within the options assessment report and transposed into an implementation plan to form the strategic direction of the headline waste strategy. Figure 1-1 shows in a simple diagram how each of the strategy documents fit together and inform each other.

**Figure 1-1: Structure of Joint Municipal Waste Management Strategy**




## 1.4 Joint Municipal Waste Management Strategy and Policy Objectives

As part of stage A in the SEA process the Scoping Report provides details of plans and programmes that are relevant to the JMWMS (see Section 3 of the Scoping Report). The report considers the following relevant documents:

- **International commitments and directives** of which the most significant of these is the European Landfill Directive as it represents the main policy instrument impacting upon the management of municipal waste and for this reason it is considered relevant. Any direct impacts of this Directive on the MSW strategy development process will be made manifest through the transposing of this Directive into UK law;

- **Planning and strategic issues** in England; of which the principal waste management policy document currently in place at National (UK) level is the recently released 'Waste Strategy for England 2007' produced by Defra and replaces the earlier Waste Strategy 2000. The most notable changes to the new strategy relate to the national recycling and recovery targets which have been set out as follows;

    - **recycling and composting of household waste –** at least 40% by 2010, 45% by 2015 and 50% by 2020; and
    - **recovery of municipal waste –** 53% by 2010, 67% by 2015 and 75% by 2020.

- Another key piece of legislation to impact waste management in the UK is the **Waste and Emissions Trading (WET) Act 2003.** The WET Act sets out the required BMW landfill allowances for each waste disposal authority; exceeding the allowance figure will result in monetary fines for the Council. **Reduction in BMW to landfill** is therefore

critical and of relevance to the MWMS development. The WET Act has been considered as part of the options development process which is summarised in Section 8 of the Scoping Report and the Options Assessment Report[9];

- **Regional planning issues in the West Midlands**; the West Midlands Regional Spatial Strategy sets out waste management requirements at a sub-regional level, including the existing need for waste management facilities and any additional municipal waste management facilities required by 2021. A partial review of the strategy is currently being undertaken to examine housing figures, employment, land, transport and waste. In particular, one of the objectives addressed within 'Quality of the Environment' is to "provide sufficient opportunities to meet identified needs of the West Midlands for waste management for all streams"[10]. The revised RSS will also incorporate the Regional Waste Strategy (also currently undergoing a revision) when re-published;

- **Local planning issues and strategic issues;** the Staffordshire and Stoke-on-Trent Joint Structure Plan, adopted February 2002 contains within its Minerals and Waste policy a sub-section on the 'Sustainable Waste Management' and the Staffordshire and Stoke-on-Trent Waste Local Plan, adopted in February 2003 outlines the broad land use framework for future waste management. The plans include household, commercial, industrial and construction wastes; and

- As a result of recent changes to the planning regulations Staffordshire County Council, as the Waste Planning Authority, are required by the **Government to produce new Local Development Documents (LDDs) setting out the waste planning** policies for the County. In addition, Stoke-on-Trent City Council and the eight Staffordshire District Councils have published Local Plans that set out detailed policies and site-specific proposals in each area.

## 1.5 Consultation Responses

The SEA Scoping report was issued to the three Statutory Consultees (the Environment Agency, English Heritage and Natural England), for a five week period. At the end of which time only one of the consultees, Natural England provided comment on the report. The responses have been noted and where possible have been incorporated into the baseline assessment and indicators used to appraise the JMWMS.

In response to the consultation responses the following changes or additions have been made to the final SEA Environmental Report;

- information included in the baseline data on legally protected species (including European Protected Species covered under the Habitats Directive) and habitats outlined in the Staffordshire Biodiversity Action Plan;
- to include within the targets for Climatic Factors a reduction in $CO_2$;
- to include as additional indicators
  - the number of known legally protected species populations that will be adversely affected; and
  - areas of habitat included in the Staffordshire Biodiversity Action Plan that will be adversely affected or improved.

[9] Key supporting document to the Headline Waste Management Strategy Document
[10] As provided by Bruce Braithwaite 30th November 2006

We also note the consultee's response regarding the inclusion of a biodiversity indicator within the options assessment process however in this circumstance it is difficult to quantify the impacts of a technology on biodiversity without a designated site. The indicators used in the SEA assessment on the Waste Strategy do however assess the impacts on biodiversity. A copy of the Natural England consultation response can be found in Technical Appendix 2.

# 2 BASELINE INFORMATION

The purpose of establishing the environmental baseline is to assist in the process of setting meaningful environmental objectives and indicators for use in the SEA process. The baseline review provides an overview of the environmental aspects of Staffordshire and Stoke-on-Trent[11]. The review aims to highlight significant sustainability issues or problems affecting the area in relation to the environment and identify where waste management objectives might affect or conflict with sustainability objectives.

## 2.1 Key Environmental / Sustainability Issues

Key environmental and sustainability issues were identified in Section 4 of the Scoping Report and are summarised in Table 2-1.

**Table 2-1: Key Environmental and Sustainability Issues for Staffordshire and Stoke-on-Trent**

| *SEA Topic* | *Key Environmental / Sustainability Issue* |
|---|---|
| **Population and Human Health** | The strategy will require consideration of inappropriate storage of dangerous materials and open waste encouraging pests to ensure preferred options and alternatives do not adversely affect human health. Staffordshire has a higher proportion of middle-aged and early pensionable residents. Deprivation is low in all of the constituent areas and health is generally good[12]. In the case of Stoke-on-Trent deprivation is higher than average and the total population classed as unhealthy is higher than the national average[13]. |
| **Biodiversity, Flora and Fauna** | To include impacts concerning damage and death of fauna and flora due to air, land or water pollutants or reduction in biodiversity of the area surrounding facilities. Staffordshire (including Stoke-on-Trent) has 69[14] Sites of Special Scientific Interest (SSSIs) which also include RAMSARs[15] and Special Protection Areas. An area within the county also falls part of the Peak Park; however this is managed under a separate Biodiversity Action Plan. |
| **Material Assets** | To identify current waste management activities including resource reuse and recovery within Staffordshire and Stoke-on-Trent. Assess the strategy in terms of moving waste management up the waste hierarchy. |

[11] The Options Assessment Report also considers the social and economic impacts associated with the development of the waste strategy
[12] Department of Health Profile for Staffordshire 2006
[13] Department of Health Profile for Stoke-on-Trent 2006
[14] See Technical Appendix 2.7 for Staffordshire and Stoke-on-Trent SSSIs
[15] RAMSARs are sites of wetlands of international importance designated under the RMASAR Convention

| *SEA Topic* | *Key Environmental / Sustainability Issue* |
|---|---|
| **Soil** | The strategy will need to consider possible impacts on the sustainable management of soils and land resources to minimise the possibility of contamination due to poor management of waste facilities. Approximately 80% of the land in the West Midlands is in agricultural use, although most of the region (48%) is Grade 3; good to moderate quality[16]. |
| **Water** | The strategy will need to consider impacts of water source and ground water contamination due to leachate leakage at landfill sites, composting pads and poor storm water management systems. The chemical quality of rivers and canals in the Midlands is average for the UK[17]. Whilst there is no immediate water shortage it is estimated that with the increase in planned developments and housing, therefore water resources will need to be preserved. |
| **Air** | Emissions from poorly maintained vehicles used in the collection and transport of waste, emissions to air from waste management and treatment facilities will need to be considered and managed within the implementation of the strategy. Six Air Quality Management Areas (AQMAs)[18] have been designated across Staffordshire and Stoke-on-Trent. These represent areas requiring monitoring of emissions caused by possible build up of traffic and local industry. |
| **Climatic Factors** | Carbon dioxide and methane are two of the most potent greenhouse gases; landfill sites are large producers of methane and the collection and management of waste creates outputs of carbon dioxide from vehicles and waste processing. |
| **Cultural heritage and landscape** | Emissions from poorly maintained vehicles used in the collection and transport of waste, emissions to air from waste management and treatment facilities will need to be considered and managed within the implementation of the strategy. |

Many of the effects of the key issues outlined above in Table 2-1 will be largely restricted to a waste management site selected to take the waste and as this Joint Municipal Waste Strategy does not address the site allocation of facilities directly it is difficult to accurately measure any impacts. At least one of these issues however will impact the County and City as a whole, particularly air quality and the associated impacts caused by the number of vehicles collecting waste throughout Staffordshire and Stoke-on-Trent.

[16] Defra West Midlands Land Quality and Use http://www.defra.gov.uk/erdp/docs/wmchapter/section11/topographic.htm#113
[17] Defra Chemical river water quality survey 2005 www.defra.gov.uk/environment/statistics/inlwater/iwquality.htm#iwtb05a
[18] See www.airquality.co.uk

A review of the available environmental baseline data is presented below in a series of GIS (Graphic Information Systems) maps on specific issues relating to MSW infrastructure which include of the following;

- **Dwellings and settlements** – see Figures 2.1 Local Plan Data, and 2.2 Previously Developed Land which also include residential land sites and greenbelt. Individual address points are shown in Figure 2.3.
- **Designated nature conservation sites** –see Figure 2.4 Ecological Designation and Figure 2.5, Broad Habitat Types. Includes; Local Nature Reserves, National Nature Reserves, RAMSAR sites, Special Areas of Conservation, Special Protection Areas, Ancient Woodlands Inventory, Sites of Special Scientific Interest, Agricultural Land Classifications and Broad Habitats.
- **Landscape Character Areas** – see Figure 2.6 Landscape Designations. Includes; Areas of Outstanding Natural Beauty, National Parks and Registered Parks and Gardens.
- **Designated archaeological sites** – see Technical Appendix (3.10) for Staffordshire and Stoke-on-Trent listed buildings.
- **The historic environment** – see Figure 2.7 Heritage Sites. Includes; Historic Battlefields, Scheduled Ancient Monuments and World Heritage Sites.
- **Main rivers and floodplains** – see Figure 2.8 Flood Zones. Includes Environment Agency Flood Zones 2 & 3 and main rivers.
- **Groundwater source protection areas** – see Figure 2.8 Flood Zones
- **Quality of agricultural land –** included within Figure 2.4 Ecological Designation
- **Green Belt** – included within Figure 2.1 Local Plan Data

Specific data corresponding to each of the GIS maps shown below in Figures 2.1 to 2.8 can be found in Technical Appendix 3.

As part of the Environmental Report any reported incidents of harm/damage as a result of municipal waste management activities are considered, particularly those having regard to:

- the number of **enforcement actions initiated by the Environment Agency** against facilities dealing with municipal waste in any given year;
- the number of **enforcement actions initiated by the Waste Planning Authority** against facilities dealing with municipal waste in any given year; and
- the number of **complaints received from the general public about facilities** dealing with municipal waste in any given year.

Currently there are two enforcement actions against waste facilities in Stoke-on-Trent for failing to hold the correct waste management licenses[19].

More specific waste related baseline data is available within the Waste Strategy Technical Appendices and provides information regarding in particular:

- the use of previously developed land;
- recycling and composting rates;
- energy recovery rates and the number of facilities contributing to renewable energy targets;
- quantity of municipal waste generated year on year;
- participation rates of general public and community groups in waste minimisation and re-use initiatives;

[19] Pre-operational, operational and non-operational waste transfer sites and material recycling facilities in Staffordshire and Stoke-on-Trent (January2007)

- baseline environmental impacts of the current waste management practices (from LCA software), to include environmental emissions;
- landfill capacity requirements;
- transport of waste and facility size;
- land use pressure; and
- LATS (Landfill Allowance Trading Scheme) targets.

### *2.1.1 Data Collection*

The baseline study area is comprised of Staffordshire County Council and Stoke on Trent County Council. Whilst the majority of the baseline data (where available) was provided by the respective waste disposal authorities or through requests to the Environment Agency, a number of the data sets requested were either unavailable, incomplete or restricted[20]. Although all data provided is the most recent dataset available, due to the dynamic nature of certain SEA topics, more recent additions or changes may not have been included and the datasets will require updating in conjunction with the monitoring report (see Section 6).

Data currently unavailable was largely restricted to landscape character and designated archaeological sites. Information relating to landscape character is a more recent requirement and many local authorities are in the process of compiling this data. Data relating to archaeological sites is less straightforward to assimilate as it is comprised of a combination of datasets, although the existing baseline information presented includes two of the key datasets, Scheduled Ancient Monuments (SAMs) as shown in Figure 2.6 and listed buildings (see Technical Appendix 3.10).

Additional information considered as preferable to the assessment (but currently unavailable) includes baseline data on historic landscape characterisation, county historic structures (not included in the SAMs list) and information detailing historic hedgerows. Again this information is likely to become available as the assimilation of, and access to county and national datasets improves.

[20] Due to the nature and sensitivity of the data only limited data regarding protected species has been made available and is referenced in the Technical Appendices (2.16)

# 3 SEA OBJECTIVES

## 3.1 Sustainable Development Objectives Relevant to the JMWMS

The SEA objectives were selected based upon close review of relevant policy and planning documents at the national, regional and local level, and in particular those directly relevant to the development of a waste management strategy. The purpose of the objectives and criteria is to allow assessment of the JMWMS to ensure it complies with wider sustainable development plans and documents.

The SEA Scoping Report identifies the assessment criteria which were subject to consultation to ensure that the key sustainability issues identified in the baseline were considered. The policy objectives identified are used to form the criteria against which the JMWMS can be appraised and is in line with West Midlands Regional Sustainable Development Framework, a key document outlining sustainable objectives for the region. The objectives fall under four main headings:

- sustainable consumption and production;
- climate change and energy;
- natural resource protection and environmental enhancement; and
- sustainable communities.

Although all of the objectives will require consideration in the preparation of Staffordshire and Stoke-on-Trent's JMWMS a number of the objectives are directly relevant to waste:

- **encourage and enable waste minimisation,** reuse, recycling and recovery to divert resources away from the waste stream, including the use of recycled material where possible;
- **reward efficient resource use** and encourage development of alternative and renewable resources in order to reduce dependence on fossil fuels; and
- **increase energy generated** from renewable and low carbon sources.

The development of the criteria for the SEA takes into consideration the objectives outlined within the Regional Sustainable Development Framework and other relevant policy documents, and was consulted upon in the Scoping Report.

| SEA Topic | Environmental Objectives | Indicator | Target |
|---|---|---|---|
| **1.0 Population and human health** | 1.1 To prevent the management of municipal waste management having an adverse impact on the amenity of residents.<br><br>1.2 To ensure that the management of municipal waste does not adversely affect the health of the population | a) Numbers of complaints upheld by the County Council from the general public.<br>b) Numbers of enforcement notices served by planning authorities.<br>c) Numbers of enforcement notices served by the Environment Agency in any given year.<br>d) Number of fly tipping incidents per annum<br>e) Publication of environmental emissions from municipal waste management facilities | To reduce the number of complaints, incidents and enforcement notices year on year or maintain at zero. |
| **2.0 Biodiversity, fauna and flora** | 2.1 To prevent the management of municipal waste having an unacceptable impact on designated nature conservation sites and species; and where possible seek positive improvements. | f) Numbers of designated nature conservation sites and species damaged or improved by municipal waste management activities in any given year and the magnitude of the impact(s)/improvement(s).<br>g) Number of known legally protected species populations that will be adversely affected or improved<br>h) Area of habitats included in the UK and Staffordshire BAP that will be adversely affected or improved | Zero negative impacts and increasing positive impacts on designated nature conservation sites, UK and Staffordshire BAP habitats, and legally protected species. |
| **3.0 Material Assets** | 3.1 To move the treatment of municipal waste up the waste hierarchy. | i) Number of properties home composting/home composters sold<br>j) Recycling and composting rates.<br>k) Recovery rates.<br>l) Quantity of municipal waste generated per head | To increase recycling/composting and recovery BVPIs and reduce landfill and waste per capita BVPIs year on year. |
| **4.0 Soil** | 4.1 To encourage the use of previously developed land by municipal waste management facilities. | m) Percentage of land-take from green and brownfield sites for facilities managing municipal waste.<br>n) Amount of best and most versatile land lost to municipal waste management development | To increase the percentage of brownfield utilised year on year<br><br>To reduce the contamination or permanent loss of best and |

| SEA Topic | Environmental Objectives | Indicator | Target |
|---|---|---|---|
| | 4.2 To prevent contamination or the permanent loss of the best and most versatile agricultural land | | versatile land or maintain at zero. |
| **5.0 Water** | 5.1 To prevent the management of municipal waste having an unacceptable impact on main rivers, flood plains and groundwater source protection areas (GSPAs) and areas of high ground water vulnerability. | m) Number of hectares of flood plain, main rivers, GSPAs or areas of high ground water vulnerability damaged or improved by municipal waste management activities in any given year and the severity of the impact(s). | To reduce number of negative incidents year on year or maintain zero. |
| **6.0 Air** | 6.1 To prevent emissions from municipal waste facilities from having an unacceptable impact on the environment. | n) Number of enforcement notices served by pollution control authorities in any given year. | To reduce the number of enforcements year on year or maintain at zero |
| **7.0 Climatic Factors** | 7.1 To reduce $CO_2$ emissions.<br><br>7.2 To increase the contribution of energy recovered from waste to renewable energy targets. | o) Number of waste miles travelled.<br><br>p) Number of facilities recovering energy from waste and the amount of energy generated<br><br>q) Tonnage of waste recovered through energy from waste | Use or locate facilities which minimise the distances waste have to travel.<br><br>To increase the contribution to renewable energy targets year on year.<br><br>To reduce CO2 emissions year on year |
| **8.0 Cultural Heritage and landscape** | 8.1 To prevent the management of municipal waste having an unacceptable impact on national parks, special landscapes, designated archaeological sites, the historic environment, best and most versatile agricultural land and the Green Belt. | r) Number of these designations damaged or improved by municipal waste management activities in any given year and the severity of the impact(s). | To reduce number of negative incidents year on year or maintain at zero, to increase the number of positive impacts year on year. |

# 4 WASTE MANAGEMENT OPTIONS ASSESSMENT

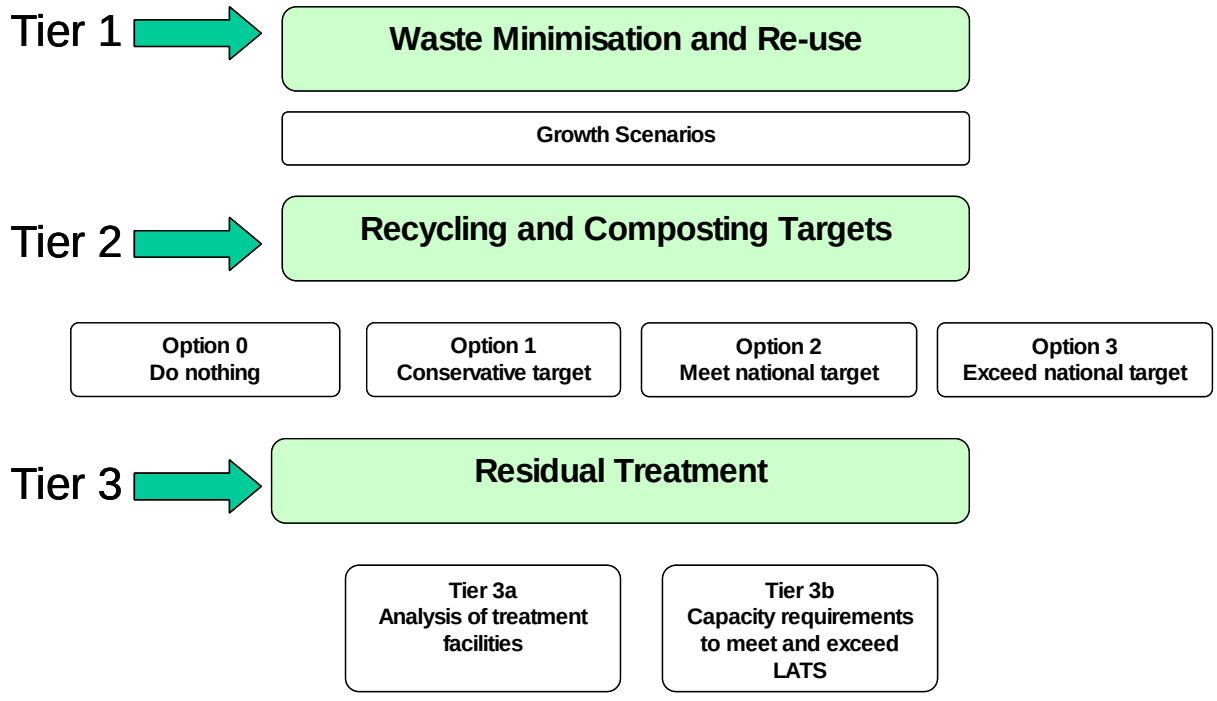
## 4.1 Introduction

As part of the JMWMS and SEA process, SLR were commissioned by Staffordshire and Stoke-on-Trent to provide an options appraisal for the long term (to the year 2020) management of the County and City's municipal solid waste (MSW). The options appraisal provides an assessment of the integrated waste options for MSW management in Staffordshire and Stoke-on-Trent in the year 2020.

The aim of the option selection process was to enable the assessment of potential waste management solutions for the County and City when compared to a range of sustainability indicators. The assessment process was designed in such a way as to be auditable, consistent and robust, and, assist in the identification of a preferred waste management option(s) for all municipal wastes arising in Staffordshire and Stoke-on-Trent for the long term. Government guidance was also applied to ensure consistency in the assessment methodology.

For ease of understanding the three tier options process is characterised pictorially in Figure 4-1 below and reflects the way in which the preferred option is derived and describes the 3 tier sequential assessment process for assessing minimisation and re-use (tier 1), recycling and composting (tier 2) and then residual waste treatment (tier 3).

**Figure 4-1: Schematic of Options Appraisal Method**




### *4.1.1 Waste Minimisation Options (Tier 1)*

Tier 1 assesses the differing growth rates and municipal waste arisings forecasted for Staffordshire and Stoke-on-Trent up to the year 2020. The adopted MSW forecast used for the tier 2 and 3 assessment stages is summarised in the JMWMS Headline Document and

reflects how growth patterns may change over time as a result of interactions between increased waste minimisation, household forecasts and per capita waste generation changes.

The strategy predicts that overall waste production per household will reduce[21] in future as a result of increased awareness through waste minimisation initiatives as set out in the JMWMS Technical Appendices and government driven changes on behalf of commercial business organisations. Despite the predicted reduction in per household waste generation, the increase in household numbers forecasted to the year 2020 by 9% (433,000 houses to 473,000 houses) results in an overall net increase of MSW year on year of between 0% and 1%. This forecasted MSW growth has been adopted as the basis for further options development.

### *4.1.2 Recycling and Composting Options (Tier 2)*

Tier 2 assesses only the fraction of MSW that is recycled and composted. Using the adopted Tier 1 MSW forecast, as explained in section 4.1.1, four recycling and composting options have been considered within the Tier 2 assessment stage using household waste performance targets for the year 2020. These four options include:

- **Option 0 –** "Stay as you are target of 31% for household waste (equivalent to 28% of MSW[22])"
- **Option 1 –** "Conservative target of 45% for household waste (equivalent to 41% of MSW)"
- **Option 2 –** "Meet proposed National target of 50% for household waste (equivalent to 46% of MSW)"
- **Option 3 –** "Exceed proposed National target 55% for household waste (equivalent to 50% of MSW)"

The assessment process identified that Option 3 should be proposed as the adopted performance level to take forward through to the tier 3 assessment stages. Option 3 assumes a combined recycling and composting level of 55% of household waste, which is equivalent to 50% of all forecasted MSW in the year 2020. A more detailed description of the options assessment process is available as part of a separate supporting document[23].

### *4.1.3 Residual Treatment Options (tier 3)*

Tier 3 assesses only the fraction of MSW that remains following recycling and composting of 50% of municipal waste. This remaining fraction is known as residual MSW which is currently either sent to the existing EfW facility in Stoke-on-Trent (180,000 tonnes) or sent to landfill as indicated in the baseline option described below. Six residual treatment options have been considered using a variety of possible treatment technologies[24] which meet the objectives in the Waste Local Plan of preventing harm, minimising waste, reducing landfill and being more integrated and include:

[21] For a more detailed explanation of predicted waste growth see Section 2 of the Options Assessment Report
[22] See JMWMS Headline Document for definitions of household and MSW waste
[23] Options Assessment Report
[24] A more detailed description of the residual waste treatment technologies is provided in the JMWMS Technical Appendix 5

- **Baseline Option –** "180,000 tonnes to Stoke EfW and remaining residual to landfill"
- **Anaerobic Digestion (AD) –** "maintain tonnage to Stoke EfW and remaining residual to AD"
- **Autoclave Option –** "maintain tonnage to Stoke EfW and remaining residual to Autoclave"
- **Energy from Waste Option –** "maintain tonnage to Stoke EfW and remaining residual to EfW"
- **Mechanical Biological Treatment (with Bio stabilisation) –** "maintain tonnage to Stoke EfW and remaining residual to MBT (bio stabilisation)"
- **Mechanical Biological Treatment (with RDF[25]) Option –** "maintain tonnage to Stoke EfW and remaining residual to MBT (RDF)"

An appraisal methodology, involving a seven-stage process, has been applied where possible to each of the options in tier 2 and 3. The seven stages of this methodology are as follows:

- Step 1 – Set overall goals for decision making for waste management, subsidiary objectives and the criteria against which all options will be measured
- Step 2 – Identify all viable options
- Step 3 – Assess the performance of options identified within Step 2 against the criteria identified within Step 1
- Step 4 – Value the performance scores for each option
- Step 5 – Weighting. Balance the different objectives or criteria against one another.
- Step 6 – Evaluate and rank the different options
- Step 7 – Sensitivity analysis. Analyse how sensitive the results are to variations in the assumptions made or the data used

## 4.2 Options Assessment Environmental Related Criteria

Each option has been assessed against 21 sustainability indicators to generate overall performance scores, as shown in Table 4-1. The environmental related objectives used to assess the options are outlined below.

[25] Refuse Derived Fuel

**Table 4-1: Sustainability Assessment Objectives and Evaluation Criteria**

| OBJECTIVES | INDICATORS/CRITERIA |
|---|---|
| **Environmental Objectives** | **Environmental Indicators/Criteria** |
| 1. To ensure prudent use of land and other resources | a) Depletion of resources, such as wood, water, fuels and ores<br>b) Landtake |
| 2. To reduce greenhouse gas emissions | c) Greenhouse gases emitted |
| 3. To minimise adverse impacts on air quality and public health | d) Emissions which are injurious to public health<br>e) Emisions contributing to air acidification<br>f) Emissions contributing to depletion of the ozone layer<br>g) Extent of odour problems<br>h) Extend of dust problems |
| 4. To conserve landscapes and townscapes | i) Extent of visual and landsacpe impacts |
| 5. To protect local amenity | j) Extent of noise problems<br>k) Extent of litter and vermin problems |
| 6. To minimise adverse effects on water quality | l) Emissions contributing to eutrophication<br>m) Extent of water pollution |
| **Socio-economic Objectives** | **Socio-economic Indicators/Criteria** |
| 7. To minimise local transport impacts (congestion, severence, fear and intimidation, physical damage) | n) Total waste kilometres (by mode)<br>o) Transport along roads other than motorways |
| 8. To provide employment opportunities | p) Number of jobs likely to be created |
| 9. To provide opportunities for public involvement and education | q) Extent of opportunitites for public involvement and education (concerning sustainable waste management practices) |
| **Operational Objectives** | **Operational Indicators/Criteria** |
| 10. To minimise the increased costs of waste management | r) Costs of collection, management and disposal, including material and energy revenues |
| 11. To ensure reliability of delivery | s) Likelihood of implementation wihtin required timescale, taking account of maturity of technology, necessary level of public participation, and the need for planning permission (taking account of scale of development and likely perceived adverse impacts) |
| **Waste Management Policy Objectives** | **Waste Management Policy Indicators/Criteria** |
| 12. To conform to waste policy | t) Percentage landfill<br>u) Percentage recycled/composted |

### *4.2.1 To Ensure Prudent Use of Land and Other Resources*

A key sustainable development objective is to use finite natural resources (such as fossil fuels and land) more efficiently. Producing more with less, for example by reusing or recycling waste, reduces the environmental pollution and degradation caused by extraction, use and disposal of natural resources.

The choice of waste management option can have a significant influence on the consumption of finite natural resources. For example, reuse and recovery of materials should result in a reduction in the consumption of primary raw materials. Non-renewable resource depletion is assessed for both the recycling and composting and residual treatment tiers using a life cycle assessment (LCA) tool[26].

Land is also a finite resource, and the emphasis of government policy is to `recycle' the use of land and buildings through brownfield site development and re-use of buildings. Some waste management options require a larger footprint/land-take than others. Landtake is measured using professional judgement based on the typical size of different facilities.

### *4.2.2 To Reduce Greenhouse Gas Emissions*

Global climate change is widely recognised as one of the greatest environmental challenges facing the world today. The clear message from the scientific community is that climate change is due, at least in part, to the increasing concentrations of greenhouse gases in the atmosphere.

[26] Environment Agency WISARD life cycle assessment tool

A number of waste management operations give rise directly or indirectly to emissions of greenhouse gases. The decomposition of waste in landfill sites also produces methane ($CH_4$), which is around 20 times more potent a greenhouse gas as $CO_2$. A key objective of the Landfill Directive is to reduce our reliance on landfill and to thereby cut methane emissions.

Measurement of this sustainability objective is made through assessing greenhouse gas emissions for both the recycling and composting options and residual treatment and recovery options using a life cycle assessment tool.

### *4.2.3 To Minimise Adverse Impacts on Air Quality and Public Health*

A key sustainable development objective is to control air pollution in order to reduce the risks to human health, the natural environment and quality of life. Pollutants that raise more concerns to Government include: Nitrogen Dioxide; Sulphur Dioxide; Carbon Monoxide; particles (PM10); and Ozone. Measurement of these indicators is made for Options in tier two, recycling and composting and tier three, residual treatment and recovery through use of a life cycle assessment tool. Human toxicity has been used as a proxy measure for public health.

The soiling of property through dust emission is a common cause of complaint. Dust is defined as small particles in the range 1-75 microns in diameter. Small particles of dust (PM10) are prejudicial to public health. A range of waste management processes potentially give rise to dust, particularly where mechanical operations and storage of waste take place in open air. Vehicle movements can also be a significant dust generator, both on and off site. Professional judgement based on experience of existing facilities is used to measure (on a nominal scale) the dust generation for each facility type.

Odour is a common cause of public concern in relation to waste management. Like dust, odours can be particularly acute where mechanical operations and storage of waste take place in open air. Odours are difficult and expensive to abate. Measurement of this indicator is made using professional judgement based on experience of existing facilities.

### *4.2.4 To Minimise Adverse Effects on Water Quality*

All waste management options will create potential impacts on water as they involve the following:

- the **storage of waste** (e.g. run off from rain and dust suppression sprays, leaching of contaminants);
- the **transport of waste** (e.g. run off from the delivery and tipping of materials, wheel washing); and
- the **operation of plant and vehicles** (e.g. potential pollution from oil and solvents, including the risk of accidental spillage)

However, some waste management options present a greater risk to water quality than others, for example with recycling and composting options:

- **composting** - leachate may be generated as part of the process and the liquor may contain heavy metals and other contaminants.

Similar assessments are also conducted for the residual treatment and recovery options

- anaerobic digestion - the process results in a digestate liquor which may contain high levels of metals and other contaminants;

- incineration - cooling and cleaning water may contain high levels of contaminants, whilst the storage and disposal of ash and air pollution control residues poses a further threat to water quality;
- mechanical biological treatment (MBT) – will generally produce small quantities of leachate that may require biological treatment;
- autoclave – the process will generate waste from the boiler system which will require biological treatment; and
- landfill/landraising - the risk of pollution depends on the characteristics of the wastes, the standard of site engineering, the underlying geology and the proximity of water courses and abstraction points[27]

## 4.3 Impacts of Options

The options assessment process assesses the likely impacts arising from the recycling and composting options (tier 2) and residual treatment options (tier 3) using the 21 sustainability indicators as outlined in Table 4-1 above. The options appraisal conducted for the JMWMS is presented in a quantitative format in the Options Assessment Report. Data from the Options Assessment Report has been used to inform the appraisal of the options against the SEA objectives (see Section 3), and is presented in Tables 4-2 and 4-3 below.

In order to present the impacts of the options in a clear and comparable format the following symbols have been used to indicate the nature of the impacts.

| | |
|---|---|
| **+** | **positive impact** |
| **-** | **negative impact** |
| **ø** | **neutral impact** |

The options presented in Tables 4-2 and 4-3 are being measured against the baseline or "do nothing" scenario and therefore this option is shown as a neutral impact throughout, however, this is not to say there are no impacts of the "do nothing" scenario.

In conjunction the assessment tables also measure the significance level of the impacts and this is shown by a colour scheme as shown below.

| | |
|---|---|
| | **major impact** |
| | **minor impact** |
| | **negligible impact** |

[27] The Environment Agency's advice is that, however well engineered a landfill site, there is a risk of leachate release to the water environment

**Table 4-2: Comparison of Tier 2 (Recycling and Composting) Options with SEA Objectives**

| Environmental Objectives | Target | Criteria | Tier 2 Option 0 (baseline) | Tier 2 Option 1 (41% MSW) | Tier 2 Option 2 (46% MSW) | Tier 2 Option 3 (50% MSW) |
|---|---|---|---|---|---|---|
| *Population and Human Health* | | | | | | |
| To protect amenity and health of the population | Reduce complaints and enforcement notices served and upheld<br><br>Reduce fly tipping incidents<br><br>Reduce emissions from waste facilities | Impact on local amenity<br>• Noise problems | Ø | - | - | - |
| | | • Litter and vermin problems | Ø | + | + | + |
| | | • Emissions injurious to human health | Ø | + | + | + |
| *Biodiversity, soil and water* | | | | | | |
| To prevent negative impacts upon conservation sites, soil and water | Conservation sites damaged<br><br>Zero negative impact from land-take from green and brownfield sites<br><br>Zero negative impact to areas of groundwater vulnerability damaged or improved | • Landtake | Ø | + | + | + |
| | | • Resource depletion | Ø | + | + | + |
| | | • Water contamination | Ø | + | + | + |
| | | • Eutrophication levels | Ø | + | + | + |
| *Air* | | | | | | |
| To improve air quality | Reduce emissions from waste facilities<br><br>Reduce number of AQMA's | Impact on air quality<br>• Air acidification | Ø | + | + | + |
| | | • Ozone depletion | Ø | + | + | + |
| | | • Odour | Ø | + | + | + |
| | | • Dust | Ø | + | + | + |

| **Environmental Objectives** | **Target** | **Criteria** | **Tier 2 Option 0 (baseline)** | **Tier 2 Option 1 (41% MSW)** | **Tier 2 Option 2 (46% MSW)** | **Tier 2 Option 3 (50% MSW)** |
|---|---|---|---|---|---|---|
| *Climatic Factors* | | | | | | |
| To reduce $CO_2$ emissions and greenhouse gases | Minimise local transport impact<br><br>Increase contribution to renewable energy targets | • Total waste kilometres | Ø | - | - | - |
| | | • Total $CO_2$ emissions | Ø | + | + | + |
| *Cultural Heritage and Landscape* | | | | | | |
| To prevent the management of municipal waste having adverse impacts | To reduce negative impacts or maintain at zero | • Nature, scale and number of facilities | Ø | + | + | + |

**Table 4-3: Comparison of Tier 3 (Residual Treatment) Options with SEA Objectives**

| Environmental Objectives | Target | Criteria | Tier 3 Option Baseline | Tier 3 Option AD | Tier 3 Option Autoclave | Tier 3 Option EfW | Tier 3 Option MBT | Tier 3 Option MBT (RDF) |
|---|---|---|---|---|---|---|---|---|
| *Population and Human Health* | | | | | | | | |
| To protect amenity and health of the population | Reduce complaints and enforcement notices served and upheld<br>Reduce fly tipping incidents<br>Reduce emissions from waste facilities | Impact on local amenity<br>• Noise problems | Ø | - | - | - | - | - |
| | | • Litter and vermin problems | Ø | + | + | + | + | + |
| | | • Emissions injurious to human health | Ø | + | + | + | + | + |
| *Biodiversity, soil and water* | | | | | | | | |
| To prevent negative impacts upon conservation sites, soil and water | Conservation sites damaged<br>Zero negative impact from land-take from green and brownfield sites<br>Zero negative impact to areas of groundwater vulnerability damaged or improved | • Landtake | Ø | + | + | + | + | + |
| | | • Resource depletion | Ø | + | + | + | + | + |
| | | • Water contamination | Ø | + | + | + | + | + |
| | | • Eutrophication levels | Ø | - | + | + | + | + |
| *Air* | | | | | | | | |
| To improve air quality | Reduce emissions from waste facilities<br>Reduce number of AQMA's | Impact on air quality<br>• Human toxicity | Ø | + | + | + | + | + |
| | | • Air acidification | Ø | + | + | + | + | + |
| | | • Ozone depletion | Ø | Ø | Ø | Ø | Ø | Ø |

| Environmental Objectives | Target | Criteria | Tier 3 Option Baseline | Tier 3 Option AD | Tier 3 Option Autoclave | Tier 3 Option EfW | Tier 3 Option MBT | Tier 3 Option MBT (RDF) |
|---|---|---|---|---|---|---|---|---|
| | | • Odour | Ø | + | + | + | + | + |
| | | • Dust | Ø | + | + | + | + | + |
| *Climatic Factors* | | | | | | | | |
| To reduce $CO_2$ emissions and greenhouse gases | Minimise local transport impact<br><br>Increase contribution to renewable energy targets | • Total waste kilometres | Ø | Ø | Ø | Ø | Ø | Ø |
| | | • Total $CO_2$ emissions | Ø | + | + | + | + | + |
| *Cultural Heritage and Landscape* | | | | | | | | |
| To prevent the management of municipal waste having adverse impacts | To reduce negative impacts or maintain at zero | • Nature, scale and number of facilities | Ø | + | + | + | + | + |

The assessment results in Tables 4-2 and 4-3 are based upon the quantitative life-cycle assessment results. As a result, measuring the impacts of the Tier 2 and Tier 3 options against the SEA objectives is perhaps more robust than other more subjective assessments.

The results of the Tier 2, recycling and composting (see Table 4-2) targets are assessed against the baseline (do nothing) scenario and indicate mainly positive impacts and an overall preference to higher recycling and composting rates. These results largely reflect the outcome of the options assessment process. The only negative impacts are classed as negligible and relate to potential noise impacts and increased waste kilometres which are associated with increased recycling activity. These negative impacts are offset by the major positive impacts associated with increased recycling and an overall reduction of waste to landfill.

The Tier 3, residual treatment options are also assessed against the SEA objectives in Table 4-3. The five residual treatment technologies all score higher overall than the baseline (do nothing) option, however, unlike the recycling and composting impacts, the scores of the residual treatment options can vary considerably.

Anaerobic digestion, Autoclave and Energy from Waste (EfW) options generally score the highest. This is largely due to lower landtake and lower CO2 emissions than both of the MBT (Mechanical Biological Treatment) options, although overall, all treatment options score higher than the baseline (landfill) option.

# 5 WASTE STRATEGY OBJECTIVES ASSESSMENT

## 5.1 Introduction

The JMWMS for Staffordshire and Stoke-on-Trent has not been produced in isolation and as with the options assessment process, the overarching waste strategy objectives have also been appraised against the SEA objectives. The purpose of the appraisal is to identify any positive or negative impacts of implementing the strategy, measure the severity of the impacts (whether positive or negative) and to recommend mitigating negative impacts and enhancing positive impacts.

## 5.2 Waste Strategy Compatibility

The SEA process requires that the objectives of the JMWMS (as identified in Section 1.3) are concurrent with those outlined within the SEA scoping report. Each of the SEA objectives was compared with the JMWMS headline objectives to ensure compatibility and mitigate potential negative impacts associated with waste management and any wider implications.

The overarching objectives within the JMWMS are also summarised here;

1. **Waste minimization;**
2. **Increased recycling;**
3. **Waste as a resource;**
4. **Recovering benefit from all remaining MSW; and**
5. **Zero waste to landfill**

The assessment, shown in Table 5-1 compares the waste strategy objectives with SEA objectives using a scoring method as explained below.

To remain consistent the same scoring method has been used for the JMWMS comparison as the Options Assessment.

| | |
|---|---|
| **+** | **positive impact** |
| **-** | **negative impact** |
| **Ø** | **neutral impact** |

A similar assessment is also used to measure the significance level of the impacts and this is depicted using the colour scheme shown below.

| | |
|---|---|
| | **major impact** |
| | **minor impact** |
| | **Negligible impact** |

## Table 5-1: Comparison of JMWMS Objectives and SEA Objectives

| SEA Objectives | Waste Strategy Objectives | | | | | Comments |
|---|---|---|---|---|---|---|
| | 1 Minimisation | 2 Recycling | 3 Resource | 4 Recovery | 5 Zero Landfill | |
| *1.0 Population and Human Health* | | | | | | |
| 1.1 To prevent the management of municipal waste having an adverse impact on the amenity of residents. | + | - | + | Ø | + | Reducing the overall production of waste will reduce the impact of collections and waste treatment capacity required. The increase in recycling may contribute to on overall increase in collection requirements however, this impact should be minimal. By ensuring adequate treatment facilities and capacity are available this should also help to reduce the number of complaints and waste related incidents. |
| 1.2 To ensure that the management of municipal waste does not adversely affect the health of the population | + | + | Ø | Ø | + | Minimising waste will reduce the requirement for waste management and increased recycling should reduce residual waste and problems associated with overflowing bins. Reducing waste to landfill will have a positive impact upon overall CO2 emissions thereby improving residents' quality of environment. |
| | | | | | | |

| SEA Objectives | Waste Strategy Objectives | | | | | Comments |
|---|---|---|---|---|---|---|
| | 1 Minimisation | 2 Recycling | 3 Resource | 4 Recovery | 5 Zero Landfill | |
| *2.0 Biodiversity, fauna and flora* | | | | | | |
| 2.1 To prevent the management of municipal waste having an unacceptable impact on designated nature conservation sites and species; and where possible seek positive improvement | + | + | + | + | + | The reduction in waste arisings and use of virgin materials due to increased recycling will have a positive impact on biodiversity. Reduced mineral extraction and increased recycling of materials such as aluminium will result in a significant benefit to the conservation of resources. Particular benefits are also present in relation to reducing landtake by reducing landfill and moving the management of waste up the waste hierarchy. |
| *3.0 Material Assets* | | | | | | |
| 3.1 To move the treatment of municipal waste up the waste hierarchy | + | + | + | + | + | Key to the waste strategy targets is to manage waste in such a way as to reduce arisings, increase recycling and recover as much benefit as possible. The more waste used as a potential resource results in less of a burden on waste managers to dispose of the waste. |
| *4.0 Soil* | | | | | | |
| 4.1 To encourage the use of previously developed land by municipal waste management facilities | Ø | Ø | Ø | Ø | + | Existing waste management and planning policy encourages the use of previously developed land. A reduced requirement for landfill will result in more land made available for alternative uses. |

| SEA Objectives | Waste Strategy Objectives | | | | | Comments |
|---|---|---|---|---|---|---|
| | 1 Minimisation | 2 Recycling | 3 Resource | 4 Recovery | 5 Zero Landfill | |
| 4.2 To prevent contamination or the permanent loss of the best and most versatile agricultural land | Ø | Ø | + | Ø | Ø | Existing planning policy protects Grade 1 and 2 agricultural land from any negative impacts and therefore the strategy should have no impact upon best agricultural land. Staffordshire and Stoke-on-Trent have reduced areas of Grade 1 or high quality land and therefore there is a lower risk. Where land is not of a high quality the addition of waste derived compost can actually provide benefit to land |
| *5.0 Water* | | | | | | |
| 1.1 To prevent the management of municipal waste having an unacceptable impact on main rivers, flood plains and groundwater source protection areas (GSPAs) and areas of high ground water vulnerability | + | + | + - | Ø | + | By reducing waste production and increasing recycling there will be less waste sent to landfill. As even the best managed landfill sites pose a threat to rivers and groundwater any reduction in landfill will reduce the threat to water. In terms of waste as a resource, run off produced from composting will contain levels of nitrate and may require managing, however the application of compost to land will also increase the water retention capabilities of the soil. |
| | | | | | | |

| SEA Objectives | Waste Strategy Objectives | | | | | Comments |
|---|---|---|---|---|---|---|
| | 1 Minimisation | 2 Recycling | 3 Resource | 4 Recovery | 5 Zero Landfill | |
| *6.0 Air* | | | | | | |
| 6.1 To prevent emissions from municipal waste facilities from having an unacceptable impact on the environment | + | + | + | + | + | All of the strategy objectives have a positive impact on the production emissions due to the overall reduction of waste produced and sent to landfill. Increased recovery of resources will result in reduced production using raw materials. A reduction in the production of methane should also reduce the overall numbers of enforcement areas, or at least prevent further enforcements. |
| *7.0 Climatic Factors* | | | | | | |
| 7.1 To reduce $CO_2$ emissions | + | + | + | + | + | All of the strategy objectives have a positive impact on the production of CO2 emissions and therefore any reduction of waste produced and sent to landfill will improve CO2 levels in Staffordshire and Stoke-on-Trent |
| 7.2 To increase the contribution of energy recovered from waste to renewable energy targets | Ø | Ø | + | + | Ø | Maximising the recovery of waste is a key requirement of the strategy. By increasing resource recovery there is less of a burden on the earth's finite resources. Also, depending upon the final residual treatment technology selected, energy can also be recovered (EfW) thereby reducing the need to burn fossil fuels. |
| | | | | | | |

| SEA Objectives | Waste Strategy Objectives | | | | | Comments |
|---|---|---|---|---|---|---|
| | 1 Minimisation | 2 Recycling | 3 Resource | 4 Recovery | 5 Zero Landfill | |
| *8.0 Cultural Heritage and Landscape* | | | | | | |
| 8.1 To prevent the management of municipal waste having an unacceptable impact on national parks, special landscapes, the historic environment, best and most versatile agricultural land and the greenbelt | Ø | + | + | + | + | By reducing the overall capacity requirement for the treatment of residual waste, this should have a positive effect on all surrounding sensitive environments. Consideration may however be required to reduce any potential visual impacts of any planned waste facilities. |

### *5.2.1 Headline Conclusions*

The overall conclusions of the SEA objectives assessed against the JMWMS objectives is very positive as there appears to be no major or minor negative impacts or incompatibilities emerging from the strategy compared with the key environmental criteria considered. At this strategic level however it is difficult to conduct a more specific or quantitative assessment and the waste strategy objectives are rather more general than the SEA indicators, thus making an accurate judgement difficult.

As the draft JMWMS only provides the residual treatment options rather than the final chosen technology it is difficult to asses the impacts of the strategy in any detail. At this stage it is also unknown where a potential waste management facility will be located and therefore the impacts are assessed across the whole of Staffordshire and Stoke-on-Trent. Due to the wealth of environmental baseline data available across the City and County it is difficult to accurately assess the impacts on the ground as they can vary enormously depending upon location. This type of site specific assessment we believe falls under Environmental Impact Assessment regime and not part of an SEA.

The SEA criteria should however be given closer consideration at the time when the strategy is implemented, preferably in parallel with the implementation process to ensure none of the adverse impacts highlighted within the Scoping and this Environmental Report are employed.

### *5.2.2 Results*

The overarching strategy objectives and waste policy principles seem to be in line with the SEA objectives and despite the absence of quantitative assessment scores at this stage a number of observations based upon professional judgement can be made.

One of the key objectives of the strategy is to achieve zero waste to landfill by the target year 2020. Any reduction in waste to landfill reduces the adverse impacts to public amenity and the construction of any new waste facility if properly managed is unlikely to affect public health.

The strategy is also clear in its commitment to manage waste without having an adverse impact upon designated nature conservation sites and species. Although the provision of further waste facilities may impact air emissions and landtake it is impossible to quantify the potential impacts at this stage. The reduction of the total amount of waste to landfill will however result in a positive effect on water as it reduces the risk of groundwater pollution.

The proposed increased recycling and recovery of waste will serve to minimise the consumption of finite resources and, depending on the final residual treatment option there is also the potential to recover energy.

Finally, despite the broad nature of the assessment of waste strategy objectives at this stage, the SEA does serve to increase the awareness of residual waste management issues both within the local government level and for the wider stakeholders. The purpose of the SEA is to identify, at the early stages, any potential negative impacts on the environment so that they may be avoided from the outset and measures implemented which can possibly improve the existing situation.

# 6 MONITORING IMPLEMENTATION

## 6.1 Summary of Proposed Mitigation Measures

The assessment of the SEA objectives against the waste management options in Section 4 and against the waste strategy objectives in Section 5 shows that the overwhelming majority of impacts from the policies are positive. However, there are a small number of potentially negative impacts to arise as a result of one or two of the waste strategy options and objectives. As part of the SEA objectives it is important to identify any negative impacts and to propose mitigating measures to reduce the negative impacts.

The purpose of this stage in the SEA process is to identify these impacts and eliminate, or where not possible offset any potential adverse impacts of the strategy.

**Table 6-1: Proposed Mitigating Measures for Potential Adverse Impacts**

| SEA Objective | SEA Criteria / Target | Waste Strategy Option/ Objective | Potential Negative Impact | Proposed Mitigation |
|---|---|---|---|---|
| *Population and Human Health* | Noise | All recycling and composting options | Increased noise due to additional collection vehicles<br><br>(negligible negative impact) | Where possible waste collection systems to be designed to collect multiple waste streams, thereby reducing the overall number of vehicles required. |
| *Climatic Factors* | Total waste kilometres | All recycling and composting options | Increased waste kilometres due to delivery of waste to various waste treatment facilities<br><br>(negligible negative impact) | In line with the waste strategy objectives aim to treat or recover waste as close to point of origin as possible to reduce the overall waste miles travelled. |
| *Population and Human Health* | Noise | All residual waste treatment options | Increased noise from increased vehicle movements and extended plant operating times | Ensure maximum efficency in all vehicle movements to reduce total movements required. Where plants are operational for extended hours restrictions on the delivery of waste to the plant will minimise noise from vehicle movements outside of normal working hours. |
| *Biodiversity, Soil and Water* | Eutrophication levels | Anaerobic Digestion residual treatment option | The treatment of waste by anaerobic digestion results in high levels of BOD (biochemical oxygen demand) and COD (chemical oxygen demand) | Assuming all effluent waste is managed through a biological treatment facility prior to discharge there should be no adverse risk to biodiversity, soil and water. |
| *Water* | Waste treatment impacts on water | Waste as a resource - composting | Application of waste derived compost to land can increase the nitrate levels of the soil | Ensure all waste derived compost conforms to industry benchmark (BSI PAS 100) and monitor application of material to land. |

## 6.2 Monitoring Plan

Following a period of consultation the on the SEA Environmental Report and any modifications to the assessment a monitoring plan will be produced to measure the environmental effects of the strategy. The plan will specifically address any of the adverse impacts highlighted as part of the SEA Environmental Report with additional scope for expansion following comments or views from the consultation exercise.

# 7 CLOSURE

This report has been prepared by SLR Consulting Limited with all reasonable skill, care and diligence, and taking account of the manpower and resources devoted to it by agreement with the client. Information reported herein is based on the interpretation of data collected and has been accepted in good faith as being accurate and valid.

This report is for the exclusive use of Staffordshire County Council and Stoke-on-Trent City Council; no warranties or guarantees are expressed or should be inferred by any third parties. This report may not be relied upon by other parties without written consent from SLR.

SLR disclaims any responsibility to the client and others in respect of any matters outside the agreed scope of the work.