Appendix E

WASTE STRATEGY FOR ESSEX

Strategic Environmental Assessment (SEA) Environmental Report

Report for: Essex County Council

Ref. ED15623100

Ricardo ref. ED15623100 Issue: 1 14/09/2023

Ricardo Energy & Environment, Gemini Building, Fermi Avenue, Harwell, Oxfordshire, OX11 0QR, UK | +44(0)1235 75 3000 | ee.ricardo.com
Registered company no. 08229264 | VAT no. GB 212 8365 24

Customer:
Essex County Council

Customer reference:
ED15623

Confidentiality, copyright and reproduction:

Ricardo reference:
ED15623100

Contact:
Alice Burrows, 30 Eastbourne Terrace, London, W2 6LA, UK

T: +44 (0) 1235 753 000
E: Alice.Burrows@ricardo.com

Author:
Simone Medonos, Connor Fulham, Adi Prasad, Alice Burrows, John Woodruff, Noel Howell

Approved by:
John Woodruff

Signed

Date:
14/09/2023

CONTENTS

Appendices

NON-TECHNICAL SUMMARY

BACKGROUND AND STRATEGIC ENVIRONMENTAL ASSESSMENT

This Non-Technical Summary of the Environmental Report sets out the findings of the Strategic Environmental Assessment (SEA) of the draft Waste Strategy for Essex.

The SEA Regulations require that public plans, programmes and strategies are assessed for their potential effects on the environment. The Waste Strategy is a local authority plan, produced by a public body, required by legislation and covers waste management. As such, it is considered to be within the scope of the SEA Regulations[1].

The following sections of this Non-Technical Summary:

- provide an overview of the draft Waste Strategy for Essex;
- describe the key stages of the SEA process and how it has been applied to the draft Strategy;
- outlines the approach to the SEA of the Strategy, including the assessment framework;
- presents a summary of the findings of the SEA of the draft Strategy and reasonable alternatives; and
- set out the next steps in the SEA process.

SEA enables environmental considerations to be built into the Waste Strategy for Essex, so that potentially significant environmental impacts are identified at an early stage. It also gives members of the public and interested organisations an opportunity to comment on the draft Strategy and its environmental effects. SEA considers how identified adverse impacts can be avoided or minimised (via 'mitigation'). A monitoring plan is also developed to identify any unexpected adverse environmental effects, should these arise. The conclusions from each stage of the assessment are summarised in the sections below.

THE WASTE STRATEGY FOR ESSEX

Essex County Council (ECC) is the statutory Waste Disposal Authority (WDA) for Essex and is obligated under the Environmental Protection Act 1990 to provide a range of waste services for the treatment and disposal of Local Authority Collected Waste.

To optimise the delivery of its statutory waste functions ECC works in partnership with the twelve Essex Waste Collection Authorities (comprising the district, city, borough councils of Essex), collectively with Essex County Council known as the Essex Waste Partnership (EWP). There is a stated ambition that effective partnership working as the EWP will ensure that:

- appropriate infrastructure can be provided and utilised.
- complimentary systems and services can be implemented to deliver effective waste operations.
- resources can be used in a manner which maximises beneficial impacts.

The Waste Strategy for Essex sets out the vision and objectives of the EWP. The Waste Strategy provides a framework detailing how waste that is produced by homes and businesses in the county will be managed for the next 25+ years.

The aim of the Waste Strategy and the Essex Waste Partnership (EWP) *is 'to work together to create, promote or support campaigns which avoid or reduce waste, improve or maximise recycling and composting, and minimise the environmental impacts of managing, treating and disposing of waste in Essex'*[2].

ECC is obliged to maintain a Joint Strategy setting out how household and similar wastes are to be managed. The current Joint Municipal Waste Management Strategy (JMWMS) was adopted in 2008, and was expected to be in place until 2032. The development of new legislative and policy drivers by government have resulted in the current JMWMS becoming outdated; ECC have therefore taken the decision to review, update and develop the Strategy to ensure it better reflects current needs and legislative requirements.

[1] The Environmental Assessment of Plans and Programmes Regulations 2004 (SI2004/1633), available at: http://www.legislation.gov.uk/uksi/2004/1633/contents/made

[2] https://www.loveessex.org/our-waste-strategy/

The current JMWMS needs to be refreshed to take account of new targets for waste management that go beyond 2020. This project is designed to assist the EWP in producing a refreshed Joint Strategy, the "Waste Strategy for Essex" which will provide a clear, concise and target-driven guide on how waste is to be managed to 2055. The refreshed Strategy will consider national waste policy, the latest legislation, performance targets and define a collective EWP ambition.

This new Strategy, covering the period up to 2055, brings a new focus on how the county of Essex will deliver an effective, efficient, and sustainable service for the future. Following the Environment Act 2021, national policy and the findings of the Essex Climate Action Commission 2020, the new Strategy updates the EWP's approach to reducing the impact that waste management has on climate change. The Strategy is research based and sets out the reasons for the approach; the principles of what will be done; and the targets that the county will strive to meet.

The EWP will review this Strategy every five years to ensure alignment with any changes in national policy and legislation, trends in waste generation, and the development of new approaches and technologies.

Further detail on the Strategy and the development of reasonable alternatives is contained in Sections 1.2 and 5.2 of the Environmental Report.

WHAT IS STRATEGIC ENVIRONMENTAL ASSESSMENT (SEA)?

This report has been prepared in accordance with the SEA Regulations[3]. The SEA Regulations require all qualifying policies, plans, programmes and strategies to undergo a SEA. The Waste Strategy is a local authority plan, produced by a public body, required by legislation and covers waste management. As such, it is a qualifying plan in accordance with the SEA Regulations[4].

Essex County Council has considered the SEA requirements and has determined that they apply to the Waste Strategy for Essex and has undertaken an SEA to ensure a systematic approach to the consideration of the environmental effects of the draft Waste Strategy for Essex.

The SEA process provides a systematic process for identifying, reporting and mitigating the environmental impacts of the proposed Strategy. It comprises the following distinct stages:

- **Screening** – determining whether the Strategy requires a SEA;
- **Scoping** – establishing significant environmental topics, setting the environmental baseline, developing appropriate SEA objectives and consulting via a Scoping Report;
- **Environmental Assessment** – assessing the potential environmental impact of the Strategy and consulting on both the draft Strategy and Environmental Report;
- **Post Adoption Statement** – how the assessment and the consultation results have been considered within the finalised Strategy;
- **Monitoring** – monitoring significant environmental effects and taking appropriate remedial action for any unforeseen significant environmental effects.

This Environmental Report sets out the findings of the SEA undertaken on the draft Waste Strategy for Essex.

Section 1.1 of the Environment Report describes in further detail the requirement for SEA of the draft Strategy and the SEA process including its relationship with the preparation of the Waste Strategy for Essex.

[3] The Environmental Assessment of Plans and Programmes Regulations 2004 (Statutory Instrument 2004 No. 1633) apply to any plan or programme which relates solely or in part to England.

[4] The Environmental Assessment of Plans and Programmes Regulations 2004 (SI2004/1633), available at: http://www.legislation.gov.uk/uksi/2004/1633/contents/made

WHAT ARE THE KEY ISSUES FOR THE WASTE STRATEGY FOR ESSEX?

As part of the SEA process, a review has been undertaken to identify the key environmental issues which are relevant to the assessment of the draft Strategy. These issues have been identified from a variety of sources, including a review of baseline data and other relevant plans and programmes. A summary of the issues identified as being most relevant to the assessment of the draft Strategy are shown in Table NTS 1.

Table NTS 1: Key Issues from Baseline Analysis

Topic	Summary of Key Issues
Material Assets and Waste Management	• The need to minimise the consumption of resources, including water and energy. • The need to follow the 'waste hierarchy' of 'reduce, re-use, recycle and recover' with the aim of reducing the proportion of waste sent to landfill. • The need to maintain consistently high recycling rates. • The need to promote and move towards a regenerative circular economy. • The need to support regional and national commitments to decarbonisation.
Biodiversity, Flora and Fauna	• The need to protect or enhance the region's biodiversity, particularly protected sites designated for nature conservation. • The need to avoid activities likely to cause irreversible damage to natural heritage. • The need to take opportunities to improve ecological resilience. • The need to control the spread of Invasive Non-Native Species (INNS). • The need to engage more people in biodiversity issues so that they personally value biodiversity and know what they can do to help, including through recognising the value of the ecosystem services.
Population and Human Health	• The need to ensure waste sites and waste management are not disproportionately impacting deprived or vulnerable communities. • The need to protect human health. • The need to ensure continued improvements in levels of health across the region, particularly in urban areas and deprived areas. • The need to ensure waste is not mismanaged so as to impact upon human health through chemicals, air pollution, land contamination and increased risk of infection and/or disease. • The need to ensure high recycling rates are maintained. • The need to accommodate an increasing population. • The need to contribute towards maintaining sustainable growth in the region.
Water	• The need to further improve the quality of the region's river, estuarine and coastal waters taking into account WFD objectives and designated sites objectives (i.e. assessment against Common Standards Monitoring Guidance, where relevant). • The need to maintain the quantity and quality of groundwater resources taking into account WFD objectives. • The need to improve the resilience, flexibility and sustainability of water resources in the region, particularly in light of potential climate change on surface waters and groundwaters. • The need to ensure sustainable abstraction to protect the water environment and meet society's needs for a resilient water supply. • The need to ensure that people understand the value of water.
Soils, Land Use and Geology	• The need to encourage effective use of the land, benefitting landowners, other stakeholders, the environment and sustainability of natural resources. • The need to apply the Waste Hierarchy; prioritising prevention, enhancing recycling and reducing the amount of waste going to landfill.
Air Quality and Climate	• The need to minimise emissions of pollutant gases and particulates and enhance air quality;

Topic	Summary of Key Issues
	• The need to reduce the need to travel and promote sustainable modes of transport; • The need to reduce greenhouse gas emissions arising from implementation of the Waste Strategy; • The need to take into account, and where possible adapt to, the potential effects of climate change; • The need to increase environmental resilience to the effects of climate change.
Archaeology and Cultural Heritage	• The need to conserve or enhance sites of archaeological importance and cultural heritage interest.
Landscape and Visual Amenity	• Landscape and designated sites should be maintained and enhanced for the enjoyment of the public.

Section 2 of the Environmental Report summarises the review of plans and programmes relevant to the draft Strategy and SEA contained in Appendix C.

Section 3 presents an overview of the baseline analysis of environmental characteristics, including the key issues and their relevance to the assessment. The detailed baseline information is presented in Appendix D.

WHAT WOULD THE EVOLUTION OF THE ENVIRONMENT BE WITHOUT THE WASTE STRATEGY?

An important part of the SEA process is to identify the current baseline conditions, and how they might change over time, in absence of the Strategy. With the knowledge of baseline conditions potential impacts of the Strategy can be identified, monitored, and if necessary mitigated.

This section provides an overview of the projected environmental trajectory in the absence of the Waste Management Strategy. With a continuation of current waste management practices, potential challenges include increased waste generation and limited landfill capacity. The absence of a deliberate focus on promoting a circular economy might hinder advancements in material reuse and recycling, consequently affecting waste reduction efforts. Furthermore, the persistence of pollution in ecosystems and landscapes is anticipated, particularly concerning challenges related to plastic waste management.

To navigate towards a more sustainable future, the importance of adopting an effective Waste Strategy can help minimise waste generation, improve resource efficiency, and move towards a more regenerative circular economy. A summary of the future baseline in the context of Government targets is provided in Table NTS 2.

Table NTS 2: Summary of the Future Baseline

Topic	Summary of future evolution of the baseline
Material assets and waste management	The Government's National Infrastructure Strategy (2020) outlines a commitment to decarbonise the economy by 2050, strategies for post-COVID-19 economic recovery, and plans to 'level-up' UK cities and regional powerhouses. It emphasises waste management investment, including green-growth clusters and Towns Fund support, with potential benefits for Essex in terms of the economy, industry, resource efficiency, and the built environment. The UK Government aims to accelerate green technology deployment through private sector investment in retrofitting, carbon capture, and low-carbon hydrogen. The 25 Year Environment Plan (2018) focuses on environmental protection and sustainable economic management. A prominent theme within the plan is "Increasing resource efficiency and reducing pollution and waste". Key commitments include promoting reuse, remanufacturing, recycling, and eliminating avoidable waste by 2050, including plastic waste by 2042. Measures to tackle air pollution and chemical impact are also part of the plan.

Topic	Summary of future evolution of the baseline
	The Resources and Waste Strategy (2018) aligns with the 25-Year Environment Plan, aiming to minimise waste, promote resource efficiency, and transition to a circular economy. The Strategy aims to eliminate avoidable plastic waste and all avoidable waste by 2050 while doubling resource productivity. It provides a roadmap to achieve these goals over the 25-year period.
Biodiversity, Flora, and Fauna	The Defra 25 Year Environment Plan commits to restoring 75% of protected sites and creating/restoring 500,000 hectares of wildlife-rich habitat. Biodiversity Net Gain is adopted in development, supported by landscape and catchment level land management to expand habitats and aid species recovery. Climate change impacts include changes in seasonal activity, water scarcity, and indirect effects through invasive species. Adaptation to climate impacts is vital for wildlife's survival.
Population and Human Health	Access to the recreational resources, green spaces and the historic environment will have greater importance in future planning and the National Planning Policy Framework emphasises green spaces' importance in planning. The National Ecosystem Assessment and Marmot Review highlight nature's positive impact on mental and physical health. The Government plans a Green Infrastructure Partnership to develop green infrastructure, benefiting human well-being.
Water	The Water Framework Directive aimed for "good status" in all waterbodies by 2015, delayed to 2021 or 2027 under certain conditions. Avoiding deterioration between status classes is a short-term goal. The UK Climate Change Risk Assessment 2021 identifies climate-induced water-related challenges, including changes in hydrology, increased demand, and impacts on water supplies and river flows.
Soil, Geology, and Land Use	The NPPF prioritises effective land use by encouraging the reuse of previously developed land (brownfield) unless it has high environmental value. Emphasis is placed on the Green Belt policy, which aims to prevent urban sprawl. The Green Belt policy has five purposes: curbing unrestricted sprawl of large built-up areas; to prevent merging of neighbouring towns; safeguarding the countryside; to preserve the setting and special character of historic towns; and to assist in urban regeneration via recycling of derelict and other urban land. The NPPF favours sustainable development but not when it impacts European or other designated sites under specific policies.
Air and Climate	The UK has set ambitious targets to significantly reduce greenhouse gas emissions by 2027, aligning with government and international goals. The UK met the first and second carbon budgets and is currently projected to meet the third carbon budget which will be assessed in the Climate Change Committee 2024 progress report. While progress is evident in controlling certain air pollutants, trends for NO2 and PM10 are showing signs of stagnation or reversal in some areas despite existing policy efforts. The Government's Net Zero ambition aims to achieve a 78% reduction in emissions by 2035 compared to 1990 levels, a key step towards net zero by 2050. Monitoring waste management's carbon emissions is pivotal in tracking progress towards this target. Climate change projections (UKCP18) indicate alterations in seasonal extremes, including increased autumn rainfall intensity and shifts in summer weather patterns. Central England is expected to experience warmer summers with fluctuations in rainfall levels. Emissions of particulate matter have been relatively stable since 2009. The Government's aim was to reduce emissions. Targets for NO2 and sulphur dioxide reductions against the 2005 baseline have been set, reflecting a decrease in emissions and ongoing efforts to improve air quality. Sulphur dioxide emissions have notably dropped by 98% since 1970.
Archaeology and Cultural Heritage	The NPPF emphasises protecting heritage assets and adapting them for future generations. Economic challenges could impact heritage assets. Climate change

Topic	Summary of future evolution of the baseline
	may affect heritage assets variably. Some types of assets and landscapes have already experienced and survived significant climatic changes in the past and may demonstrate considerable resilience in the face of future climate change. However, direct climate impacts could put more historic assets at risk.
Landscape and Visual Amenity	NPPF promotes diverse roles of different areas, conserving urban vitality and protecting Green Belts. Weight is given to conserving landscape and scenic beauty in National Parks and AONBs. Refusal of major developments in these areas is likely, except under exceptional circumstances and where it can be demonstrated they are in the public interest.

Appendix D of this Environmental Report identifies and characterises current environmental baseline conditions against each SEA topic, along with their likely evolution.

HOW HAVE THE EFFECTS OF THE DRAFT STRATEGY AND ANY REASONABLE ALTERNATIVES BEEN ASSESSED?

The SEA Regulations require that Essex County Council also identify, describe and evaluate the likely significant effects on the environment of any 'reasonable alternatives' to the draft Strategy, taking into account its objectives and geographical scope.

Consideration of alternatives was undertaken in discussion with a wide range of stakeholders. The extent to which alternatives could be considered 'reasonable' was influenced by the existing legislative and policy context that the document must reference and align with, and the current Government commitments and targets.

Detailed technical work has been carried out so far to explore the current activities across the EWP in terms of waste collection, treatment and disposal, and to investigate scenarios and opportunities for the future. In the case of this SEA and the Waste Strategy these scenarios and associated sensitivities that feed into the development of the Strategy have been the subject of the assessment and the scenarios and sensitivities are considered to be reasonable alternatives in the context of the SEA Regulations.

Establishing appropriate SEA objectives as an assessment method is helpful in identifying the effects of the Strategy on the environment. The waste management scenarios and sensitivities that have been identified has been assessed against the SEA objectives to determine the scale and significance of the effect.

The SEA objectives used in the assessment of the Strategy reflect the topics contained in Schedule 2 (6) of the SEA Regulations and have been informed by:

- the review of relevant plans and programmes and the associated environmental protection objectives;
- the baseline information and key issues that have been identified;
- an understanding of the likely effects arising from the construction and operation of waste infrastructure; and
- responses to the scoping consultation.

The SEA objectives are presented in Table NTS 3.

Table NTS 3: Assessment Framework and SEA Objectives

SEA Topic	SEA Objectives	
Material Assets and Waste Management	1.1	To support a circular economy, minimise waste arisings, promote reuse, recovery and recycling, minimising the impact of waste on the environment and communities and contribute to the sustainable use of natural and material assets.

SEA Topic	SEA Objectives	
Biodiversity, Flora and Fauna	2.1	To protect and enhance biodiversity including designated sites of nature conservation interest and protected habitats and species, enhance ecosystem resilience and habitat connectivity and deliver a net biodiversity gain.
Population and Human Health	3.1	To protect and enhance human health and wellbeing.
	3.2	To minimise disturbance to local communities.
Water	4.1	To protect and enhance water quality and help achieve the objectives of the Water Framework Directive.
Soil, Geology and Land-Use	5.1	To make appropriate and efficient use of land and protect and enhance soil, local geomorphology and geodiversity and contribute to the sustainable use of land.
Air and Climate	6.1	To minimise emissions of pollutant gases and particulates and enhance air quality.
	6.2	To minimise greenhouse gas emissions and embodied carbon associated with waste management and landfill.
	6.3	To adapt waste management practices to climate change and improve resilience to the threats of a changing climate.
Archaeology and Cultural Heritage	7.1	To conserve and enhance the historic environment including designated and non-designated heritage assets and their settings.
Landscape and Visual Amenity	8.1	To protect and enhance landscape, townscape character and visual amenity.

Section 4 of the Environmental Report provides further information in relation to the approach to the assessment of the draft Strategy.

WHAT ARE THE LIKELY SIGNIFICANT EFFECTS OF THE WASTE STRATEGY?

The likely significant environmental effects of implementing the draft Strategy have been identified, described and evaluated in accordance with the requirements of the SEA Regulations. A summary is presented in this section.

Scenarios Assessment

Overall, the assessment of six short-listed waste management scenarios has found that the draft Strategy will have a range of positive effects across the majority of the SEA objectives, relative to the current baseline. This broadly reflects the socio-economic and environmental benefits associated with sustainable waste management and moving waste up the waste management hierarchy. No significant (major) positive effects have been identified which reflects the context of a non-spatial strategy which looks at different collection and frequencies of waste streams and an assumed change in treatment.

Negative effects have been identified across several SEA objectives. No significant negative effects have been assessed but moderate negative effects were assessed on population and human health and landscape and visual amenity objectives which are related to three-weekly waste collections and the potential impact of waste accumulation if, for example, users were not fully using recycling and food waste services.

The Best Practicable Environmental Scenario (BPES) assessment determined that Scenario 2 was the highest scoring scenario and was therefore used to evaluate the likely impacts of the sensitivities. The sensitivities were also assessed using the SEA assessment framework.

Sensitivities Assessment

A range of positive and negative effects were assessed against each of the SEA objectives on all sensitivities. The following significant effects were identified.

Both positive and negative effects were found for Scenarios 2 and 3 and narrative regarding the moderate and minor effects is provided in the body of the report. The positive contribution to resource recovery and emission reduction that Sensitivity 3 could provide, would enhance the circular economy, and is assessed as having a significant positive effect on material assets and waste management, yet the unproven scale of carbon capture leaves uncertainty. The GHG emissions savings made through Carbon Capture, Utilisation and Storage (CCUS) technology are considered to be a significant positive effect.

In addition, significant negative effects were identified on material assets and waste management for Sensitivities 2 and 3 due to the significant infrastructure required by the addition of Combined Heat and Power (CHP) and CCUS technology respectively.

The assessment found no positive or negative significant effects for Sensitivities 1 or 4.

Cumulative Assessment

The cumulative assessment of each sensitivity in combination with highest scoring Scenario 2 assessed mixed effects across several SEA objectives, particularly, material assets and waste management, population and human health, air and climate and water.

Significant positive effects were reported on material assets and resource use for sensitivity 3 reflecting that in capturing carbon emissions, the technology contributes positively to resource recovery and emission reduction, enhancing the circular economy approach, however, again it is important to note that the technology is unproven at scale. Significant positive effects were also reported on air and climate objective 6.2 for Sensitivities 2 and 3 acknowledging the positive effect that CHP and CCUS have on reducing greenhouse gas emissions respectively.

Significant negative effects were reported on material assets for Sensitivities 2 and 3, primarily due to the introduction of significant additional infrastructure. Moderate negative effects were assessed on population and human health and landscape and visual amenity across all sensitivities due to the impact of three-weekly collections of residual waste on population and human health and landscape and visual amenity.

When viewed from a strategic standpoint in combination with other non-spatial plans and programmes, rather than in terms of scenarios and sensitivities, the draft Strategy offers potential positive cumulative effects across SEA objectives, particularly material assets and waste management. It is not expected that significant negative effects will arise from the draft Strategy's in-combination effects with other plans and programmes. While aligning with waste hierarchy goals will necessitate increased utilisation of existing and potentially new waste facilities, it is acknowledged that negative environmental impacts during construction and operation are anticipated. These must be identified, assessed, and mitigated through legislative frameworks, including the NPPF, local waste plans, and environmental permitting processes.

The detailed assessment of the draft Strategy is contained in Section 5 of the Environmental Report.

WHAT ARE THE PROPOSED MITIGATION AND ENHANCEMENT MEASURES?

The SEA Regulations require information to be provided on measures that should be taken to prevent, reduce and as fully as possible offset any significant adverse effects on the environment of implementing the draft Strategy. These measures are often referred to as mitigation measures. Based on the assessment of

the draft Strategy, a range of mitigation measures have been identified. The measures identified are principally service-level actions which could help reduce the potential negative environmental effects.

The mitigation measures are set out in Section 5.7 of the Environmental Report.

HOW WILL THE EFFECTS OF THE STRATEGY BE MONITORED?

Once the Strategy is implemented, its effects on the environment will need to be monitored. Monitoring the significant effects of the Strategy can help to answer questions such as:

- Were the SEA predictions of effects accurate?
- Is the Strategy contributing to the achievement of the SEA objectives?
- Are mitigation measures performing as well as expected?
- Are there any adverse effects? Are these within acceptable limits, or is remedial action desirable?

Section 6 of the Environmental Report identifies a number of potential indicators that could be used for monitoring the effects of the Strategy's implementation.

Monitoring proposals will be considered further and a final monitoring framework that satisfies the requirements of the SEA Regulations will be presented in the Post Adoption Statement.

WHAT ARE THE NEXT STEPS?

This Environmental Report is being published for consultation alongside the draft Waste Strategy for Essex.

Feedback received from consultees will be documented and considered in reviewing the proposals for the draft Strategy. A Post Adoption Statement will summarise how the SEA and the consultation responses have been taken into account and how environmental considerations have been integrated into the final decisions regarding the Strategy.

HOW TO COMMENT ON THE ENVIRONMENTAL REPORT?

Comments on the Environmental Report can be made by visiting https://consultations.essex.gov.uk/rci/waste-strategy-for-essex-consultation/ where you will find the draft strategy documents and the Public Consultation Questionnaire. The questionnaire is available for 10 weeks from 13th September to 22nd November. If you wish to request another format of the questionnaire, please email wastestrategyforessex@essex.gov.uk or call 0345 603 7625.

Further detail on the consultation is provided in Section 1.5 of the Environmental Report.

1 INTRODUCTION

1.1 THE PURPOSE OF THIS ENVIRONMENTAL REPORT

SEA became a statutory requirement following the adoption[5] of Directive 2001/42/EC on the assessment of the effects of certain plans and programmes on the environment. In England, this was transposed into legislation on 20th July 2004 as Statutory Instrument 2004 No.1633 - The Environmental Assessment of Plans and Programmes Regulations 2004.

SEA is a systematic decision support process, aiming to ensure that the likely significant environmental effects of plans, programmes and strategies are identified, described to avoid, manage or mitigate any significant negative effects and to enhance any positive effects. In this context, the purpose of SEA is to integrate environmental considerations into the development of any plan, programme or strategy. Where relevant, generally, a SEA is therefore conducted before an Environmental Impact Assessment (EIA) is undertaken.

In this context, the purpose of the SEA of the draft Waste Strategy for Essex is to:

- identify, describe and evaluate the likely significant effects of the draft Strategy including reasonable alternatives to the Strategy in terms of the measures being considered by Essex County Council for collection service and frequency, and treatment of waste;
- help identify appropriate measures to prevent, reduce or as far as possible offset any significant adverse effects on the environment and to enhance beneficial effects associated with the implementation of the draft Strategy wherever possible;
- to provide monitoring measures for the likely significant effects arising from the implementation of the draft Strategy.
- give the statutory SEA bodies, stakeholders and the wider public the ability to see and comment upon the effects that the draft Strategy may have on them, their communities and their interests, and
- inform Essex County Council's selection of measures to be taken forward into the final Strategy.

SEA comprises five key stages:

Stage A: Scoping;

Stage B: Develop and Refine Alternatives and Assess Effects;

Stage C: Prepare Environmental Report;

Stage D: Consult on the Draft Plan and Environmental Report and Prepare the Post Adoption Statement; and

Stage E: Monitor Environmental Effects.

Stage A of the SEA of the Waste Strategy for Essex led to the production of the SEA Scoping Report which incorporated the screening stage which determined that a SEA was required. The scoping stage itself comprised five tasks that are listed below:

i. Review of other relevant policies, plans, programmes and strategies;
ii. Collation and analysis of baseline information;
iii. Identification of key sustainability issues;
iv. Development of an assessment framework;
v. Consultation with statutory Consultation Bodies on the scope of the SEA.

Information collected and analysed (as part of tasks i and ii) reflected Essex County Council's operational area. The Scoping Report set out the proposed framework for assessing the likely significant environmental effects of the draft Strategy.

[5] EU law has ceased to apply in the UK under the terms of the Withdrawal Agreement and EU Treaties. The European Union (Withdrawal) Act 2018 (EUWA) has established a new body of domestic law known as retained EU law. Any references to EU Directives in this Technical Note should be read as references to the domestic legislation that implemented the Directive (including that domestic legislation as it is revised or replaced from time to time).

Following scoping consultation and amendments as appropriate, the SEA assessment framework has been used to assess the likely significant environmental effects (including cumulative effects) of the scenarios and sensitivities contained in the draft Strategy and any reasonable alternatives (**Stage B**).

These assessments are presented in this Environmental Report (in a form to meet the requirements of Schedule 2 of the SEA Regulations) which has been completed to accompany the draft Strategy (**Stage C**).

The draft Strategy and accompanying documents including the Environmental Report are presented and published as documents for consultation (**Stage D**). Following consultation, in conjunction with publishing the final Strategy, a Post Adoption Statement will also be issued (to meet the requirements of SEA regulation 16 (4)). This will set out the results of the consultation and SEA processes and the extent to which the findings of the SEA have been accommodated in the final plan.

The SEA requires monitoring of any resulting environmental effects of the Strategy (**Stage E**).

1.1.1 SCOPING CONSULTATION

At each stage of the SEA process, there is a requirement to consult the statutory Consultation Bodies. In England these are the Environment Agency, Historic England, and Natural England. The present SEA process began with the production of a Scoping Report issued to the Consultation Bodies for consultation for 5 weeks from 14th February 2023 – 22nd March 2023. Responses were received from Historic England and Natural England.

The Scoping Report set out initial information on the likelihood of significant effects arising from the Waste Strategy. It also provided a proposed evidence base that would be used to inform the assessment.

Comments from the SEA Consultation Bodies on the Scoping Report (received from Natural England and Historic England) have been taken into account, in terms of how the assessment has been undertaken, what it covers, and the level of detail required in this Environmental Report. The representations received and how they have been taken into account are presented in a schedule of consultation responses in Appendix B.

1.2 THE WASTE STRATEGY FOR ESSEX CONTEXT AND OVERVIEW

Essex County Council (ECC) is the statutory Waste Disposal Authority for Essex and is obligated under the Environmental Protection Act 1990 to provide a range of waste services for the treatment and disposal of Local Authority Collected Waste.

To optimise the delivery of its statutory waste functions ECC works in partnership with the twelve Essex Waste Collection Authorities (comprising the district, city, borough councils of Essex), collectively with Essex County Council known as the Essex Waste Partnership (EWP).

There is a stated ambition that effective partnership working as the EWP will ensure that:

- appropriate infrastructure can be provided and utilised;
- complimentary systems and services can be implemented to deliver effective waste operations;
- resources can be used in a manner which maximises beneficial impacts in line with the waste hierarchy.

The Waste Strategy for Essex sets out the vision and objectives of the EWP. The Waste Strategy provides a framework detailing how waste that is produced by homes and businesses in the county will be managed for the next 25+ years.

The aim of the Waste Strategy and the EWP *is 'to work together to create, promote or support campaigns which avoid or reduce waste, improve or maximise recycling and composting, and minimise the environmental impacts of managing, treating and disposing of waste in Essex'*[6].

ECC is obliged to maintain a Joint Strategy setting out how household and similar wastes are to be managed. The current Joint Municipal Waste Management Strategy (JMWMS) was adopted in 2008, and was expected to be in place until 2032. The development of new legislative and policy drivers by government have resulted in the current JMWMS becoming outdated; ECC have therefore taken the decision to review, update and

[6] https://www.loveessex.org/our-waste-strategy/

develop the Strategy to ensure it better reflects current needs and legislative requirements. As with the development of the current JMWMS, it was intended that, although the project will be led by ECC, it will be carried out in partnership with EWP members, including engagement with wider stakeholders facilitating 'buy-in' at all levels of the Partnership.

The current JMWMS needs to be refreshed to take account of new targets for waste management that go beyond 2020. This project is designed to assist the EWP in producing a refreshed Joint Strategy, the "Waste Strategy for Essex" which will provide a clear, concise and target-driven guide on how waste is to be managed to 2055. The refreshed Strategy will consider national waste policy, the latest legislation, performance targets and define a collective EWP ambition. The Strategy will be based on a good understanding of current waste flows and how these may change over the lifetime of the plan to ensure that a sustainable resource management solution is delivered.

This new Strategy, covering the period up to 2055, brings a new focus on how the county of Essex will deliver an effective, efficient, and sustainable service for the future. Following the Environment Act 2021, national policy and the findings of the Essex Climate Action Commission 2020, the new Strategy updates the EWP's approach to reducing the impact that waste management has on climate change. The Strategy is research based and sets out the reasons for the approach; the principles of what will be done; and the targets that the county will strive to meet.

The EWP will comprehensively review this Strategy every five-years to ensure alignment with any changes in national policy and legislation, trends in waste generation, and the development of new approaches and technologies.

1.2.1 Strategic Framework

A series of workshops were held, involving various EWP stakeholders, in order to shape and guide the vision, objectives and priorities for the Waste Strategy for Essex, with the goal of understanding and capturing the diverse views across the EWP and to identify areas where there is consensus already within and across the groups.

The workshops supported the shape of the proposed strategic framework for the Waste Strategy for Essex.

The working Vision Statement *"Zero waste, zero carbon, more impact"* was broken down into five main themes:

- decarbonisation
- cost-effective resource use
- management of residual waste
- management of organic waste
- regional alignment

For each theme, strategic objective areas were identified as listed with any targets or objectives to be achieved. The chart also represents the instruments and tools that will enable the implementation of the Waste Strategy for Essex.

It should be noted that the elements presented as part of the Strategic Framework summarise what was discussed during the workshops and are not an exhaustive list of the themes and objectives that are included in the Strategy. The workshop sessions were used as a starting point to agree the six collection and treatment scenarios to be modelled.

Further information regarding the development of the Strategy and the scenarios and sensitvities to be assessed is provided in Section 4.5.

1.3 SCENARIOS CONSIDERED AND HOW THEY WERE IDENTIFIED

To develop the Partnership Vision, an extensive series of workshops were held with officers, and Councillors to explore the levels of aspiration and vision for the Strategy, develop the Vision Statement for the Strategy, understand stakeholder priorities and explore and develop the collection scenarios to be considered. The aim of the workshops was to shape and guide the vision, objectives and priorities for the Strategy, with the goal of understanding and capturing the diverse views across the EWP and to identify areas where there is consensus

already within and across the groups. Multiple workshops were held with officers, and Councillors across all EWP member authorities, including briefings, presentations, interactive discussions and scenarios reports.

To inform the development of the criteria, EWP developed a Best Practicable Environmental Scenario (BPES) approach to the consideration and development of the criteria to be used to assess each of the scenarios to be considered. This approach enabled a framework to be developed to clearly illustrate the relative merits of each scenario considered in terms of:

- emissions to air (including climate change impacts), water and land;
- deliverability;
- performance against national targets;
- performance against EWP vision; and
- financial cost.

These workshops resulted in the agreement of a Vision Statement, the agreement of an initial long list of potential collection methodologies and a set of evaluation criteria to be used to assess each scenario. To enable the relative importance of each of the criteria, a weighting was agreed by the EWP during the workshops. The criteria and weightings were developed throughout the workshops, with an agreement that the average of the votes submitted by Members and officers would be used for assessing the short-listed whole system scenarios. A review of UK, EU and international technologies that are available for sustainable waste treatment was undertaken, and the workshops considered how each approach would be likely to advance EWP towards achieving the Vision. The review explored proven and emerging technologies, and evaluation criteria were developed to enable ranking of the scenarios.

The agreed shortlist of six whole system scenarios were modelled. These enabled each scenario to be considered in terms of waste arisings, composition, capture rates, facility destinations, number of vehicles required, productivity, associated (collection) costs for vehicles, staffing levels, number and type of containers, associated (waste management) costs for gate fees, material income and treatment costs. Each scenario was considered on a 'per authority' basis and a combined collection and waste management level, enabling the 'whole system cost' across the EWP for each scenario to be considered. Finally, a whole system WRATE analysis calculated the environmental impacts arising from each collection system, including embodied emissions from bins, sacks, collection vehicles, and collection, transport and treatment of the waste.

The quantitative outputs from the modelling exercise were then combined with the qualitative elements agreed at the workshops. Each of the six modelled scenarios were evaluated against the criteria and weightings agreed by the EWP during the Partnership Vision stage of the process. This led to a BPES being identified.

Following the presentation of this outcome to the EWP Ricardo were asked to carry out further modelling of additional 'sensitivities' on the highest scoring scenario, to allow the consideration of potential technological and legislative developments considered to have the potential to further impact the waste landscape. In agreement with ECC, four sensitivities were modelled for scenario 2 in order to assess the effect of introducing the following:

- Sensitivity 1: Addition of front-end recycling to the Energy from Waste (EfW) facility for household residual waste
- Sensitivity 2: Addition of combined heat and power (CHP) at the EfW facility
- Sensitivity 3: Addition of carbon capture, utilisation and storage technology (CCUS) at the EfW facility
- Sensitivity 4: Introduction of householder charges for garden waste collections

The detailed modelling and analysis has been incorporated into this SEA.

1.4 ENVIRONMENTAL REPORT STRUCTURE

Section 1.5 provides information on how to comment on the Environmental Report. The remainder of this Environmental Report is structured as follows:

- **Section 2: Review of Plans and Programmes** – Provides an overview of the review of plans and programmes relevant to the draft Waste Strategy and SEA that are contained in **Appendix C**;

- **Section 3: Baseline Analysis** – Presents an overview of the baseline analysis and identifies the key issues relevant to the draft Strategy and SEA with the detailed social, economic and environmental characteristics presented in **Appendix D**;
- **Section 4: Approach to the Assessment** – Outlines the approach to the SEA of the draft Waste Strategy including the assessment framework, comprising assessment objectives and guide questions, categorisation of effects and definitions of significance;
- **Section 5: Assessment of the Draft Waste Strategy** – Presents the findings of the assessment of the scenarios that comprise the draft Waste Strategy and any reasonable alternatives, including consideration of cumulative effects and mitigation;
- **Section 6: Next Steps and Proposals for Monitoring** – Details the next steps in the SEA process and presents views on how the environmental effects of the Waste Strategy will be monitored.

The report contains the following appendices:

- **Appendix A: Quality Assurance Checklist.**
- **Appendix B: Schedule of Scoping Consultation Responses.**
- **Appendix C: Review of Plans and Programmes.**
- **Appendix D: Baseline Analysis.**

1.5 HOW TO COMMENT ON THE ENVIRONMENTAL REPORT

This Environmental Report is being issued to the SEA Consultation Bodies and the public, for comment alongside the draft Waste Strategy. The consultation period on the Waste Strategy and the accompanying SEA Environmental Report runs for ten weeks from the 13th September – 22nd November 2023.

Following the consultation, a Post-Adoption Statement will be prepared. The Statement will reflect on the views provided on the findings of the assessment and the draft Waste Strategy and will explain how the issues raised have been taken into account in finalising the Strategy.

Details of how to respond to the consultation are provided below.

This Consultation: How to Give Us Your Views

We would welcome views on any aspect of this Environmental Report. However, respondents may find the following questions helpful to provide a focus for their responses.

1. Do you wish to provide any comments on the Environmental Report?
2. Does the Environmental Report correctly identify the likely significant effects of the draft Strategy?
3. What are your views on the likely significant environmental effects of the draft Strategy?
4. Please provide any other further comments you have on the Environmental Report?

Please submit responses to this Environmental Report to Essex County Council by the closing date of 22nd November. You can respond online by visiting:

https://consultations.essex.gov.uk/rci/waste-strategy-for-essex-consultation/

The questionnaire is available for 10 weeks from 13th September to 22nd November. If you wish to request another format of the questionnaire, please email wastestrategyforessex@essex.gov.uk or call 0345 603 7625.

2 REVIEW OF PLANS AND PROGRAMMES

2.1 OVERVIEW

The SEA Regulations require a report containing "*an outline of the contents, main objectives of the plan or programme and relationship with other relevant plans and programmes"* (Schedule 2(1)) as well as "*The environmental protection objectives, established at international, (European) 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"* (Schedule 2(5)),

The review demonstrates how the Waste Strategy for Essex might be influenced by other plans, policies, programmes and identifies other objectives which the Waste Strategy should consider.

Relevant plans, policies, programmes and strategies (referred to as plans and programmes) have been identified from the wide range that has been produced at an international, national, regional and local level. Plans and programmes that have no likely interaction with the Waste Strategy (i.e. they are unlikely to influence the Waste Strategy, or be influenced by it), have been excluded from the review.

The completed review of plans and programmes is used to provide the policy context for the assessment process and helps to inform the development of objectives that comprise the assessment framework (see Section 4). It is also a valuable source of information to support the completion of baseline analysis and to determine the key issues for the draft plans and SEA (see Section 3 and Appendix D).

A review of relevant plans and programmes is presented in Appendix C. A summary of key messages derived from the review is presented in Table 2.1.

2.2 SUMMARY OF REVIEWED PLANS AND PROGRAMMES

Table 2.1 Summary of Plans, Policies and Programmes

SEA Topic	Key Messages and Objectives	Plans, Policies and Programmes
Material Assets and Waste Management	Promote sustainable production and consumption whilst seeking to reduce the amount of waste generated by using materials, energy and water more efficiently. Contribute to a resource efficient, green and competitive low carbon economy. Minimise the production of waste, ensure waste management is in line with the waste hierarchy, and eliminate waste sent to landfill. Promote the sustainable management of natural resources. Promotion of the 'waste hierarchy' of 'reduce, re-use, recycle and recover' with the aim of reducing the proportion of waste sent to landfill. Maintaining consistently high recycling rates. Identify steps to promote a circular economy.	*International* United Nations Economic Commission for Europe (1998) Aarhus Convention – Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters Paris Agreement (2015) European Commission, Directive 2001/42/EC on the assessment of the effects of certain plans and programmes on the environment (SEA Directive) European Community (EC) Directive 1999/31/EC on the landfill of waste European Commission (2009) Promotion of the use of energy from renewable sources Directive (2009/28/EC) European Commission, Urban Waste Water Treatment Directive (1991/271/EC) United Nations (2002), Commitments arising from the World Summit on Sustainable Development, Johannesburg *National*

SEA Topic	Key Messages and Objectives	Plans, Policies and Programmes
		The Environmental Assessment of Plans and Programmes Regulations 2004 (the SEA Regulations) Waste Management Plan 2021 Resources and Waste Strategy Industrial Strategy White Paper (2017) DCLG (2012) National Planning Policy Framework (as amended 2019) Department for Energy and Climate Change (2020) Energy White Paper: Powering our Net Zero Future Department of energy and climate change (2011) Planning our electric future: a White Paper for secure, affordable and low carbon electricity Defra (2011) Government Review of Waste Policy in England (2011) HM Government (2018) Our Waste, Our Resources: A Strategy for England Defra (2002) The Strategy for Sustainable Farming and Food – facing the future UK Government (2018), A Green Future: Our 25 Year Plan to Improve the Environment The Energy Act 2013 Environment Act, 2021 Environment Act, 1995 The Environmental Damage (Prevention and Remediation) (England) Regulations 2015 HM Government (2016) National Infrastructure Delivery Plan 2016-2021, Infrastructure Projects Authority National Policy Statement for Wastewater (2012) Circular Economy Package, 2020 Integrated Radioactive Waste Strategy, 2019 National Planning Policy for Waste, 2014 Control of Pollution Act 1974 National Policy Statement: Hazardous Waste, 2013 The Waste Regulations, 2011 Resource and Waste Strategy, 2018 *Regional* Essex and Southend on Sea Waste Local Plan, 2017 Everyone's Essex: our plan for levelling up the county 2021 to 2025, 2021 Relevant Waste Collection Authority waste plans and strategies

SEA Topic	Key Messages and Objectives	Plans, Policies and Programmes
Biodiversity, Flora and Fauna	Conservation and enhancement of the natural environment, in particular internationally and nationally designated sites, priority habitats and species, taking into account future climate change. Avoid activities likely to cause irreversible damage to natural heritage. Support the function of ecosystems and enhance ecological networks and resilience. Protection, conservation and enhancement of natural capital. Ecosystem services from natural capital contributes to the economy and therefore should be protected and, where possible, enhanced. Avoidance of activities likely to cause the spread of Invasive Non-Native Species (INNS). A need to protect the green infrastructure network.	*International* Ramsar Convention: The Convention on Wetlands of International Importance (1971) The Bern Convention on the Conservation of European Wildlife and Natural Habitats (1979) The Bonn Convention on the Conservation of Migratory Species of Wild Animals (1983) European Commission, Directive 2001/42/EC on the assessment of the effects of certain plans and programmes on the environment (SEA Directive) European Commission (2011), Our life insurance, our natural capital: an EU biodiversity Strategy to 2020 European Commission, Environmental Liability Directive (2004/35/EC) European Commission (1992), Habitats Directive (1992/43/EC) European Commission (2009), Birds Directive (2009/147/EC) *National* The Environmental Assessment of Plans and Programmes Regulations 2004 (the SEA Regulations) Conservation of Habitats and Species Regulations 2017 (Amendment) (EU Exit) Regulations (2019) The Natural Environment and Communities Act 2006 (NERC Act) Defra (2004) Rural Strategy Defra (2002) The Strategy for Sustainable Farming and Food – facing the future UK Government (2018), A Green Future: Our 25 Year Plan to Improve the Environment Defra (2020), The Draft Environment Bill 2020, and content related to the development of Nature Recovery Networks (parts 6 and 7) Environment Act, 2021 Environment Act, 1995 Wildlife and Countryside Act, 1981 (as amended) Natural Capital Committee (2020) State of Natural Capital Annual Report 2020 *Regional* Everyone's Essex, 2021 Essex Green Infrastructure Strategy, 2020

SEA Topic	Key Messages and Objectives	Plans, Policies and Programmes
Population and Human Health	To ensure all communities have a clean, safe and attractive environment in which people can take pride. Access to high quality open spaces and opportunities for sport and recreation can make an important contribution to the health and wellbeing of communities. Promotion of healthy communities and protection from risks to health and wellbeing. Promotion of sustainable economy supported by access to essential utility and infrastructure services. To promote sustainable growth.	*International* European Commission, Directive 2001/42/EC on the assessment of the effects of certain plans and programmes on the environment (SEA Directive) The Environment Noise Directive (Directive 2002/49/EC) European Commission, Environmental Liability Directive (2004/35/EC) United Nations (2002), Commitments arising from the World Summit on Sustainable Development, Johannesburg *National* The Environmental Assessment of Plans and Programmes Regulations 2004 (the SEA Regulations) The Countryside and Rights of Way (CROW) Act, 2000 DCLG (2012) National Planning Policy Framework (as amended 2019) Defra (2005) Securing the Future: Delivering UK Sustainable Development Strategy UK Government (2018), A Green Future: Our 25 Year Plan to Improve the Environment Environment Act, 2021 Environment Act, 1995 The Environmental Damage (Prevention and Remediation) (England) Regulations 2015 HM Treasury (2020) National Infrastructure Strategy Build Back Better: our plan for growth, 2021 *Regional* Essex Green Infrastructure Strategy, 2020 Levelling Up Essex Strategy, 2022 Essex Joint Health and Wellbeing Strategy, 2022-2026 Economic Plan for Essex, 2014
Water	Promote sustainable water resource management. Improve the quality of the water environment and the ecology which it supports. Prevent deterioration of water quality status. Promote measures to enable and sustain long term improvement in water efficiency. Develop a resilient and flexible water management approach to cope with	*International* European Commission, Directive 2001/42/EC on the assessment of the effects of certain plans and programmes on the environment (SEA Directive) European Commission, Urban Waste Water Treatment Directive (1991/271/EC) European Commission, Directive on the Assessment and Management of Flood Risks (2007/60/EC) *National*

SEA Topic	Key Messages and Objectives	Plans, Policies and Programmes
	changing climate, population and economic conditions. Reduce flood risk to people, residential and non-residential properties, community facilities and key transport links, as well as designated nature conservation sites and heritage assets and landscapes of value.	The Environmental Assessment of Plans and Programmes Regulations 2004 (the SEA Regulations) UK Government (2018), A Green Future: Our 25 Year Plan to Improve the Environment Environment Act, 2021 Environment Act, 1995 Environment Agency (2009), Water Resources Strategy for England and Wales The Environmental Damage (Prevention and Remediation) (England) Regulations 2015 Environment Agency (2018) The Environment Agency's approach to groundwater protection The Water Act, 2003 (as amended) The Water Environment (WFD) (England and Wales) Regulations, 2003 National Flood and Coastal Erosion Risk Management Strategy for England (2020) National Policy Statement for Wastewater (2012) *Regional* Essex County Council, Local Flood Risk Management Strategy, 2018
Soil, Geology and Land-use	Ensure that soils will be protected and managed to optimise the varied functions that soils perform for society (e.g. supporting agriculture and forestry, protecting cultural heritage, supporting biodiversity, as a platform for construction), in keeping with the principles of sustainable development. Encourage the effective use of land by reusing land that has been previously developed (brownfield land), provided that it is not of high environmental value. To reduce the reliance on landfill sites.	*International* European Commission, Directive 2001/42/EC on the assessment of the effects of certain plans and programmes on the environment (SEA Directive) European Community (EC) Directive 1999/31/EC on the landfill of waste Council of Europe (2003) European Soils Charter European Commission (2006) Thematic Strategy for Soil Protection *National* The Environmental Assessment of Plans and Programmes Regulations 2004 (the SEA Regulations) Defra (2009) Safeguarding our soils – A Strategy for England Defra (2004) The First Soil Action Plan for England Defra (2004) Rural Strategy Defra (2002) The Strategy for Sustainable Farming and Food – facing the future UK Government (2018), A Green Future: Our 25 Year Plan to Improve the Environment Environment Act, 2021 Environment Act, 1995

SEA Topic	Key Messages and Objectives	Plans, Policies and Programmes
		Integrated Radioactive Waste Strategy, 2019 Resource and Waste Strategy, 2018
Air and Climate	Reduce greenhouse gas emissions. Targets include: Reduce the UK's greenhouse gas emissions by at least 80% (relative to 1990 levels) by 2050. Reduce the effects of air pollution on ecosystems. Improve overall air quality. Minimise energy consumption, support the use of sustainable / renewable energy and improve resilience to climate change. Build in adaptation to climate change to future planning and consider the level of urgency of associated risks of climate change impacts accordingly. Achieve and sustain compliance with and contribute towards national objectives for pollutants, taking into account the presence of Air Quality Management Areas and the cumulative impacts on air quality from individual sites in local areas.	*International* The Cancun Agreement (2011) & Kyoto Agreement (1997) Paris Agreement (2015) European Commission, Directive 2001/42/EC on the assessment of the effects of certain plans and programmes on the environment (SEA Directive) European Commission (2008) The 2008 ambient air quality directive (2008/50/EC) European Commission, Thematic Strategy on air pollution (2005) European Commission (2009) Promotion of the use of energy from renewable sources Directive (2009/28/EC) European Commission, Directive on the Assessment and Management of Flood Risks (2007/60/EC) *National* The Environmental Assessment of Plans and Programmes Regulations 2004 (the SEA Regulations) The Climate Change Act 2008 The Climate Change Act 2008 (2050 Target Amendment) Order 26 June 2019 DCLG (2012) National Planning Policy Framework (as amended 2019) Department for Energy and Climate Change (2020) Energy White Paper: Powering our Net Zero Future Department of energy and climate change (2011) Planning our electric future: a White Paper for secure, affordable and low carbon electricity Defra (2017) The UK Climate Change Risk Assessment 2017 Evidence Report Defra (2007) The Air Quality Strategy for England, Scotland and Wales UK Government (2018), A Green Future: Our 25 Year Plan to Improve the Environment The Energy Act 2013 Environment Act, 2021 Environment Act, 1995 UK Climate Projections UKCP18. UKCIP, 2018

SEA Topic	Key Messages and Objectives	Plans, Policies and Programmes
		Defra (2018), The National Adaptation Programme and the Third Strategy for Climate Adaptation Reporting *Regional* Essex Climate Action Plan 2022 Relevant Council Climate statements, plans and programmes
Archaeology and Cultural Heritage	Promote the conservation and enhancement of the historic environment, including the promotion of heritage and landscape as central to the culture of the region and conserve and enhance distinctive characteristics of landscape and settlement. Conserve and enhance the historic environment, heritage assets and their settings.	International European Commission, Directive 2001/42/EC on the assessment of the effects of certain plans and programmes on the environment (SEA Directive) Charter for the Protection and Management of Archaeological Heritage (1990) National The Environmental Assessment of Plans and Programmes Regulations 2004 (the SEA Regulations) DCLG (2012) National Planning Policy Framework (as amended 2019) Historic England (2013) Strategic Environmental Assessment, Sustainability Appraisal and the Historic Environment Planning (Listed Buildings and Conservation Areas) Act 1990 Ancient Monuments and Archaeological Areas Act 1979 Defra (2004) Rural Strategy Department for Culture, Media and Sport (2001) The Historic Environment – A Force for the Future Historic England (2020) Heritage at Risk 2020 Historic England (2008) Climate Change and the Historic Environment Historic England (2013) Strategic Environmental Assessment, Sustainability Appraisal and the Historic Environment Historic England (2015) Historic Environment Good Practice Advice in Planning Note 3 Historic England (2017) The Setting of Heritage Assets, Historic Environment Good Practice Advice in Planning 3, 2nd Edition *Regional* Relevant Council Heritage plans and strategies

SEA Topic	Key Messages and Objectives	Plans, Policies and Programmes
Landscape and Visual Amenity	Protection and enhancement of landscape (including designated landscapes, landscape character, distinctiveness and the countryside). Enhance the value of the countryside by protecting the natural environment for this and future generations. Improve access to valued areas of landscape character in sustainable ways to enhance its enjoyment and value by visitors and stakeholders.	*International* European Commission, Directive 2001/42/EC on the assessment of the effects of certain plans and programmes on the environment (SEA Directive) Council of Europe (2006), European Landscape Convention *National* The Environmental Assessment of Plans and Programmes Regulations 2004 (the SEA Regulations) The Countryside and Rights of Way (CROW) Act, 2000 DCLG (2012) National Planning Policy Framework (as amended 2019) Defra (2004) Rural Strategy Defra (2011) The Natural Choice: securing the value of nature, The Natural Environment White Paper Natural England (2016), Conservation 21 – Natural England's Conservation Strategy for the 21st Century UK Government (2018), A Green Future: Our 25 Year Plan to Improve the Environment Natural Capital Committee (2020) State of Natural Capital Annual Report 2020

3 BASELINE ANALYSIS

3.1 INTRODUCTION

The SEA Regulations also require that the Environmental Report contains:

"Relevant aspects of the current state of the environment and the likely evolution thereof without implementation of the plan or programme" (Schedule 2(2));

"The environmental characteristics of areas likely to be significantly affected" (Schedule 2(3));

"Any existing environmental problems which are relevant to the plan or programme" (Schedule 2(4)).

Appendix D of this Environmental Report identifies and characterises current environmental baseline conditions, along with their likely evolution in the absence of the Strategy. With a knowledge of existing conditions, and a consideration of their likely evolution, the effects of the draft Waste Strategy can be identified, described, assessed and monitored, and if necessary mitigated. This is also useful in determining the key issues for each topic that should be taken forward in the SEA, through the SEA objectives and guide questions.

The analysis of baseline information is presented for the SEA assessment area the following topics:

- Material Assets and Waste Management;
- Biodiversity, Flora and Fauna;
- Population and Human Health;
- Water;
- Soil, Geology and Land Use;
- Air and Climate;
- Archaeology and Cultural Heritage; and
- Landscape and Visual Amenity.

Each topic includes further sub-topics with information structured according to the following:

- Baseline Characteristics;
- Likely Evolution of the Baseline without the Strategy, presented as the Future Baseline;
- Key Issues Relevant to the Assessment of the Strategy.

Baseline data has been drawn from a range of sources, including a number of the plans, policies, programmes and strategies reviewed and summarised in Table 2.1 and Appendix C.

3.2 SUMMARY OF THE KEY ISSUES

The key issues arising from the review of baseline conditions are summarised for each topic in Table 3.1.

Table 3.1 Key Issues from Baseline Analysis

Topic	Summary of Key Issues
Material Assets and Waste Management	• The need to minimise the consumption of resources, including water and energy. • The need to follow the 'waste hierarchy' of 'reduce, re-use, recycle and recover' with the aim of reducing the proportion of waste sent to landfill. • The need to maintain consistently high recycling rates. • The need to promote and move towards a regenerative circular economy. • The need to support regional and national commitments to decarbonisation.
Biodiversity, Flora and Fauna	• The need to protect or enhance the region's biodiversity, particularly protected sites designated for nature conservation. • The need to avoid activities likely to cause irreversible damage to natural heritage. • The need to take opportunities to improve ecological resilience.

Topic	Summary of Key Issues
	• The need to control the spread of Invasive Non-Native Species (INNS). • The need to engage more people in biodiversity issues so that they personally value biodiversity and know what they can do to help, including through recognising the value of the ecosystem services.
Population and Human Health	• The need to ensure waste sites and waste management are not disproportionately impacting deprived or vulnerable communities. • The need to protect human health. • The need to ensure continued improvements in levels of health across the region, particularly in urban areas and deprived areas. • The need to ensure waste is not mismanaged so as to impact upon human health through chemicals, air pollution, land contamination and increased risk of infection and/or disease. • The need to ensure high recycling rates are maintained. • The need to accommodate an increasing population. • The need to contribute towards maintaining sustainable growth in the region.
Water	• The need to further improve the quality of the region's river, estuarine and coastal waters taking into account WFD objectives and designated sites objectives (i.e. assessment against Common Standards Monitoring Guidance, where relevant). • The need to maintain the quantity and quality of groundwater resources taking into account WFD objectives. • The need to improve the resilience, flexibility and sustainability of water resources in the region, particularly in light of potential climate change on surface waters and groundwaters. • The need to ensure sustainable abstraction to protect the water environment and meet society's needs for a resilient water supply. • The need to ensure that people understand the value of water.
Soils, Land Use and Geology	• The need to encourage effective use of the land, benefitting landowners, other stakeholders, the environment and sustainability of natural resources. • The need to apply the Waste Hierarchy; prioritising prevention, enhancing recycling and reducing the amount of waste going to landfill.
Air Quality and Climate	• The need to minimise emissions of pollutant gases and particulates and enhance air quality; • The need to reduce the need to travel and promote sustainable modes of transport; • The need to reduce greenhouse gas emissions arising from implementation of the Waste Strategy; • The need to take into account, and where possible adapt to, the potential effects of climate change; • The need to increase environmental resilience to the effects of climate change.
Archaeology and Cultural Heritage	• The need to conserve or enhance sites of archaeological importance and cultural heritage interest.
Landscape and Visual Amenity	• Landscape and designated sites should be maintained and enhanced for the enjoyment of the public.

3.3 LIMITATIONS OF THE DATA AND ASSUMPTIONS MADE

The information used to form the baseline has been sourced, as much as possible, from recent datasets utilising a wide range of authoritative and official sources. Principal limitations which surround the future social and environmental baseline are where there are substantial differences in the availability and temporal resolution of robust projections across the various SEA topic areas. For example, whilst the Strategy is intended to cover 25+ years, climate change estimates extend up to 80 years, and regional population and household projections only extend to 2028.

The area under consideration for this SEA covers different geographical regions, which makes establishing an all-encompassing baseline challenging. There are also challenges around extrapolating information from data

collated at differing spatial resolutions particularly for a non spatial Strategy. Relevant spatial data have been used where appropriate to summarise the extensive datasets involved.

It is also important to acknowledge that there are variable time lags between raw data collection and its publication. Consequently, due to reporting cycles, available information which formed the baseline or predicted future trends described in this report may have been updated.

SEA is a high-level assessment aimed at highlighting potential environmental concerns. The environmental data to be used in this assessment is based on that which is readily available from existing sources such as statutory organisations. No primary research or survey work has been carried out specifically to inform the SEA and therefore it is possible that at the additional environmental issues could influence the scenarios and sensitivities assessed.

Some of the data gathered to complete the baseline pre-dates the Covid-19 pandemic and its potential environmental, social and economic effects. Data that relates to these changes is only becoming available periodically and it could be several years before the effects of the pandemic can be fully determined, and whether changes in the baseline have been short-term or sustained.

4 APPROACH TO THE ASSESSMENT

4.1 INTRODUCTION

This section describes the approach to the assessment of the Waste Strategy for Essex. It draws on the information contained in Sections 2 and 3, as well as the more detailed information contained in Appendices C and D, to define the scope of the assessment (in terms of the environmental and socio-economic issues to be considered) and sets out the SEA objectives and guide questions that comprise the assessment framework.

4.2 THE SCOPE OF THE ASSESSMENT

4.2.1 What is being assessed

The aim of SEA is to identify, describe and evaluate the likely significant effects of implementing the draft Strategy on the environment. Schedule 2 of the SEA Regulations require that the assessment includes information on 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 inter-relationship between the issues referred to".*

The key policy objectives identified from the review of other plans and programmes relevant to the assessment of the Waste Strategy and the key environmental and socio-economic issues arising from the analysis of the baseline, together with the characteristics of the Waste Strategy scenarios, were used to define the scope of the assessment in terms of the topics set out in Schedule 2 of the SEA Regulations.

The Waste Strategy scenarios focus on the methodology and frequency of waste collections and the Strategy is not looking to identify sites or infrastructure gaps. As the Strategy is not site specific, during scoping, likely significant effects on archaeology and cultural heritage were not anticipated and therefore the topic was scoped out of the assessment. Material assets and waste management; biodiversity, flora and fauna, population and human health; water; soil, geology and land-use; air and climate and landscape and visual amenity were scoped in.

The perceived move away from landfill as a treatment process is connected with the Strategy scenarios and sensitivities and it was anticipated these would generally have a positive effect on biodiversity, flora and fauna and landscape and therefore these topics were scoped in on a precautionary basis.

However, the decisions around the treatment process are out with the scope of the Strategy and the SEA process, although, the relative benefits of the EfW approach compared to the baseline (landfill) have been considered in the body of the report.

Essex County Council is in the process of procuring a new offtake contract for residual waste. This procurement process will determine the treatment route(s) for the Council's residual waste. As the procurement exercise is still ongoing, the residual waste treatment route and technology(ies) for the modelled year in the Strategy is currently unknown. For the purposes of the Strategy, Energy from Waste has been modelled as the treatment method for residual waste, however this may not be the outcome.

As the Strategy is not site-specific, this was only modelled in respect of impacts of the general treatment process on parameters including recycling/recovery rates, greenhouse gas emissions and costs (such as gate fees) when compared to the baseline scenario of landfilling the Council's residual waste. Further sensitivities have also been explored, assessing the impacts of implementing front-end sorting, combined heat and power (CHP) and carbon capture, utilisation and storage (CCUS) on the same parameters for EfW. Likewise, these sensitivities are only assessed in terms of the technology/process type and do not take into account any spatial aspects as these are outside of the scope of this Strategy.

After conducting the environmental assessment of the scenarios and sensitivities, it was determined that the anticipated environmental effects on archaeology and cultural heritage would still not be significant at this stage, especially considering the absence of specific sites under evaluation. However, in the interest of providing a comprehensive and thorough assessment with signposting to where spatial considerations will be undertaken, the inclusion of archaeology and cultural heritage within the scope was deemed appropriate.

4.2.2 Geographic Scope

The geographic extent of the SEA is the administrative extent of the Essex county area covered by the Waste Strategy. The Waste Strategy scenarios focus on the methodology and frequency of waste collections and as noted in section 4.2.1 the Waste Strategy is non-site specific. Therefore, the SEA will not assess any site-specific proposals for waste and resources infrastructure.

Import and export of waste for treatment and disposal is not changing as a result of the Strategy. As such, potential impacts beyond the County's administrative area are not anticipated.

4.2.3 Timescales

Schedule 1 (2)(a) of the SEA Regulations requires that the assessment of the effects should have regard to *"the probability, duration, frequency and reversibility of the effects"*. In considering the timing of potential effects of the Waste Strategy and capturing effects that could arise at different timescales, the assessment has classified effects as 'short,' 'medium' or 'long-term.'

Table 4.1 below summarises the timescales applied in the SEA informed by the 25+ year duration of the plan. For the purposes of this assessment, short-term is considered as up to 5 years (the plan review cycle), medium-term (from 5 to 25 years) and long-term is for the period beyond 25 years (beyond the term of the plan).

Table 4.1 Duration of Short, Medium and Long Term in years

Estimated Length (years)	Duration
0-5 years	Short
>5-25 years	Medium
Over 25 years	Long

4.3 ASSESSMENT FRAMEWORK

Establishing appropriate SEA objectives and guide questions as an assessment method is helpful in identifying the effects of the Strategy on the environment. Each of the waste management scenarios and sensitivities has been assessed against the SEA objectives to determine the scale and significance of the effect. Guide questions focus the assessment on specific aspects of the objective that reflect issues identified from the review of baseline and contextual information relating to the Waste Strategy for Essex.

The SEA objectives and supporting guide questions used in the assessment of the Strategy reflect the topics contained in Schedule 2 (6) of the SEA Regulations and have been informed by:

- the review of relevant plans and programmes and associated environmental protection objectives;
- the baseline information and key issues that have been identified;
- an understanding of the likely generic effects arising from the construction and operation of waste infrastructure; and
- responses to the scoping consultation.

The assessment framework used to complete the assessment of the Waste Strategy for Essex is presented in Table 4.2.

Table 4.2 Assessment Framework and SEA Objectives

SEA Topic	SEA Objectives		Guide Questions
Material Assets and Waste Management	1.1	To support a circular economy, minimise waste arisings, promote reuse, recovery and recycling, minimising the impact of waste on the environment and communities and contribute to the sustainable use of natural and material assets.	• Will the draft Strategy promote the efficient use of existing infrastructure, resources and minimise waste? • Will the draft Strategy promote the re-use and recycling of waste materials and reduce the proportion of waste sent to landfill? • Will the draft Strategy promote and move towards a regenerative circular economy? • Will the draft Strategy help to minimise the consumption of resources, including water and energy? • Will the Strategy affect waste practices and behaviours in residents and businesses? • Will the draft Strategy affect community level or national capabilities to re-use, recycle and recover materials?

SEA Topic	SEA Objectives		Guide Questions
Biodiversity, Flora and Fauna	2.1	To protect and enhance biodiversity including designated sites of nature conservation interest and protected habitats and species, enhance ecosystem resilience and habitat connectivity and deliver a net biodiversity gain.	• Will the draft Strategy protect and/or enhance sites that are designated, both nationally and internationally, for their nature conservation value? • Will the draft Strategy protect and/or enhance priority species and habitats? • Will the draft Strategy protect and/or enhance non-designated habitats and species including protected species? • Will the draft Strategy lead to an improvement in natural capital and a net gain in biodiversity? • Will the Strategy avoid further spread of invasive, non-native species?
Population and Human Health	3.1	To protect and enhance human health and wellbeing	• Will the draft Strategy help to promote healthy communities and avoid risks to human health and wellbeing for example, due to noise, odour and dust? • Will the draft Strategy promote sustainable growth and maintain and enhance the economic and social well-being of local communities? • Will the draft Strategy minimise extent of litter and vermin generation? • Will the draft Strategy impact vehicle movements? • Will the draft Strategy minimise the health impact from waste treatment collection, sites and management e.g. through chemicals, air pollution, land contamination and increased risk of infection and/or disease? • Will the draft Strategy affect opportunities for recreation and physical activity? • Will the draft Strategy ensure vulnerable communities are protected and not disproportionately impacted? • Will the draft Strategy help to ensure that all residents have equal access and ability to participate in waste and resource management practices?
	3.2	To minimise disturbance to local communities	

SEA Topic	SEA Objectives		Guide Questions
Water	4.1	To protect and enhance water quality and help achieve the objectives of the Water Framework Directive.	• Will the draft Strategy protect and/or enhance surface, ground, estuarine and coastal water quality and quantity and ensure sustainable water resource management? • Will the draft Strategy prevent the deterioration of Water Framework Directive waterbody status (or potential)? • Will the draft Strategy reduce the risk of flooding?
Soil, Geology and Land-Use	5.1	To make appropriate and efficient use of land and protect and enhance soil, local geomorphology and geodiversity and contribute to the sustainable use of land.	• Will the draft Strategy have an effect on soil quality/function? • Will the draft Strategy prioritise prevention of waste, enhance recycling and reduce the amount of waste going to landfill? • Will the draft Strategy increase the risk of land contamination? • Will the draft Strategy protect and/or enhance Geological Conservation Sites, important geological features and geophysical processes and functions?
Air and Climate	6.1	To minimise emissions of pollutant gases and particulates and enhance air quality.	• Will the draft Strategy affect air quality? • Will the draft Strategy create a nuisance for people or wildlife (for example from dust, vibration or odours)? • Will the draft Strategy help to minimise traffic volumes? • Will the draft Strategy encourage alternative and sustainable means of transporting freight, waste and minerals, where possible? • Will the draft Strategy help to ensure a low carbon design solution to the design and delivery of waste management services including infrastructure? • Will the draft Strategy lead to an increase in low carbon energy use? • Will the draft Strategy increase resilience to the effects of climate change?
	6.2	To minimise greenhouse gas emissions and embodied carbon associated with waste management and landfill	
	6.3	To adapt waste management practices to climate change and improve resilience to the threats of a changing climate	
Archaeology and Cultural Heritage	7.1	To conserve and enhance the historic environment including designated and non-designated heritage assets and their settings.	• Will the draft Strategy affect the significance of internationally and nationally designated heritage assets and their settings? • Will the draft Strategy affect non-designated heritage assets and their settings?

SEA Topic	SEA Objectives		Guide Questions
			• Will the draft Strategy conserve and enhance the historic environment including landscapes, townscapes, buildings, structures and archaeological remains? • Will the draft Strategy affect the fabric and setting of historic buildings, places or spaces such as conservation areas that contribute to local distinctiveness, character and appearances?
Landscape and Visual Amenity	8.1	To protect and enhance landscape, townscape character and visual amenity.	• Will the draft Strategy lead to detrimental visual impacts? • Will the draft Strategy affect the purposes and/or special qualities of protected/designated/culturally important landscapes and their setting? • Will the draft Strategy provide opportunities to enhance nationally and locally designated landscapes, townscapes, seascapes and their settings? • Will the draft Strategy affect the intrinsic character or setting of local landscapes, streetscapes, townscapes and seascapes? • Will the draft Strategy help to minimise light pollution from operational activities on residential amenity and on sensitive locations and receptors? • Will the draft Strategy help reduce the likelihood of littering and fly-tipping and other waste crime?

4.4 ASSESSMENT METHODOLOGY

The SEA has been carried out by assessing the likely significant environmental effects of implementing the draft Waste Strategy for Essex, taking into account the collection and frequency, implied technology use and noting that the Waste Strategy is a high level document which is non-site specific and that the decisions around the chosen treatment process (Energy from Waste) are out with the scope of this Strategy process.

The assessment of scenarios has drawn on the other assessments and studies undertaken in support of the Essex Waste Strategy proposals such as the BPES, WRATE modelling and the short-list evaluation criteria that were developed as part of the scenarios appraisal process.

Following assessment of the short-listed scenarios an assessment has been carried out of the highest scoring scenario incorporating the modelling of each of the chosen sensitivities / types of treatment. This includes identifying, describing and evaluating the cumulative effects of Scenario 2 in combination with each sensitivity individually.

In accordance with the SEA Regulations, the assessment process has identified the likely significant effects of the draft Waste Strategy. This has been carried out by applying the assessment framework to identify the likely changes to the baseline conditions as a result of implementing the draft Strategy scenarios. The effects of each scenario have been assessed against each of the SEA objectives that comprise the assessment framework. The assessment of effects includes consideration of the following:

- the nature of the potential effect (what is expected to happen);
- the timing and duration of the potential effect (e.g., short, medium or long term);
- the geographic scale of the potential effect (e.g., local, regional, national);
- the location of the potential effect (e.g., whether it affects rural or urban communities, or those in particular parts of a plan area); and
- the potential effect on vulnerable communities or sensitive sites.

Where available, the assessment is based on modelled information, as well as professional judgement with reference to relevant legislation, regulations and policy. More specifically during the assessment, consideration has been given to:

- Baseline information including key issues and the future evolution of the baseline in the absence of the Strategy;
- Likely activities and potential sources and receptors of effects associated with the operation of the waste collection and assumed treatment methods;
- The regulatory framework;
- The SEA objectives and guide questions;
- Schedule 1 of the SEA Regulations (criteria for determining the likely significant effects on the environment).

Table 4.3 shows the key for significance ratings used in the assessment against each objective.

Table 4.3 Significance Ratings

Score	Description	Symbol
Major/Significant Positive Effect	Significant positive effect of the scenario on this objective	**+++**
Moderate Positive Effect	Moderate positive effect of the scenario on this objective	**++**
Minor Positive Effect	Minor positive effect of the scenario on this objective	**+**
Neutral	Neutral effect of the scenario on this objective	**0**

Score	Description	Symbol
Minor Negative Effect	Negative effect of the scenario on this objective	-
Moderate Negative Effect	Moderate effect of the scenario on this objective	--
Major/Significant Negative Effect	Significant negative effect of the scenario on this objective	---
Uncertain	The Waste Strategy scenario has an uncertain relationship to the objective or the relationship is dependent on the way in which the aspect is managed. In addition, insufficient information may be available to enable an accurate assessment to be made.	?

The assessment takes account of any proposed mitigation measures that have been incorporated into the scenario, i.e. it is the residual effects after the application of known mitigation that are assessed.

4.4.1 Assessment of Secondary, Cumulative and Synergistic Effects

Schedule 2(6) of the SEA Regulations requires the assessment of *"The likely significant effects on the environment, including short, medium and long-term effects, permanent and temporary effects, positive and negative effects, and secondary, cumulative and synergistic effects…."*

In addition to the assessments of the scenarios and sensitivities described above, this also includes the cumulative effects assessment of the Strategy in-combination with other plans and programmes. Relevant definitions are provided in Table 4.4.

Table 4.4: Definitions of Secondary, Cumulative and Synergistic Effects[7]

Effect	Explanation
Secondary or indirect effects	These are effects that are not a direct result of the Waste Strategy, but occur away from the direct impact or as a result of a complex pathway. Examples of a secondary effect of the draft Strategy could include health effects of changes to air quality associated with emissions from the transportation of waste.
Cumulative effects	These arise where several activities or developments each have insignificant effects but together combine to have a significant effect; or where several individual effects of the Strategy (e.g. noise, dust and visual) have a combined effect. Examples of a cumulative effect resulting from the implementation of the draft Strategy could include potential effects on a receptor and the cumulative effects of disturbance and pollutant emissions causing a significant impact. Cumulative effects will also include the potential effects (if any) of a proposed activity and any other proposed and consented developments.
Synergistic effects	This is where effects interact to produce a new effect or a magnitude of effect greater than the sum of the individual effects. For example, this can occur where the toxicity of two chemicals is greatly increased when they are combined.

4.5 DIFFICULTIES ENCOUNTERED IN THIS ASSESSMENT

The SEA Regulations require the identification of any difficulties encountered during the assessment process. The difficulties encountered in undertaking the SEA of the draft Waste Strategy are summarised below.

The SEA assessment process was undertaken retrospectively as the detailed modelling and the Waste Strategy largely advanced prior to commencement of the SEA, thus limiting the possibility of the SEA to

[7] Adapted from Office of the Deputy Prime Minister (2005) A Practical Guide to the Strategic Environmental Assessment Directive.

influence the Strategy's development. However, as the draft strategy will be subject to further consideration post consultation, scope will exist for the SEA to influence the final adopted strategy.

Every effort has been made to make the SEA a useful process in terms of promoting potential mitigation measures and monitoring opportunities. Also, detailed technical WRATE modelling and BPES assessment results have been incorporated into the SEA where applicable.

Linked to this, as the SEA assessment process has moved along, assessing the short-listed scenarios, individual councils have started to change collection methods and frequencies, and therefore the SEA presents a snapshot in time of the baseline versus the scenarios, of what is an evolving situation in waste management.

Conducting a SEA for a waste strategy that exclusively addresses collection methods and frequencies and assumes a particular treatment type due to the lack of viable alternative treatment options, presents a unique set of challenges. In such cases, the focus is narrowed to primarily operational aspects, and the Strategy's scope is limited to these parameters. However, this approach introduces complexities that necessitate careful consideration.

Reflecting the strategic nature of the draft Waste Strategy, the potential design, location and timing of any new waste management infrastructure coming forward as a result of the procurement process is unknown. Likewise, the location and degree of use of existing waste infrastructure is currently unknown. Therefore, the location of any construction work is not known at this stage and would (if taken forward) be subject to more detailed analysis during the implementation of the Strategy.

Therefore, once the spatial aspects of the associated procurement process and any associated plans, programmes or strategies are known, these may need to undergo a separate SEA exercise and depending on the scale and likely effects of the development it is assumed that the environmental effects of waste management infrastructure proposals will be fully considered through EIA and Habitats Regulations Assessment (HRA) (as appropriate) and subsequently, the environmental effects of the operation of infrastructure will be managed through permitting.

5 ASSESSMENT OF THE DRAFT WASTE STRATEGY

5.1 REASONABLE ALTERNATIVES AND REASONS FOR SELECTING THEM

To develop the draft Strategy and inform the priorities, targets and ambitions, the EWP commissioned systems modelling to look at the type and volume of the waste currently in Essex, how this may change in future and different scenarios for managing the waste. Detailed systems modelling was carried to explore the current activities across the EWP in terms of waste collection, treatment and disposal, and to investigate scenarios and opportunities for the future.

The systems modelling examined waste collection and disposal methods and the environmental and cost implications of alternative scenarios and sensitivities. In the case of this SEA and the Waste Strategy these scenarios and associated sensitivities that feed into the development of the Strategy have been the subject of the assessment and are considered to be reasonable alternatives in the context of the SEA Regulations.

In terms of treatment alternatives, these were not looked at as part of the modelling. Landfill is not considered a viable Business As Usual option primarily due to its negative environmental impacts, limited capacity and the overall government approach to disincentivising the use of landfill, and is therefore not a long term option. As a result, the focus has shifted towards utilising energy from waste methods. This shift is driven by the need to reduce waste volumes, minimise greenhouse gas emissions, and harness energy potential from waste materials through more sustainable and efficient means.

5.2 DEVELOPMENT OF SCENARIOS FOR ASSESSMENT

Extensive analysis was carried out on the current waste management landscape across the EWP area. This included the development of baseline (current) models of the collection services for each of the EWP members. Models were developed outlining a series of deliverable waste collection, treatment and disposal scenarios for the management of all Local Authority Collected Waste in Essex. These were developed in collaboration with EWP members through a series of workshops where the scenarios to be considered, the assumptions to be made, and the evaluation criteria to be used were agreed.

Each of the scenarios were illustrated by accompanying waste-flow models and financial models to estimate both the cost and likely performance of each waste collection methodology. The models were provided for each Collection Authority, and then combined to illustrate a Whole System Cost across the EWP, including collection, reprocessing and disposal costs to show the net cost of each scenario to the county.

A Best Practicable Environmental Scenario (Option) (BPES) lifecycle assessment was carried out for each of the scenarios to enable them to be considered in terms of:

- emissions to air (including climate change impacts), water and land;
- deliverability;
- performance against national targets;
- performance against EWP vision; and
- financial cost

A workshop was held in November 2021 with Officers and Members of the Essex Waste Partnership Authorities to agree and approve a long-list of collection and treatment scenarios, and evaluation criteria weightings. The long-list evaluation stage was used to assess the relative performances of the long-list of collection and treatment technology scenarios. The long-list was then assessed against the evaluation criteria to determine a short-list of scenarios.

An explanation of the collection methodologies is provided in Box 5.1 with the long-list collection scenarios shown in Figure 5.1. An explanation of the treatment/disposal technology types is provided in Box 5.2 with the long-list technology scenarios shown in Figure 5.2.

Box 5.1: Explanation of collection methodologies

Dry recycling includes the following materials: paper, card, plastic bottles, pots tubs and trays, cartons, aluminium and steel cans, glass. Plastic film and flexible packaging are also included in this stream based on the current direction of government policy through the Environment Act.

In the UK there are currently three primary approaches to dry recyclate collections:

Comingled/single stream: Where all dry recyclate is collected in a single container and then separated at a Materials Recovery Facility (MRF) before onward transport to reprocessors. A standard refuse collection vehicle (RCV) can be utilised for collections, and transfer, storage and transport of the recyclate.

Twin/two-stream: Collections in which one material stream (in general either glass or paper and card) is collected in a separate container from the rest of the dry recyclate. In general, either glass or paper and card (co-collected) are the material streams collected separately. The remaining co-collected materials are separated at a MRF before onward transport to re-processors. Twin-stream collections require residents to segregate their recyclate and use two containers. This uses split bodied or multiple vehicles and/or additional staff.

Source segregated / Multi-stream: Requiring residents to fully segregate their recyclate into different containers. This requires more complex vehicles with multiple compartments (often with lower capacity) and/or additional staff. Multiple streams of material are involved. Multi-stream collections commonly involve separate collection of

1. Paper and card
2. Glass
3. Plastics, plastic film and cans collected as three streams
4. Other materials: Small WEEE, batteries, textiles

The more separation occurs at the kerbside the higher the collection costs. However, this can be offset by reduced mechanical separation and consequent MRF gate fees and potentially improve material qualities and incomes.

Collection frequency can influence the yields collected for recycling and organic treatment. Reducing residual waste collection frequencies can reduce collection costs and increase recycling yields (as residents are incentivised to recycle more to reduce the volume of residual waste). More frequent recycling collections can also improve yields (by maximising effective recycling capacity and increasing convenience).

Figure 5.1: Long-list collection scenarios

Dry recycling collection	Food waste collection	Garden waste collection	Dry recycling frequency	Organic waste frequency	Residual waste frequency
•Commingled •Twin stream: commingled recycling and separate paper&card •Twin stream: commingled recycling and separate glass collection •Multi-stream	•Separate food collections •Co-collected food and garden waste	•Separate - without subscription •Separate - with subscription •Co-collected with food waste	•Weekly •Fortnightly •Three-weekly	•Weekly •Fortnightly	•Weekly •Fortnightly •Three-weekly •Four-weekly

Box 5.2: Explanation of the treatment/disposal technology types

Combustion (EfW): Combustion (also referred to as incineration) encompasses those processes where waste feedstock undergoes complete oxidation (combustion) in a furnace with excess oxygen, releasing heat into the gaseous exhaust and solid combustion products.

- moving grate: Moving grate refers to the action of the furnace grate, which moves the waste feedstock through the combustion area to facilitate complete combustion.
- fluidised bed: pre-treated waste is combusted within a reactor chamber containing very hot sand, which is fluidised by an air stream, thus promoting rapid heat transfer between particles.
- oscillating kiln: waste is loaded into a hopper and mechanically pushed into the top of a tapering cylinder or kiln. To pass the waste through the kiln and control the rate of combustion, the kiln oscillates from side to side, passing the waste between paddles set into the internal walls of the kiln.

Advanced Thermal Treatment (ATT): Advanced Thermal Treatment (ATT) is an umbrella term applied to a wide range of technologies, all of which involve the conversion of waste into a combination of gas, liquid and solid products which can be upgraded and used for various purposes.

- plasma gasification: Gasification is the thermal breakdown/partial oxidation of waste under a controlled oxygen atmosphere, producing syngas, which primarily consists of carbon monoxide (CO) and hydrogen (H_2) (the oxygen content is lower than necessary for full combustion). Some gasification processes (including plasma assisted processes) operate at very high temperatures to melt the ash and other residues, with potential to use in construction.
- pyrolysis: Pyrolysis is the thermal breakdown of waste in the absence of oxygen. Waste is heated to high temperatures (>400°C) without the addition of oxygen.

Clean material recovery facility (MRF): MRFs use a combination of sorting equipment including screens, separators and conveyors to sort dry recyclable material streams into their constituent material categories. After sorting at a MRF, the separate recyclate streams are typically sent to reprocessors, where further processing or refining may be carried out in order to achieve the quality specifications required for the materials to be utilised as an alternative to raw materials.

- single stream: capable of sorting a completely mixed stream of co-mingled dry recyclate feedstock into its constituent material categories (e.g., sorting mixed dry recyclate into paper, card, plastics, metals, glass).
- two stream: capable of sorting a partially mixed stream of dry recyclate feedstock, that has been partially segregated at source (e.g., sorting mixed plastics, cans and glass into separated plastics, cans and glass).
- multi-stream: capable of sorting a material that has been mostly segregated at source (e.g., sorting mixed paper and card into separated paper and card).

Material reprocessing: Facilities that accept sorted or fully segregated dry recyclate and undertake the refinement required to prepare the materials for recycling facilities to use. For example, this could involve taking a sorted 'plastic bottles' stream from a MRF and conducting the washing, removal of labels, separation of lids from bottles, shredding and pelletising. These reprocessing facilities are commonly the "front-end" process at recycling facilities.

Dirty material recovery facility (Dirty MRF): Dirty MRF is a term used for the processing of residual municipal solid waste (MSW) or other non-dry mixed recycling (DMR) streams through a mechanical sorting process. Dirty MRFs are often used in combination with biological treatment processes. The output of useable recyclate from such facilities is lower than other methodologies due to the cross-contamination of the materials during the collection and transport processes.

Mechanical biological treatment (MBT): Mechanical biological treatment is a combination of sorting and processing technologies in one facility used to recover recyclate from and subsequently process mixed residual waste. Within the facility, there are mechanical sorting processes (similar to a dirty MRF) to extract dry recyclate, followed by biological processes to treat the remaining waste, which typically has a high proportion of organic components. This type of facility is collectively known as MBT. Biological processes include:

- Autoclave: high pressure rotating vessels which effectively "cook" the waste at high pressure and temperature
- Enzyme reactor: involves loading the organic material into a large rotating drum and adding water and an enzyme mixture which partially breaks down the organic fraction, allowing it to be separated from the other materials and accelerating the AD process

Aerobic Composting: Composting is the biological treatment of waste by aerobic microorganisms in the presence of air.

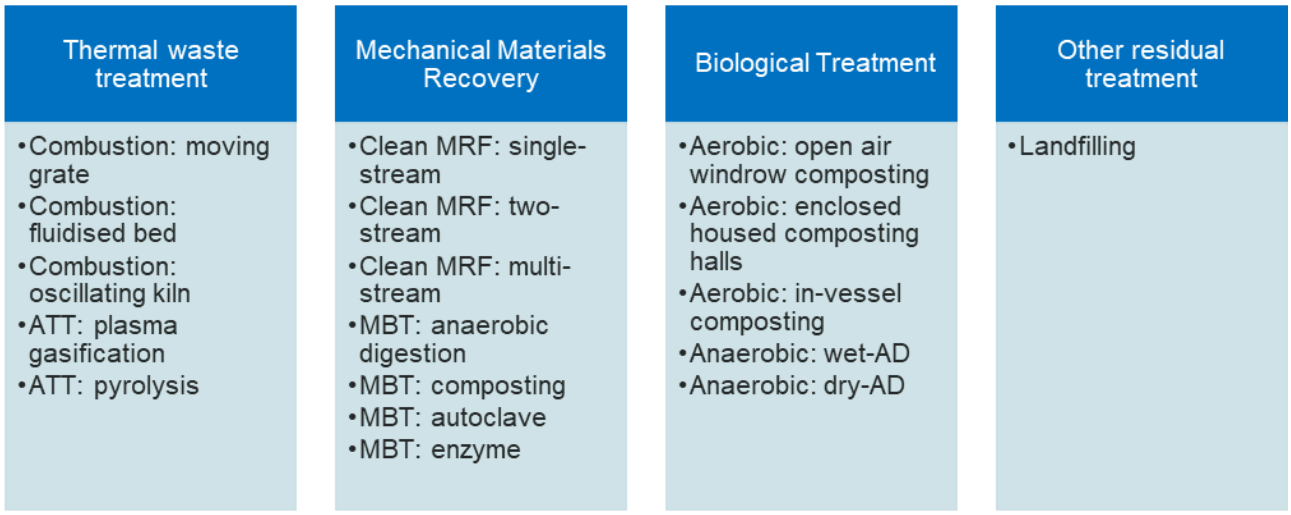
- open air windrow composting: a simple open-air process undertaken outside on concrete pads
- enclosed housed composting halls: composting undertaken within a building
- in-vessel composting: composting undertaken within a vessel

Anaerobic digestion (AD): a biological process through which organic material is decomposed without the presence of oxygen by micro-organisms and within an enclosed system to generate biogas

- wet-AD: with the waste as a liquid slurry of relatively low dry matter content
- dry-AD: with the waste in a solid form with a relatively high dry matter content

Landfilling: disposing of waste in an excavated pit (landfill)

Figure 5.2: Long-list technology scenarios*



**Please note combustion is also referred to as Energy from Waste/EfW in these explanatory boxes.*

The evaluation criteria of the long-list scenarios were divided into four themes; technical and deliverability; cost; environmental; and sustainability.

Outcomes from the stakeholder workshop identified that the environmental impact (first) and deliverability risk (second) were the most important criteria when assessing the proposed collection and treatment scenarios.

As a result of the long-list scoring, the six scenarios in Table 5.1 were proposed as the short-listed scenarios to be assessed. The individual scenarios comprise of a collection stream and a treatment stream with each focussing on four waste elements; Dry recycling; Food waste; Garden waste; and Residual waste.

Table 5.1: Short-listed scenarios

Scenarios		Dry recycling	Food waste	Garden waste	Residual waste
Scenario 1	Collection	Comingled, fortnightly	Separate, weekly	Separate, fortnightly (no subscription)	Fortnightly
	Treatment	MRF	Wet AD	Open Air Windrow (OAW) composting	EFW - Moving Grate
Scenario 2	Collection	Comingled, fortnightly	Separate, weekly	Separate, fortnightly (no subscription)	Three-weekly
	Treatment	MRF	Wet AD	OAW composting	EFW - Moving Grate
Scenario 3	Collection	Multistream, fortnightly	Separate, weekly	Separate, fortnightly (no subscription)	Fortnightly
	Treatment	Direct to Reprocessor	Wet AD	OAW composting	EFW - Moving Grate

Scenario 4	Collection	Multistream, fortnightly	Separate, weekly	Separate, fortnightly (no subscription)	Three-weekly
	Treatment	Direct to Reprocessor	Wet AD	OAW composting	EFW - Moving Grate
Scenario 5	Collection	Multistream, weekly	Separate, weekly	Separate, fortnightly (no subscription)	Fortnightly
	Treatment	Direct to Reprocessor	Wet AD	OAW composting	EFW - Moving Grate
Scenario 6	Collection	Multistream, weekly	Separate, weekly	Separate, fortnightly (no subscription)	Three-weekly
	Treatment	Direct to Reprocessor	Wet AD	OAW composting	EFW - Moving Grate

Environmental factors were considered and modelled in the determination of the short-list scenarios using a Waste and Resources Assessment Tool (WRATE). The WRATE model was chosen due to the ability to assess a variety of environmental criteria including, each with separate weightings:

- Quantitative assessment of Greenhouse Gas (GHG) emissions (CO_{2eq})
- Evaluation of local and wider transport impacts – distance travelled (collections & haulage)
- Acid rain potential
- Potential water pollution
- Human toxicity
- Resources depletion

In addition to the above factors modelled within WRATE, the following environmental factors were included in the scenarios modelling:

- Waste reduction (quantitative assessment of kg/hh/yr)
- Quantitative assessment of recycling rate (Local Authority collected waste)

The results of the scenarios modelling were put into a scenarios appraisal model, together with agreed qualitative environmental and sustainability factors, to determine the BPES.

Sustainability issues and agreed qualitative environmental issues were also considered within the scenarios appraisal under separate criteria which are detailed below:

- Quantitative assessment of jobs created or sustained
- Evaluation of local energy creation and potential for useable heat
- Litter (Potential for)
- Noise (Potential for)
- Odour (Potential for)

In addition to the Environmental and Sustainability themes, Cost and Technical & Deliverability were the other themes used within the scenarios appraisal. The four themes were weighted based on the Vision workshops attended by ECC Members and Officers as outlined below in Table 5.2.

Table 5.2: Theme weightings

Theme	Weighting
Sustainability	9.2%
Environmental	27.1%
Cost	41.7%
Technical and Deliverability	22%

5.2.1 Sensitivities

In addition to the six scenarios, four sensitivities were also included as part of the Scenarios Appraisal and modelling. Assessment of the highest scoring scenario has incorporated the modelling of the additional scenarios known as chosen sensitivities / types of treatment.

The 4 sensitivities are:

- Sensitivity 1: Addition of front-end recycling to the EfW facility for household residual waste
- Sensitivity 2: Addition of combined heat and power (CHP) at the EfW facility
- Sensitivity 3: Addition of carbon capture utilisation and storage technology (CCUS) at the EfW facility
- Sensitivity 4: Introduction of householder charges for garden waste collections

The results of this assessment are discussed in section 5.3.

5.2.2 Current Baseline of Collection and Treatment across the County of Essex.

The current baseline collection and treatment across the County of Essex are shown in Table 5.3.

Table 5.3: Current Baseline Collection and Treatment in Essex

Method	Collection in number of district, city and borough councils	Treatment
Dry Recycling	**Frequency**: 11/12 councils have fortnightly collections, 1/12 have weekly collections **Service**: varies from 4/12 councils having comingled (single, mixed stream); 5/12 with two-stream (two separate streams) and 3/12 councils with multi-stream (multiple separate streams)	Comingled/mixed streams: MRF Separate/clean streams: secondary processing (material-specific processor)
Food Waste	**Frequency**: all councils have weekly collections **Service**: 9/12 = separate collections, 3/12 = mixed with garden waste	Separate food: undergoes Wet AD Mixed food/garden: undergoes composting
Garden Waste	**Frequency**: all have fortnightly collections **Service**: 9/12 provide a separate service, 3/12 provide a service mixed with food. 6/12 councils provide a subscription service, the other 6 provide a free service (i.e., no subscription charge).	Separate garden: composting Mixed food/garden: composting
Residual Waste	**Frequency**: 10/12 councils have fortnightly, 2/12 weekly **Service**: n/a	Mix of landfill, MBT, EfW

5.3 ASSESSMENT OF SHORTLISTED SCENARIOS

The six scenarios outlined in the Waste Strategy for Essex have been assessed in Sections 5.3.1 to 5.3.7. The SEA has utilised the information associated with each scenario and the current baseline information for collection and treatment in Essex (shown in Table 5.3) to assess against the eleven SEA objectives. Scores across each of the SEA topics are provided below with negative and positive scores separated out. The SEA topics to which the narrative pertains (and associated objectives where there are more than one per topic), are shown in **bold font**.

The cumulative effects (including, where relevant, secondary and synergistic effects) of each of the scenarios on the SEA objectives have been identified and described. In the case of the Waste Strategy, the potential changes to the different waste streams within each proposed scenario may lead to cumulative effects. Interactions between elements of each scenario have been considered here and also where the highest scoring scenario is assessed with each of the sensitivities in turn in Section 5.5.

For all elements of waste processing (EFW, MRF, AD, OAW) it has been assumed that capacity at existing facilities will be utilised. This assumption has been based on a thorough analysis of capacity at a range of appropriate facilities within a practical geographical range.

Where effects have been identified, in some instances mitigation is discussed in sections below, but is more wholly covered in Section 5.7.

5.3.1 Scenario 1

Scenario 1 assumes all district, city and borough councils moving to the following collection and treatment regimes summarised in Table 5.4 with assessment scores shown in Table 5.5. Associated supporting text is provided below. Scenario 1 proposes the following:

Dry Recycling: Transitioning to a comingled collection system for dry recycling. All councils would adopt a consistent fortnightly collection schedule, and the collected recyclables would undergo processing at a MRF for advanced sorting.

Food Waste: A separate collection system for food waste. All councils would implement a weekly collection schedule for food waste, which would then undergo Wet AD treatment.

Garden Waste: The proposed change introduces separate collections and composting methods. Councils would transition to fortnightly, separate and free garden waste collections, processed through OAW Composting.

Residual Waste: The proposed change for residual waste involves adopting EFW treatment alongside a modified fortnightly collection schedule. Residual waste would be directed to an EFW facility for combustion and electricity generation.

Table 5.4: Scenario 1 Collection and Treatment

Collection		**Treatment**	
Dry Recycling	Comingled, fortnightly	Dry Recycling	MRF
Food Waste	Separate, weekly	Food Waste	Wet AD
Garden Waste	Separate, fortnightly (no subscription)	Garden Waste	Open Air Windrow (OAW) Composting
Residual Waste	Fortnightly	Residual Waste	EFW - Moving Grate

Table 5.5: Scenario 1 Assessment Scoring

1.1 Material Assets and Waste Management	2.1 Biodiversity, Flora and Fauna	3.1 Human Health and Wellbeing	3.2 Minimise Local Community Disturbance	4.1 Water Quality	5.1 Soil, Geology and Land-use	6.1 Air Quality	6.2 Greenhouse Gas Emissions	6.3 Climate Resilience	7.1 Archaeology and Cultural Heritage	8.1 Landscape and Visual Amenity
-	-?	-	-?	0	0	-?	-?	-?	0	0
++	?	+	?	+	0	+	++	++	0	0

In terms of Material Assets and Waste Management, the quality of recyclate is lower with comingled collections, compared with multistream collections. Comingling material tends to result in more contamination and therefore lower quality recyclate. Sending all comingled recyclables to a MRF simplifies the collection infrastructure. However, relative to the sorting of segregated material streams, the sorting of mixed recyclables may result in less effective sorting of high-quality materials due to the mixed nature of the stream. This could affect the overall value and usefulness of the recycled materials. Lower quality recyclate means lower value materials and consequent movement away from a circular economy. This is predicted to have a minor negative effect.

However, based on evidence compiled by WRAP, comingled recycling typically results in higher recycling yields and thus higher recycling rates compared to multistream, as it makes the act of recycling easier for the householder and therefore more people are likely to make it a habit. Fortnightly residual waste collections are shown to reduce quantities of residual waste when compared to weekly collections, as there is an effective reduction in the capacity (e.g. moving from a 240 litre bin collected per week to a 240 litre bin collected per fortnight equating to a reduction of 50%). This has also been shown to improve recycling participation and performance, because residents are nudged towards using their recycling containers more. 11 councils already have fortnightly collections so adding one more district council area could be considered to be a relatively minor change.

As the SEA assessment process have progressed, individual councils have started to change collection methods and frequencies, and therefore the SEA presents a snapshot in time of the baseline versus the scenarios, of what is an evolving situation in waste management. For example, at time of writing the remaining council is now progressing consideration of fortnightly collections.

There is an assumed change in the Strategy for residual waste treatment i.e. that it would go from a mix of landfill, MBT and EfW, to just EfW. While specific EfW sites are not proposed, this change does signal a positive move up the waste hierarchy, i.e. reducing waste to landfill and sending it for energy recovery instead. Moving from mixed food and garden waste to separate food is shown to increase capture of food waste and therefore resulting in a higher recycling rate. This is predicted to be a moderate positive effect on **Material Assets and Waste Management.**

Considering **Biodiversity, Flora, and Fauna**, it's important to clarify that this Strategy is not spatial nor does it introduce new or modifications to existing infrastructure. Changes in collection routes and frequencies, such as increasing garden waste collections from subscription-based to a free service; potentially increasing uptake and therefore necessitating more vehicles or reducing residual waste collections from weekly to fortnightly (likely decreasing vehicle numbers), could affect biodiversity, for example via vehicle emissions near protected areas. The specific volumes of waste collection vehicles and their routes in relation to designated protected areas is unknown and therefore this scenario has been assessed as having a minor negative uncertain effect and uncertain positive effect on this objective.

With regard to **Population and Human Health,** comingled recycling is shown to increase recycling yields and thus increase recycling rates compared to multistream. Fortnightly residual waste collections are shown to reduce tonnages of residual waste when compared to weekly collections. Whilst reduced collection frequency could lead to slightly larger volumes of waste and recyclables being stored between collections; this has the potential to have negative effects from accumulating waste, such as odour. However, this is mitigated by the weekly collection of food waste (the most odorous element of household waste). WRATE modelling shows

that the diversion of waste from 'residual' to 'recycling' is estimated to have a positive impact on human health through a reduction of the negative toxicity effects from landfilling/incinerating waste. This scenario has therefore been assessed as having minor negative and minor positive effects on **Population and Human Health objective 3.1**.

In terms of **minimising disturbance to local communities** (**Population and Human Health Objective 3.2**), this is not a spatial Strategy and it does not include specific changes to infrastructure or sites. There is an assumed change in the Strategy for residual waste treatment; that it would go from a mix of landfill, MBT and EfW, to just EfW. As use of specific EfW sites and introduction of new infrastructure are not proposed as part of this Strategy, it is unlikely that this change would result in a net change to disturbance levels.

Changes to collection routes and frequencies such as increased garden waste collections when changed from a subscription-based to a free service (due to increased resident uptake) or decreased residual waste collections from weekly to fortnightly may have both positive and negative impacts on levels of disturbance but this depends on individual locations, timing of collections and volume of vehicles required, which are all uncertain. This scenario has been assessed as having a minor negative uncertain effect and an uncertain positive effect on **Population and Human Health objective 3.2**.

While specific EfW sites are not proposed, it is unlikely that this change would result in a net effect to **soil, geology and land-use** or **water** quality.

Comingled recycling is shown to increase recycling yields and thus rates compared to multistream recycling. Fortnightly residual waste collections are shown to reduce tonnages of residual waste when compared to weekly collections. WRATE modelling shows that the diversion of waste from 'residual' to 'recycling' is estimated to have an indirect positive effect on **population and human health** through a reduction of the eutrophication effects from landfilling/incinerating waste, therefore, this is predicted to be a minor positive effect on the **water** objective.

In terms of minimising emissions of pollutant gases, particulates and enhancing air quality; minimising greenhouse gas emissions; and embodied carbon and adapting to climate change and improving resilience **(air and climate objectives 6.1, 6.2 and 6.3)** there would be more collection vehicles compared with the baseline, resulting in higher transport-related emissions.

With the overall assumed change in the Strategy for residual waste treatment from a mix of landfill, MBT and EfW to just EfW, while landfill can still release emissions to air, they are usually capped and the landfill gas can be captured and used for combustion. The gases released from EfW are different (i.e. more NOx, SOx, metals...), so sending more waste to EfW would reduce emissions associated with landfill, but increase emissions associated with EfW. EfW releases GHG emissions from materials that would have been "locked up" in landfill (biogenic/non-fossil based such as organic material from landfill versus non-biogenic/fossil based carbon such as plastic and synthetic materials from EfW). Since the strategy aims to reduce material going for disposal, the effect is predicted to be minor negative uncertain across the three **air and climate** objectives reflecting the unknown volume of associated vehicular activity and volumes of gases released by the different treatment methods.

Comingled recycling is shown to increase recycling yields and thus rates compared to multistream recycling. Fortnightly residual waste collections are shown to reduce tonnages of residual waste when compared to weekly collections. These changes mean increased recycling, which results in a replacement of greater quantities of virgin materials, leading to reduced greenhouse gas emissions from extraction and manufacturing processes. In addition, there would be benefits of minimising carbon emissions from using wet AD compared with in-vessel composting. Moderate positive effects are therefore predicted across **air and climate objectives 6.2 and 6.3** and a minor positive effect in terms of reduced pollutant gas emissions from extraction and manufacturing processes (**air and climate objective 6.1),** as demonstrated in the WRATE modelling undertaken**.**

This is not a spatial Strategy and no new infrastructure or facilities are proposed as part of this Strategy therefore effects on **archaeology and cultural heritage** and **landscape and visual amenity** are not anticipated. However, there is an assumed change in the Strategy for residual waste treatment i.e. that it would go from a mix of landfill, MBT and EfW, to just EfW. At present specific EfW sites are not proposed, but this change assumes that landfill and MBT sites will be removed/abandoned (which would potentially have a positive impact on **archaeology and cultural heritage** as well as **landscape and visual amenity**), and potentially replaced with use of EfW which could be potentially have associated negative impacts on sites and

their settings). As well as the other SEA topics, **archaeology and cultural heritage** and **landscape and visual** will need to be revisited during the procurement process when further detail is known about location of any new or existing sites to be used for infrastructure.

5.3.2 Scenario 2

Scenario 2 assumes all district, city and borough councils moving to the following collection and treatment regimes shown in Table 5.6 with assessment scores in Table 5.7 with associated supporting text provided below.

Scenario 2 presents the same alterations in collection methods and frequency as those seen in Scenario 1, apart from one distinct difference. In Scenario 2, the collection frequency for residual waste would occur every three weeks instead of the fortnightly collection in Scenario 1. This change is in contrast to the baseline, where 10 out of 12 councils have a fortnightly residual waste collection, and the remaining 2 councils have a weekly collection frequency.

Table 5.6: Scenario 2 Collection and Treatment

Collection		**Treatment**	
Dry Recycling	Comingled, fortnightly	Dry Recycling	MRF
Food Waste	Separate, weekly	Food Waste	Wet AD
Garden Waste	Separate, fortnightly (no subscription)	Garden Waste	Open Air Windrow (OAW) Composting
Residual Waste	Three-weekly	Residual Waste	EFW - Moving Grate

Table 5.7: Scenario 2 Assessment Scoring

1.1 Material Assets and Waste Management	2.1 Biodiversity, Flora and Fauna	3.1 Human Health and Wellbeing	3.2 Minimise Local Community Disturbance	4.1 Water Quality	5.1 Soil, Geology and Land-use	6.1 Air Quality	6.2 Greenhouse Gas Emissions	6.3 Climate Resilience	7.1 Archaeology and Cultural Heritage	8.1 Landscape and Visual Amenity
-	-?	--	-?	0	0	-?	-?	-?	0	--
++	?	++	?	++	0	++	++	++	0	0

The assessment of Scenario 2 is considered to be largely the same as Scenario 1 except for the following variations resulting from the three-weekly collections as elaborated below.

In terms of **material assets and waste management** three weekly residual waste collections are shown to reduce tonnages of residual waste when compared to fortnightly and weekly collections again due to the reduced capacity available to residents).

As mentioned previously, the Strategy does not involve new sites or potential modifications or additional use of existing infrastructure/sites. However, alterations in collection routes and frequencies, such as the shift from subscription-based to free service for garden waste collections or the reduction of residual waste collections from weekly or fortnightly to every three weeks, could potentially influence vehicle emissions near protected areas (**biodiversity, flora, and fauna**) and sensitive receptors such as schools and residential areas (**population and human health**). Given the absence of specific information about route changes and their proximity to designated sites and sensitive receptors, as per scenario 1 the predicted effects remain uncertain for **biodiversity, flora and fauna** and **population and human health (objective 3.2).**

When compared to weekly and fortnightly collections, three weekly residual waste collections are shown to reduce tonnages of residual waste and to encourage increased recycling. WRATE modelling shows that the diversion of waste from 'residual' to 'recycling' is estimated to have a positive impact on human health through a reduction of the negative toxicity effects from landfilling/incinerating waste. Since all councils in the county would potentially move to three-weekly collections under this scenario, it is assessed as having a moderate positive effect on **population and human health objective 3.1.**

There is a commonly assumed, but not evidence-led, risk of public and political perceptions of increased odour and vermin, such as rodents and seagulls if a three-weekly collection is employed for residual waste which would mean effectively a longer storage period for waste, potential overflow as currently recorded in fortnightly collections[8] and is assessed as having a moderate negative effect with a risk of major/significant effect on **population and human health objective 3.1** and on local **landscape and visual amenity** if not supported by an appropriate collection methodology and if appropriate mitigation measures are not implemented. Transitioning to a three-weekly waste collection frequency could potentially lead to increased litter and overflowing bins, affecting the landscape and visual amenity of neighbourhoods. As waste accumulates over a longer period between collections, households might face challenges in managing the volume of waste within their bins, especially if bin capacities are not aligned with the extended collection cycle. The longer storage duration may result in bins filling up faster, causing some residents to resort to alternative waste disposal methods, such as placing waste beside or around bins. This can contribute to a scattered and untidy appearance, impacting the overall aesthetics of streets and public spaces. Additionally, the presence of overflowing bins can attract scavenging animals and pests, exacerbating litter issues and negatively influencing the perception of cleanliness and orderliness.

This effect could be largely mitigated by providing guidance on segregating waste to ensure that the maximum recyclate is being generated and that items are correctly disposed of and stored. In particular, participation in the weekly food waste collection service would minimise odour issues. A mechanism of reporting overflowing bins could be introduced. Also, appropriately sized containers with barriers to odour and vermin could be supplied.

With three weekly residual waste collections leading to reduction in tonnages of residual waste when compared to weekly and fortnightly collections, the diversion of waste from 'residual' to 'recycling' would be greater than for fortnightly and weekly collections. As a result of the increased waste diversion, the anticipated positive impact is expected to be more significant. Specifically, it is predicted to have a moderate positive effect on **water** quality by reducing the eutrophication effects linked to the practices of landfilling and incinerating waste.

Three weekly residual waste collections are shown to further reduce tonnages of residual waste when compared to weekly and fortnightly collections. The associated increased recycling across the county would mean a replacement of greater quantities of virgin materials, leading to reduced pollutant gas emissions from extraction and manufacturing processes. This is assessed as having a moderate positive effect on minimising pollutant gas emissions (**air and climate objective 6.1**).

5.3.3 Scenario 3

Scenario 3 assumes all district, city and borough councils moving to the following collection and treatment regimes shown in Table 5.8 with assessment scores in Table 5.9 with associated supporting text provided below.

Scenario 3 proposes the following:

Dry Recycling: Moving to a multistream collection system for dry recycling. All councils would adopt a fortnightly collection schedule, and the collected recyclables would be taken directly to a reprocessor(s). This differs from scenarios 1 and 2. As previously noted, it has been assumed that capacity at existing reprocessing facilities will be utilised. This assumption has been based on a thorough analysis of capacity at a range of appropriate facilities within a practical geographical range.

Food Waste: A separate collection system for food waste. All councils would implement a weekly collection schedule for food waste, which would then undergo Wet AD treatment. This would be the same as scenarios 1 and 2.

[8] Essex County Council and Savanta (2023): Resident attitudes towards waste and recycling.

Garden Waste: The proposed change introduces separate collections and composting methods. Councils would transition to fortnightly separate garden waste collections, processed through OAW Composting. This would be the same as scenarios 1 and 2.

Residual Waste: The proposed change for residual waste involves adopting EFW treatment alongside a modified fortnightly collection schedule. Residual waste would be directed to an EFW facility for combustion and electricity generation. This is the same as Scenario 1.

Table 5.8: Scenario 3 Collection and Treatment

Collection		**Treatment**	
Dry Recycling	Multistream, fortnightly	Dry Recycling	Direct to Reprocessor
Food Waste	Separate, weekly	Food Waste	Wet AD
Garden Waste	Separate, fortnightly (no subscription)	Garden Waste	Open Air Windrow (OAW) Composting
Residual Waste	Fortnightly	Residual Waste	EFW - Moving Grate

Table 5.9: Scenario 3 Assessment Scoring

1.1 Material Assets and Waste Management	2.1 Biodiversity, Flora and Fauna	3.1 Human Health and Wellbeing	3.2 Minimise Local Community Disturbance	4.1 Water Quality	5.1 Soil, Geology and Land-use	6.1 Air Quality	6.2 Greenhouse Gas Emissions	6.3 Climate Resilience	7.1 Archaeology and Cultural Heritage	8.1 Landscape and Visual Amenity
-	-?	-	-?	0	0	-?	-?	-?	0	0
++	?	+	?	+	0	+	++	++	0	0

In terms of **material assets and waste management** multistream collections, which require residents to fully segregate their recyclate into different containers, are shown, based on evidence by WRAP, to have lower recycling yields and thus rates compared to comingled collections (due to the additional effort required by residents to segregate each dry recycling stream and present it in a separate container tending to lower participation rates) and hence this scenario is assessed as having a minor negative effect on this objective.

However, fortnightly residual waste collections are shown to reduce tonnages of residual waste when compared to weekly collections. Nevertheless, 11 of the 12 councils currently have a fortnightly collection, so adding one more district council could be considered a relatively minor change. While specific EfW sites are not proposed for the assumed change to EfW, this change does signal a positive move up the waste hierarchy, i.e. reducing waste to landfill and sending it for energy recovery instead. The quality of recyclate is higher with multistream collections, compared with comingled collections. Higher quality recyclate results in higher value materials and a movement towards a circular economy. Moving from mixed food and garden waste to separate food collections is also shown to increase capture of food waste and therefore resulting in a higher recycling rate. Therefore, this scenario is assessed as having a moderate positive effect on **material assets and waste management**.

Changes in collection routes and frequencies, such as increasing garden waste collections from subscription-based to a free service; potentially increasing uptake and therefore necessitating more vehicles or reducing residual waste collections from weekly to fortnightly (likely decreasing vehicle numbers), could affect vehicle emissions near protected areas. The specific volumes of waste collection vehicles and their routes in relation to designated protected areas is unknown and therefore this scenario has been assessed as having a minor negative uncertain and uncertain positive effects on **biodiversity, flora and fauna**.

Fortnightly residual waste collections are shown to reduce tonnages of residual waste when compared to weekly collections. Whilst reduced collection frequency could lead to slightly larger volumes of waste and recyclables being stored between collections; this has the potential to have negative effects from accumulating waste, such as odour; however, participation in the weekly food waste collection service would minimise odour issues. WRATE modelling shows that the diversion of waste from 'residual' to 'recycling' is estimated to have a positive impact on human health through a reduction of the negative toxicity effects from landfilling/incinerating waste. This scenario is therefore assessed as having a minor negative and minor positive effects on **population and human health objective 3.1**.

In terms of **minimising disturbance to local communities** (**population and human health objective 3.2**), with the assumed change to EfW; while specific EfW sites are not proposed, it is unlikely that this change would result in a net change to disturbance levels. Changes to collection routes and frequencies such as increased garden waste collections when changed from a subscription-based to a free service or decreased residual waste collections from weekly to fortnightly could have both positive and negative impacts on levels of disturbance but this depends on individual locations, timing of collections and volume of vehicles required, which are all uncertain. This scenario has been assessed as having a minor negative uncertain effect and an uncertain positive effect on **population and human health objective 3.2**. Due consideration should be given to local residents in terms of collection times (to prevent disturbance) and types of vehicle used.

This is not a spatial strategy and it does not include possible infrastructure/site changes. While specific EfW sites are not proposed, it is unlikely that this change would result in a net impact to **soil, geology and land-use** or to **water** quality.

Fortnightly residual waste collections are shown to reduce tonnages of residual waste when compared to weekly collections. WRATE modelling shows that the diversion of waste from 'residual' to 'recycling' is estimated to have a positive impact on human health through a reduction of the eutrophication effects from landfilling/incinerating waste. This scenario is therefore assessed as having a minor positive effect on the **water** objective.

In terms of minimising emissions of pollutant gases, particulates and enhancing air quality; minimising greenhouse gas emissions; and embodied carbon and adapting to climate change and improving resilience **(air and climate objectives 6.1, 6.2 and 6.3** respectively) there would be more collection vehicles compared with the baseline, resulting in higher transport-related emissions. In addition, there would be benefits of minimising carbon emissions from using wet AD compared with in-vessel composting.

With the overall assumed change in the Strategy for residual waste treatment from a mix of landfill, MBT and EfW to just EfW, while landfill can still release emissions to air, they are usually capped and the landfill gas can be captured and used for combustion. The gases released from EfW are different (i.e. more NOx, SOx, metals...), so sending more waste to EfW would reduce emissions associated with landfill, but increase emissions associated with EfW. EfW also releases GHG emissions from materials that would have been "locked up" in landfill (biogenic versus non-biogenic carbon). Since the strategy aims to reduce material going for disposal the effect is predicted to be minor negative uncertain across the three **air and climate** objectives reflecting the unknown volume of associated vehicular activity and volumes of gases released by the different treatment methods.

Fortnightly residual waste collections are shown to reduce tonnages of residual waste when compared to weekly collections. These changes mean increased recycling, which results in a replacement of greater quantities of virgin materials, leading to reduced greenhouse gas emissions from extraction and manufacturing processes. Moderate positive effects are therefore predicted across **air and climate objectives 6.2 and 6.3** and a minor positive effect in terms of reduced pollutant gas emissions from extraction and manufacturing processes (**air and climate objective 6.1)** as demonstrated in the WRATE modelling**.**

This is not a spatial strategy and no new infrastructure or facilities are proposed as part of this strategy therefore effects on **archaeology and cultural heritage** and **landscape and visual amenity** are not anticipated at this stage.

5.3.4 Scenario 4

Scenario 4 assumes all district, city and borough councils moving to the following collection and treatment regimes shown in Table 5.10 with assessment scores in Table 5.11 with associated supporting text provided below.

Table 5.10: Scenario 4 Collection and Treatment

Collection		Treatment	
Dry Recycling	Multistream, fortnightly	Dry Recycling	Direct to Reprocessor
Food Waste	Separate, weekly	Food Waste	Wet AD
Garden Waste	Separate, fortnightly (no subscription)	Garden Waste	Open Air Windrow (OAW) Composting
Residual Waste	Three-weekly	Residual Waste	EFW - Moving Grate

Table 5.11: Scenario 4 Assessment Scoring

1.1 Material Assets and Waste Management	2.1 Biodiversity, Flora and Fauna	3.1 Human Health and Wellbeing	3.2 Minimise Local Community Disturbance	4.1 Water Quality	5.1 Soil, Geology and Land-use	6.1 Air Quality	6.2 Greenhouse Gas Emissions	6.3 Climate Resilience	7.1 Archaeology and Cultural Heritage	8.1 Landscape and Visual Amenity
-	-?	--	-?	0	0	-?	-?	-?	0	--
++	?	++	?	++	0	++	++	++	0	0

The assessment of Scenario 4 is considered to be largely the same as Scenario 3 except for the following variations resulting from the three-weekly collections as elaborated below.

In this scenario, all councils would be moved to three-weekly residual waste collections.

In terms of **material assets and waste management** multistream collections, which require residents to fully segregate their recyclate into different containers, are shown, based on evidence from WRAP, to have lower recycling yields and thus rates compared to comingled collections. This is due to difficulties users encounter in adhering to the precise sorting requirements of multistream collections, leading to lower levels of participation in the scheme.

However, the quality of recyclate is higher with multistream collections, compared with comingled collections. Higher quality recyclate means higher value materials which helps accelerate the movement towards a circular economy. Three-weekly residual waste collections are shown to reduce quantities of residual waste when compared to fortnightly and weekly collections. Therefore, there is a potential tension in this scenario. While the three-weekly residual waste collections might contribute to lowering residual waste, they could inadvertently compound the challenges faced by multistream recycling. The extended intervals between collections could result in increased accumulation of residual waste for residents following the multistream method, potentially straining their storage and disposal capabilities. This situation could potentially hinder recycling efforts and complicate overall waste management. This scenario is assessed as having a minor negative and moderate positive effect on **material assets and waste management**.

As mentioned previously, the Strategy does not involve new sites or potential modifications or additional use of existing infrastructure/sites. However, alterations in collection routes and frequencies, such as the shift from subscription-based to free service for garden waste collections or the reduction of residual waste collections from weekly or fortnightly to every three weeks, could potentially influence vehicle emissions near protected

areas (**biodiversity, flora, and fauna**) and sensitive receptors such as schools and residential areas (**population and human health**). Given the absence of specific information about route changes and their proximity to designated sites and sensitive receptors, as per Scenario 3 the predicted effects remain uncertain for **biodiversity, flora and fauna** and **population and human health (objective 3.2).**

Three weekly residual waste collections are shown to reduce tonnages of residual waste when compared to weekly and fortnightly collections. WRATE modelling shows that the diversion of waste from 'residual' to 'recycling' is estimated to have a positive impact on human health through a reduction of the negative toxicity effects from landfilling/incinerating waste. Since all councils in the county would potentially move to three-weekly collections under this scenario, it is assessed as having a moderate positive effect on **population and human health (objective 3.1).**

There is a commonly assumed, but not evidence-led, risk of public and political perceptions of increased odour and vermin, such as rodents and seagulls if a three-weekly collection is employed for residual waste which would mean effectively a longer storage period for waste, potential overflow as currently recorded in fortnightly collections[9] and is assessed as having a moderate negative effect with a risk of major/significant effect on **population and human health objective 3.1** and on local **landscape and visual amenity** if not supported by an appropriate collection methodology and if appropriate mitigation measures are not implemented. Transitioning to three-weekly waste collection could lead to increased litter and overflowing bins. With longer storage times, bins may fill up quickly, causing residents to resort to improper waste disposal methods. Overflowing bins and scattered waste can mar the area's appearance and attract pests as well as causing odour issues. To mitigate this, clear communication about waste management, larger bins, and community engagement are essential for maintaining visual amenity and cleanliness.

With three weekly residual waste collections leading to reduction in tonnages of residual waste when compared to weekly and fortnightly collections, the diversion of waste from 'residual' to 'recycling' would be greater than for fortnightly and weekly collections. As a result of the increased waste diversion, the anticipated positive impact is expected to be more significant. Specifically, it is predicted to have a moderate positive effect on **water** quality by reducing the eutrophication effects linked to the practices of landfilling and incinerating waste.

Three weekly residual waste collections are shown to further reduce tonnages of residual waste when compared to weekly and fortnightly collections. The associated increased recycling across the county would mean a replacement of greater quantities of virgin materials, leading to reduced pollutant gas emissions from extraction and manufacturing processes. This is assessed as having a moderate positive effect on minimising pollutant gas emissions (**air and climate objective 6.1**).

5.3.5 Scenario 5

Scenario 5 assumes all district, city and borough councils moving to the following collection and treatment regimes shown in Table 5.12 with assessment scores in Table 5.13 with associated supporting text provided below.

Scenario 5 proposes the following:

Dry Recycling: Moving to a multistream collection system for dry recycling. All councils would adopt a weekly collection schedule, and the collected recyclables would be taken directly to a reprocessor. Whilst multistream is adopted in Scenarios 3 and 4, Scenario 5 introduces a weekly collection which differs from Scenarios 1-4. As previously noted, it has been assumed that capacity at existing reprocessing facilities will be utilised. This assumption has been based on a thorough analysis of capacity at a range of appropriate facilities within a practical geographical range.

Food Waste: A separate collection system for food waste. All councils would implement a weekly collection schedule for food waste, which would then undergo Wet AD treatment. This would be the same as Scenarios 1-4.

Garden Waste: The proposed change introduces separate collections and composting methods. Councils would transition to fortnightly separate garden waste collections, processed through OAW Composting. This would be the same as Scenarios 1-4.

[9] Essex County Council and Savanta (2023): Resident attitudes towards waste and recycling.

Residual Waste: The proposed change for residual waste involves adopting EFW treatment alongside a modified fortnightly collection schedule. Residual waste would be directed to an EFW facility for combustion and electricity generation. This would be the same as Scenarios 1 and 3.

Table 5.12: Scenario 5 Collection and Treatment

Collection		Treatment	
Dry Recycling	Multistream, weekly	Dry Recycling	Direct to Reprocessor
Food Waste	Separate, weekly	Food Waste	Wet AD
Garden Waste	Separate, fortnightly (no subscription)	Garden Waste	Open Air Windrow (OAW) Composting
Residual Waste	Fortnightly	Residual Waste	EFW – Moving Grate

Table 5.13: Scenario 5 Assessment Scoring

1.1 Material Assets and Waste Management	2.1 Biodiversity, Flora and Fauna	3.1 Human Health and Wellbeing	3.2 Minimise Local Community Disturbance	4.1 Water Quality	5.1 Soil, Geology and Land-use	6.1 Air Quality	6.2 Greenhouse Gas Emissions	6.3 Climate Resilience	7.1 Archaeology and Cultural Heritage	8.1 Landscape and Visual Amenity
-	--?	0	--?	0	0	--	-	-	0	0
++	0	+	?	+	0	+	++	++	0	0

Multistream collections are shown to have lower recycling yields and thus lower recycling rates compared to comingled collections due to the relative difficulty of taking part in the scheme and the limited space available for the multiple material streams. However, with weekly multi-stream collections this effect is somewhat mitigated as weekly collections provide users with more space for recycling materials (on an average weekly basis), also recyclables may be less likely to accumulate and become mixed with other waste streams, which helps to maintain quality and value. This regular engagement can lead to a more consistent and accurate practice of sorting materials correctly. This scenario is assessed as having a minor negative effect on **material assets and waste management**.

Fortnightly residual waste collections are shown to reduce tonnages of residual waste when compared to weekly collections. There is an assumed change in the Strategy for residual waste treatment; that it would go from a mix of landfill, MBT and EfW, to just EfW. While specific EfW sites are not proposed, this change does signal a positive move up the waste hierarchy, i.e. reducing waste to landfill and sending it for energy recovery instead. The quality of recyclate is higher with multistream collections, compared with comingled collections. Higher quality recyclate means higher value materials which would be a movement towards a circular economy. Moving from mixed food and garden waste to separate food collections is also shown to increase capture of food waste and therefore resulting in a higher recycling rate. Therefore, a moderate positive effect is considered on **material assets and waste management**.

Changes to collection routes and frequencies such as increased garden waste collections when changed from a subscription-based to a free service or decreased residual waste collections from weekly to fortnightly may have both positive and negative impacts on vehicle emissions levels near protected areas (**biodiversity, flora and fauna**). Due to the potential for 11/12 councils moving to weekly collections of dry recycling this is considered to be a moderate negative uncertain effect on **biodiversity, flora and fauna** as the volume of vehicles and the proximity to sensitive receptors is unknown. Fortnightly residual waste collections are shown to reduce tonnages of residual waste when compared to weekly collections. WRATE modelling shows that the diversion of waste from 'residual' to 'recycling' is estimated to have a positive impact on human health through

a reduction of the negative toxicity effects from landfilling/incinerating waste. Therefore, a minor positive effect is anticipated on **population and human health objective 3.1.**

For the assumed change for residual waste treatment to only EfW, while specific EfW sites are not proposed, it is unlikely that this change would result in a net change to disturbance levels on **population and human health objective 3.2.**

Changes to collection routes and frequencies may have both positive and negative impacts on levels of disturbance. Weekly dry recycling collections are likely to cause increased disturbance. However, volumes of vehicles and routes in relation to sensitive receptors are not known. Therefore, this is assessed as a moderate negative uncertain effect on **population and human health objective 3.2**. While specific EfW sites are not proposed, it is unlikely that the assumed change to treatment method would result in a net change to **soil, geology and land-use** or **water** quality.

Fortnightly residual waste collections are shown to reduce tonnages of residual waste when compared to weekly collections. WRATE modelling shows that the diversion of waste from 'residual' to 'recycling' is anticipated to have a minor positive effect on **human health** through a reduction of the eutrophication effects from landfilling/incinerating waste (**water**).

For Scenario 5 more collection vehicles are predicted compared with the baseline and Scenarios 1-4, resulting in higher transport-related emissions. Again, with the assumed change to residual waste treatment, while landfill can still release emissions to air, they are usually capped and the landfill gas can be captured and used for combustion. The gases released from EfW are different (i.e. more NOx, SOx, metals...), so sending more waste to EfW would reduce emissions associated with landfill, but increase emissions associated with EfW. A moderate negative effect is therefore anticipated for **air and climate objective 6.1.**

Fortnightly residual waste collections are shown to reduce tonnages of residual waste when compared to weekly collections. These changes mean increased recycling, which tends to mean a replacement of greater quantities of virgin materials, leading to reduced pollutant gas emissions from extraction and manufacturing processes. Therefore, a minor positive effect is expected for **air and climate objective 6.1.**

For minimising greenhouse gas emissions and adapting to climate change and improving resilience, (**air and climate objectives 6.1 and 6.2**), an increased number of collection vehicles in comparison to the baseline and Scenarios 1-4 has a direct correlation with heightened transport-related emissions. This adjustment is coupled with an envisioned shift in the residual waste treatment approach to solely EfW. EfW releases GHG emissions from materials that would have been "locked up" in landfill (biogenic versus non-biogenic carbon). Since the strategy aims to reduce material going for disposal, consequently, a minor negative score is foreseen for both **air and climate objectives 6.2 and 6.3**.

The associated reduction in residual waste generation when considering the impact of fortnightly residual waste collections as opposed to weekly collections, leads to an increase in recycling rates, reducing the need for virgin materials and consequent decrease in greenhouse gas emissions linked to the extraction and manufacturing processes. In addition, there would be benefits of minimising carbon emissions from using wet AD compared with in-vessel composting. As a result, a moderate positive effect is projected for both **air and climate objectives 6.2 and 6.3**.

This is not a spatial Strategy and no new infrastructure or facilities are proposed as part of this Strategy, therefore, effects on **archaeology and cultural heritage** and **landscape and visual amenity** are not anticipated at this stage.

5.3.6 Scenario 6

Scenario 6 assumes all district, city and borough councils moving to the following collection and treatment regimes shown in Table 5.14 with assessment scores in Table 5.15 with associated supporting text provided below.

Table 5.14: Scenario 6 Collection and Treatment

Collection		Treatment	
Dry Recycling	Multistream, weekly	Dry Recycling	Direct to Reprocessor
Food Waste	Separate, weekly	Food Waste	Wet AD
Garden Waste	Separate, fortnightly (no subscription)	Garden Waste	Open Air Windrow (OAW) Composting
Residual Waste	Three-weekly	Residual Waste	EFW - Moving Grate

Table 5.15: Scenario 6 Assessment Scoring

1.1 Material Assets and Waste Management	2.1 Biodiversity, Flora and Fauna	3.1 Human Health and Wellbeing	3.2 Minimise Local Community Disturbance	4.1 Water Quality	5.1 Soil, Geology and Land-use	6.1 Air Quality	6.2 Greenhouse Gas Emissions	6.3 Climate Resilience	7.1 Archaeology and Cultural Heritage	8.1 Landscape and Visual Amenity
-	--?	--	--?	0	0	--	-	-	0	--
++	0	++	?	++	0	++	++	++	0	0

The assessment of Scenario 6 is considered to be comparable to Scenario 5 except for the following variations resulting from the three-weekly collections as elaborated below.

In this scenario, all councils would be moved to three-weekly residual waste collections.

In terms of **material assets and waste management,** multistream collections, which require residents to fully segregate their recyclate into different containers, based on evidence compiled by WRAP, are shown to have lower recycling yields and thus rates compared to comingled collections. This is due to difficulties users encounter in adhering to the precise sorting requirements of multistream collections, potentially leading to contamination and reduced recycling efficiency.

However, the quality of recyclate is higher with multistream collections, compared with comingled collections. Higher quality recyclate means higher value materials which equals movement towards circular economy. Three weekly residual waste collections are shown to reduce tonnages of residual waste when compared to fortnightly and weekly collections. Therefore, there is a potential tension in this scenario. While the three-weekly residual waste collections might contribute to lowering residual waste, they could inadvertently compound the challenges faced by multistream recycling. The extended intervals between collections could result in increased accumulation of residual waste for residents following the multistream method, potentially straining their storage and disposal capabilities. This situation could potentially hinder recycling efforts and complicate overall waste management. This scenario is assessed as having a minor negative and moderate positive effect on **material assets and waste management**.

As mentioned previously, the Strategy does not involve new sites or potential modifications or additional use of existing infrastructure/sites. However, alterations in collection routes and frequencies, such as weekly dry recycling collections, the shift from subscription-based to free service for garden waste collections or the reduction of residual waste collections from weekly or fortnightly to every three weeks, could potentially

influence vehicle emissions near protected areas (**biodiversity, flora, and fauna**) and sensitive receptors such as schools and residential areas (**population and human health**). Given the absence of specific information about route changes and their proximity to designated sites and sensitive receptors, as per Scenario 5 the predicted effects remain uncertain for **biodiversity, flora and fauna** and **population and human health (objective 3.2).**

Three weekly residual waste collections are shown to reduce tonnages of residual waste when compared to weekly and fortnightly collections. WRATE modelling shows that the diversion of waste from 'residual' to 'recycling' is estimated to have a positive impact on human health through a reduction of the negative toxicity effects from landfilling/incinerating waste. Since all councils in the county would potentially move to three-weekly collections under this scenario, it is assessed as having a moderate positive effect on **population and human health (objective 3.1).**

There is a commonly assumed, but not evidence-led, risk of public and political perceptions of increased odour and vermin, such as rodents and seagulls if a three-weekly collection is employed for residual waste which would mean effectively a longer storage period for waste, potential overflow as currently recorded in fortnightly collections[10] and is assessed as having a moderate negative effect with a risk of major/significant effect on **population and human health objective 3.1** and on local **landscape and visual amenity** if not supported by an appropriate collection methodology and if appropriate mitigation measures are not implemented. Transitioning to three-weekly waste collection could lead to increased litter and overflowing bins. With longer storage times, bins may fill up quickly, causing residents to resort to improper waste disposal methods. Overflowing bins and scattered waste can mar the area's appearance and attract pests as well as causing odour issues. To mitigate this, clear communication about waste management, larger bins, and community engagement are essential for maintaining visual amenity and cleanliness.

With three weekly residual waste collections leading to reduction in tonnages of residual waste when compared to weekly and fortnightly collections, the diversion of waste from 'residual' to 'recycling' would be greater than for fortnightly and weekly collections. As a result of the increased waste diversion, the anticipated positive impact is expected to be more significant. Specifically, it is predicted to have a moderate positive effect on **water** quality by reducing the eutrophication effects linked to the practices of landfilling and incinerating waste.

For Scenarios 5 and 6 more collection vehicles are predicted compared with the baseline and Scenarios 1-4, resulting in higher transport-related emissions. Three weekly residual waste collections are shown to further reduce tonnages of residual waste when compared to weekly and fortnightly collections. The associated increased recycling across the county, would mean a replacement of greater quantities of virgin materials, leading to reduced pollutant gas emissions from extraction and manufacturing processes. This is assessed as having a moderate positive effect on minimising pollutant gas emissions (**air and climate objective 6.1**).

5.3.7 Assumed use of EFW

This Strategy is distinct from a spatial plan, and it does not propose new infrastructure or facilities as part of its implementation. As a result, it is not anticipated to have likely significant effects on some SEA topics.

However, there is an assumption envisioned in the approach to residual waste treatment. This means a transition from a mix of landfill, MBT, and EfW to an exclusive reliance on EfW. While specific EfW sites are not currently outlined, this change assumes the removal, abandonment or phasing out of landfill and MBT sites. This potential change might have positive impacts across SEA topics and associated objectives including archaeology, cultural heritage, and landscape and visual. Nonetheless, the introduction of EfW facilities could also introduce negative effects across several SEA topics. The effects of this transition remain uncertain until further details emerge regarding the locations of new or existing sites designated for infrastructure. As previously noted, it has been assumed for the purposes of this SEA that capacity at existing reprocessing facilities will be utilised.

It is important to note that potential land use changes arising from future actions, such as implementing the outcomes of procurement exercises and pinpointing site-specific EfW locations, will necessitate individual project evaluations under the relevant statutory frameworks, including EIA. This evaluation process will ensure the identification of any potential significant environmental effects and the consideration of opportunities to prevent, minimise, or offset these effects. Moreover, a comprehensive public consultation will be required to gather input and insights from stakeholders. As such, the potential impacts and necessary assessments for

[10] Essex County Council and Savanta (2023): Resident attitudes towards waste and recycling.

various aspects of this Strategy will be examined in detail at appropriate stages in accordance with UK legislation.

5.4 SENSITIVITIES

Through the scenarios appraisal carried out as part of the systems modelling, it was determined that when applying the selected weighted evaluation criteria Scenario 2 was identified as the BPES which was carried forward for additional sensitivity modelling. Following this next phase of modelling, the sensitivities appraisal then examined the performance of the sensitivities relative to the BPES. For ease of reading, a reminder of Scenario 2 is shown in Table 5.16.

Table 5.16: Scenario 2 Collection and Treatment

Collection		**Treatment**	
Dry Recycling	Comingled, fortnightly	Dry Recycling	MRF
Food Waste	Separate, weekly	Food Waste	Wet AD
Garden Waste	Separate, fortnightly (no subscription)	Garden Waste	Open Air Windrow (OAW) Composting
Residual Waste	Three-weekly	Residual Waste	EFW - Moving Grate

In agreement with the EWP, four sensitivities were modelled for Scenario 2 in order to assess the effect of introducing the following in combination with Scenario 2:

- Sensitivity 1: Addition of front-end recycling to the EfW facility for household residual waste.
- Sensitivity 2: Addition of combined heat and power (CHP) at the EfW facility.
- Sensitivity 3: Addition of carbon capture utilisation and storage technology (CCUS) at EfW facility.
- Sensitivity 4: Introduction of householder charges for garden waste collections.

Sensitivity 1 assumes the development of a materials recovery facility at the ‘front end’ of the EfW facility; this would allow the collected residual waste to be further sorted, with some recyclable streams able to be separated out (Plastic bottles, PTTs, glass, aluminium and steel (ferrous)). Although the modelling shows that, due to the proportion of tonnes recycled increasing and the proportion of tonnes landfilled decreasing (leading to higher recycled tonnage and thus material income), material income increases, this is outweighed by the increased gate fees due to the additional sorting cost.

Sensitivity 2 assumes that the EfW would incorporate combined heat and power (CHP) technology. In this approach, CHP is a highly efficient process that captures and utilises the heat that is a by-product of the electricity generation process. However, this approach is reliant on the heat generated during this process being supplied to an appropriately matched heat demand that would otherwise be met by a conventional boiler, which would allow heat requirements to be met that would otherwise require additional fuel to be burnt. The availability of such offtake requirements differs for each EfW site, and it was not possible in the modelling to quantify this without a detailed study into local infrastructure.

Sensitivity 3 explores the potential for carbon capture systems to be incorporated into the EfW process, further improving the carbon efficiency of this disposal method. This approach does not affect the waste arisings, but has a positive carbon impact. However, modelling suggests that costs would increase substantially due to the higher gate fees required to fund the installation and operation of this technology.

Sensitivity 4 explores the impact of the government permitting Waste Collection Authorities to continue making a charge to householders for the collection of garden waste. The modelling shows a reduction in the number of collection vehicles compared to Scenario 2 (where a universal free service is modelled), a slight reduction in recycling rates and a substantial overall cost saving due to the additional income received from a subscription scheme.

It is these four sensitivities modelled for Scenario 2, that are the subject of this next stage of assessment. Further details regarding each of the sensitivities are provided in the Waste Strategy for Essex Final Report[11].

Please be aware that this SEA assessment is conducted at a high level and is not specific to any particular site. To reiterate, the utilisation of EfW as the treatment process is assumed, and the exact locations of existing plants which could potentially be utilised or any potential need for new plants are unknown and pending the procurement exercise. The assessment within the following sections 5.4.1 to 5.4.4, assumes Scenario 2 is already in place as the baseline. Where possible, detailed modelling results have been used to inform the assessment.

[11] Ricardo (2023) Waste Strategy for Essex, Final Report.

5.4.1 Assessment of Sensitivity 1: Addition of front-end recycling to the EfW facility for household residual waste

Table 5.17 shows the assessment of the sensitivity versus each of the SEA objectives with supporting narrative provided below.

Table 5.17: Assessment scoring of Sensitivity 1: Addition of front-end recycling to the EfW facility for household residual waste

1.1 Material Assets and Waste Management	2.1 Biodiversity, Flora and Fauna	3.1 Human Health and Wellbeing	3.2 Minimise Local Community Disturbance	4.1 Water Quality	5.1 Soil, Geology and Land-use	6.1 Air Quality	6.2 Greenhouse Gas Emissions	6.3 Climate Resilience	7.1 Archaeology and Cultural Heritage	8.1 Landscape and Visual Amenity
--	0	0	0	0	0	0	0	0	0	0
+	+	+	+	+	+	+	+	+	0	0

The assessment of the effects of introducing Sensitivity 1 (Front-end recycling to the EfW facility for household residual waste) against the baseline of the highest scoring Scenario 2 is provided below, with signposting to the relevant objective.

Assuming Scenario 2 is in place already as the baseline, implementing front-end recycling directly reduces the residual waste entering the EfW facility, optimising resource use and recovery efforts, supporting the circular economy. Waste that is effectively recycled at the front end of the process reduces the need for disposal methods like EfW. This contributes to resource conservation by diverting materials away from the waste stream and back into productive use.

The addition of front-end recycling has the potential to result in a residual waste stream with a higher calorific value to maximise the opportunity for energy and heat generation from the processing of this material stream. Also, Sensitivity 1 had the strongest impact on recycling rate (out of the four sensitivities), with the additional capture of recyclable material from residual waste. By reducing waste sent to EfW through front-end recycling, there is potential for a minor positive effect on **material assets and waste management**.

However, there would be a high risk associated with the quality of the additional recyclate recovered. This is due to the possibility of contamination within the mixed waste stream, which might compromise the quality of the recyclable materials. When different types of waste are comingled, there is an increased likelihood of cross-contamination, resulting in reduced purity and value of the recovered recyclate. This could potentially lead to challenges in finding suitable markets for the recycled materials, increased sorting and processing costs, and a higher likelihood of rejected or downgraded recyclate.

Sensitivity 1 requires some additional infrastructure and there might be negative implications if the recycling process inadvertently diverts certain materials away from beneficial recovery processes.

This sensitivity is therefore assessed as having a moderate negative effect on **material assets and waste management**.

By reducing the reliance on EfW for residual waste compared to Scenario 2, there is potential to mitigate the associated pollutants and greenhouse gases associated with energy generation from waste and contribute to the protection and enhancement of nearby biodiversity and designated nature conservation sites. This is assessed as having a minor positive effect on **biodiversity, flora and fauna.**

However, it is important to note that this assessment assumes use of EfW technology. The overall impact on SEA objectives heavily depends on the specifics of the EfW facility's design, emissions control, and proximity to sensitive areas. While reducing waste to EfW can be beneficial, it is important to ensure that the design of the facility and emissions of the EfW facility itself are well-managed.

By reducing the amount of waste entering EfW, there is potential to decrease air emissions and pollutants that could impact local air quality. This reduction in emissions can have positive implications for the respiratory

health of nearby residents, contributing to improved wellbeing. However, as the percentage of material that could be realistically captured through front end sorting is relatively small, this is assessed as having a minor positive effect on **population and human health objective 3.1.**

There is also potential for less noise, odour, and traffic associated with waste transportation and facility operations. This reduction in disturbance aligns with the objective of minimising disruptions to nearby communities and is assessed as having a minor positive effect on **population and human health objective 3.2**.

While Sensitivity 1 and the proposed changes are not inherently water-focused, the reduction in waste entering EfW could indirectly contribute to improved water quality. Fewer emissions from EfW facilities could translate into fewer pollutants entering water bodies through air deposition. However, the overall impact on water quality depends on the specifics of EfW emissions control and the proximity of water bodies to the facility. The effect is therefore assessed to be minor positive on **water**.

Reducing the reliance on EfW and encouraging front-end recycling has potential to conserve land resources that would have been allocated to the EfW facilities, aligning with efficient land use practices. Whilst some land would be required for the front-end sorting process, this would extend the timeframe before additional EfW facilities would be required, due to effectively extending the current EfW capacity. While not directly related to soil, geomorphology, or geodiversity, the approach indirectly minimises the footprint associated with waste disposal and contributes to sustainable land use and is assessed as a minor positive effect on **soil, geology and land use**.

Decreasing the waste lowers the associated pollutants and particulates released into the air, contributing to improved local air quality and minimised environmental impact. While Sensitivity 1 and the proposed changes focus on residual waste reduction rather than direct greenhouse gas emissions, the reduction of waste entering the EfW process can potentially lead to reduced overall emissions associated with waste management. However, the impact on embodied carbon depends on the specifics of EfW emissions control, energy recovery, and the carbon footprint of the recycling process. Also, while Sensitivity 1 does not explicitly address climate change adaptation, the reduction in waste can potentially contribute to lower emissions associated with waste management, aligning with resilience-building efforts by minimising environmental impacts. The addition of front-end recycling has the potential to result in a residual waste stream with a higher calorific value to maximise the opportunity for energy and heat generation from the processing of these material streams. This sensitivity is assessed as having a minor positive effect on **air and climate objectives 6.1 and 6.2** and **6.3.**

By reducing waste, there is potential to indirectly minimise visual and air quality impacts that could affect the landscape as well as heritage assets, their settings and contribute to their preservation. However, this is considered to have a negligible effect on **archaeology and cultural heritage** and **landscape and visual amenity**.

5.4.2 Assessment of Sensitivity 2: Addition of combined heat and power (CHP) at the EfW facility.

Table 5.18 shows the assessment of the sensitivity versus each of the SEA objectives.

Table 5.18: Assessment scoring of Sensitivity 2: Addition of CHP at the EfW facility.

1.1 Material Assets and Waste Management	2.1 Biodiversity, Flora and Fauna	3.1 Human Health and Wellbeing	3.2 Minimise Local Community Disturbance	4.1 Water Quality	5.1 Soil, Geology and Land-use	6.1 Air Quality	6.2 Greenhouse Gas Emissions	6.3 Climate Resilience	7.1 Archaeology and Cultural Heritage	8.1 Landscape and Visual Amenity
---	0	0	0	0	0	0	0	0	0	0
+	0	+	+	+	+	+	++	+	0	0

The assessment of the effects of introducing Sensitivity 2 (addition of CHP at the EfW facility) against the baseline of the highest scoring Scenario 2 is provided below, with signposting to the relevant objective.

Assuming Scenario 2 is in place already as the baseline, the introduction of CHP technology at the EfW facility is anticipated to contribute positively to a circular economy, however significant infrastructure would be required. By generating both electricity and heat from waste, the facility maximises resource utilisation and aligns with the objective of minimising waste arisings. The efficient energy recovery process supports sustainable material asset management and promotes the principles of reuse, recovery, and recycling. This sensitivity is assessed as having a minor positive effect on **material assets and waste management**. However, since this sensitivity requires significant infrastructure, this is considered to be a major negative effect.

However, it must be noted that considering the substantial infrastructure required for CHP implementation, there exists potential for localised impacts on specific sites. While optimising energy generation and diminishing reliance on traditional sources could indirectly contribute to habitat preservation and ecosystem resilience, although in the context of this Strategy this is considered to be negligible, the site-specific nature of these impacts may vary significantly but are not a consideration of this Strategy. Thus, this Sensitivity is appraised as holding a neutral effect on **biodiversity, flora, and fauna**, but site-specific considerations would alter this assessment.

The incorporation of CHP technology aligns with protecting human health and wellbeing. By reducing emissions and pollutants associated with waste-to-energy processes, the technology can improve air quality and positively impact public health. The addition of CHP technology could lead to positive outcomes for local communities. With efficient energy generation on-site, there is potential to reduce waste transportation, traffic, and associated disturbances to local communities. This is assessed as having a minor positive effect on **population and human health objectives 3.1 and 3.2**.

The introduction of CHP technology may indirectly contribute to improved water quality. By optimising energy recovery from waste and reducing overall emissions, the technology can lead to lower atmospheric deposition of pollutants into water bodies. This is assessed as having a minor positive effect on **water**.

By maximising energy production from waste, the technology promotes efficient resource utilisation and contributes to sustainable land use. This aligns with minimising waste arisings and optimising energy recovery, leading to a minor positive effect on **soil, geology and land use.**

The introduction of CHP technology has positive implications for air quality objectives. By improving the efficiency of energy generation from waste, there is potential to reduce emissions of pollutant gases and particulates. This leads to enhanced air quality and aligns with the goal of minimising negative effects on the environment and public health. The consequent effect on **air and climate objective 6.1** is assessed as minor positive.

The incorporation of CHP technology is expected to have a moderate positive effect on reducing greenhouse gas emissions and embodied carbon (**air and climate objective 6.2)**. As shown in the modelling optimising energy recovery from waste, the reliance on fossil fuel-based energy sources decreases, leading to lower overall emissions. This aligns with climate change mitigation goals and contributes to the reduction of carbon footprint associated with waste management.

The addition of CHP technology may not have a direct impact on climate change adaptation efforts. However, by reducing greenhouse gas emissions and promoting energy efficiency, it indirectly aligns with resilience-building goals by contributing to climate change mitigation. for energy and heat generation from the processing of these material streams. A consequent minor positive effect is assessed on **air and climate objective 6.3.**

Without consideration of infrastructure and site locations, the addition of CHP technology is unlikely to have a direct impact on heritage assets or their settings (**archaeology and cultural heritage**) or on **landscape and visual amenity.** Alongside other SEA topics, considerations related to archaeology and cultural heritage, landscape and visual amenity will require reassessment during the procurement process, once information about the locations of new or existing sites intended for infrastructure are available.

5.4.3 Assessment of Sensitivity 3: Addition of carbon capture utilisation and storage (CCUS) technology at the EfW facility

Table 5.19 shows the assessment of the sensitivity versus each of the SEA objectives.

Table 5.19: Assessment scoring of Sensitivity 3: Addition of CCUS technology at the EfW facility.

1.1 Material Assets and Waste Management	2.1 Biodiversity, Flora and Fauna	3.1 Human Health and Wellbeing	3.2 Minimise Local Community Disturbance	4.1 Water Quality	5.1 Soil, Geology and Land-use	6.1 Air Quality	6.2 Greenhouse Gas Emissions	6.3 Climate Resilience	7.1 Archaeology and Cultural Heritage	8.1 Landscape and Visual Amenity
---	0	0	0	0	0	0	-	-	0	0
++/?	0	++	++	0	+	0	+++	+	0	0

The assessment of the effects of introducing Sensitivity 3 (addition of CCUS technology at the EfW facility) against the baseline of the highest scoring Scenario 2 is provided below, with signposting to the relevant objective.

The addition of CCUS technology aligns well with the material assets and waste management objective; however, significant infrastructure would be required. By capturing carbon emissions, the technology contributes positively to resource recovery and emission reduction, enhancing the circular economy approach. The reduction of carbon emissions supports a more sustainable use of material and natural assets, making it a significant step towards achieving this objective. However, the technology has not been proven at scale and the addition of CCUS technology might lead to increased energy consumption for carbon capture and compression, potentially offsetting some emissions reduction benefits. This additional energy demand could impact the circular economy efforts by increasing overall resource use and environmental impact. This is assessed as having moderate positive uncertain and major negative effects on **material assets and waste management**.

By reducing air pollutants and mitigating the environmental impact of waste-to-energy processes, CCUS technology indirectly contributes to habitat protection and ecosystem health by minimising the harmful effects of pollution on their habitats although in the context of this Strategy this is considered to be negligible and the site-specific nature of these effects may vary significantly, but are not a consideration of this Strategy. Thus, this sensitivity is appraised as having a neutral effect on **biodiversity, flora, and fauna**, but site-specific considerations may alter this assessment.

The modelling suggests that Sensitivity 3 scores highly on public acceptability on the assumption that there is broad public support for lower carbon technologies. The integration of CCUS technology is considered to benefit human health and wellbeing by reducing air pollutants associated with waste-to-energy processes. The capture of carbon emissions supports better air quality, which directly contributes to improved health outcomes and overall community well-being. The reduction in harmful emissions could positively influence the quality of life for local residents, making this a moderate positive effect on **population and human health objectives 3.1 and 3.2**.

While CCUS technology primarily addresses air emissions, it could have a positive contribution to emission reduction and could indirectly benefit water quality by decreasing the atmospheric deposition of CO2. However, this is considered to have a negligible effect on **water.**

While not directly related to land use practices or protection of soil and geomorphology, the technology's impact on emissions reduction aligns with the objective of efficient land utilisation. By reducing air pollutants, it contributes to preserving local environmental quality, consequently this is assessed as a minor positive effect on **soil, geology and land-use.**

CCUS technology would capture CO2 but is considered to be a neutral effect on **air and climate objective 6.1** as it is not known to capture other pollutants any more than the existing EfW plant.

The incorporation of CCUS technology has a major positive effect on reducing greenhouse gas emissions (**air and climate objective 6.2**). As shown in the modelling of the sensitivities, Sensitivity 3 results in significant GHG emissions savings through CCUS technology. However, the potential for increased energy consumption could result in a minor negative effect on the overall carbon footprint of the waste management process.

The addition of CCUS technology supports climate change mitigation efforts by reducing carbon emissions and is assessed as a minor positive effect on **air and climate objective 6.3**. While not directly linked to climate change adaptation, the technology's role in emissions reduction contributes to overall climate resilience. However, the potential for increased energy consumption and operational complexities might have a minor negative effect on the overall climate resilience improvements.

Without consideration of infrastructure and site locations, the addition of CCUS technology is unlikely to have a direct impact on heritage assets or their settings (**archaeology and cultural heritage**) nor on **landscape and visual amenity.** Alongside other SEA topics, considerations related to archaeology and cultural heritage, landscape and visual amenity will require reassessment during the procurement process once information is available about the locations of new or existing sites intended for infrastructure.

5.4.4 Assessment of Sensitivity 4: Introduction of householder charges for garden waste collections

Table 5.20 shows the assessment of the sensitivity versus each of the SEA objectives.

Table 5.20: Assessment scoring of Sensitivity 4: Introduction of householder charges for garden waste collections.

1.1 Material Assets and Waste Management	2.1 Biodiversity, Flora and Fauna	3.1 Human Health and Wellbeing	3.2 Minimise Local Community Disturbance	4.1 Water Quality	5.1 Soil, Geology and Land-use	6.1 Air Quality	6.2 Greenhouse Gas Emissions	6.3 Climate Resilience	7.1 Archaeology and Cultural Heritage	8.1 Landscape and Visual Amenity
--	-	-	-	0	-	-	-	-	0	0
+	+?	0	+?	0	0	+?	0	0	0	0

The assessment of the effects of introducing Sensitivity 4 (Introduction of householder charges for garden waste collections) against the baseline of the highest scoring Scenario 2 is provided below, with signposting to the relevant objective.

According to the research undertaken by the EWP[12] 56% of residents with a garden were found to use the kerbside garden waste collection all of the time with 83% net use across the county.

It is considered that the introduction of charges for garden waste collections might discourage participation in proper waste management and hinder the circular economy by potentially increasing the use of residual waste services for garden waste, leading to potential negative effects on waste arisings, reuse, recovery, and recycling. This could lead to environmental degradation and additional waste management costs for local authorities as users may deposit waste into other waste streams. This is considered to be a moderate negative effect on **material assets and waste management**. Some additional infrastructure would also be required for this sensitivity such as distributing and managing collection bins or bags and mechanisms for tracking and verifying subscription status. This is potentially offset by the reduction in infrastructure as only a fifth or so of households may take part and therefore resulting in far fewer bins required.

The modelling of the sensitivities found that Sensitivity 4 results in a waste reduction effect due to the implementation of a subscription fee for charged garden waste. Also, it was found that fewer collection resources (vehicles and containers) would be required due to a lower uptake of collections. This is considered to be a minor positive effect on **material assets and waste management**. Reduced vehicular activity could also have some benefits on other objectives such as **air and climate** objective 3.1 and indirectly **biodiversity**

[12] Essex County Council and Savanta (2023): Resident attitudes towards waste and recycling.

and **population and human health** (objective 3.2) and is considered to be a minor positive effect. Given the absence of specific information about route changes and their proximity to designated sites and sensitive receptors, the predicted effects are uncertain.

The imposition of charges could increase improper disposal, negatively affecting both local ecosystems and air quality, particularly in designated sites of nature conservation interest. The reduced collection of organic materials might also hinder habitat enhancement efforts through composting resulting in a minor negative effect on **biodiversity, flora and fauna**.

From a human health and wellbeing perspective, introducing the charges might lead to improper disposal, contaminating other waste streams, impacting air quality and subsequently, community health and is considered to be a minor negative effect on **population and human health objective 3.1**. Charging for garden waste collections could lead to negative community reactions due to concerns about improper disposal practices and potential increase in waste-related issues. This could potentially increase disturbances and conflicts within local communities and is considered to be a minor negative effect on **population and human health objective 3.2**.

Furthermore, the charges might indirectly lead to more instances of improper disposal that could potentially contaminate water bodies, albeit this is assessed as being a negligible effect on **water**.

In terms of land use and quality, charges for garden waste collections might contribute to increased improper disposal. Increased dumping or burning could have a minor negative effect on soil health and local geomorphology (**soil, geology and land use**). Similarly, charges might discourage responsible waste management practices, contributing to higher greenhouse gas and pollutant emissions and negating efforts to minimise emissions and embodied carbon. Additionally, these charges could compromise climate resilience by fostering improper waste disposal practices for example, discouraging proper composting, leading to increased landfilling, contribute to higher greenhouse gas emissions. This sensitivity is assessed as having minor negative effects on **air and climate objectives 6.1, 6.2 and 6.3**).

Although the historic environment may not be directly impacted by the charges, increased improper disposal could potentially lead to a negative effects on the visual amenity of designated and non-designated heritage assets and their settings (**archaeology and cultural heritage**). Likewise, landscape aesthetics and visual amenity might suffer due to improper disposal practices associated with the charges especially if dumping or burning of waste becomes more common (**landscape and visual amenity**). However, at this stage this is considered to be a negligible effect across both objectives.

5.5 ASSESSMENT OF CUMULATIVE EFFECTS

Table 5.21 presents the cumulative assessment of the strategic effects of the draft Strategy Scenario 2 with each sensitivity.

Table 5.21: Cumulative assessment of Scenario 2 with each of the four sensitivities

SEA Objective	Sensitivity 1-4	Cumulative score (with Scenario 2)	Commentary
1.1 Material Assets and Waste Management: To support a circular economy, minimise waste arisings, promote reuse, recovery and recycling, minimising the impact of waste on the environment and communities and contribute to the sustainable use of natural and material assets.	1	--/++	Three weekly residual waste collections of Scenario 2 are shown to reduce tonnages of residual waste when compared to more frequent collections. However, the quality of recyclate is lower with comingled collections, which means lower value materials and consequent movement away from a circular economy. While specific EfW sites are not proposed, this change does signal a positive move up the waste hierarchy. For Sensitivity 1, implementing front-end recycling directly reduces the residual waste entering the EfW facility, optimising resource use and recovery efforts and supporting the circular economy. For Sensitivity 1 the addition of front-end recycling has the potential to result in a residual waste stream with a higher calorific value to maximise the opportunity for energy and heat generation from the processing of these material streams. Also, Sensitivity 1 had the strongest impact on recycling rate, with the additional capture of recyclable material from residual waste. However, there would be a high risk associated with the quality of the additional recyclate recovered. Therefore, cumulative moderate positive and moderate negative effects have been assessed. In Sensitivity 2, by generating both electricity and heat from waste, the CHP facility maximises resource utilisation and minimises waste. However, CHP requires significant additional infrastructure. Therefore, the cumulative major negative and moderate positive effects have been assessed. The addition of CCUS technology in Sensitivity 3 would also require significant additional infrastructure. By capturing carbon emissions, the technology contributes positively to resource recovery and emission reduction, enhancing the circular economy approach, however, the technology is unproven at scale. This is assessed as having cumulative major negative and major positive uncertain effects. Sensitivity 4 results in a waste reduction effect due to the implementation of a subscription fee for charged garden waste. The modelling found that Sensitivity 4 requires fewer collection resources due to the introduction of a garden waste subscription resulting in lower uptake. It is considered that the introduction of charges for garden waste collections might also discourage participation in proper waste management and hinder the circular economy. Scenario 2 is assessed as having moderate negative and moderate positive cumulative effects in combination with Scenario 2.
	2	---/++	
	3	---/+++?	
	4	--/++	
2.1 Biodiversity, flora and fauna: To protect and enhance biodiversity including designated sites of nature conservation interest and protected habitats and species, enhance ecosystem resilience and habitat connectivity and deliver a net biodiversity gain.	1	-?/+?	There is potential for disturbance or improvement due to changing collections and frequencies. The specific volumes of waste collection vehicles and their routes in relation to designated protected areas are unknown and therefore effects are uncertain. For Sensitivities 2 and 3 the cumulative effects are assessed as minor negative uncertain and uncertain positive. With Sensitivity 1, there is potential to mitigate pollutants and greenhouse gases associated with energy generation from waste and contribute a minor positive effect on biodiversity. With Sensitivity 4 introducing charges could increase improper disposal, negatively affecting both local ecosystems and air quality. The reduced collection of organic materials might also hinder habitat enhancement efforts through composting. However, decreasing vehicles associated with garden waste collections could potentially benefit biodiversity, flora and fauna. The cumulative effects are assessed as minor negative uncertain and minor positive uncertain.
	2	-?/?	
	3	-?/?	
	4	-?/+?	

3.1 Population and Human health: To protect and enhance human health and wellbeing.	1	--/++	Cumulatively moderate negative effects are expected across all sensitivities due to the three-weekly collections of residual waste and associated inconvenience to users, and potential for increased litter, overflowing bins and storage issues. Three weekly residual waste collections are shown to reduce tonnages of residual waste when compared to less frequent collections. WRATE modelling shows that the diversion of waste from 'residual' to 'recycling' is estimated to have a positive impact on human health through a reduction of the negative toxicity effects from landfilling/incinerating waste. Therefore, a cumulative moderate positive effect is also assessed across all sensitivities.
	2	--/++	
	3	--/++	
	4	--/++	
3.2 Population and Human Health: To minimise disturbance to local communities.	1	-?/+?	Changes to collection routes and frequencies associated with the Scenario 2 may have both positive and negative impacts on levels of disturbance but this depends on individual locations, timing of collections and volume of vehicles, which are all uncertain. Public acceptability regarding collections was also modelled and considered to be a negative effect across all sensitivities due to the inconvenience of a three-weekly collection of residual waste. In combination, Sensitivity 1, with it's potential for less noise, odour, and traffic, the cumulative effects are assessed as minor negative uncertain and minor positive. The incorporation of CHP technology in Sensitivity 2 can improve air quality and positively impact public health. With efficient energy generation on-site, there is potential to reduce waste transportation, traffic, and associated disturbances disturbance to local communities. This is assessed as having minor negative uncertain and minor positive uncertain cumulative effects. As the integration of CCUS technology in Sensitivity 3 is considered to significantly benefit human health and wellbeing by reducing air pollutants associated with waste-to-energy processes, cumulatively it is assessed as having minor negative uncertain and moderate positive uncertain effects. Charging for garden waste collections could lead to both increasing disturbance (such as negative community reactions and improper disposal) and decreasing disturbance (fewer vehicles). Cumulatively, Scenario 2 with Sensitivity 4 are assessed as having minor negative uncertain and minor positive uncertain effects.
	2	-?/+?	
	3	-?/++?	
	4	-?/+?	
4.1 Water: To protect and enhance water quality and help achieve the objectives of the Water Framework Directive.	1	++	An overall cumulative moderate positive effect is anticipated on water quality for all sensitivities primarily as the increased waste diversion associated with Scenario 2 is predicted to result in reducing the eutrophication effects linked to the practices of landfilling and incinerating waste and in the case of Sensitivities 1 and 2 this also includes lower atmospheric deposition of pollutants.
	2	++	
	3	++	
	4	++	
5.1 Soil, Geology and Land-Use: To make appropriate and efficient use of land and protect and enhance soil, local geomorphology and geodiversity and contribute to the sustainable use of land.	1	+	For Sensitivities 1-3 with Scenario 2 the cumulative effects are assessed as minor positive due to indirectly contributing to efficient resource utilisation and sustainable land use. However, for Sensitivity 4 charges for garden waste collections could contribute to increased improper disposal and consequently a cumulative minor negative effect is assessed on soil, geology and land use.
	2	+	
	3	+	
	4	-	

6.1 Air and Climate: To minimise emissions of pollutant gases and particulates and enhance air quality.	**1**	**-?/++**	In Scenario 2 there would be more collection vehicles compared with the baseline, resulting in higher transport-related emissions. Sending more waste to EfW would reduce emissions associated with landfill, but increase emissions associated with EfW. EfW releases GHG emissions from materials that would have been "locked up" in landfill. Comingled recycling is shown to increase recycling yields and thus rates compared to multistream recycling. Three weekly residual waste collections further reduce tonnages of residual waste when compared to more frequent collections. The associated increased recycling, would mean a replacement of greater quantities of virgin materials, leading to reduced pollutant gas emissions from extraction and manufacturing processes. All sensitivities are assessed as having minor negative uncertain effects primarily reflecting the unknown volume of associated vehicular activity and relative volumes of gases from the treatment processes. For Sensitivity 1, reducing the waste lowers the associated pollutants and particulates released into the air, contributing to improved local air quality and cumulatively is assessed as a moderate positive effect. The introduction of CHP technology in Sensitivity 2 would improve the efficiency of energy generation from waste, there is potential to reduce emissions of pollutant gases and particulates. This leads to enhanced air quality. Cumulatively this is assessed as a moderate positive effect. CCUS technology in Sensitivity 3 is unlikely to capture pollutants (aside of CO2), over and above the existing EfW facility. Cumulatively there would be improved air quality and this sensitivity is assessed as having a moderate positive effect. Additional positive effects are foreseen with respect to air quality on Sensitivity 4 with regard to fewer vehicles. Cumulatively with Scenario 2, this is considered to have a moderate positive uncertain effect acknowledging the uncertainty around routes and volumes of vehicles.
	2	**-?/++**	
	3	**-?/++**	
	4	**-?/++?**	
6.2 Air and Climate: To minimise greenhouse gas emissions and embodied carbon associated with waste management and landfill.	**1**	**-?/++**	In Scenario 2 there would be more collection vehicles compared with the baseline, resulting in higher transport-related emissions. Sending more waste to EfW would reduce emissions associated with landfill, but increase emissions associated with EfW. EfW releases GHG emissions from materials that would have been "locked up" in landfill. Comingled recycling is shown to increase recycling yields and thus rates compared to multistream recycling. Three weekly residual waste collections further reduce tonnages of residual waste when compared to more frequent collections. The associated increased recycling, would mean a replacement of greater quantities of virgin materials, leading to reduced pollutant gas emissions from extraction and manufacturing processes. All sensitivities are assessed as having minor negative uncertain effects when combined with Scenario 2 primarily reflecting the unknown volume of associated vehicular activity and relative volumes of gases from the treatment processes. For Sensitivity 1, the reduction of waste entering EfW facilities can potentially lead to reduced overall emissions associated with waste management and cumulatively a moderate positive effect is assessed. As shown in the modelling, optimising energy recovery from waste in Sensitivity 2 by incorporating CHP technology means a decreased reliance on fossil fuel-based energy sources, leading to lower overall emissions. Cumulatively, this is assessed as a major positive effect. The incorporation of CCUS technology in Sensitivity 3 results in significant GHG emissions and has a cumulative major positive effect on reducing greenhouse gas emissions. No additional positive effects are foreseen with respect to GHG emissions and embodied carbon on Sensitivity 4. Cumulatively with Scenario 2, this is considered to have a moderate positive effect.
	2	**-?/+++**	
	3	**-?/+++**	
	4	**-?/++**	

6.3. Air and Climate: To adapt waste management practices to climate change and improve resilience to the threats of a changing climate.	**1**	**-?/++**	In Scenario 2 there would be more collection vehicles compared with the baseline, resulting in higher transport-related emissions. Sending more waste to EfW would reduce emissions associated with landfill, but increase emissions associated with EfW. EfW releases GHG emissions from materials that would have been "locked up" in landfill. Comingled recycling is shown to increase recycling yields and thus rates compared to multistream recycling. Three weekly residual waste collections further reduce tonnages of residual waste when compared to more frequent collections. The associated increased recycling, would mean a replacement of greater quantities of virgin materials, leading to reduced pollutant gas emissions from extraction and manufacturing processes. Sensitivities 1-3 are assessed as having minor negative uncertain effects when combined with Scenario 2 primarily reflecting the unknown volume of associated vehicular activity and relative volumes of gases from the treatment processes. The modelling showed that the combined tonnage of residual waste and food waste in Sensitivities 1, 2 and 3 maximises the opportunity for energy and heat generation from the processing of these material streams. The waste reduction associated with Sensitivity 4 reduces the potential of available residual waste and food waste and the consequent opportunity for energy and heat generation from the processing of these material streams. A cumulative moderate negative uncertain score is assessed for this sensitivity. All sensitivities are assessed as having moderate positive scores with respect to climate resilience when combined with Scenario 2.
	2	**-?/++**	
	3	**-?/++**	
	4	**--?/++**	
7.1 Archaeology and Cultural Heritage: To conserve and enhance the historic environment including designated and non-designated heritage assets and their settings.	**1**	**0**	In the case of Sensitivities 1-4, without consideration of infrastructure and site locations, the addition of CHP technology is unlikely to have a discernible effect on heritage assets or their settings and therefore is assessed to have a cumulative neutral effect.
	2	**0**	
	3	**0**	
	4	**0**	
8.1 Landscape and Visual Amenity: To protect and enhance landscape, townscape character and visual amenity.	**1**	**--**	In the case of Sensitivities 1-3, without consideration of infrastructure and site locations, the addition of CHP technology is unlikely to have a direct impact, however, in combination with Scenario 2 and transitioning to a three-weekly waste collection frequency could potentially lead to increased litter and overflowing bins, affecting the streetscape and visual amenity of neighbourhoods. This is assessed as a moderate negative effect across all sensitivities.
	2	**--**	
	3	**--**	
	4	**--**	

5.6 EFFECTS OF THE WASTE STRATEGY IN COMBINATION WITH OTHER POLICIES, PLANS AND STRATEGIES

As well as the cumulative effects that arise from the components of each scenario, the SEA Regulations require a cumulative assessment of the strategic effects of the draft Waste Strategy resulting from interaction with the effects of other plans and programmes.

There are several plans and developments ongoing in Essex and the UK which could be considered to fall under some of the following categories:

- Large existing and emerging Local Plan allocations e.g. 500 or more dwellings;
- Projects on the Planning Inspectorate's Programme of Projects;
- Hybrid Bills;
- Transport and Works Act Orders for large-scale transport infrastructure;
- Minerals and waste applications, including for landfill and energy from waste;
- Large Town and Country Planning applications where an EIA is required.

For example, a number of National Significant Infrastructure Projects (NSIP) are listed on the Essex County Council website including waste related projects such as the Rivenhall Integrated Waste Management Facility and Energy Centre. However, as Strategy is not spatial, it is not possible to meaningfully assess interactions with the construction and operation of other facilities on a spatial or temporal scale.

The draft Strategy operates within the broader context of various plans and programmes, as outlined in Appendix C. Assessing the in-combination effects of the draft Strategy with these other initiatives presents challenges; nonetheless, when considering the National Planning Policy for Waste, the Environment Act, NPPF, Resources and Waste Strategy, the Waste Management Plan for England, the 25 Year Environment Plan, Essex and Southend-on-Sea Waste Local Plan, the draft Strategy appears to offer a range of environmental benefits tied to sustainable waste management. This approach aligns with the goals of moving waste up the hierarchy and transitioning towards a circular economy.

For example, the draft Strategy corresponds favourably with the objectives of the 25-Year Environment Plan. Through promoting recycling, waste reduction, and improved waste treatment technologies including enhanced energy recovery from EfW, these changes contribute to a more sustainable and circular economy. However, the potential negative effects on communities and landscape resulting from three-weekly collections of residual waste if pursued, would require mitigation to minimise negative effects on population and human health objectives. Similarly, if significant new infrastructure is required for Sensitivities 2 and 3 this should be carefully managed to prevent and/or mitigate negative effects on other topics beyond material assets and waste management. Overall, the Strategy aligns with the aims of the 25-Year Environment Plan and can contribute to improved environmental outcomes.

In relation to the Waste Management Plan for England, the proposed changes and sensitivities demonstrate coherence with its priorities. They address resource efficiency, recycling targets, and emission reductions. The introduction of new waste treatment technologies and enhancements in waste collection practices are aligned with the aspirations of the plan, offering an opportunity to elevate waste management practices and work towards its goals.

Similarly, the draft Strategy aligns well with the NPPF, which emphasises waste minimisation, efficient infrastructure, environmental protection, and community engagement. However, again it is important to approach any changes to residual waste collections and for example, introduction of charges for garden waste collections cautiously, to prevent potential negative effects to community wellbeing. On the whole, the proposed changes are consistent with the NPPF's vision and have the potential to yield positive impacts on waste management and environmental outcomes.

In the Essex and Southend-on-Sea Waste Local Plan vision and objectives, the premise of the waste hierarchy is clear with alignment with mitigating and adapting to climate change,and moving to a circular economy. As the Waste Strategy is not spatial, the site specificity of the Waste Local Plan is not applicable, nor the movement of waste across county borders.

When considering the draft Strategy in combination with these legislative frameworks it offers a cohesive approach to waste management. It supports resource efficiency, recycling targets, and emission reductions while also considering community engagement and wellbeing. However, it is important to ensure that the

implementation of these changes is well-planned and executed to maximise benefits and mitigate potential negative consequences. Collaborative efforts among stakeholders, authorities, and communities will be essential in successfully integrating these changes into the broader legislative landscape.

The Resource and Waste Strategy launched in 2018 by the government, along with subsequent consultations in 2021, explored initiatives such as a Deposit Return Scheme, Extended Producer Responsibility, and improved waste recycling consistency. While certain elements of the Strategy were incorporated into the Environment Act 2021, most proposals will be implemented through secondary legislation and the details of the implementation of the Act thus remain uncertain. These initiatives hold implications for all members of the Essex Waste Partnership and may necessitate significant alterations to current waste collection and management practices. The modelling report provides further detail on this.

Overall, the draft Strategy, when viewed in combination with other relevant plans and programmes, presents the potential for positive cumulative effects across the SEA objectives. Potential significant negative effects which could arise from the draft Strategy's in-combination effects with other plans and programmes. For example, if a three-weekly residual waste collection is implemented then there is potential for significant negative effects to arise, unless properly managed.

In addition, if the Strategy requires increased use of existing and potentially new waste facilities to align with waste hierarchy goals, (such as in Sensitivities 2 and 3) potential significant negative environmental effects during construction and operation are anticipated and will need to be identified, assessed, and mitigated through legislative frameworks, including the NPPF, local waste plans, and environmental permitting processes.

5.7 MITIGATION AND ENHANCEMENT MEASURES

Based on the assessment of the draft Strategy presented, a range of mitigation measures have been identified in addition to those identified in Table 13 of the Waste Strategy for Essex Final Report. These measures are principally service-level mitigation identified which could address the potential negative environmental effects associated with waste collection services. The measures are summarised in Table 5.22.

Table 5.22: Mitigation and enhancement measures per topic

Measure	SEA Objective(s)
Providing guidance to householders on segregating waste to ensure that the maximum recyclate is being generated and that items are correctly disposed of and stored.	All SEA objectives
Community engagement and education to encourage responsible waste disposal behaviours.	3.1 Population and human health: To minimise disturbance to local communities 8.1 Landscape and visual amenity
Particularly concerning less frequent collection cycles, or more complex waste systems there is potential to incorporate advanced mechanisms. Such as deployment of sensors within communal bins to monitor the remaining capacity and assess whether bins are nearing fullness or experiencing overflow, thus indicating the need for prompt emptying. Alternatively, this technology could help optimise collection routes by identifying instances where collection vehicles can be spared unnecessary visits.	1.1 Material assets and waste management 3.1 Population and human health: To minimise disturbance to local communities 6.2 Air and Climate: To minimise greenhouse gas emissions and embodied carbon associated with waste management and landfill 8.1 Landscape and visual amenity
Introduction of a mechanism where users can report overflowing communal bins ensuring any full or overflowing bins are emptied between regular collections.	3.1 Population and human health: To minimise disturbance to local communities 8.1 Landscape and visual amenity

Measure	SEA Objective(s)
Supply of appropriately sized waste containers, particularly in the case of communal bins for residual waste, with barriers to odour and vermin.	3.2: Population and Human Health: To minimise disturbance to local communities 8.1 Landscape and visual amenity
Due consideration should be given to local residents in terms of collection times (to prevent disturbance) and type of vehicle used.	3.2: Population and Human Health: To minimise disturbance to local communities
Litter audits could be undertaken regularly to track the impact of new services upon litter and fly-tipping on the environment.	All SEA objectives
Uptake or use of low or zero emission vehicles, for example hybrid or electric, should be used wherever possible for waste collection and transportation, subject to feasibility, applicability and cost.	1.1 Material Assets and Waste Management 2.1 Biodiversity, flora and fauna 3.1 Population and Human Health: To protect and enhance human health and wellbeing 6.2 Air and Climate: To minimise greenhouse gas emissions and embodied carbon associated with waste management and landfill
Backhauling opportunities should be explored within, and between, local authorities and waste management contractors to minimise vehicle movements.	3.1 Population and Human Health: To protect and enhance human health and wellbeing 6.1 Air and Climate: To minimise emissions of pollutant gases and particulates and enhance air quality.
Strong awareness campaigns could be implemented to encourage participation in any collection services for example, with local school, community groups, and businesses.	1.1 Material Assets and Waste Management:
Services should be designed to maximise recycling and recovery rates and should take into account the convenience and minimising disturbance to consumers by, for example, optimising the number and sensitive siting of communal bins for example, away from private properties.	3.2: Population and Human Health: To minimise disturbance to local communities
Avoiding Air Quality Management Areas (AQMAs) wherever possible for collection and waste management sites and ensuring monitoring is in place where no more preferable alternative is possible, as appropriate under environmental permitting requirements.	6.1 Air and Climate: To minimise emissions of pollutant gases and particulates and enhance air quality.
Where additional waste management infrastructure is required, environmental assessment should be undertaken on an individual project level where appropriate. Depending on the nature and location of the scheme, statutory EIA or other environmental assessments may be required.	All SEA objectives
When considering the introduction or modification of sites, including addition of CHP or CCUS technology or smaller-scale infrastructure like the placement of communal bin hubs, a comprehensive consultation procedure should be employed and suitable locations carefully selected. This approach is essential to avoid any disruption to both communities and users,	All SEA objectives

Measure	SEA Objective(s)
especially when these sites fall outside the scope of the regulatory frameworks outlined.	

Mitigation and enhancement related to infrastructure and spatial considerations will be addressed through complementary plans, programmes, and the procurement process. These measures will involve coordinated efforts to ensure that the design, placement, and management of waste management infrastructure align with local spatial strategies. Additionally, the procurement exercises required to deliver the strategy will need to integrate sustainability criteria to foster innovative solutions that minimise environmental impacts and optimise resource utilisation, for example, sustainable materials and community liaison. Any new infrastructure proposed should be considered against the policies and requirements of the relevant waste local plan, or National Policy Statement (if applicable).

5.8 CONCLUSIONS

The likely significant environmental effects of implementing the draft Strategy have been identified, described and evaluated in accordance with the requirements of the SEA Regulations.

5.8.1 Scenarios assessment

Overall, the assessment of six short-listed waste management scenarios has found that the draft Strategy will have a range of positive effects across the majority of the SEA objectives, relative to the current baseline. This broadly reflects the socio-economic and environmental benefits associated with sustainable waste management and moving waste up the waste management hierarchy. No significant positive effects have been identified which reflects the context of a non-spatial strategy which looks at different collection and frequencies of waste streams and an assumed change in treatment.

Negative effects have been identified across several SEA objectives. No significant negative effects have been assessed but moderate negative effects were assessed on population and human health and landscape and visual amenity objectives which are related to three-weekly waste collections and the potential impact of waste accumulation if, for example, users were not fully using recycling and food waste services.

The BPES assessment determined that Scenario 2 was the highest scoring scenario and was therefore used to evaluate the likely impacts of the sensitivities. The sensitivities were also assessed using the SEA assessment framework.

5.8.2 Sensitivities assessment

A range of positive and negative effects were assessed against each of the SEA objectives on all sensitivities. The following significant effects were identified.

Both positive and negative effects were found for Scenarios 2 and 3. The positive contribution to resource recovery and emission reduction that Sensitivity 3 could provide, would enhance the circular economy, and is assessed as having significant positive effect on material assets and waste management, yet the unproven scale of carbon capture leaves uncertainty. The GHG emissions savings made through CCUS technology are considered to be a significant positive effect.

In addition, significant negative effects were identified on material assets and waste management for Sensitivities 2 and 3 due to the significant infrastructure required by the addition of CHP and CCUS technology respectively.

The assessment found no positive or negative significant effects for Sensitivities 1 or 4.

5.8.3 Cumulative assessment

The cumulative assessment of each sensitivity in combination with highest scoring Scenario 2 assessed mixed effects across several SEA objectives, particularly, material assets and waste management, population and human health, air and climate and water.

Significant positive effects were reported on material assets and resource use for sensitivity 3 reflecting that in capturing carbon emissions, the technology contributes positively to resource recovery and emission

reduction, enhancing the circular economy approach, however, it is important to note that the technology is unproven at scale. Significant positive effects were also reported on air and climate objective 6.2 for Sensitivities 2 and 3 acknowledging the respective positive effect that CHP and CCUS have on reducing greenhouse gas emissions.

Significant negative effects were reported on material assets for Sensitivities 2 and 3, primarily due to the introduction of significant additional infrastructure. Moderate negative effects were assessed on population and human health and landscape and visual amenity across all sensitivities due to the impact of three-weekly collections of residual waste on population and human health and landscape and visual amenity.

When viewed from a strategic standpoint in combination with other non-spatial but relevant plans and programmes, rather than in terms of scenarios and sensitivities, the draft Strategy offers potential positive cumulative effects across SEA objectives, particularly material assets and waste management. It is not expected that significant negative effects will arise from the draft Strategy's in-combination effects with other plans and programmes. While aligning with waste hierarchy goals will necessitate increased utilisation of existing and potentially new waste facilities, it is acknowledged that negative environmental impacts during construction and operation are anticipated. These must be identified, assessed, and mitigated through legislative frameworks, including the NPPF, local waste plans, and environmental permitting processes.

5.8.4 Other considerations

Implementation of scenarios and sensitivities could involve site selection, including EfW facilities, and their environmental effects will be assessed through EIA under the relevant regulations. Construction and operation of new waste management infrastructure could yield negative effects related to land use, vehicle movements, air emissions, and landscape impact relative to the baseline. New site locations would adhere to waste local plans consistent with NPPF and NPPW policies, subject to SEA and HRA, and necessitate planning permissions and environmental consents. The operation of waste management facilities is also subject to environmental permitting.

When considering the introduction or modification of sites, including smaller-scale infrastructure like the placement of communal bin hubs, a comprehensive consultation procedure should be employed and suitable locations carefully selected. This approach is essential to avoid any disruptions to both communities and users, especially when these sites fall outside the scope of the regulatory frameworks outlined.

Mitigation measures for any potential negative impacts (along with enhancement measures for positive effects) have been proposed in Section 5.7 relative to the relevant primary objective against which they are predicted to arise, along with the responsible party.

It anticipated that the outcomes from the SEA, and in particular key potential effects, can be monitored as an integral part of the monitoring of the Waste Strategy itself and proposed monitoring indicators are provided in Section 6.1. Further information on monitoring proposals will be set out in the SEA Post Adoption Statement.

6 NEXT STEPS

A summary report of the consultation feedback will be published on Citizen Space after consultation is complete and responses have been analysed.

The feedback obtained from responses to the Public Consultation Questionnaire and other consultation mechanisms will be used to develop and publish a final version of the Waste Strategy for Essex.

The Waste Strategy for Essex will act as a framework for waste management in Essex informing the design of local collection services and disposal arrangements. Collection arrangements will continue to be managed by District, Borough and City Councils in a way that is appropriate to their residents and communities. The councils in the EWP will take local decisions on adoption of the final version of the Strategy.

In conjunction with publishing the final Strategy, a Post Adoption Statement will also be issued (to meet the requirements of SEA regulation 16 (4)). This will set out the results of the consultation and SEA processes and the extent to which the findings of the SEA have been accommodated in the final plan.

6.1 MONITORING THE EFFECTS OF THE WASTE STRATEGY

The SEA Regulations require that the SEA Responsible Authority (Essex County Council) monitors the significant environmental effects of the implementation of the Strategy in order to identify any unforeseen adverse effects at an early stage and undertake appropriate remedial action. Given the range of indicators currently in use, and to avoid duplication, it is recommended that existing indicators are utilised wherever possible. Monitoring indicators are not provided for all SEA objectives. As required by the SEA Regulations monitoring indicators are focussed on those objectives where potential for likely significant effects of the strategy's implementation have been identified. Further information on monitoring proposals will be set out in the Post Adoption SEA Statement.

In this context, the Resource and Waste Strategy includes a 25 Year Environment Plan Outcome Indicator Framework[13] in development for monitoring progress against Resource and Waste Strategy policies and commitments that consists of a number of measures and which reflect progress against the following six policy priorities: increasing resource productivity; reducing greenhouse gas emissions; reducing waste production; increasing recycling; and reducing landfilling. It may be that these will be appropriate to use as monitoring indicators once fully developed.

Table 6.1 provides a list of potential indicators for relevant SEA objectives.

Table 6.1: Potential Indicators for Monitoring Effects

SEA Objective	Potential Waste Monitoring Indicator	Potential Source of Information
1.1 Material Assets and Waste Management: To support a circular economy, minimise waste arisings, promote reuse, recovery and recycling, minimising the impact of waste on the environment and communities and contribute to the sustainable use of natural and material assets.	Amount of arisings, split by waste streams	ECC
	Total waste per household	ECC
	Residual waste arising per household	EWP

[13] Outcome Indicator Framework for the 25 Year Environment Plan (defra.gov.uk)

SEA Objective	Potential Waste Monitoring Indicator	Potential Source of Information
	Percentage reused/recycled/composted	EWP
	Amount of energy generated	ECC
2.1 Biodiversity, Flora and Fauna: To protect and enhance biodiversity including designated sites of nature conservation interest and protected habitats and species, enhance ecosystem resilience and habitat connectivity and deliver a net biodiversity gain.		
3.1 Population and Human Health: To protect and enhance human health and wellbeing **3.2 Population and human health:** To minimise disturbance to local communities	Percentage of users satisfied with waste services	EWP
	Number of nuisance related complaints	EWP
	Percentage missed collections	EWP
	Number of environmental permit breaches for waste facilities	EWP
4.1 Water: To protect and enhance water quality and help achieve the objectives of the Water Framework Directive.		
5.1 Soil, Geology and Land-Use: To make appropriate and efficient use of land and protect and enhance soil, local geomorphology and geodiversity and contribute to the sustainable use of land.	Number of fly tipping incidents per annum	ECC

SEA Objective	Potential Waste Monitoring Indicator	Potential Source of Information
6.1 Air and Climate: To minimise emissions of pollutant gases and particulates and enhance air quality.	Waste miles travelled to dispose of waste	EWP
	Waste vehicle capacity utilisation rates	EWP
6.2 Air and Climate: To minimise greenhouse gas emissions and embodied carbon associated with waste management and landfill.	CO2 saved through greater alignment with the waste hierarchy	EWP
	Percentage of low emission vehicles and plant	EWP
6.3 Air and Climate: To adapt waste management practices to climate change and improve resilience to the threats of a changing climate.	Energy use in waste operation	EWP
7.1 Archaeology and Cultural Heritage: To conserve and enhance the historic environment including designated and non-designated heritage assets and their settings.		
8.1 Landscape and Visual Amenity: To protect and enhance landscape, townscape character and visual amenity.	Number of nuisance-related complaints such as noise, dust, and overflowing bins related to local landscape and streetscape.	EWP

7 GLOSSARY

Anaerobic Digestion (AD)

A process where biodegradable material (typically food) is enclosed in a container and the oxygen is removed, which encourages the material to break down. The process produces biogas a renewable energy which can be used to generate heat and electricity, and it can produce solids/liquid known as digestate which can be used as fertiliser and compost.

Carbon offsetting

Carbon offsetting can help individuals and organisations to compensate for any emissions they cannot avoid or reduce by paying for an equivalent amount of emissions to be reduced or removed elsewhere.

Circular Economy

A circular economy is an economic system designed with the intention that maximum use is extracted from resources and minimum waste is generated for disposal.

Climate change

Climate change refers to a change in the state of the climate, causing changes in weather patterns on a global scale and for an extended period of time. Effects include changes in rainfall patterns, sea level rise, potential droughts, habitat loss and heat stress.

Closed Loop Recycling

Closed loop recycling is a process where waste is collected and recycled to make the same type of product. For example, glass bottles can be remade into more glass bottles.

Composting (windrow)

Shredded waste is placed in elongated heaps, called windrows, normally outdoors. The windrows are turned mechanically periodically to push air into the composting waste. The process takes at least 16 weeks. At the end, the compost weighs around half of the weight of the original waste and is distributed for agricultural and domestic use.

Cumulative effects

These arise where, for example, several developments each have insignificant effects but together have a significant effect or where several individual effects such as noise, dust and visual have a combined effect. The term cumulative effects is often taken to include secondary and synergistic effects.

Decarbonisation

Decarbonisation is the term used for removal or reduction of carbon dioxide (CO2) output into the atmosphere. Decarbonisation is achieved by switching to usage of low carbon energy sources from fossil fuels.

DEFRA – Department for Environment, Food and Rural Affairs

The Government department responsible for the environment, food, and rural affairs. DEFRA's remit within the environment includes waste management.

Energy from Waste (EfW) with heat capture

Energy from waste is a recovery process that takes residual waste and turns it into electricity. Capturing and using the heat generated significantly increases the overall efficiency of the process and the environmental benefits.

Essex Waste Partnership (EWP)

A partnership comprising all twelve district, borough and city councils and the county council in Essex. The partnership was set up to ensure cost-efficient and sustainable waste management across the county.

Fossil fuels

Fuels such as coal, petroleum, and natural gas, which contain carbon and release energy in combustion.

Greenhouse gas

Gases that trap heat in the atmosphere and contribute to climate change. This causes the greenhouse effect. Water vapour, carbon dioxide, nitrous oxide, methane and ozone are the primary greenhouse gases in the atmosphere.

Home composting

The manufacture of compost material at home (from the breakdown of food and garden waste) using a compost heap, a purpose-made container or a wormery.

Landfill or Landfill sites

Land in which waste is deposited, often disused quarries.

Local Authority Collected Waste (LACW)

Local Authority Collected Waste is household waste and any other waste that is collected for treatment and disposal by a local authority. LACW comprises of waste from households, Recycling Centres for Household Waste, street sweepings and local authority-collected commercial waste.

Procurement

The process of buying goods, works and services from third parties and in-house providers. This refers to all stages of the process from identifying what is needed, to the end of a service contract or the end of the useful life of an asset.

Recovery

In recovery, a waste treatment process is used to recover energy and new raw materials from the waste. Recovery waste treatment processes include anaerobic digestion and Energy from Waste (EfW)

Recycling

The reprocessing of waste materials into the same products or different ones.

Residual Waste

Waste that is not reused, recycled, composted or anaerobically digested

Reuse

In the commercial sector - using products designed to be used many times, such as re-useable packaging.

In homes, re-use includes buying products that use refillable containers or re-use plastic bags. It contributes to sustainable development and can save raw materials, energy, and transport costs.

SEA – Strategic Environmental Assessment

SEA is the environmental assessment of plans, programmes, or strategies. It seeks to provide high level protection to the environment; integrate the environment and sustainable development into planning processes; promote sustainable development; and promote a more open, transparent, and evidence-based planning culture.

Secondary or indirect effects

Effects that are not a direct result of the plan, but occur away from the original effect or as a result of a complex pathway.

Synergistic effects

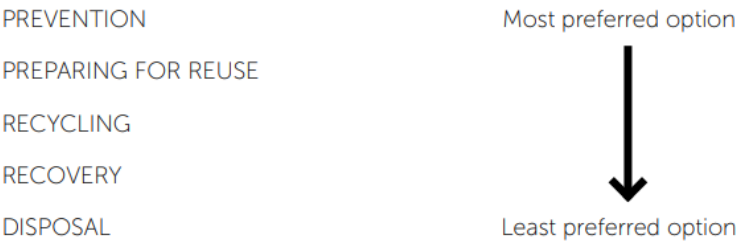
Effects that interact to produce a total effect greater than the sum of the individual effects.

Waste Hierarchy

The Waste Hierarchy sets out the order in which scenarios for waste management should be considered based on environmental impact. It is a legal framework that has become a cornerstone of sustainable waste management.

Establishes an order of preference for the management of waste, to maximise the prevention of waste, whilst minimising disposal. The Waste (Management) Hierarchy is established in the Waste Framework Directive (Directive 2008/98/EC), and prescribes the following:

Waste Hierarchy



Waste reduction (Waste prevention)

Action to prevent waste being produced to reduce or minimise the amount of waste requiring final disposal. Minimising waste saves on collection and disposal costs and helps to reduce the demand for raw materials.

Waste treatment

The mechanical, chemical, thermal, or biological processing of certain wastes to make them harmless, reduce volumes before landfilling or recycle them.

Zero Waste

Zero Waste means minimising the population's demand on primary resources and maximising the reuse, recycling and recovery of resources, rather than treating them as waste.

APPENDICES

APPENDIX A QUALITY ASSURANCE CHECKLIST

The UK Government's Guidance on SEA[14] contains a quality assurance checklist to help ensure that the requirements of the SEA Regulations are met. Those requirements relevant to the environmental assessment have been set out below.

Quality Assurance Checklist	
Objectives and Context	
The plan's or programme's purpose and objectives are made clear.	The purpose of the draft Waste Strategy is set out in **Section 1.2** of this Environmental Report. The objectives of the draft Waste Strategy are set out in **Section 1.2.**
Environmental issues and constraints, including international environmental protection objectives, are considered in developing objectives and targets.	Key environmental issues identified through a review of relevant plans and programmes (see **Section 2** and **Appendix C** of this report) and analysis of baseline conditions (see **Section 3 and Appendix D**) have informed the development of the assessment framework presented in **Section 4.3**.
SEA objectives, where used, are clearly set out and linked to indicators and targets where appropriate.	SEA objectives and guide questions are set out in **Section 4.3** of this report.
Links with other related plans, programmes and policies are identified and explained.	Links are identified in **Section 2** and **Appendix C**.
Conflicts that exist between SEA objectives, between SEA and plan objectives and between SEA objectives and other plan objectives are identified and described.	The relationships between the SEA, the Waste Strategy and other plan objectives have been identified in the review of plans and programmes included in **Appendix C**.
Scoping	
Consultation Bodies are consulted in appropriate ways and at appropriate times on the content and scope of the Environmental Report.	The SEA Scoping Report was consulted upon and responses to this are included in this Environmental Report (see **Appendix B**).
The assessment focuses on significant issues.	The scope of the assessment reflects the geographic extent of the Waste Strategy area and provides a proportionate approach to assessment of this non-spatial Strategy. This enables the assessment to determine which impacts will be considered significant.
Technical, procedural and other difficulties encountered are discussed; assumptions and uncertainties are made explicit.	General difficulties, limitations and assumptions are set out in **Section 4.5** of this report. Baseline data limitations are discussed in **Section 3.3**.
Reasons are given for eliminating issues from further consideration.	The scope of the assessment is set out in **Section 4.2**.
Alternatives	
Realistic alternatives are considered for key issues, and the reasons for choosing them are documented.	All scenarios were assessed as set out in **Section 5** of this report.
Alternatives include 'do minimum' and/or 'business as usual' scenarios wherever relevant.	A 'do minimum' and/or 'business as usual' scenario is not appropriate for the draft Waste Strategy due to landfill not being a viable long term solution. This is set out in **Section 5.1**.
The environmental effects (both adverse and beneficial) of each alternative are identified and compared.	This is included in **Section 5** of this report.
Inconsistencies between the alternatives and other relevant plans, programmes or policies are identified and explained.	No inconsistencies were identified.
Reasons are given for selection or elimination of alternatives.	This is set out in **Sections 1.3 and 5** of this report.

[14] Office of the Deputy Prime Minister (2005) *A Practical Guide to the Strategic Environmental Assessment Directive.*

Quality Assurance Checklist

Baseline Information	
Relevant aspects of the current state of the environment and their likely evolution without the plan or programme are described.	**Section 3** and **Appendix D** of this report characterise the current environmental baseline conditions, along with how these are likely to change in the future.
Environmental characteristics of areas likely to be significantly affected are described, including areas wider than the physical boundary of the plan area where it is likely to be affected by the plan.	The environmental characteristics of the Waste Strategy area are described in **Section 3** and **Appendix D** of this report.
Difficulties such as deficiencies in information or methods are explained.	Baseline data limitations are discussed in **Section 3.3**. Difficulties and limitations encountered during the environmental assessment are set out in **Section 4.5**.
Prediction and Evaluation of Likely Significant Environmental Effects	
Effects identified include the types listed in the Directive (biodiversity, population, human health, fauna, flora, soil, water, air, climate factors, material assets, cultural heritage and landscape), as relevant; other likely environmental effects are also covered, as appropriate.	The potential effects of the scenarios are identified in **Section 5**.
Both positive and negative effects are considered, and the duration of effects (short, medium or long-term) addressed.	The nature and duration of potential effects has been considered during the assessment set out in **Section 5** of this report.
Likely secondary, cumulative and synergistic effects are identified where practicable.	Information on secondary, cumulative and synergistic effects is set out in **Section 5**.
Inter-relationships between effects are considered where practicable.	These relationships are identified where appropriate in **Section 5** of this report.
The prediction and evaluation of effects makes use of relevant accepted standards, regulations, and thresholds.	Relevant standards, regulations and thresholds have been used where appropriate in undertaking the assessment.
Methods used to evaluate the effects are described.	Information on the methods used for evaluation of potential effects is included in **Section 4** of this report.
Mitigation Measures	
Measures envisaged to prevent, reduce and offset any significant adverse effects of implementing the plan or programme are indicated.	Mitigation measures for potential negative effects are set out in **Section 5.7**.
Issues to be taken into account in project consents are identified.	Issues to be taken into account in project consents, where relevant, are included in **Section 5**.
The Environmental Report	
Is clear and concise in its layout and presentation.	We believe the report is clear and concise, reflective of the information in the draft Waste Strategy.
Uses simple, clear language and avoids or explains technical terms.	The report uses accessible language wherever possible.
Uses maps and other illustrations where appropriate.	Maps and illustrations have been utilised as appropriate.
Explains the methodology used.	The method used is set out in the report in **Section 4**.
Explains who was consulted and what methods of consultation were used.	**Section 1.1.1** and **Appendix B** of this report outlines the consultation that has been carried out to-date.
Identifies sources of information, including expert judgement and matters of opinion.	Sources of information are included throughout the report.
Contains a non-technical summary covering the overall approach to the SEA, the objectives of the plan, the main options considered, and any changes to the plan resulting from the SEA.	A Non-Technical Summary has been included at the front of the report.
Consultation	

Quality Assurance Checklist	
The SEA is consulted on as an integral part of the plan-making process.	The previously issued SEA Scoping Report was consulted upon and responses are included in this Environmental Report (see **Appendix B**).
Consultation Bodies and the public likely to be affected by, or having an interest in, the plan or programme are consulted in ways and at times which give them an early and effective opportunity within appropriate time frames to express their opinions on the draft plan and Environmental Report.	Consultation on the draft Waste Strategy and this Environmental Report will be undertaken by Essex County Council.
Decision-making and Information on the Decision	
The Environmental Report and the opinions of those consulted are taken into account in finalising and adopting the plan or programme.	This will be incorporated following consultation on draft Waste Strategy and Environmental Report.
An explanation is given of how they have been taken into account.	This will be provided in the Post Adoption Statement following consultation on the draft Waste Strategy and Environmental Report.
Reasons are given for choosing the plan or programme as adopted, in the light of other reasonable alternatives considered.	This will be set out in the Post Adoption Statement following consultation on the draft Waste Strategy and Environmental Report.
Monitoring Measures	
Measures proposed for monitoring are clear, practicable and linked to the indicators and objectives used in the SEA.	The report sets out potential monitoring measures that could be used in **Section 6.1**.
Monitoring is used, where appropriate, during implementation of the plan or programme to make good deficiencies in baseline information in the SEA.	The suggestions for monitoring measures are included in **Section 6.1** of the report.
Monitoring enables unforeseen adverse effects to be identified at an early stage. (These effects may include predictions which prove to be incorrect.)	The suggestions for monitoring made in **Section 6.1** are for Essex County Council and EWP to act on, with monitoring taking place following implementation of the Waste Strategy.
Proposals are made for action in response to significant adverse effects.	Mitigation methods are outlined in **Section 5.7** of this report.

APPENDIX B SCHEDULE OF SCOPING CONSULTATION RESPONSES

Historic England Comments	Response
Comment 1 As you will be aware, under the provisions of Article 5(1) of The SEA Directive there is a requirement to assess the likely significant effects which the Policies and proposals of a Plan might have upon "cultural heritage including architectural and archaeological heritage". In terms of the historic environment, whilst we would endorse some aspects of the Appraisal, we have significant concerns regarding the scoping out of archaeology and cultural heritage (Table 3.6: Scoping of topics into the SEA). We understand that the rationale for this is that the Strategy is not seeking to identify new sites, which we accept. However, both Biodiversity, Flora and Fauna, and Landscape and Visual Amenity have been scoped in on the basis that there is potential for significant impacts to designated sites and species and landscapes. Given the scoping report acknowledges the potential for significant impacts on designated landscapes and sites, how can we be sure there will be no impacts on heritage assets within these landscapes and sites? Moreover, whilst the Strategy may not be seeking to identify new sites, we would remind you that even changes to existing operations, including intensification of use have the potential to impact on heritage assets. On this basis, and given the uncertainty of Strategy at this stage, it would be wise to scope archaeology and cultural heritage into the Strategic Environmental Assessment. We therefore request that the Scoping Report is reissued, scoping in archaeology and cultural heritage, and including corresponding SEA Objectives and guide questions.	The Waste Strategy options assessed focus on the methodology and frequency of waste collections and the Strategy is not looking to identify sites or infrastructure gaps. The Strategy is not site specific and likely significant effects on archaeology and cultural heritage are not anticipated, however, we understand that some wording in the Scoping Report could have been misleading as to the site specificity of the Strategy. The perceived move away from landfill as a treatment process was connected with the Strategy options and it was anticipated these would generally have a positive effect on biodiversity and landscape and therefore these topics were scoped in on a precautionary basis. However, the decisions around the chosen treatment process (Energy from Waste) are out with the scope of this Strategy process. Essex County Council is in the process of procuring a new offtake contract for the Council's residual waste, which would commence in 2024. This procurement process will determine the treatment route(s) for the Council's residual waste. As the procurement exercise is still ongoing, the residual waste treatment route for the modelled year in the Strategy is currently unknown. For the purposes of the Strategy, Energy from Waste has been modelled as the treatment method for residual waste as this was deemed the most likely outcome of the procurement exercise. As the Strategy is not site-specific, this was only modelled in respect of impacts of the general treatment process on parameters including recycling/recovery rates, greenhouse gas emissions and costs (e.g. gate fees) when compared to the baseline scenario of landfilling the Council's residual waste. Further sensitivities have also been explored, assessing the impacts of implementing front-end sorting, combined heat and power (CHP) and carbon capture, utilisation and storage (CCUS) on the same parameters for Energy from Waste. Likewise, these sensitivities are only assessed in terms of the technology/process type and do not take into account any spatial aspects as these are outside of the scope of this Strategy. The baseline of the collections and treatment throughout the Essex County Council area is as follows against which the shortlisted options will be assessed:

Method	Collection in number of district councils	Treatment
Dry Recycling	**Frequency**: 11/12 fortnightly, 1/12 weekly **Service**: varies from 4/12 comingled (single, mixed stream) to 5/12 two-stream (two separate streams) to 3/12 multi-stream (multiple separate streams)	Comingled/mixed streams: MRF Separate/clean streams: secondary processing (material-specific processor)
Food Waste	**Frequency**: all weekly **Service**: 9/12 = separate, 3/12 = mixed with garden	Separate food: Wet AD Mixed food/garden: composting
Garden Waste	**Frequency**: all fortnightly **Service**: 9/12 = separate, 3/12 = mixed with food	Separate garden: composting Mixed food/garden: composting
Residual Waste	**Frequency**: 10/12 fortnightly, 2/12 weekly **Service**: n/a	Mix of landfill, MBT, EfW

This table will be included in the Environmental Report. The non-spatial nature of the Strategy will also be set out more clearly in the Environmental Report and references to site specific effects will be removed.

Whilst archaeology and cultural heritage will not be scoped into this assessment it will be fully considered as we move forward with associated spatial plans[15].

Existing regulatory frameworks will manage impacts of the Strategy as it is taken forward, and the

Historic England Comments	Response
	potential for environmental effects arising from individual waste proposals will continue to be assessed and mitigated, where appropriate through existing mechanisms, including through the EIA process, application of standards and guidelines and consenting where relevant. For example, where future actions have the potential to introduce land use change, individual projects will be subject to consideration through the relevant statutory regimes including EIA to ensure any likely significant environmental effects are identified and opportunities to avoid, reduce or offset these are considered.
Comment 2 **Spatial aspects to the Strategy** We would remind you that paragraphs 199 and 200 of the NPPF make it clear that great weight should be given to the conservation of heritage assets, and that any harm to, or loss of, the significance of a designated heritage assets (including as a result of changes in their settings) should require clear and convincing justification. However, we often see assessments concluding 'uncertain effects' in relation to potential site allocations because there isn't sufficient information to understand what impact development would have on the significance of nearby heritage assets. Our Advice Note 3 'The Historic Environment and Site Allocations in Local Plans' (HEAN 3) (<https://historicengland.org.uk/images-books/publications/historic-environment-and-site-allocations-in-local-plans/heag074-he-and-site-allocation-local-plans/>) sets out a suggested approach to assessing sites and their impact on heritage assets. If through the course of the Strategy any spatial elements emerge, then we recommend that this methodology is applied to the assessment and selecting of sites within the Basildon Borough Local Plan, and therefore request that HEAN3 be added to the review of relevant plans, policies and programmes in the report.	The Historic Environment and Site Allocations in Local Plans Advice Note 3 will be included within the Environmental Report for completion. Due consideration will be given to the methodology in the HEAN3 advice note when environmental assessments are made of associated spatial plans.

[15] After conducting a comprehensive assessment of the scenarios and sensitivities, it was determined that the anticipated environmental effects on archaeology and cultural heritage would still not be significant at this stage, especially considering the absence of specific sites under evaluation. However, in the interest of providing a comprehensive and thorough assessment and signpost to where spatial considerations will be undertaken, the inclusion of archaeology and cultural heritage within the scope was deemed appropriate.

Historic England Comments	Response
Comment 3 Historic England strongly advises that the conservation and archaeological team of your authority are closely involved throughout the preparation of the IIA of this Plan. They are best placed to advise on; local historic environment issues and priorities, including access to data held in the HER; how the policy or proposal can be tailored to minimise potential adverse impacts on the historic environment; the nature and design of any required mitigation measures; and opportunities for securing wider benefits for the future conservation and management of heritage assets.	Agreed. Where plans are anticipated to have effects on archaeology and cultural heritage, the conservation and archaeological team of Essex County Council are and will be closely involved in their preparation.

Natural England Comments	Response
Comment 1 As a general point, the Scoping Report doesn't provide a picture of the geographic reach of existing arrangements for the management of the County's waste or how this might be changed as a consequence of the Draft Waste Strategy. The report identifies the baseline level and profile of waste generated within the County and the waste management infrastructure currently available or in construction. However, the report doesn't identify whether there are elements of waste "export" or "import" for treatment/disposal. This information would enable a more comprehensive assessment of the environmental baseline as the Waste Strategy may have environmental effects beyond the County boundary. For example, transporting waste for treatment in neighbouring Counties could result in traffic-related impacts for the air quality experienced at designated sites outside Essex. Accordingly, there may need to be an expansion of the baseline analysis where it relates to "Biodiversity, flora and fauna" if there are potential impacts beyond the County's administrative area.	The Waste Strategy options assessed focus on the methodology and frequency of waste collections and the Strategy is not looking to identify sites or infrastructure gaps. Import and export of waste is not changing as a result of the Strategy. Import and export is set by the procurement process and led by the market. This is out with the scope of the Strategy. Essex County Council is in the process of procuring a new offtake contract for the Council's residual waste, which would commence in 2024. This procurement process will determine the treatment route(s) for the Council's residual waste and therefore the relative import/export requirements, if any. As the procurement exercise is still ongoing, the residual waste treatment route for the modelled year in the Strategy is currently unknown. For the purposes of the Strategy, Energy from Waste has been modelled as the treatment method for residual waste as this was deemed the most likely outcome of the procurement exercise. As the Strategy is not site-specific, this was only modelled in respect of impacts of the general treatment process on parameters including recycling/recovery rates, greenhouse gas emissions and costs (e.g. gate fees) when compared to the baseline scenario of landfilling the Council's residual waste. Text will be included in the Environmental Report to reflect this. The current baseline of waste collection and treatment across the County is set out in the table below. This will be included in the Environmental Report.

<table>
<tr><th>Natural England Comments</th><th>Response</th></tr>
<tr><td></td><td>
<table>
<tr><th>Method</th><th>Collection in number of district councils</th><th>Treatment</th></tr>
<tr><td>Dry Recycling</td><td>Frequency: 11/12 fortnightly, 1/12 weekly
Service: varies from 4/12 comingled (single, mixed stream) to 5/12 two-stream (two separate streams) to 3/12 multi-stream (multiple separate streams)</td><td>Comingled/mixed streams: MRF
Separate/clean streams: secondary processing (material-specific processor)</td></tr>
<tr><td>Food Waste</td><td>Frequency: all weekly
Service: 9/12 = separate, 3/12 = mixed with garden</td><td>Separate food: Wet AD
Mixed food/garden: composting</td></tr>
<tr><td>Garden Waste</td><td>Frequency: all fortnightly
Service: 9/12 = separate, 3/12 = mixed with food</td><td>Separate garden: composting
Mixed food/garden: composting</td></tr>
<tr><td>Residual Waste</td><td>Frequency: 10/12 fortnightly, 2/12 weekly
Service: n/a</td><td>Mix of landfill, MBT, EfW</td></tr>
</table>
</td></tr>
<tr><td>Comment 2
In relation to air quality, the Scoping report states (paragraph 3.7.1.3) “the air quality baseline can be best described through reference to information produced by the local authorities in Essex that have declared Air Quality Management Areas (AQMA). Reference to AQMAs will be made when considering any adverse impacts on air quality of the Waste Strategy options.” Whilst this baseline will be important for the assessment of impacts for human health, the Air Pollution Information System (APIS) is the key source for baseline air quality information for sites of value for nature</td><td>Whilst not a site-specific Strategy, the SEA Environmental Report will take into consideration air quality impacts on designated biodiversity sites. The baseline sections of the Environmental Report will be updated to include relevant information from the APIS website.</td></tr>
</table>

Natural England Comments	Response
conservation (SPAs, SACs, SSSIs). The APIS website Air Pollution Information System | Air Pollution Information System (apis.ac.uk) provides a searchable database and information on pollutants and their impacts on habitats and species and should be interrogated for the purposes of the air quality baseline analysis.	
Comment 3 As the Draft Waste Strategy could involve development which affects "best and most versatile agricultural land", the section of the report which concerns Soils should include a reference to the Agricultural Land Classification of the non-urban areas of the County as part of its baseline analysis. Agricultural Land Classification information is available on the Magic website.	The Waste Strategy options assessed focus on the methodology and frequency of waste collections and the Strategy is not looking to identify sites or infrastructure gaps. However, the Environmental Report will include reference to Agricultural Land Classification baseline data of the non-urban areas as well as a GIS map.
Comment 4 The section of the Report which concerns Landscape and Visual Amenity notes that there are no Areas of Outstanding Natural Beauty (AONBs) within Essex and therefore such nationally designated landscapes do not fall within the Report's baseline assessment. However, a section of the Suffolk Coast and Heaths AONB extends into Essex (at Manningtree, Mistley and Wrabness area within Tendring District) and this AONB should therefore be included in the baseline Landscape assessment. Moreover, in accordance with the National Planning Policy Framework, consideration should be given to the effects of development on the setting of an AONB which will include locations beyond the defined boundary of an AONB.	Noted. This AONB will be added to the baseline section of the Environmental Report. This guide question covers the point regarding setting: "Will the draft Strategy affect the purposes and/or special qualities of protected/designated/culturally important landscapes and their setting?".
Comment 5 Your consultation asks whether the SEA objectives and guide questions cover the breadth of issues appropriate for appraising the effects of the Draft Waste Strategy. This is a difficult question to respond to without a clear picture of the site specific impacts of the Strategy. Nevertheless, the Report could include additional guide questions that are explicit about their assessment of the impacts of the Strategy upon designated sites. For example, the existing questions address the impacts upon water quality/quantity in general but do not specifically focus on the impacts upon the designated sites whose interest features (habitats and species) are water-dependent and rely on their conservation status being maintained or improved.	As the Strategy is not site specific the objectives and guide questions were intended to cover a breadth of issues. It is felt that adding further detail to the guide questions would not be proportionate to the scenarios being assessed. We are happy to discuss further if necessary.

.

APPENDIX C REVIEW OF PLANS AND PROGRAMMES

Table A. 1 Plans, Policies and Programmes

Objectives identified in the Policy, Plan or Programme	Influences on the Waste Strategy and the SEA objectives
International	
Ramsar Convention: The Convention on Wetlands of International Importance (1971)	
The Convention on Wetlands (Ramsar, Iran, 1971) (the "Ramsar Convention") is an intergovernmental treaty that embodies the commitments of its member countries to maintain the ecological character of their Wetlands of International Importance and to plan for the "wise use", or sustainable use, of all of the wetlands in their territories.	The impacts of the Waste Strategy scenarios on important wetland habitats must be considered as part of the SEA.
The Bern Convention on the Conservation of European Wildlife and Natural Habitats (1979)	
International convention which aims to ensure conservation of wild flora and fauna species and their habitats. Special attention is given to endangered and vulnerable species, including endangered and vulnerable migratory species specified in appendices. Enforced in European legislation through the Habitats Directive (92/43/EEC) and Birds Directive (79/409/EEC).	The impacts of the Strategy scenarios on internationally designated sites, species and important Bird habitats must be considered as part of the SEA.
The Bonn Convention on the Conservation of Migratory Species of Wild Animals (1983)	
Aims to conserve terrestrial, marine and avian migratory species throughout their range. Enforced in European legislation through the Habitats Directive (92/43/EEC) and Birds Directive (79/409/EEC).	The impacts of the Strategy scenarios on important Bird habitats (i.e. Ramsar sites and SPA designated sites) must be considered as part of the SEA.
The Cancun Agreement (2011) & Kyoto Agreement (1997)	
The agreement represents key steps forward in capturing plans to reduce greenhouse gas emissions and to help developing nations protect themselves from climate impacts and build their own sustainable futures. It includes a shared vision to keep global temperature rise to below two degrees Celsius.	The SEA should seek to promote a reduction in greenhouse gas emissions.
Charter for the Protection and Management of Archaeological Heritage (1990)	
The International Council on Monuments and Sites (ICOMOS) International Committee on Archaeological Heritage Management (ICAHM) created a charter to establish principles and guidelines of archaeological heritage management that are globally valid and can be adapted to national policies and conditions. This includes general principles for investigation, maintenance, and conservation as well as reconstruction of architectural heritage.	The impacts of the scenarios on archaeological heritage sites must be considered as part of the SEA.
United Nations Economic Commission for Europe (1998) Aarhus Convention - Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters	
The Aarhus Convention grants the public rights regarding access to information, public participation and access to justice, in governmental decision-making processes on	The Convention is designed to improve the way ordinary people engage with government and decision-makers on environmental matters. It

matters concerning the local, national and transboundary environment. It focuses on interactions between the public and public authorities. The Aarhus Convention has been ratified by the European Community, which has begun applying Aarhus-type principles in its legislation, notably the Water Framework Directive (Directive 2000/60/EC).	helps to ensure that environmental information is easy to get hold of and easy to understand. The SEA should seek to provide easily understood information to the public on the environmental implications of the Waste Strategy and its constituent scenarios.
Paris Agreement (2015)	
The Paris Agreement is a legally binding international treaty on climate change. It was adopted by 196 Parties at COP 21 in Paris, on 12 December 2015 and entered into force on 4 November 2016. Its goal is to limit global warming to well below 2, preferably to 1.5 degrees Celsius, compared to pre-industrial levels.	The SEA should take into account the need to consider impacts towards climate change i.e. contribution towards greenhouse gas emission reductions).
European Commission, Directive 2001/42/EC on the assessment of the effects of certain plans and programmes on the environment (SEA Directive)	
This Directive ensures that individual Parties integrate environmental assessment into their plans and programmes at the earliest stages, whereby an SEA becomes mandatory for plans/programmes which are: • Prepared for agriculture, forestry, fisheries, energy, industry, transport, waste/ water management, telecommunications, tourism, town & country planning or land use and which **set the framework** for future development consent of projects listed in the EIA Directive; Or • Have been determined to require an assessment under the Habitats Directive. For any plans/programmes not included in the above, the Member States must carry out a screening procedure to determine whether the plans/programmes are likely to have significant environmental effects.	This Directive provides the regulatory basis for an SEA being carried out as part of the Strategy. From December 31 2020, following the exit of the UK from the European Union the SEA Regulations are now the principal legal basis for the SEA. However, as some of the guidance has not been updated the various SEA stages and deliverables may still refer to the SEA Directive where deemed appropriate.
European Community (EC) Directive 1999/31/EC on the landfill of waste	
The Directive requires, amongst other things, that a Strategy on biodegradable waste is put in place that achieves the progressive diversion of biodegradable municipal waste from landfill (Articles 5(1) & (2)). This requirement has been implemented in England through Waste Strategy 2007 and across the UK through the Waste and Emissions Trading Act 2003	The SEA should ensure that any scenarios for the Waste Strategy are within the guidance set out by the Landfill Directive.
Council of Europe (2003) European Soils Charter	
Sets out common principles for protecting soils across Europe and will help.	The SEA should seek to ensure that the quality of the region's land, including soils, is protected or enhanced.
Council of Europe (2006), European Landscape Convention	
European Landscape Convention (ELC) is the first international convention to focus specifically on landscape. Natural England implements the European Landscape Convention in England. The aims of the 2009/10 action plan are:	The implementation of the Waste Strategy may influence landscape or the enjoyment of landscapes in the Essex County Council area and as such the SEA should seek to maintain or

Lead on improving the protection, planning and management of all England's landscapes Raise the quality, influence and effectiveness of policy and practical instruments Increase the engagement in and enjoyment of landscapes by the public Collaborate with partners across the UK and Europe.	enhance the quality of the region's landscapes and the potential enjoyment of these landscapes.
The Environment Noise Directive (Directive 2002/49/EC)	
The END aims to —define a common approach intended to avoid, prevent or reduce on a prioritised basis the harmful effects, including annoyance, due to the exposure to environmental noise. It also aims to provide the basis for developing EU measures to reduce noise emitted by major sources, in particular road and rail vehicles and infrastructure, aircraft, outdoor and industrial equipment and mobile machinery.	The SEA assessment framework should include for the protection against excessive noise.
European Commission (2008) The 2008 ambient air quality directive (2008/50/EC)	
The 2008 ambient air quality directive (2008/50/EC) sets legally binding limits for concentrations in outdoor air of major air pollutants that impact public health such as particulate matter (PM10 and PM2.5) and nitrogen dioxide (NO2). As well as having direct effects, these pollutants can combine in the atmosphere to form ozone, a harmful air pollutant (and potent greenhouse gas) which can be transported great distances by weather systems.	The implementation of the Waste Strategy may have some influence on air quality, either directly or indirectly through construction or operation activities. The SEA should seek to ensure that the region's air quality is maintained or enhanced, and that emissions of air pollutants are kept to a minimum.
European Commission, Thematic Strategy on air pollution (2005)	
This policy sets out interim objectives for air pollution in the EU and measures for achieving them.	The SEA should seek to ensure that the region's air quality is maintained or enhanced, and that emissions of air pollutants are kept to a minimum.
European Commission (2009) Promotion of the use of energy from renewable sources Directive (2009/28/EC)	
This promotes the use of energy from renewable sources.	The SEA should seek to promote the use of renewable energy.
European Commission (2011), Our life insurance, our natural capital: an EU biodiversity Strategy to 2020	
This is a long-term vision which was endorsed as a result of the 2010 biodiversity target not being met. It sets out the EU 2020 biodiversity target and vision for 2050. The key targets included: • Conserving and restoring nature; • Maintaining and enhancing ecosystems and their services; • Ensuring the sustainability of agriculture, forestry and fisheries; • Combating invasive alien species; and Addressing the global biodiversity crisis.	The implementation of the Strategy should seek to facilitate achievement of the EU 2020 biodiversity target and 2050 vision, through its existing consideration of impacts towards biodiversity, set out in the SEA objectives.
European Commission, Environmental Liability Directive (2004/35/EC)	
The Directive establishes a framework for environmental liability based on the "polluter pays" principle, with a view to preventing and remedying environmental damage.	The SEA should seek to ensure that the Waste Strategy avoids causing direct or indirect damage to the aquatic environment or contamination of land that creates a significant risk to human health.

European Commission, Urban Waste Water Treatment Directive (1991/271/EC)	
The Directive's objective is to protect the environment from the adverse effects of urban waste water discharges and discharges from certain industrial sectors and concerns the collection, treatment and discharge of domestic waste water, mixture of waste water and waste water from certain industrial sectors.	The SEA should seek to maintain, protect and improve water quality across the region.
European Commission (1992), Habitats Directive (1992/43/EC)	
The aim of the Directive is to promote the maintenance of biodiversity by requiring Member States to take measures to maintain or restore natural habitats and wild species listed on the Annexes to the Directive at a favourable conservation status, introducing robust protection for those habitats and species of European importance.	The impacts of the Strategy on internationally designated sites and species must be considered as part of the SEA.
European Commission (2006) Thematic Strategy for Soil Protection	
The Thematic Strategy for Soil Protection consists of a Communication from the Commission to the other European Institutions, a proposal for a framework Directive (a European law), and an Impact Assessment.	The SEA assessment framework should include consideration of soils and their protection.
European Commission (2009), Birds Directive (2009/147/EC)	
The Directive provides a revised framework for the conservation and management of, and human interactions with, wild birds in Europe. It sets broad objectives for a wide range of activities, although the precise legal mechanisms for their achievement are at the discretion of each Member State (in the UK delivery is via several different statutes).	The SEA should seek to protect and conserve important bird habitats.
European Commission, Directive on the Assessment and Management of Flood Risks (2007/60/EC)	
This Directive requires Member States to assess whether all water courses and coast lines are at risk from flooding, to map the flood extent and assets and humans at risk in these areas and to take adequate and coordinated measures to reduce this flood risk.	The impacts of the Strategy on existing fluvial, groundwater and coastal flood risk must be considered as part of the SEA.
United Nations (2002), Commitments arising from the World Summit on Sustainable Development, Johannesburg	
The World Summit on Sustainable Development proposed broad-scale principles which should underlie sustainable development and growth. It included objectives such as: Greater resource efficiency Work on waste and producer responsibility New technology development Push on energy efficiency Integrated water management plans needed Minimise significant adverse effects on human health and the environment from chemicals by 2020.	These commitments are the highest level definitions of sustainable development. The Waste Strategy should be influenced strongly by all of these themes and should seek to take its aims into account. The SEA should seek to promote the achievement of the sustainable development objectives outlined in this plan.
National	
The Environmental Assessment of Plans and Programmes Regulations 2004 (the SEA Regulations)	

This represents the transposition of the Directive 2001/42/EC on the assessment of the effects of certain plans and programmes on the environment (SEA Directive).	These Regulations provide the UK regulatory basis for an SEA being carried out as part of the Waste Strategy.
Waste Management Plan 2021	
The plan set out an overview of waste management in England bringing current waste management policies into a single national plan. The Wate Management Plan sets out a vision and policies with the aim of moving to a circular economy. The following documents contain significant policies that contribute to the Waste Management Plan for England: • the Clean Growth Strategy • the Industrial Strategy • the Litter Strategy • the UK Plan for Shipments of Wastes • the National Policy Statements for Hazardous Waste and for Renewable Energy Infrastructure (in so far as it relates to facilities which recover energy from waste).	The Waste Strategy should promote the policies set forward in the Waste Management Plan 2021 alongside the support documents which contribute to the overall plan for England.
The Climate Change Act 2008	
This act sets carbon targets for 2050. The net carbon account for 2050 at least 80% lower than 1990 baseline.	This target needs to be taken into account in the SEA.
The Climate Change Act 2008 (2050 Target Amendment) Order 26 June 2019	
This amendment changed the UK carbon emissions reduction target from an 80% to a 100% reduction	This target needs to be taken into account in the SEA objective for energy use and greenhouse gas emissions, and adaptation to climate change.
Conservation of Habitats and Species Regulations 2017 (Amendment) (EU Exit) Regulations (2019)	
These regulations consolidate all the various amendments made to the Conservation (Natural Habitats) Regulations 1994 in England. The regulations provide for the designation and protection of 'European sites', the protection of 'European species', and the adaptation of planning and other controls for the protection of European Sites. They are the principal means by which the Habitats Directive is transposed in England as such its main objective is to promote the maintenance of biodiversity.	The impacts of the Waste Strategy scenarios species diversity must be considered as part of the SEA.
Resource and Waste Strategy (2018)	
The Strategy sets out how we will preserve our stock of material resources by minimising waste, promoting resource efficiency and moving towards a circular economy. Initiatives within the Strategy include: • A Deposit Return Scheme for drinks containers • Extended Producer Responsibility for packaging • Consistency in household and business waste recycling	The Waste Strategy should fall in line with guidance set out in the Resource and Waste Strategy with scenarios contributing to the overall aims of the policy paper.
Industrial Strategy White Paper (2017)	

This White Paper sets out long-term plans to boost productivity and earning power of people throughout the UK. There is specific reference to waste with respect to moving towards a regenerative circular economy: - promotion of recycling and strong secondary materials markets - deliver a 20% per capita reduction in food waste by 2025 - strengthen policies in line with ambitions of zero avoidable waste and doubling of resource productivity by 2050.	The Waste Strategy should aim to promote the plans set out in the Industrial Strategy with respect to moving towards a regenerative circular economy.
The Countryside and Rights of Way (CROW) Act, 2000	
The Act provides for increased public access to the countryside and strengthens protection for wildlife. The main provisions of the Act are as follows: Extends the public's ability to enjoy the countryside whilst also providing safeguards for landowners and occupiers Creates new statutory right of access to open country and registered common Land Use Consultants Modernises Right of Way system Gives greater protection to SSSIs Provides better management arrangements for AONBs Strengthens wildlife enforcement legislation.	If the Waste Strategy is to have an effect on public access to the countryside, the SEA should include objectives that take into account public access, protection of SSSIs and the management of relevant landscape designations.
The Natural Environment and Communities Act 2006 (NERC Act)	
This provides the legislative framework to extend the biodiversity duty set out in the Countryside and Rights of Way (CROW) Act to public bodies and statutory undertakers to ensure due regard to the conservation of biodiversity. Importantly, Section 41 of the Act refers to a published list of habitats and species which are of principal importance for the conservation of biodiversity in England. This duty applies to all utility companies.	There are a range of designated Natural Environment and Rural Communities (NERC) Act Section 41 habitats within the assessment area. The Strategy may have an effect on NERC habitats and therefore the SEA must include objectives that take these effects into account.
DCLG (2012) National Planning Policy Framework (as amended 2019)	
Presumption in favour of sustainable development. Core planning principles include taking account of the development needs of an area; contribute to conserving and enhancing the environment; re-use of previously developed land; conserve heritage assets; deliver sufficient community facilities to meet local needs. Delivering sustainable development includes: Building a strong competitive economy; Supporting a prosperous rural economy; Promoting sustainable transport; Requiring good design; Promoting healthy communities; Protecting green belt land; Meeting the challenge of climate change, flooding and coastal change; Conserving and enhancing the natural environment; Conserving and enhancing the historic environment;	The Waste Strategy and SEA should take account of the key components of sustainable development.

Facilitating the sustainable use of minerals. Reservoirs are included within the definition of open space - of public value due to opportunities for sport and recreation and providing a visual amenity.	
Department for Energy and Climate Change (2020) Energy White Paper: Powering our Net Zero Future	
The white paper outlines a series of policies and commitments made by the government as part of the transition to net zero carbon emissions. The strategies are three fold: • Prioritisation of renewable sources energy generation and invest in low-carbon technologies • Supporting a green recovery from COVID-19 through investment in green industries • Creating a fair deal for consumers through facilitating competition, enhanced regulation and strategies to improve the energy performance of homes.	The implementation of the Waste Strategy may have an influence energy use within the Essex County Council Region. The SEA should seek to promote energy efficiency, as well as seeking to reduce the effects of climate change through greenhouse gas emissions. The SEA should also promote the use of renewable energy, where relevant.
Department of energy and climate change (2011) Planning our electric future: a White Paper for secure, affordable and low carbon electricity	
This white paper outlines a package of reforms so that by 2030 there will be a flexible, smart and responsive electricity system, powered by a range of low carbon sources of electricity. This includes engaging with consumers on energy use. Decarbonisation is important in meeting the 2050 targets.	The implementation of the Waste Strategy may have an influence energy use within the Essex County Council Region. The SEA should seek to promote energy efficiency, as well as seeking to reduce the effects of climate change through greenhouse gas emissions. The SEA should also promote the use of renewable energy, where relevant.
Defra (2011) Government Review of Waste Policy in England 2011	
The review is guided by the “waste hierarchy”, EU obligations and targets on waste management, carbon impacts, environmental objectives and the costs and benefits of different policy options. The Governments vision include a move beyond the current throwaway society to a “zero waste economy” in which material resources are re-used, recycled or recovered wherever possible, and only disposed of as the option of very last resort.	The Waste Strategy will involve scenarios related to waste generation and recycling. The SEA should seek to enhance recycling and minimise the amount of waste going to landfill.
HM Government (2018) Our Waste, Our Resources: A Strategy for England	
In response to the 25 Year Environmental Plan, this document sets out a targeted Strategy for preserving our stock of material resources by minimising waste, promoting resource efficiency and moving towards a circular economy	The SEA should take into account effects on resource use and waste, and the benefits of promoting resource efficiency.
Defra (2017) The UK Climate Change Risk Assessment 2017 Evidence Report	
Identifies themes that form the priorities for adaptation in the UK.	The SEA should take into account the need for climate change adaptation.
Defra (2009) Safeguarding our soils – A Strategy for England	
The new Soil Strategy for England – Safeguarding our Soils – outlines the Government’s approach to safeguarding our soils for the long term. It provides a clear vision to guide future policy development across a range	The SEA should seek to ensure that the quality of the regions soils and their management are protected and/or enhanced.

of areas and sets out the practical steps that we need to take to prevent further degradation of our soils, enhance, restore and ensure their resilience, and improve our understanding of the threats to soil and best practice in responding to them. The Governments vision is that: By 2030, all England's soils will be managed sustainably and degradation threats tackled successfully. This will improve the quality of England's soils and safeguard their ability to provide essential services for future generations.	
Defra (2007) The Air Quality Strategy for England, Scotland and Wales	
This Strategy identifies air quality objectives and policy options to further improve air quality in the UK into the long term. The options are intended to provide important benefits to quality of life and help protect the environment as well as the direct benefits to public health.	The implementation of the Strategy may have some influence on air quality, either directly or indirectly through construction or operational activities. The SEA should seek to ensure that the region's air quality is maintained or enhanced, and that emissions of air pollutants are kept to a minimum.
Defra (2005) Securing the Future: Delivering UK Sustainable Development Strategy	
The Strategy for sustainable development aims to enable all people to satisfy their basic needs and enjoy a better quality of life without compromising the quality of life of future generations. The Strategy places a focus on protecting natural resources and enhancing the environment.	The SEA must seek to ensure that objectives relating to sustainable development, sustainable resource use and protecting the natural environment, are considered when assessing the potential impacts of the waste management Strategy.
Defra (2004) The First Soil Action Plan for England	
This plan is a comprehensive statement on the state of the UK's soils and how Government and other partners were working together to improve them. Ensure that England's soils will be protected and managed to optimise the varied functions that soils perform for society (e.g. supporting agriculture and forestry, protecting cultural heritage, supporting biodiversity, as a platform for construction), in keeping with the principles of sustainable development.	The SEA should seek to ensure that the quality of the region's land, including soils, is protected or enhanced.
Defra (2004) Rural Strategy	
The Strategy sets out rural and countryside policy, and draws upon from lessons learnt following the rural white paper. Objectives include supporting economic and social regeneration across rural England and enhance the value of the countryside and protect the natural environment for this and future generations.	The implementation of certain Strategy scenarios may have an effect upon rural communities and the countryside. The SEA should also seek to ensure that the quality of the region's landscapes, natural resources and biodiversity are maintained or enhanced.
Defra (2002) The Strategy for Sustainable Farming and Food – facing the future	
This Strategy sets out how industry, Government and consumers could work together to secure a sustainable future for our farming and food industries. The Strategy's objectives are to support the viability and diversity of rural and urban economies and communities, respect and operate within the biological limits of natural resources (especially soil, water and biodiversity) and achieve consistently high standards of environmental performance by reducing energy consumption, by	The implementation of the Strategy may have some indirect links with the food industry. The SEA should also seek to promote the most effective use of the region's natural resources, including soil, biodiversity and energy resources.

minimising resource inputs, and use renewable energy wherever possible.	
Defra (2011) The Natural Choice: securing the value of nature, The Natural Environment White Paper	
This paper sets out a new approach for protecting and improving the natural environment, developing a green economy and reconnecting people to nature, based on the findings of the UK National Ecosystem Assessment.	The Waste Strategy and SEA should seek to ensure that the natural environment and distinctive landscapes are protected and public access to them, are maintained.
UK Government (2018), A Green Future: Our 25 Year Plan to Improve the Environment	
The 25 Year Plan sets out to deliver cleaner air and water in our cities and rural landscapes, protect threatened species and provide richer wildlife habitats, in addition to tackling the effects of climate change. The 25-year goals include: 1. Clean air; 2. Clean and plentiful water; 3. Thriving plants and wildlife; 4. A reduced risk of harm from environmental hazards such as flooding and drought; 5. Using resources from nature more sustainably and efficiently; 6. Enhanced beauty, heritage and engagement with the natural environment; In addition, managing pressures on the environment by: 7. Mitigating and adapting to climate change; 8. Minimising waste; 9. Managing exposure to chemicals; and 10. Enhancing biosecurity.	The Waste Strategy and SEA objectives should be consistent with the principles behind the 25-year goals of the plan. The SEA should seek to ensure that the themes included in the 25-year goals are also reflected in the SEA objectives, particularly around air quality, resource use, energy use and greenhouse gas emissions, adaptation to climate change, minimising waste.
Defra (2020), The Draft Environment Bill 2020, and content related to the development of Nature Recovery Networks (parts 6 and 7)	
This policy paper provides greater clarity on some of the key changes proposed in the 25 Year Environmental Plan, including: - The implications of the requirement for local areas to develop a Local Nature Recovery (LNR) Strategy, in driving the delivery of a National Nature Recovery (NNR) Network; - New 'biodiversity net gain' measures as part of the planning requirements for new developments; and - New measures that will support the design and delivery of strategic approaches for the protection of both species and habitats.	The Strategy and SEA objectives for biodiversity should take account of the need to consider impacts towards LNR and NNR strategies and potential for biodiversity net gain.
The Energy Act 2013	
This provides the legislative framework for delivering secure, affordable and low carbon energy. It includes provisions for decarbonisation,	The implementation of the Strategy may have an influence upon Essex County Council's total energy use. The SEA should seek to promote energy efficiency, as well as seeking to reduce the effects of climate change through greenhouse gas emissions. The SEA should also promote the use of renewable energy, where relevant.

Environment Act, 2021	
The Environment Act makes provisions about targets, plans and policies for improving the natural environment; creation of the Office for Environmental Protection; about waste and resource efficiency; about air quality; for the recall of products that fail to meet environmental standards; about water; about nature and biodiversity; for conservation covenants; about the regulation of chemicals; and for connected purposes. Section 45A outlines specific waste and resource related provisions including: 'recyclable household waste must be collected separately from other household waste for recycling or composting, recyclable streams must be collected separately, food waste must be collected weekly'.	The Strategy and the SEA should seek ensure that any scenarios follow targets and policies set out in the Environment Act.
Environment Act, 1995	
The Environment Act set up the EA to manage resources and protect the environment in England and Wales	The SEA should seek to promote the protection and enhancement of all resources without having negative effects on other aspects of the Environment.
Environment Agency (2009), Water Resources Strategy for England and Wales	
This is the national EA Strategy for water resource management in the long term. It looks to 2050 and considers the impacts of climate change, the water environment, water resource and valuing water. Aims and objectives include: - Ensure water is used efficiently in homes and buildings, and by industry and agriculture - Provide greater incentives for water companies and individuals to manage demand and - Share existing water resources more effectively	The SEA should seek to ensure that Strategy objectives are also reflected in the SEA objectives, particularly around water resource use and availability in the region.
The Environmental Damage (Prevention and Remediation) (England) Regulations 2015	
These regulations amend the 2009 regulations and provide additional protection to habitats and species identified on Annexes 1 and 2 of the EC Habitats Directive (92/43/EEC), SSSIs and, in some cases, classified waterbodies from environmental damage where an operator has intended to cause damage or been negligent to the potential for damage. Applies to the most serious categories of environmental damage, including: - Contamination of land that results in a significant risk of adverse effects on human health - Adverse effects on surface water or groundwater consistent with a deterioration in the water's status - Adverse effects on the integrity of a SSSI or on the conservation status of species and habitats protected by EU legislation outside SSSIs.	The SEA should seek to ensure that the guidance provided by the regulations is considered when assessing the Waste Strategy.
Environment Agency (2018) The Environment Agency's approach to groundwater protection	

This document contains position statements which detail the Environment Agency's approach to managing and protecting groundwater. The primary aim of all of the position statements is the prevention of pollution of groundwater and protection of it as a resource.	The Strategy and SEA approach to groundwater protection should be compliant with the Environment Agency's approach.
Historic England (2013) Strategic Environmental Assessment, Sustainability Appraisal and the Historic Environment	
Guidance for addressing the historic environment in Strategic Environmental Assessment or Sustainability Appraisal. It identifies the recommended list of plans, programmes and policies for review, approach to baseline review, potential sustainability issues.	The SEA should consider the potential effects of the Strategy on the historic environment, particularly designated assets and their settings, and to important wetland areas with potential for paleo-environmental deposits. Historic characterisation can supplement information about designations. Sustainability issues, objectives and indicators identified in this document should be taken into account in the SEA.
HM Government (2016) National Infrastructure Delivery Plan 2016-2021, Infrastructure Projects Authority	
The Plan explores the Government's plans for economic infrastructure for 2016-2021 and the resultant economic benefits. The objective for the waste sector is to ensure that infrastructure is in place to deal with waste as efficiently as possible, with an ambition to move towards a 'circular economy' where material resources are valued and kept in circulation.	The SEA objectives should take into account the objectives for the waste sector presented in this plan.
Planning (Listed Buildings and Conservation Areas) Act 1990	
Addresses listed buildings including prevention of deterioration and damage, as well as preservation and enhancement of conservation areas.	The Strategy and SEA should take account of the need to protect listed buildings and conservation areas.
The Water Act, 2003 (as amended)	
The Water Act 2003 is in three Parts, relating to water resources, regulation of the water industry and other provisions. The four broad aims of the Act are: - The sustainable use of water resources - Strengthening the voice of consumers - A measured increase in competition - The promotion of water conservation.	The implementation of the Strategy may have an effect through it's role in maintaining supplies of water. The SEA should seek to promote sustainable use of water resources.
The Water Environment (WFD) (England and Wales) Regulations, 2003	
These Regulations make provision for the purpose of implementing in river basin districts within England and Wales. The Regulations require a new strategic planning process to be established for the purposes of managing, protecting and improving the quality of water resources.	The SEA should seek to promote the protection and enhancement of all water resources. The SEA should seek to maintain, protect and improve water quality across the region and ensure efficient use of resources.
Wildlife and Countryside Act, 1981 (as amended)	
The Act is the principle mechanism for providing legislative protection of wildlife in Great Britain. Species listed in Schedule 5 of the Act are protected from disturbance, injury, intentional destruction or sale. Other	Some aspects of the Strategy may have effects on habitats and species in the Essex County Council supply area and beyond. The SEA should seek to maintain or enhance the quality of habitats and

provisions outlaw certain methods of taking or killing listed species. This Act is brought up to date regularly to ensure the most endangered animals are on the schedule. The Act also improved protection for the most important wildlife habitats.	biodiversity and take into regard protected species and habitats.
UK Climate Projections UKCP18. UKCIP, 2018	
The UKCP18 Projections provide a basis for studies of impacts and vulnerability and decisions on adaptation to climate change in the UK over the 21st century. Projections are given of changes to climate, and of changes in the marine and coastal environment; recent trends in observed climate are also discussed. The methodology gives a measure of the uncertainty in the range of possible outcomes; a major advance beyond previous national scenarios The projections will allow planners and decision-makers to make adaptations to climate change. In order to do so they need as much good information as possible on how climate change will evolve. They are one part of a UK government programme of work to put in place a new statutory framework on, and provide practical support for, adaptation.	The SEA should use UKCP18 projections in the broader assessment of climate change effects and any potential cumulative effects. For example, the ecological requirements of aquatic habitats that may be affected by the Strategy will also be influenced by climate change.
Defra (2018), The National Adaptation Programme and the Third Strategy for Climate Adaptation Reporting	
This second National Adaptation Programme (NAP) sets out the government's response to the second Climate Change Risk Assessment (CCRA). High level actions are presented for addressing the key risks identified, including in relation to the following areas: - Flooding and coastal change risks to communities, businesses and infrastructure; - Risks of shortages in the public water supply for agriculture, energy generation and industry; - Risks to natural capital including terrestrial, coastal, marine and freshwater ecosystems, soils and biodiversity; and New and emerging pests and diseases and invasive non-native species affecting people, plants and animals.	The SEA objectives of the Waste Strategy should take into account the key risks identified in this document.
National Flood and Coastal Erosion Risk Management Strategy for England (2020)	
This updated Strategy describes what needs to be done by all risk management authorities, including water and sewerage companies, involved in flood and coastal erosion risk management. It has 3 long-term ambitions: 1. Climate resilient places: improving resilience to flooding and coastal change; 2. Making the right investment and planning decisions to secure sustainable growth, environmental improvements and infrastructure resilient to flooding and coastal change; and 3. Educating local communities to make sure that they understand their risk to flooding and coastal change.	The SEA objectives of the Strategy should take the long-term ambitions into account.
National Policy Statement for Wastewater (2012)	

This document sets out Government policy for the provision of major waste water infrastructure. The seven key policy objectives include: 1. Sustainable development; 2. Public health and environmental improvement; 3. To improve water quality in the natural environment; 4. To reduce water consumption; 5. To reduce the demand for waste water infrastructure capacity; 6. Climate change mitigation and adaptation; and 7. Waste hierarchy.	The SEA should seek to ensure that Strategy objectives are also reflected in the SEA objectives particularly regarding maintaining, protecting and improving water quality across the region and ensure efficient use of resources.
HM Treasury (2020) National Infrastructure Strategy	
This Strategy sets out the government's plans to deliver on their ambition for a radical improvement in the quality of the UK's infrastructure and to put the UK on the path to net zero emissions by 2050.	The decision-making process for determining which schemes should be prioritised in the Waste Strategy should take this policy document into account.
Circular Economy Package, 2020	
The Circular Economy Package identifies steps for the reduction of waste and establishing an ambitious and credible long-term path for waste management and recycling. The plan sets out targets to recycle 65% of municipal waste by 2035 and to have no more than 10% municipal waste going to landfill by 2035.	The Waste Strategy should increase recycling rates and reduced landfill creation.
Integrated Radioactive Waste Strategy, 2019	
The strategic objective for radioactive waste is to manage radioactive waste and dispose of it wherever possible or by placing it in safe, secure and suitable storage ensuring the delivery of national policies.	The Waste Strategy should ensure that radioactive waste is managed, stored and disposed in a safe and secure manner.
National Planning Policy for Waste, 2014	
This policy set out detailed waste planning policies. The policy should be read in conjunction with the NPPF, Waste Management Plan for England and National Policy Statements for Waste Water and Hazardous Waste, or any successor documents.	All scenarios identified within the Waste Strategy should be within the context of the National Planning Policy for Waste.
Control of Pollution Act 1974	
An Act to make further provision with respect to waste disposal, water pollution, noise, atmospheric pollution and public health.	The Waste Strategy and SEA should ensure scenarios take this legislation into account.
Build Back Better: our plan for growth, 2021	
The Build Back Better plan aims to tackle long term problems to deliver growth creating high-quality jobs across the UK and strengthen the union. There is focus on levelling up the UK, supporting a transition to net zero.	The Waste Strategy should aim to stimulate growth in the long-term, deliver on net zero goals and provide opportunities for jobs.
National Policy Statement: Hazardous Waste, 2013	

The NPS sets out government policy for hazardous waste infrastructure. The statement sets out the following key objectives for the policy: • To protect human health and the environment – stringent legislative controls are in place to control the management of waste with hazardous properties; • Implementation of the waste hierarchy – to produce less hazardous waste, using it as a resource where possible and only disposing of it as a last resort; • Self-sufficiency and proximity – to ensure that sufficient disposal facilities are provided in the country as a whole to match expected arisings of all hazardous wastes, except those produced in very small quantities, and to enable hazardous waste to be disposed of in one of the nearest appropriate installations; • Climate change – to minimise greenhouse gas emissions and maximise opportunities for climate change adaptation and resilience.	The SEA should ensure the scenarios identified in the Waste Strategy are in line with the objectives set out in this National Policy Statement.
The Waste Regulations, 2011	
This Regulation transpose the EU Waste Framework Directive (2008/98/EC). The Waste Regulations set out the following: Waste Prevention Programmes; Waste Management Plans; Duties in relation to waste management and improved use of waste as a resource; duties of planning authorities; deposits in the sea; transfer of waste; enforcement.	The SEA should ensure scenarios set out in the Strategy align with Regulations set out in the legislation.
Ancient Monuments and Archaeological Areas Act 1979	
This act addresses the protection of scheduled monuments including the control of works affecting scheduled monuments. It also addresses archaeological areas.	The Management Strategy and SEA should take account of the need to protect scheduled monuments and archaeological areas.
Defra (2004) Rural Strategy	
The Strategy sets out rural and countryside policy, and draws upon from lessons learnt following the rural white paper. Objectives include supporting economic and social regeneration across rural England and enhance the value of the countryside and protect the natural environment for this and future generations.	The implementation of certain Strategy scenarios may have an effect upon rural communities and the countryside. The SEA should also seek to ensure that the quality of the region's landscapes, natural resources and biodiversity are maintained or enhanced.
Department for Culture, Media and Sport (2001) The Historic Environment – A Force for the Future	
This Strategy outlines the Governments policy regarding the historic environment. The Strategy has key aims and objectives that demonstrate the contribution the historic environment makes to the country's economic and social well-being.	The SEA should seek to ensure any adverse effects on heritage assets are minimised or avoided.
Historic England (2020) Heritage at Risk 2020	
Heritage at Risk is a national project that aims to identify the endangered sites (historic buildings and places with	The SEA should seek to protect and enhance heritage and landscape.

increased risks of neglect and decay) and then help secure them for the future.	
English Heritage, now known as Historic England (2008) Climate Change and the Historic Environment	
Sets out the current thinking on the implications of climate change for the historic environment. It is intended both for the heritage sector and also for those involved in the wider scientific and technical aspects of climate change; in the development of strategies and plans relating to the impact of climate change; or in projects relating to risk assessment, adaptation and mitigation.	The SEA should seek to assess the implications of the waste management Strategy in combination with climate change and the potential impacts on heritage and the historic environment.
Historic England (2013) Strategic Environmental Assessment, Sustainability Appraisal and the Historic Environment	
Guidance for addressing the historic environment in Strategic Environmental Assessment or Sustainability Appraisal. It identifies the recommended list of plans, programmes and policies for review, approach to baseline review, potential sustainability issues.	The SEA should consider the potential effects of the Strategy on the historic environment, particularly designated assets and their settings, and to important wetland areas with potential for paleo-environmental deposits. Historic characterisation can supplement information about designations. Sustainability issues, objectives and indicators identified in this document should be taken into account in the SEA.
Historic England (2015) Historic Environment Good Practice Advice in Planning Note 3	
This provides guidance on managing change within settings of heritage assets. This includes archaeological remains, historic buildings, sites, areas and landscapes.	The SEA should take into account any effects on settings of heritage assets.
Historic England (2017) The Setting of Heritage Assets, Historic Environment Good Practice Advice in Planning 3, 2nd Edition	
This replaces The Setting of Heritage Assets: Historic Environment Good Practice Advice in Planning Note 3 – 1st Edition. It sets out general advice on understanding setting, and how it may contribute to the significance of heritage assets and allow that significance to be appreciated, as well as advice on how views contribute to setting.	The SEA should take into account any effects on settings of heritage assets.
Natural England (2016), Conservation 21 – Natural England's Conservation Strategy for the 21st Century	
This Strategy sets out a new approach to reverse biodiversity loss, protect natural landscapes for public enjoyment and for the services that they provide. The Strategy is based on three guiding principles: 1. Creating resilient landscapes and seas 2. Putting people at the heart of the environment 3. Growing natural capital	The Strategy and SEA should seek to ensure that the natural environment and distinctive landscapes are protected and public access to them are maintained.
Natural Capital Committee (2020) State of Natural Capital Annual Report 2020	
This provides an overview of the progress made towards the 10 goals set out in the 25 Year Environmental Plan and reiterates the importance of embedding the natural capital approach in decision making for the areas of natural capital accounts, the National Food Strategy, review of national landscapes, and local nature and national nature recovery strategies.	The Waste Strategy and the SEA objectives for biodiversity and landscape and visual amenity, should take account of the need to consider impacts towards natural capital and biodiversity resources, LNR and NNR strategies, protection and enhancement of designated landscapes.

Ancient Monuments and Archaeological Areas Act 1979	
This act addresses the protection of scheduled monuments including the control of works affecting scheduled monuments. It also addresses archaeological areas.	The Strategy and SEA should take account of the need to protect scheduled monuments and archaeological areas.
Defra (2004) Rural Strategy	
The Strategy sets out rural and countryside policy, and draws upon from lessons learnt following the rural white paper. Objectives include: - supporting economic and social regeneration across rural England; - enhancing the value of the countryside; and - protecting the natural environment for this and future generations.	The implementation of certain Strategy scenarios may have an effect upon rural communities and the countryside. The SEA should also seek to ensure that the quality of the region's landscapes, natural resources and biodiversity are maintained or enhanced.
Department for Culture, Media and Sport (2001) The Historic Environment – A Force for the Future	
This Strategy outlines the Governments policy regarding the historic environment. The Strategy has key aims and objectives that demonstrate the contribution the historic environment makes to the country's economic and social well-being.	The SEA should seek to ensure any adverse effects on heritage assets are minimised or avoided.
Historic England (2020) Heritage at Risk 2020	
Heritage at Risk is a national project that aims to identify the endangered sites (historic buildings and places with increased risks of neglect and decay) and then help secure them for the future.	The SEA should seek to protect and enhance heritage and landscape.
English Heritage, now known as Historic England (2008) Climate Change and the Historic Environment	
Sets out the current thinking on the implications of climate change for the historic environment. It is intended both for the heritage sector and also for those involved in the wider scientific and technical aspects of climate change; in the development of strategies and plans relating to the impact of climate change; or in projects relating to risk assessment, adaptation and mitigation.	The SEA should seek to assess the implications of the Waste Strategy in combination with climate change and the potential impacts on heritage and the historic environment.
Historic England (2013) Strategic Environmental Assessment, Sustainability Appraisal and the Historic Environment	
Guidance for addressing the historic environment in Strategic Environmental Assessment or Sustainability Appraisal. It identifies the recommended list of plans, programmes and policies for review, approach to baseline review, potential sustainability issues.	The SEA should consider the potential effects of the Strategy on the historic environment, particularly designated assets and their settings, and to important wetland areas with potential for paleo-environmental deposits. Historic characterisation can supplement information about designations. Sustainability issues, objectives and indicators identified in this document should be taken into account in the SEA.
Historic England (2015) The Historic Environment and Site Allocations in Local Plans. Historic England Advice Note 3	
This technical advice note helps to ensure that the historic environment plays a positive role in allocating sites for development. The note provides advice on evidence	The SEA should ensure that the Historic Environment plays a positive role in scenario assessment.

gathering and site allocation policies whilst providing guidance on ensuring that heritage considerations are integrated into site selection methodology.	
Historic England (2015) Historic Environment Good Practice Advice in Planning Note 3	
This provides guidance on managing change within settings of heritage assets. This includes archaeological remains, historic buildings, sites, areas and landscapes.	The SEA should take into account effects on settings of heritage assets.
Historic England (2017) The Setting of Heritage Assets, Historic Environment Good Practice Advice in Planning 3, 2nd Edition	
This replaces The Setting of Heritage Assets: Historic Environment Good Practice Advice in Planning Note 3 – 1st Edition. It sets out general advice on understanding setting, and how it may contribute to the significance of heritage assets and allow that significance to be appreciated, as well as advice on how views contribute to setting.	The SEA should take into account effects on settings of heritage assets.
Natural England (2016), Conservation 21 – Natural England's Conservation Strategy for the 21st Century	
This Strategy sets out a new approach to reverse biodiversity loss, protect natural landscapes for public enjoyment and for the services that they provide. The Strategy is based on three guiding principles: 1. Creating resilient landscapes and seas 2. Putting people at the heart of the environment 3. Growing natural capital.	The Strategy and SEA should seek to ensure that the natural environment and distinctive landscapes are protected and associated public access are maintained.
Regional	
Essex County Council, Local Flood Risk Management Strategy, 2018	
This Strategy sets out aims and actions to reduce the impact of local flooding on the local community. The Strategy is set out with the following measures: • Investigating Floods • Mapping Local Routes for Water • Looking after our watercourses • Planning for future floods • Influencing new development and drainage • Building new flood defences	The SEA must ensure that the scenarios identified in the Waste Strategy do not increase the council's risk to flooding.
Essex Green Infrastructure Strategy, 2020	
The Essex Green Infrastructure Strategy enables a protection, creation and improvement of green infrastructure for the local biodiversity and people. The Strategy also improves connectivity and inclusivity all whilst contributing to economic growth.	The SEA should make sure scenarios in the Waste Strategy have no significant impact on current or future green infrastructure creation.
Levelling Up Essex Strategy, 2022	
The Strategy sets out how the council will support people living in priority areas of the county to benefit from the same opportunities and life chances as the wider Essex population.	The Waste Strategy and SEA should seek to benefit and support those people in the priority areas of Essex.
Essex Joint Health and Wellbeing Strategy, 2022-2026	

The Strategy aims to improve health and wellbeing outcomes for people of all ages in the Essex County region.	The SEA should seek to improve the health and wellbeing of those living in the Essex County area.
Economic Plan for Essex, 2014	
The economic plan for Essex outlines how the council intends to support economic growth in the region.	The SEA and Waste Strategy should ensure economic growth is supported in the region.
Essex Waste Local Plan, 2017	
The plan sets out how Essex and Southend-on-Sea aim to manage waste for its duration, seeking to deal with waste sustainably, encourage recycling and reduce reliance on landfill.	Scenarios set out in the Strategy should align with the Essex Waste Local Plan policies.
Everyone's Essex: our plan for levelling up the county 2021 to 2025, 2021	The Waste Strategy should align with the 20 commitments outlined.
Essex Green Infrastructure Strategy, 2020	Where relevant the Waste Strategy should align with the Green Infrastructure Strategy objectives in protecting, improving, creating and connecting green infrastructure to benefit wildlife and people's health and wellbeing.
Relevant Waste Collection Authority waste plans and strategies	Scenarios set out in the Strategy should align with the relevant Waste plans and strategies.
Essex Climate Action Plan 2022	Scenarios set out in the Strategy should align with the Essex Climate Action Plan.
Relevant Council Climate statements, plans and programmes	Scenarios set out in the Strategy should consider and align with the relevant Climate statements, plans and programmes.
Relevant Council Heritage plans and strategies	Scenarios set out in the Strategy should consider and align with the relevant Heritage plans and strategies.

APPENDIX D BASELINE ANALYSIS

D.1 MATERIAL ASSETS AND WASTE MANAGEMENT

D.1.1 Baseline

D.1.1.1 Resource use and waste

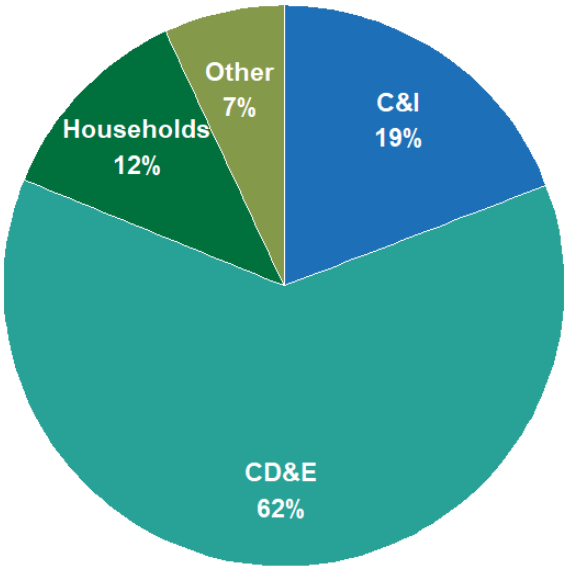
There is a need for society to reduce the amount of waste it generates, by using materials more efficiently, and improving the management of waste that is produced in order to achieve sustainable living.

The majority of municipal waste which is received at landfill is classified as 'mixed' waste (i.e. waste that cannot be routinely identified as being a part of a certain waste stream e.g. food waste). In 2020, a total of 10,425 thousand tonnes of municipal waste were sent to landfill in England[16]. Biodegradable municipal waste (BMW) is municipal waste which will decompose within landfill producing greenhouse gases such as methane. Typically, BMW includes food waste, green waste, cardboard and paper. In the UK BMW has reduced each year since 2010 (expect in 2016), with 6.1 million tonnes of BMW sent to landfill in 2020[17].

Household recycling rates in England have climbed to almost 45% (from 11.2% in 2000). In 2020, the recycling rate for England was 44% which has seen no significant change from 2015 (44.3%); waste generated by businesses declined by 29% in the six years to 2009 and business recycling rates were above 50% in 2011[18][19]. Approximately, 37.2 million tonnes of commercial and industrial (C&I) waste were generated in 2018 in England[20].

A total of 2,886 thousand tonnes of waste were collected in the East of England with the region having the smallest proportion of waste sent for incineration. Through 2018-2020, the East of England had the second highest recycling rates across the UK with approximately 47%, with the South West, the highest, having an approximate 49% recycling rate[21]. In line with the widely adopted 'waste hierarchy', best practice for waste management is to prevent, re-use, recycle and recover[22], and only then should disposal (or storage) in landfill be considered.

Figure D. 1 Waste generation split by source in 2018



[16] Defra (2022) UK statistics on waste - GOV.UK (www.gov.uk)
[17] Defra (2022) UK statistics on waste - GOV.UK (www.gov.uk)
[18] Defra (2011) Government Review of Waste Policy in England 2011. pb13540-waste-policy-review110614.pdf (publishing.service.gov.uk)
[19] UK statistics on waste - GOV.UK (www.gov.uk) Section 4, Table 1
[20] Defra (2022) UK statistics on waste - GOV.UK (www.gov.uk)
[21] Defra (2021) Statistics on waste managed by local authorities 2019 (publishing.service.gov.uk)
[22] Waste hierarchy evidence summary (publishing.service.gov.uk)

Data on waste arisings is collected in a range of categories; Commercial and Industrial; Construction, demolition and excavation (CD&E); Households; and Other [consisting of waste from mining, agriculture, forestry and fishing]. Table D. 1 and Table D. 2[23] outline the waste generation from each of these categories in the UK. Construction, demolition and excavation generated approximately 62% of total UK waste in 2018, with Commercial and Industrial (C&I) accounting for 19% [24].

Table D. 1 Waste generation split by responsible economic activity in the UK [million tonnes] [25]

Year	Commercial & Industrial	Construction, demolition & excavation (includes dredging)	Households	Other	Total
2016	39.8	136.2	27.3	15.0	218.3
2018	42.6	137.8	26.4	15.4	222.2
Change	7.0%	1.2%	-3.3%	2.8%	1.8%

The Essex County Council and Southend-on-Sea Borough Council Waste Local Plan (2017) outline the existing waste management capacity with data from the Plan presented in Table D. 2[26].

Table D. 2 Summary of Existing Waste Management Capacity in Essex

Facility Type	Operating and Under Construction	
	Number	Number Estimated Capacity (tonnes)
Transfer	116	1,776,928
Non-Inert Materials Recovery	120	2,262,963
Biological Treatment	13	280,938
Inert Materials Recovery	39	2,072,073
Energy Recovery	2	21,792
Disposal Landfill	12	17,964,802
Hazardous Landfill	0	Previous facility closed in April 2014
Total	168	22,602,560

The East of England is a large consumer of electricity, with a total domestic consumption in 2020 of 11,344GWh, the 4th highest region in the UK. Non-domestic electricity consumption follows a similar trend, being the 4th highest region in the UK. Renewable electricity generation in the UK fell by 9.3% in 2021 compared to 2020. The East of England is a large producer of renewable electricity generation having a capacity of 6,269GW (56% from wind and 34% from Solar PV). Two new large schemes were also set to be installed in 2021 in Eastern England and are both now operational[27][28]; Little Staughton Solar PV (50MW) which

[23] Defra (2022) UK statistics on waste - GOV.UK (www.gov.uk)
[24] Defra (2022) UK statistics on waste - GOV.UK (www.gov.uk)
[25] Defra (2022) UK statistics on waste - GOV.UK (www.gov.uk)
[26] Essex County Council and Southend-on-Sea Borough Council (2017) waste-local-plan-2017-compressed.pdf (ctfassets.net)
[27] Colony Farm - CNG Services
[28] Staughton Solar PV Park, UK (power-technology.com)

and Colony Farm Anaerobic Digestion (4MW)[29]. It is important to note that neither of these new schemes are within the Essex County Council area.

The current baseline of collection and treatment type, service and frequency across the county of Essex is summarised in Table 5.3 within the main body of the report.

D.1.2 Future Baseline

The Government's National Infrastructure Strategy[30] (2020) outlines a legal commitment to decarbonise the economy by 2050, strategies to rebuild the economy following the COVID-19 pandemic and plans to 'level-up' UK cities and regional powerhouses. Throughout the Strategy, waste is a prominent theme with focus on investment in the waste sector. Plans for green-growth clusters in formerly industrial areas and investment via the Towns Fund[31] could benefit the Essex region in terms of the economy, industry, resource usage and the built environment. The UK Government also plans to accelerate the deployment of green technology through private sector investment in the retrofitting of existing stock, carbon capture and low-carbon hydrogen[32].

The 25 Year Environment Plan (2018)[33] runs alongside the Industrial Strategy (2017)[34] and outlines the government's approach to safeguarding the environment and sustainable management of the economy. A prominent theme within the plan is "Increasing resource efficiency and reducing pollution and waste". Specific commitments made in the 25 Year Environment Plan are:

- Make sure resources are used more efficiently and kept in use for longer to minimise waste and reduce its environmental impacts by promoting reuse, remanufacturing and recycling
- Work towards eliminating all avoidable waste by 2050 and all avoidable plastic waste by end of 2042
- Reduce pollution by tacking air pollution in the Clean Air Strategy and reduce the impact of chemicals

The Resources and Waste Strategy (2018)[35] sets out actions, in line with the 25-Year Environment Plan, on how the UK will preserve stock of material resources by minimising waste, promote resource efficiency and move towards a circular economy. This overall aim of the Strategy is to set out a blueprint for *"eliminating avoidable[1] plastic waste over the lifetime of the 25 Year Plan, doubling resource productivity, and eliminating avoidable waste of all kinds by 2050"*[36].

D.1.3 Key Issues

The key sustainability issues arising from the baseline assessment for Material Assets and Resource Use are:

- The need to minimise the consumption of resources, including water and energy.
- The need to follow the 'waste hierarchy' of 'reduce, re-use, recycle and recover' with the aim of reducing the proportion of waste sent to landfill.
- The need to maintain consistently high recycling rates.
- The need to promote and move towards a regenerative circular economy.

---

[29] BEIS (2021) Regional renewable electricity in 2021 (publishing.service.gov.uk)

[30] HM Treasury Infrastructure UK (2020). National Infrastructure Strategy https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/938539/NIS_Report_Web_Accessible.pdf

[31] Ministry of Housing, Communities and Local Government (2019). Towns Fund Prospectus. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/924503/20191031_Towns_Fund_prospectus.pdf

[32] HM Treasury Infrastructure UK (2020). National Infrastructure Strategy https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/938539/NIS_Report_Web_Accessible.pdf

[33] HM Government (2018) A Green Future: Our 25 Year Plan to Improve the Environment. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/693158/25-year-environment-plan.pdf

[34] HM Government (2017) Industrial Strategy. Building a Britain fit for the future. https://www.gov.uk/government/publications/industrial-strategy-building-a-britain-fit-for-the-future

[35] Defra (2018 Our waste, our resources: a strategy for England. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/765914/resources-waste-strategy-dec-2018.pdf

[36] Defra (2018) Resources and waste strategy: at a glance. https://www.gov.uk/government/publications/resources-and-waste-strategy-for-england/resources-and-waste-strategy-at-a-glance

- The need to support regional and national commitments to decarbonisation.

D.2 BIODIVERSITY, FLORA AND FAUNA

D.2.1 Baseline

Biodiversity is the variety of plants (flora) and animals (fauna) in an area, and their associated habitats. The importance of preserving biodiversity is recognised from an international to a local level. Biodiversity has importance in its own right, and has value in terms of quality of life and amenity. The Essex region has a number of valuable and rare habitats for flora and fauna, including coastal saltmarshes, mudflats, wetlands, ancient woodlands and veteran trees.

The Essex County area includes a number of sites that are designated as important for biodiversity at an international level, namely 13 Special Protection Areas (SPA)[37], 3 Special Areas of Conservation (SAC)[38] and 11 Ramsar[39] sites.

86 Sites of Special Scientific Interest (SSSI)[40] and 7 National Nature Reserves (NNRs)[41] are located within the County area. SSSIs and NNRs relate to the country's best wildlife and geological sites. Local Natural Reserves (LNRs (51)) together with areas of Ancient Woodland are also located throughout the Essex County Council region. A number of non-statutory designated sites are also present in the region including 1,600 local wildlife sites (LWSs).

Some nature based sites and designations may be vulnerable to certain air quality impacts through nitrogen deposition, sulphur deposition, acid deposition and other pollutants such Sulphur Dioxide and Nitrogen Oxide. The Air Pollution Information System (APIS)[42] database includes the individual vulnerabilities and critical loads of habitats and species around the UK. This information can help identify which sites are more likely to experience negative effects from certain pollutants and air quality impacts. Where there are spatial impacts from air quality, the APIS database will be utilised to identify potential impact pathways.

D.2.2 Future Baseline

The Defra 25 Year Environment Plan[43] includes a commitment to restoring 75% terrestrial and freshwater protected sites to favourable condition and to create or restore 500,000 hectares of wildlife-rich habitat outside the protected site network, focusing on priority habitats as part of a wider set of land management changes providing extensive benefits. The 25 Year Plan also proposed an adoption of 'Biodiversity Net Gain'[44] approach to development, an approach introduced into national planning policy in 2019 and which is mandated in the Environment Act.

The 25-year Plan also includes a commitment to support land management at landscape and catchment level and to support the adoption of long-term sustainable land management practices to significantly expand wildlife habitat and provide opportunities for species and ecosystem recovery.

Climate change is anticipated to have an impact on wildlife in the future by exacerbating existing pressures such as changes to the timing of seasonal activity, and water scarcity. It is acknowledged that there is a need to allow wildlife to adapt to the impacts of climate change. Climate may limit species' distributions indirectly

[37] Special Protection Areas (SPAs) are strictly protected sites classified in accordance with Article 4 of the EC Directive on the conservation of wild birds (79/409/EEC), also known as the Birds Directive, which came into force in April 1979. They are classified for rare and vulnerable birds, listed in Annex I to the Birds Directive, and for regularly occurring migratory species. www.jncc.org.uk

[38] Special Areas of Conservation (SACs) are strictly protected sites designated under the EC Habitats Directive. Article 3 of the Habitats Directive requires the establishment of a European network of important high-quality conservation sites that will make a significant contribution to conserving the 189 habitat types and 788 species identified in Annexes I and II of the Directive (as amended). www.jncc.org.uk

[39] Ramsar sites are wetlands of international importance designated under the Ramsar Convention.

[40] Natural England has responsibility for identifying and protecting the SSSIs in England under the Wildlife and Countryside Act 1981 (as amended by the Countryside and Rights of Way Act 2000). www.naturalengland.org.uk

[41] NNRs are protected under Sections 16 to 29 of the National Parks and Access to the Countryside Act, 1949 and the Wildlife and Countryside Act, 1981.

[42] APIS (2023) UK Air Pollution Information System (APIS). https://www.apis.ac.uk/

[43] https://www.gov.uk/government/publications/25-year-environment-plan

[44] Biodiversity Net Gain is an approach in which biodiversity enhancement can be embedded into a development or project to demonstrate the importance of biodiversity's vital function in society and the economy. An important feature of BNG is avoiding and minimising biodiversity loss as much as possible, and then achieving net gains that are measurable which contribute towards local and strategic biodiversity priorities (CIEEM (2019) Biodiversity net gain. Good practice principles for development. https://cieem.net/wp-content/uploads/2019/02/C776a-Biodiversity-net-gain.-Good-practice-principles-for-development.-A-practical-guide-web.pdf)

though the impact of invasive species on native species along climatic gradients[45]. It will affect the abundance and diversity of natural enemies, competitors and species that constitute resources, as well as a species' ability to compete for resources or resist natural enemies.

D.2.3 Key Issues

The key sustainability issues arising from the baseline assessment for biodiversity are:

- The need to protect or enhance the region's biodiversity, particularly protected sites designated for nature conservation.
- The need to avoid activities likely to cause irreversible damage to natural heritage.
- The need to take opportunities to improve ecological resilience.
- The need to control the spread of Invasive Non-Native Species (INNS).
- The need to engage more people in biodiversity issues so that they personally value biodiversity and know what they can do to help, including through recognising the value of the ecosystem services.

D.3 POPULATION AND HUMAN HEALTH

D.3.1 Baseline

D.3.1.1 Population

The East of England has centres of densely populated areas, many of which are located within the Essex region. Essex has the highest population of counties in the East of England. As per the first results of the 2021 census, the administrative county of Essex is estimated to have a population of 1,503,300, one of the largest non-metropolitan county populations in the United Kingdom[46,47].

Table D. 3 Population and Household Statistics (based on administrative area of Essex)

Region	2011 Population	2011 Households	2021 Populations	2021 Households	Population Change (%)	Household Change (%)
Essex	1,393,587	581,589	1,503,300	626,500	7.8%	7.7%
East England	5,846,965	2,423,035	6,334,500	2,628,700	8.3%	8.5%
England	53,012,456	22,063,368	56,489,800	23,435,700	6.6%	6.2%

Population change is the function of natural change (difference between births and deaths) and net migration (the difference between the number of people moving into and out of an area). The balance of factors underlying population change varies by region. **Error! Reference source not found.** presents the population a nd household change over ten years since 2011.

D.3.1.2 Human Health and Deprivation

The Waste Strategy has the potential to influence quality of life, including human health, well- being, amenity and community, through actions to improve waste collection systems and recycling practices.

In comparison to other regions of England, Essex has a higher-than-average life expectancy at birth for both males and females.

It has been shown that, in some cases, people in disadvantaged areas experience greater exposure to negative impacts on human health including air pollution, flooding, and proximity to large industrial and waste management sites[48]. The Index of Multiple Deprivation combines a number of indicators, chosen to cover a

[45] Pateman & Hodgson (2015) Biodiversity Climate change impacts report card technical paper. Available from: http://www.nerc.ac.uk/research/partnerships/lwec/products/report-cards/biodiversity/papers/source06/

[46] ONS (2022) Population and household estimates, England and Wales: Census 2021 - Office for National Statistics (ons.gov.uk)

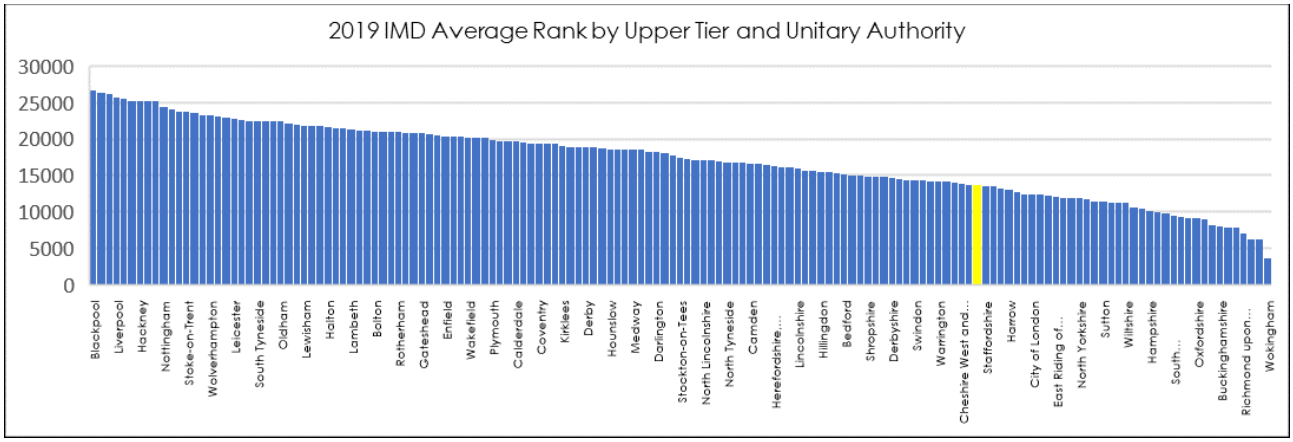
[47] ONS (2011) Population and household estimates - Office for National Statistics (ons.gov.uk)

[48] Defra (2006) Air Quality and Social Deprivation in the UK: an environmental inequalities analysis

range of economic, social and housing issues[49], into a single deprivation score for each Lower Super Output Area[50] (LSOA) in the UK. This allows each area to be ranked relative to one another according to their level of deprivation. The Indices are used widely to analyse patterns of deprivation, identify areas that would benefit from special initiatives or programmes and as a tool to determine eligibility for specific funding streams.

The 2019 Indices of Deprivation show that Essex compares favourably with other Local Authority regions. Essex has lower levels of deprivation than 70% of upper tier authority areas (County Councils in England). Compared to other counties in the south-east of England, the percentage of Essex residents living in the most deprived 20% of areas is amongst the highest in the south east. There is also a reported large gap between the most and least deprived districts with significant structural factors such as income and employment affecting deprivation in Essex. 75 neighbourhoods (LSOAs) in Essex, home to 120,000 Essex residents, are among the 20% most deprived nationally[51]. Figure D. 2[52] shows the county level rank for overall deprivation. Compared to other upper tier and unitary authorities in England, Essex is within the 30% least deprived areas nationally.

Figure D. 2 County level rank for overall deprivation



D.3.1.3 Human Health and Waste

Mismanagement of waste can have significant negative effects on human health through factors such as air pollution, water and soil contamination, increased risk of infection and transmissible disease, and direct interaction with dangerous substances from waste material (e.g. electronic and industrial waste).

Globally, around 54 million tonnes of e-waste (e.g. TVs, computers) are generated annually with this figure expected to increase to 75 million tonnes by 2030[53]. The United Kingdom has significantly higher recycling rates of e-waste compared to other international regions: global e-waste recycling rates were 17.4% in 2019 with the UK 67% in 2018[54,55]. Exposure to poorly managed e-waste has been reported to cause adverse health and developmental impacts in young children[56].

A report commissioned by the Environment Agency[57] identified evidence of socially unequal distribution of IPC sites (Integrated Pollution Control). It was found that significant sources of pollution are disproportionately situated in the more deprived areas in England. Waste sites, in particular, are disproportionately located in those areas with higher deprivation levels. Although there is evidence of a relationship between proximity to

[49] Income Deprivation, Employment Deprivation, Health Deprivation and Disability, Education Skills and Training Deprivation, Barriers to Housing and Services, Living Environment Deprivation, and Crime.

[50] Super Output Areas (SOAS) are a set of geographical areas developed following the 2001 census. The aim was to produce a set of areas of consistent size, whose boundaries would not change, suitable for the publication data of such as the Indices of Deprivation. They are an aggregation of adjacent Output Areas with similar social characteristics. Lower Layer Super Output Areas (LSOAs) typically contain 4 to 6 OAs with a population of around 1500.

[51] Essex County Council (2019) Changes in the Index of Multiple Deprivation for Essex: IMD 2019.

[52] Essex County Council (2019) Changes in the Index of Multiple Deprivation for Essex: IMD 2019.

[53] WHO (2019) Compendium of WHO and other UN guidance on health and environment. who_compendium_chapter4_v2_01092021.pdf

[54] ITU (2020) Global E-waste monitor 2020. Global E-waste Monitor 2020 (itu.int)

[55] Statista (2022) Recycling rate of electrical and electronic waste in the United Kingdom (UK) UK: e-waste recycling rate 2010-2018 | Statista

[56]WHO (2019) Electrical/electronic waste and children's health. Training for health care providers. Geneva (https://apps.who.int/iris/handle/10665/331057)

[57] Walker et al (2003). Environmental Quality and Social Deprivation. 1 (publishing.service.gov.uk)

IPC sites and areas of deprivation, this study was commissioned by the Environment Agency in 2003 with no recent, updated research carried out.

Hazardous waste or unsafe waste treatment can directly harm waste workers or vulnerable groups residing in local communities[58]. Improper waste collection has the potential to increase the risk of water borne diseases through the excess creation of environmental and marine pollution entering water bodies subsequently impacting drainage networks[59,60]. Extreme flooding events may increase the potential for direct impact pathways between contaminated waste and human health if waste is not managed in the correct manner.

Waste management industries are required to tackle environmental controls including noise pollution under the Environmental Permitting Regulations 2016. Material recovery facilities have processes which can emit noise levels exceeding 80dB (Lower Exposure Action Value) and 85dB (Upper Exposure Action Value) which require action to be taken under the Control of Noise at Work Regulations 2005[61]. Managing these risks can be achieved through controlling the noise at the source whilst also adopting reasonable practicable controls such as spatial management of site locations and adopting vehicles which contain 'quiet cabs'[62].

D.3.2 Future Baseline

In response to recent studies, access to the recreational resources, green spaces and the historic environment will have greater importance in future planning. The National Planning Policy Framework[63] suggests a range of areas that should be taken into account, including the provision of appropriate facilities for recreation that preserve the openness of the green belt.

The National Ecosystem Assessment[64] and the Marmot Review[65], *Fair Society, Healthy Lives*, demonstrate the positive impact that nature has on mental and physical health and as a result the Government intends to establish a Green Infrastructure Partnership with civil society to support the development of green infrastructure in England.

D.3.3 Key Issues

The key sustainability issues arising from the baseline assessment for population and human health are:

- The need to ensure waste sites and waste management are not disproportionately impacting deprived or vulnerable communities.
- The need to protect human health.
- The need to ensure continued improvements in levels of health across the region, particularly in urban areas and deprived areas.
- The need to ensure waste is not mismanaged so as to impact upon human health through chemicals, air pollution, land contamination and increased risk of infection and/or disease.
- The need to ensure high recycling rates are maintained.
- The need to accommodate an increasing population.
- The need to contribute towards maintaining sustainable growth in the region.

[58] WHO (2019) Compendium of WHO and other UN guidance on health and environment. who_compendium_chapter4_v2_01092021.pdf

[59] Ibid

[60] Solid Waste Management (MOOC). Open learning campus. Washington: World Bank Group; 2020 (https://olc.worldbank.org/content/solid-waste-management-mooc,

[61] Noise in the waste management and recycling industry (hse.gov.uk)

[62] Noise in Material Recovery Facilities (MRFs) (hse.gov.uk)

[63] Department for Levelling Up, Housing and Communities (2012) National Planning Policy Framework https://www.gov.uk/guidance/national-planning-policy-framework

[64] National Ecosystem Assessment Initiative (2022) NEA Initiative (ecosystemassessments.net)

[65] Marmot, M (2010) Fair society, healthy lives : the Marmot Review : strategic review of health inequalities in England post-2010. Department for International Development. https://www.gov.uk/research-for-development-outputs/fair-society-healthy-lives-the-marmot-review-strategic-review-of-health-inequalities-in-england-post-2010

D.4 WATER

D.4.1 Baseline

In the context of the Water Framework Directive (WFD), the water environment includes rivers, lakes, estuaries, groundwater and coastal waters out to one nautical mile. There are 5 operational catchments in the Essex combined management region; Blackwater; Chelmer; Colne Essex; Crouch and Roach; and Stour OC.

Provision and management of water resources is vital to human health, social wellbeing, and economic stability. Pollution and flooding events can have a significant impact on the economy, society and environment making it vitally important to manage, monitor and protect water resources. Water quality is assessed in England based on the General Quality Assessment classification which takes into account, chemical (e.g. dissolved oxygen, ammonia and biochemical oxygen demand) and biological (e.g. macroinvertebrates)[66] factors. Recent (2019) water quality statistics have found that nationally, only 16% of waters meet the criteria for 'good ecological status' [unchanged from 2016]. New monitoring techniques have been adopted to classify water bodies more accurately[67]. The 25 Year Environment Plan and Environment Act have now set ambitious water quality objectives and legally binding targets to improve the state of water bodies and concentrate on pollutants impacting the water environment.

The Essex Rivers Hub Partnership works to ensure rivers, wetlands and water resources are "resilient to changing climate and population growth, are richer in biodiversity, support a thriving economy and contribute to the well being of the citizens of Essex"[68]. Current challenges identified in the region include:

- Pollution from agriculture and rural areas
- Pollution from waste water
- Physical modifications: removal of redundant structures and modifications to increase ecological resilience

One of the wider challenges identified by the Essex Rivers Hub Partnership relevant to the Waste Management Strategy is to remove plastics and litter from the water environment.

Leachate is a liquid which drains or leaches from a landfill and has the potential to cause significant issues to human health, and the quality of surface water and groundwater due to leachate's chemical composition (dissolved organic chemicals, ammonia and metals). Infiltration due to rainfall can encourage leachate to enter water bodies and groundwater and must therefore be monitored and managed appropriately through groundwater risk assessments, and leachate management plans[69]. Liners can be used to create a seal against the liquid attempting to escape, mitigating against leachate entering water bodies.

Fly-tipping also poses a risk to watercourses. For 2020/2021, local authorities in England dealt with an increase of 16% since 2019/2020. Fly-tipping incidents to watercourse, compared to other land types is relatively low, however still poses a risk[70].

D.4.1.1 Flood Risk

The Essex Local Flood Risk Management Strategy[71] outline 9 objectives to inform, understand and manage flooding in the county. These include: ensuring people understand the risk of flooding; how flood risk is assessed and prioritised; ensure planning decisions consider flooding and future impact of any development; highlight detailed information and legislation regarding flooding. A measure set out by the local flood risk Strategy is keeping a record of structures of features which form part of local drainage strategies. This database has approximately 10,000 records and can be used to ensure flood planning is transparent and supported by data.

[66] Defra (2010) River water quality indicator - GOV.UK (www.gov.uk)

[67] Defra (2020) Latest water classifications results published - Defra in the media (blog.gov.uk)

[68] Environment Agency (2022) Essex Rivers Hub | Catchment Data Explorer

[69] Gov.uk (2022) Landfill operators: environmental permits. https://www.gov.uk/guidance/landfill-operators-environmental-permits/manage-leachate

[70] Defra (2021) Fly-tipping statistics for England, 2020-2021. https://www.gov.uk/government/statistics/fly-tipping-in-england/fly-tipping-statistics-for-england-2020-to-2021#total-number-of-fly-tipping-incidents-in-england

[71] Essex County Council (2018) essex-local-flood-risk-management-strategy.pdf

D.4.2 Future Baseline

Originally, the WFD set a target of aiming to achieve at least 'good status' in all waterbodies by 2015. However, provided that certain conditions are satisfied, it was acknowledged that in some cases the achievement of good status may be delayed until 2021 or 2027. The primary objective in the short-term is to ensure no deterioration in status between status classes: the 2015 water body classification is the baseline from which deterioration between classes is assessed; no deterioration between status classes is permitted unless certain and specific conditions apply.

The UK Climate Change Risk Assessment (CCRA3) 2021 Evidence Report[72] draws together and interprets the evidence gathered CCRA regarding current and future threats and opportunities for the UK posed by the impacts of climate change up until 2100. Findings of all CCRA assessments include:

- Changing climatic conditions and extreme events, including temperature change, water scarcity, wildfire, flooding, wind, and altered hydrology (including water scarcity, flooding and saline intrusion)
- Increasing pressure on the UK's water resources due to changes in hydrological conditions and regulatory requirements to maintain good ecological status
- Increases in water demand for irrigation of crops
- A reduction in public water supplies due to increasing periods of water scarcity
- Lower summer river flows across the UK due to warming and drying conditions
- An increase in precipitation in winter months due to a combination of greater depths and more frequent heavy rainfall events – suggesting larger volumes of runoff with potential negative impacts on flood risk and sewer overflows in urban environments
- Flash-flooding associated releases from combined sewer overflows (CSO) could in turn increase associated illnesses at the coast due to the varying occurrence of microbial pathogens in the marine environment.

D.4.3 Key Issues

- The need to further improve the quality of the region's river, estuarine and coastal waters taking into account WFD objectives and designated sites objectives (i.e. assessment against Common Standards Monitoring Guidance, where relevant).
- The need to maintain the quantity and quality of groundwater resources taking into account WFD objectives.
- The need to improve the resilience, flexibility and sustainability of water resources in the region, particularly in light of potential climate change on surface waters and groundwaters.
- The need to ensure sustainable abstraction to protect the water environment and meet society's needs for a resilient water supply.
- The need to ensure that people understand the value of water.

D.5 SOIL, GEOLOGY AND LAND-USE

D.5.1 Baseline

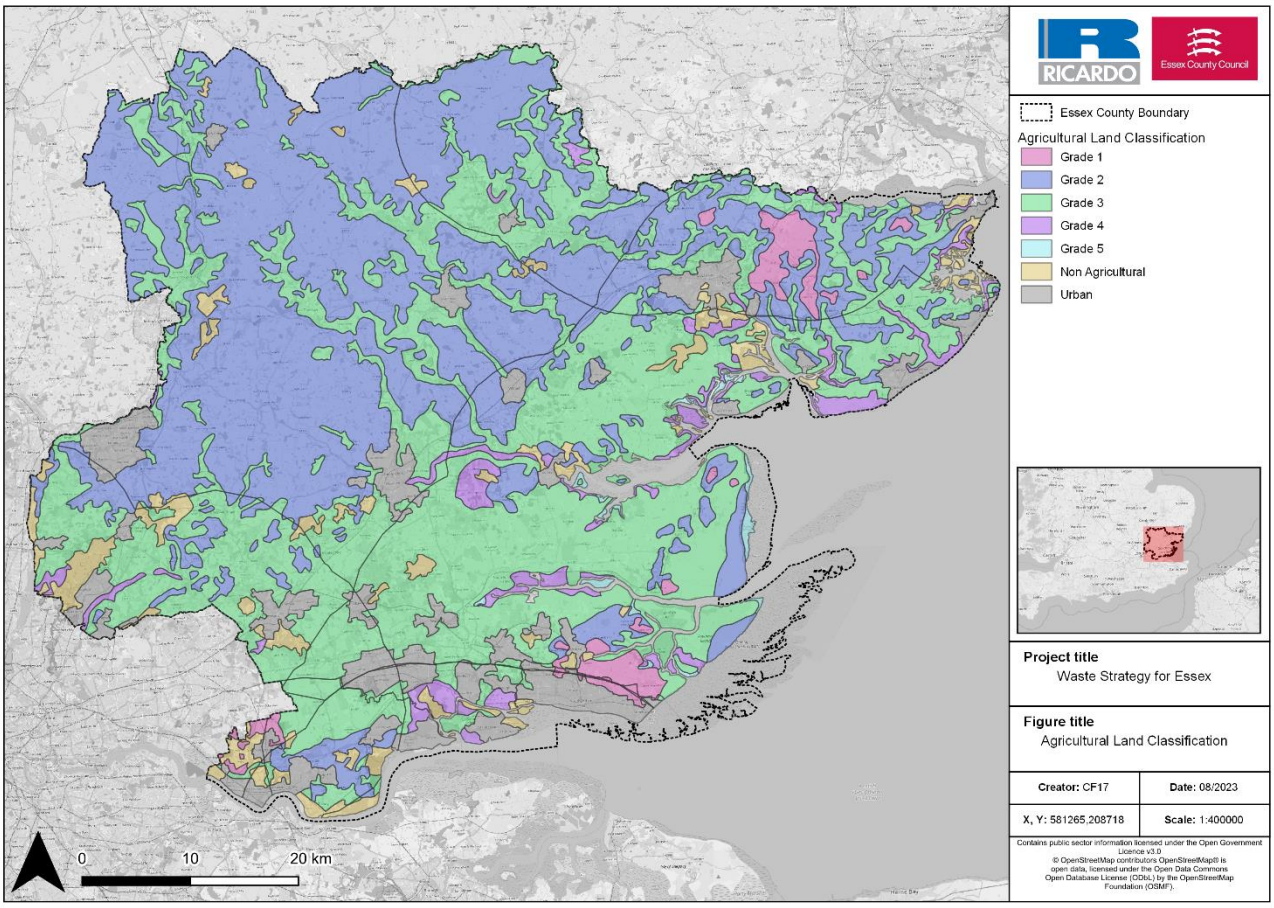
D.5.1.1 Agricultural Land Classification

The county region of Essex has a varying degree of Agricultural Land ranging from Urban to Excellent as shown in Figure D. 3. The Agricultural Land Classification (ALC) provides a method for assessing the quality of land and farmland to help enable choices with the intention of protecting the best and most versatile agricultural land[73]. With respect to the Waste Strategy for Essex, the ALC database should be utilised to ensure Strategy scenarios do not have negative impacts on best and most versatile agricultural land.

[72] Defra (2016) The UK Climate Change Risk Assessment 2017 Evidence Report

[73] Natural England (2012) Agricultural Land Classification: protecting the best and most versatile agricultural land (TIN049)

Figure D. 3 Agricultural Land Classification in Essex County Council



D.5.1.2 Geology

The Essex County region is diverse and with a relatively young geology. A significant proportion of the region is made up of London clay in the East and South of the area, with Glacial Till being in the North/North West[74]. The geodiversity of Essex is typically subdued relief with gentle slopes resulting in a soft, young underlying geology. This geology generally produces, arable and fertile soil[75].

Three National Character Areas (NCAs) dominate the Essex region and their characteristics, geology and features are discussed below:

Greater Thames Estuary – predominantly a remote, tranquil landscape with shallow creeks, drowned estuaries, low-lying islands, mudflats, tidal salt march and reclaimed grazing marsh lying between the North Sea and rising ground inland. This NCA contains some of the least settled areas on the English coasts with few major settlements and medieval patterns of small villages and hamlets on higher ground. Sea defences are present which protect large areas of reclaimed grazing marsh. A number of historic military landmarks characterise the coastal landscape[76].

Northern Thames Basin – the area is diverse extending from Hertfordshire to the Essex coast. Included in the NCA are suburbs of North London with historic and planned new towns and cities throughout the area. Arable agriculture is a dominant industry in the area with soil quality ranging from good to poor quality. The London Clay proves poor quality soil becoming waterlogged in the winter and cracking/shrinking in the summer. Good quality soil is found in alluvial deposit areas from the Thames and other rivers. There is a rich geodiversity, archaeology, history and diverse landscape in the area. Urban expansion is a feature of the area with significant pressure on the area in terms of housing, schooling and other critical infrastructure[77].

[74] GeoEssex (2022) Essex Geology - GeoEssex
[75] GeoEssex (2013) essex_lgap_final_march_2013.pdf (geoessex.org.uk)
[76] NCA Profile: 81 Greater Thames Estuary - NE473 (naturalengland.org.uk)
[77] NCA Profile:111 Northern Thames Basin - NE466 (naturalengland.org.uk)

South Suffolk and North Essex Clayland – the NCA covers four counties including Essex. The ancient landscape is wooded arable countryside with a character of gently undulating, chalky boulder clay plateau. A complex network of species-rich hedgerows, ancient woods and parks, meadows with streams and rivers characterise the area. Traditional irregular field patterns are discernible over the area despite field enlargements in the 20th century. The soil is moderately fertile, chalky clay giving the vegetation a calcareous character. Gravel and sand deposits are important geological features typically exposed during mineral extraction which also provide a great deal of evidence in understanding ice-age environmental change[78].

D.5.1.3 Landfill

There are 534 landfill facilities in England, 24 more than in 2016. In the Essex region, there are 33 permitted landfill sites that are currently operating. Historically, landfills in the United Kingdom were the most common option for waste disposal and for certain waste types are still recognised as the Best Practicable Environmental Scenario (BPES). However, certain rules apply to waste before they are disposed in landfill, such as classifying of the waste, treatment, and confirmation that waste can be accepted[79]. UK biodegradable municipal waste (BMW) sent to landfill has fallen from approximately 6.6 million tonnes in 2019 to around 6.1 million tonnes in 2020.[80]

'Soils' make up 58% and 'mineral wastes' 6% received by landfills. The two other features of waste at landfills are 'household & similar wastes' (10%) and 'other wastes' (26%) [includes 'sorting residues', typically mixed wastes following processing to remove recyclates[81].

D.5.2 Future Baseline

One of the core planning principles of the NPPF is to encourage the effective use of land by reusing land that has been previously developed (brownfield land), provided that it is not of high environmental value. The NPPF also places great importance with respect to Green Belt policy, the aim of which is to prevent urban sprawl by keeping land permanently open. The Green Belt policy serves five purposes: to check the unrestricted sprawl of large built-up areas; to prevent neighbouring towns merging into one another; to assist in safeguarding the countryside from encroachment; to preserve the setting and special character of historic towns; and to assist in urban regeneration, by encouraging the recycling of derelict and other urban land. Although the NPPF promotes a presumption in favour of sustainable development, this does not apply where proposed developments may affect European or other designated sites covered by specific policies.

D.5.3 Key Issues

The key sustainability issues arising from the baseline assessment for soil, geology and land use are:

- The need to encourage effective use of the land, benefitting landowners, other stakeholders, the environment and sustainability of natural resources.
- The need to apply the Waste Hierarchy; prioritising prevention, enhancing recycling and reducing the amount of waste going to landfill.

D.6 AIR AND CLIMATE

D.6.1 Baseline

The scenarios in the Waste Strategy may include increased numbers of vehicles on the road, operational and process changes at existing locations and development of new infrastructure. Therefore, there is potential for adverse effects on air quality and climate through emissions associated with construction (on site and transport) or through the operation of the schemes.

D.6.1.1 Greenhouse Gases and Climate Change

Robust information on climate change and variability is required to adapt, build resilience and inform decision making. UK Climate Projections 2018 (UKCP18) are the latest national climate projections and provide the most recent scientific evidence on projected climate changes.

---

[78] NCA Profile: 86 South Suffolk and North Essex Clayland - NE515 (naturalengland.org.uk)

[79] Gov.uk (2021) Dispose of waste to landfill. https://www.gov.uk/guidance/dispose-of-waste-to-landfill

[80] Defra (2022) UK Statistics on waste. UK statistics on waste - GOV.UK (www.gov.uk)

[81] Defra (2022) UK Statistics on waste. UK statistics on waste - GOV.UK (www.gov.uk)

The average temperature over the past decade has been on average 0.3°C warmer than the 1981-2010 average and 0.9 °C warmer than the 1961-1990 average. All the top ten warmest years for the UK, in the series from 1884, have occurred since 2002[82]. The highest ever summer temperature was recorded in the East of England with 38.7°C at Cambridge Botanic Gardens (2019). The UK is experiencing wetter days than the previous decade, with an increase of 5% more rain than 1961-1990 and average UK extreme rainfall increasing. However, given the geography of the East of England, there are not significant total rainfall increases seen during extreme rain events.

The UK Climate Change Risk Assessment (CCRA3) 2021 Evidence Report, which is required to conduct its assessment every five years[83], draws together and interprets evidence gathered by CCRA regarding current and future threats and opportunities for the UK posed by the impacts of climate change up until 2100. Overall, the findings of the CCRA3 have identified eight priority areas for Government and other organisations to address within the next five years:

- Risks to the viability and diversity of terrestrial and freshwater habitats and species from multiple hazards
- Risks to soil health from increased flooding and drought
- Risks to natural carbon stores and sequestration from multiple hazards leading to increased emissions
- Risks to crops, livestock and commercial trees from multiple hazards
- Risks to supply of food, goods and vital services due to climate-related collapse of supply chains and distribution networks
- Risks to people and the economy from climate-related failure of the power system
- Risks to human health, well-being and productivity from increased exposure to heat in homes and other buildings
- Multiple risks to the UK from climate change impacts overseas.

The UK Climate Change Act 2008 set legally binding targets for the UK to reduce greenhouse gas emissions by at least 80% by 2050, and CO2 emissions by at least 26% by 2020, both set against a 1990 baseline. Under the requirements of the Act, the Government has set five year carbon budgets to set out a trajectory for emissions reductions to 2050. Budgets have been set covering the periods 2008-12, 2013-17, 2018-22, 2023-27 and 2028-32, equivalent to 22%, 28%, 34%, 50% and 57% reductions in carbon emissions compared to 1990 levels respectively. The National Adaptation Programme (NAP)[84] is currently in its second period [2018-2023] which sets out the actions that government and others will take to adapt to climate change challenges in England. The NAP addresses climate risks which could affect the natural environment, critical infrastructure, communities and businesses and consequently explains associated actions and future responses on risks such as flooding and coastal change, risks to health from high temperatures, and risk of public water supply shortages[85].

D.6.1.2 Landfills and Greenhouse Gases

The IPCC, in the latest Climate Change Report, identified that waste management as a sector is a significant global producer of methane and an important contributor to global warming[86]. Landfill sites contain biodegradable waste which produces greenhouse gases such as methane and carbon dioxide[87]. Emissions from landfill do not arise immediately and can take place at differing timescales dependent on the greenhouse gas and waste type. Greenhouse gas emissions from UK landfill in 2020 were 12.8 million metric tonnes $CO_{2e,}$ down from 24.3 in 2010[88]. Landfill gas emissions make up 3.1% of the total UK greenhouse gas emissions with Waste Management as a whole making up 4.2% (2019)[89].

---

[82] Met Office (2022) ukcp18_headline_findings_v4_aug22.pdf (metoffice.gov.uk)

[83] Defra (2021) The UK Climate Change Risk Assessment 2021 Evidence Report. Available at: https://www.theccc.org.uk/wpcontent/uploads/2021/07/Independent-Assessment-of-UK-Climate-Risk-Advice-to-Govt-for-CCRA3-CCC.pdf

[84] Defra (2018) The National Adaptation Programme and the Third Strategy for Climate Adaptation Reporting. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/727252/national-adaptation-programme-2018.pdf

[85] DEFRA (2018) The National Adaptation Programme and the Third Strategy for Climate Adaptation Reporting. Available at: nationaladaptation-programme-2018.pdf (publishing.service.gov.uk)

[86] IPCC (2021) Short-lived Climate Forcers: Chapter 6 https://report.ipcc.ch/ar6/wg1/IPCC_AR6_WGI_FullReport.pdf

[87] Defra (2004) Review of Environmental and Health Effects of Waste Management: Municipal Solid Waste and Similar Wastes. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/69391/pb9052a-health-report-040325.pdf

[88] UK: landfill greenhouse gas emissions 2010-2020 | Statista

[89] BEIS (2019) final-greenhouse-gas-emissions-tables-2019.xlsx (live.com)

Climate mitigation models have suggested that strong decreases of CO_2 emissions and other 'Short-lived Climate Forcers' are dependent on reductions in methane production from waste activities[90].

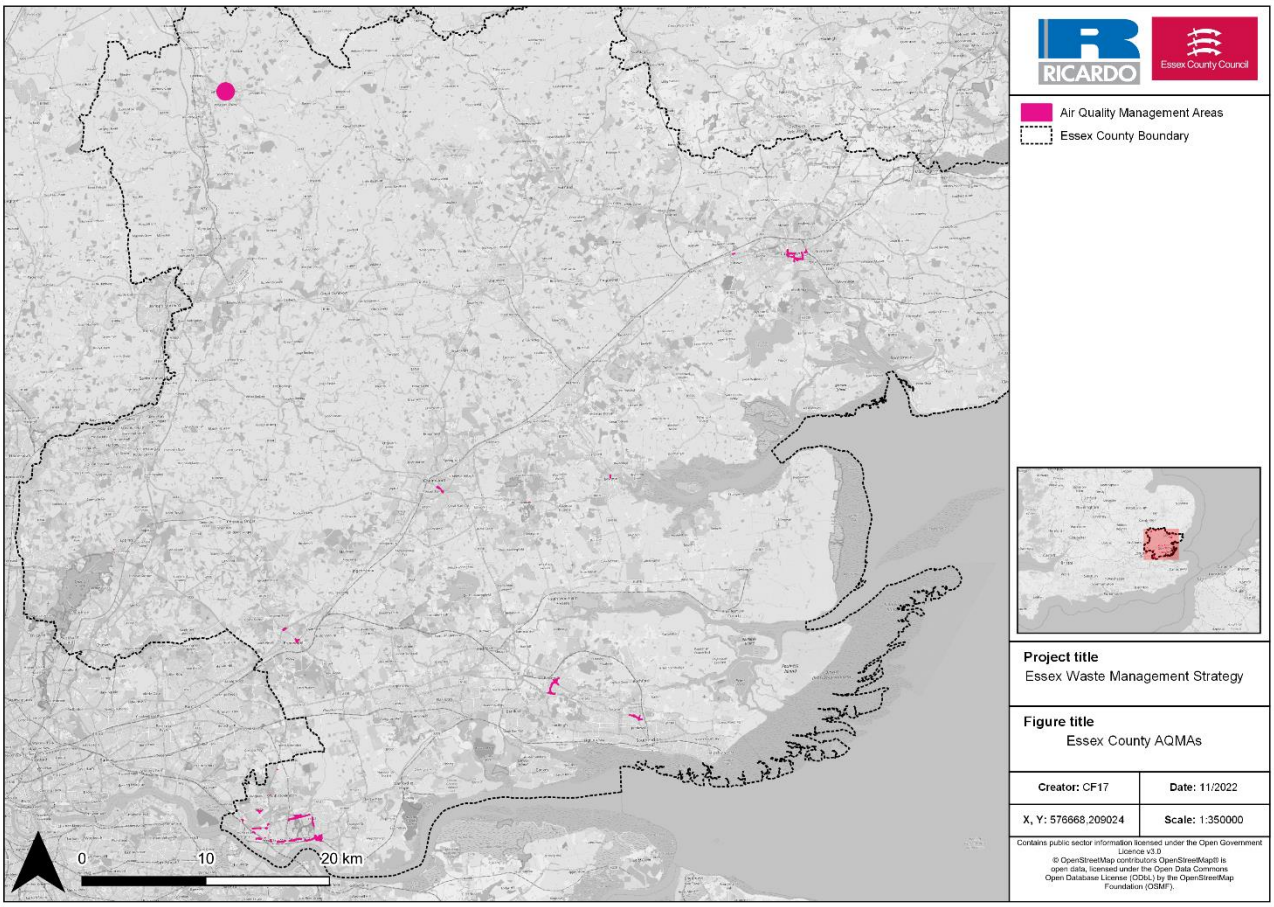
D.6.1.3 Air Quality

The air quality baseline can be best described through reference to information produced by the local authorities in Essex that have declared Air Quality Management Areas (AQMA). A local authority declares an AQMA when UK National air quality objectives are unlikely to be met. The majority of the AQMAs in the UK have been declared because of emissions from road transport.

Scenarios within the Waste Strategy may include a change in waste vehicle types or frequency of vehicles on the roads which may have an impact on vehicle emissions and associated local air quality. Reference to AQMAs will be made when considering any adverse impacts on air quality of the Waste Strategy scenarios.

30 AQMAs are located within the Essex County Council region and are presented in Figure D. 4.

Figure D. 4 AQMAs located in the Essex County Council region



D.6.2 Future Baseline

Government and international targets will require significant cuts in greenhouse gas emissions by 2027. The UK met the first and second carbon budgets with headrooms of 36 and 384 MtCO2e respectively and is currently projected to meet the third carbon budget with a headroom of around 26 MtCO2e (until 2022)[91]. Objectives are being achieved for many air pollutants (lead, benzene, 1,3-butadiene and carbon monoxide (CO)). However, measurements show that long-term reducing trends for NO_2[92] and PM_{10}[93] are flattening or

[90] IPCC (2021) Short-lived Climate Forcers: Chapter 6 https://report.ipcc.ch/ar6/wg1/IPCC_AR6_WGI_FullReport.pdf

[91] DECC (2020) Updated energy and emissions projections 2019. Available at: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/931323/updated-energy-andemissions-projections-2019.pdf

[92] Nitrogen Dioxide

[93] Particulates with a diameter of 10µm or less

even reversing at a number of locations, despite current policy measures.

The Government's Net Zero ambition is to "*reduce emissions by 78% by 2035 compared to 1990 levels, taking the UK more than three-quarters of the way to reaching net zero by 2050*"[94]. Measuring waste management activities using the generation of carbon emissions as a key metric will be required to monitor performance against this target.

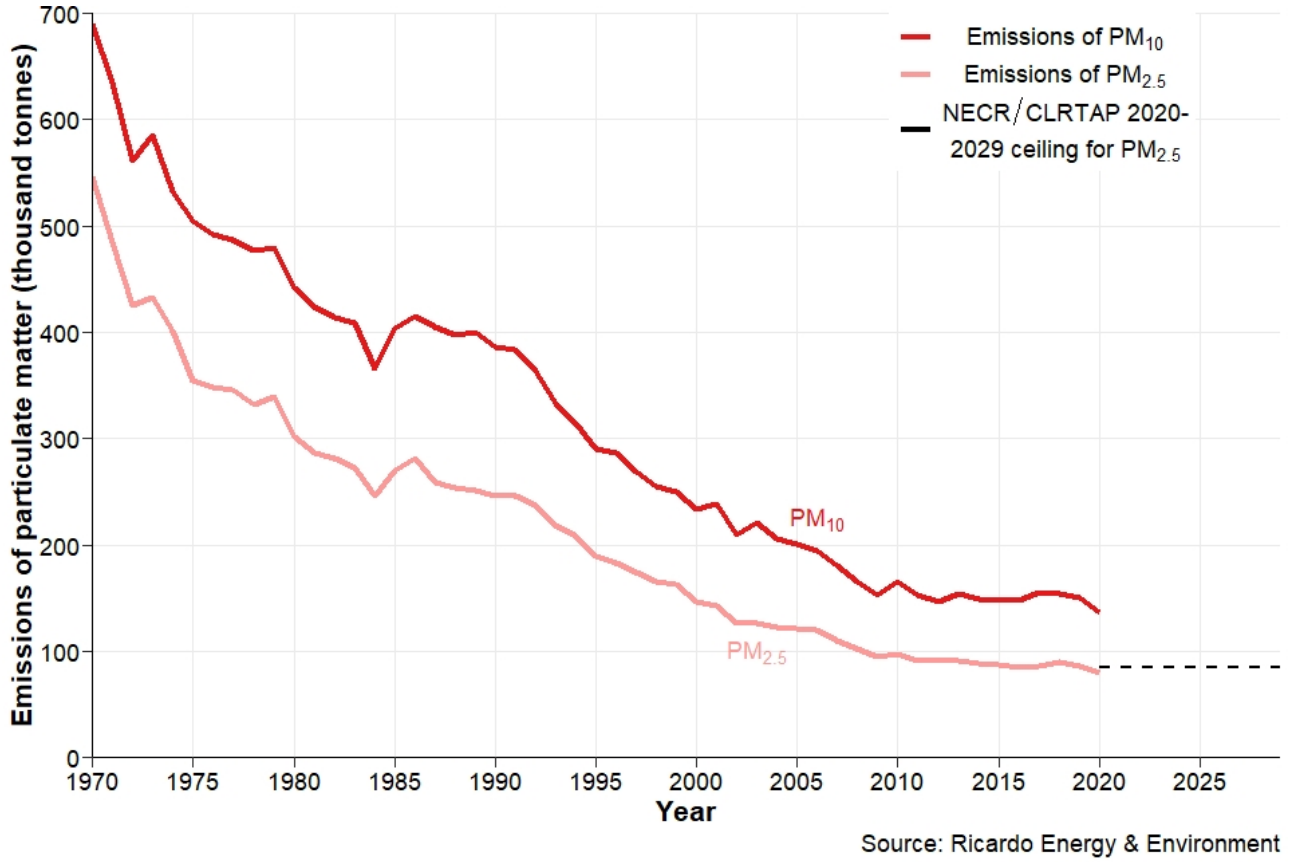
Future climate change is projected (UKCP18) to cause a change in the seasonality of extremes through an extension of the convective season from summer to autumn, with increases in heavy rainfall intensity in the autumn. Although an overall summer drying trend is to be expected in the future, data from the Met Office's UK Climate Projections (UKCP18 [Local 2.2km] projections) suggest increases in heavy summer rainfall event intensity[95]. The UKCP18 also estimates that summers in central England are likely to be between 1.1°C to 5.8°C warmer, 57% drier and 9% wetter[96].

Emissions of PM_{10} and $PM_{2.5}$ have been relatively stable since 2009. The Government's aim was to reduce emissions of $PM_{2.5}$ against the 2005 baseline by 30% by 2020, and 46% by 2030. The trends in total annual emissions from 1970 to 2020[97] are shown in Figure D. 5.

There is a target to decrease emissions of NO_2 against the baseline of 2005 by 55% by 2020. There has been an average decline of 1.3% between 1997 and 2021[98]. Targets to reduce emissions of sulphur dioxide against the 2005 baseline have been set at decreases of 59% by 2020, moving to 88% by 2030[99]. Emissions of sulphur dioxide have fallen by 98 per cent since 1970, to 136 thousand tonnes in 2020[100].

[94] UK enshrines new target in law to slash emissions by 78% by 2035 - GOV.UK (www.gov.uk)
[95] Met Office (2021) UK Climate Projections: Headline Findings
[96] Defra, BEIS, the Met Office and the Environment Agency (2018) – UKCP18 Climate Change Over Land: https://www.metoffice.gov.uk/binaries/content/assets/metofficegovuk/pdf/research/ukcp/ukcp18-infographicheadlinefindings-land.pdf
[97] Emissions of air pollutants in the UK – Particulate matter (PM10 and PM2.5) - GOV.UK (www.gov.uk)
[98] Concentrations of nitrogen dioxide - GOV.UK (www.gov.uk)
[99] Defra (2019), Clean Air Strategy 2019
[100] Emissions of air pollutants in the UK – Sulphur dioxide (SO2) - GOV.UK (www.gov.uk)

Figure D. 5 Annual emissions of PM10 and PM2.5 in the UK: 1970-2020



Residual waste in landfill sites can remain in situ for multiple years. The degradation process of landfill waste releases greenhouse gases such as methane and carbon dioxide and can take place over a long period of time. Future baseline of landfill emissions is therefore variable and uncertain. Landfill emissions can also be affected by the influence of climate change through decomposition rates being affected by higher temperatures and rainfall variations[101]. Other waste management activities can be affected by changing climate with examples shown in Table D. 4[102].

Controlling landfill gas is important to minimise local environmental issues and limit the contribution of greenhouse gases. Best practice in England for managing landfill gas is to collect the gas and use it as an energy source to generate electricity or simply burnt as a flare. These two approaches involve the process of oxidation of methane to carbon dioxide. As gas yields and methane concentrations vary over time in light of climatic change, these common oxidation techniques become less effective. In light of this, waste managers should use guidance and framework to identify the best technology available (e.g heat and power generation; high temperature flares; micro power generation; biofilters; biocovers) relevant to individual scenarios. Key variables include: methane concentrations, whether a landfill site has an active extraction system; whether a landfill site has an electrical grid connection; technical performance of technology; capital and operational costs; emissions from the technology (noise, air quality, odour)[103].

[101] Environment Agency (2003) Potential Impacts of Climate Change on Waste Management. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/290358/sx1-042-tr-e-e.pdf
[102] Environment Agency (2003) Potential Impacts of Climate Change on Waste Management. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/290358/sx1-042-tr-e-e.pdf
[103] Environment Agency (2017) Landfill methane oxidation techniques. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/650318/Landfill_methane_oxidation_techniques_-_report.pdf

Table D. 4 Climate Change Impacts on Waste Management Processes

Climate Variation	Waste Management Change
Higher Temperatures	Alter waste decomposition rates
	Reduced water availability altering site hydrology and leachate production
	Reduced water availability increasing the strength of leachate as a result of dilution reductions
	Increased risk of water borne disease transmission
	Increased risk of odour nuisance
Reduced Precipitation in summer	Reduce waste decomposition rates
	Increase leachate strength
	Reduce water availability for site management
	Increase risk of shrinkage in clay lining and capping layers
Increased Precipitation in Winter	Increased waste decomposition rates
	Increased risk of flooding and pollution incidents
	Increase leachate production
Increase of extreme weather (e.g storms)	Lead to increased incidents of windblown litter and debris
	Increased infrastructure damage and risk of pollution incidents.

D.6.3 Key Issues

The key sustainability issues relevant to the Waste Strategy and the SEA, arising from the analysis of the air quality and climate baseline are:

- the need to minimise emissions of pollutant gases and particulates and enhance air quality;
- the need to reduce the need to travel and promote sustainable modes of transport;
- the need to reduce greenhouse gas emissions arising from implementation of the Waste Strategy;
- the need to take into account, and where possible adapt to, the potential effects of climate change;
- the need to increase environmental resilience to the effects of climate change.

D.7 ARCHAEOLOGY AND CULTURAL HERITAGE

D.7.1 Baseline

Table D. 5 outlines the designated heritage assets in the Essex County region[104].

Table D. 5 Designated heritage assets in Essex

Asset	Essex
World Heritage Site	0
Scheduled Monuments	303
Conservation Areas	210
Listed Buildings	13992
Registered Parks and Gardens	39
Registered Historic Battlefields	1

[104] Historic England - Championing England's heritage | Historic England

Asset	Essex
Protected Historic Wrecks	0

D.7.2 Future Baseline

Core planning principles in the NPPF include those aiming to protect heritage assets, including "conserve heritage assets in a manner appropriate to their significance, so that they can be enjoyed for their contribution to the quality of life of this and future generations"[105]. Recent and ongoing national economic difficulties may have a negative effect on removing heritage assets from the heritage at risk register. Climate change could have variable impacts on heritage assets in the future. Some types of assets and landscapes have already experienced and survived significant climatic changes in the past and may demonstrate considerable resilience in the face of future climate change. However, many more historic assets are potentially at risk from the direct impacts of future climate change[106].

D.7.3 Key Issues

The key sustainability issue arising from the baseline assessment for archaeology and cultural heritage is:

- The need to conserve or enhance sites of archaeological importance and cultural heritage interest.

D.8 LANDSCAPE AND VISUAL AMENITY

D.8.1 Baseline

The landscape character network[107] defines landscape character as 'a distinct, recognisable and consistent pattern of elements in the landscape that makes one landscape different from another, rather than better or worse'. The National Character Areas have been identified in the Essex County region in Section 3.6.

D.8.1.1 Nationally Designated Sites

Some landscapes are special because they have a particular amenity value, such as those designated as Areas of Outstanding Natural Beauty (AONB). Others may have an intrinsic value as good examples or be the only remaining examples of a particular landscape type. Two AONBs are situated within the Essex County border, Dedham Vale and Suffolk Coast & Heaths. Some landscapes are more sensitive to development whereas others have a greater capacity to accommodate development. Assessments of landscape character and landscape sensitivity enable decisions to be made about the most suitable location of development to minimise impacts on landscapes. Another important protected landscape assets in the UK are National Parks, however no National Parks are located within the Essex County area and therefore not applicable to this report.

D.8.1.2 Green Belt

The main characteristics of Green Belt are its openness and permanence. The main aim of Green Belt policy is to prevent urban sprawl by keeping land permanently open. The Green Belt therefore aims to check the unrestricted sprawl of large built-up areas; prevent neighbouring towns merging into one another; assist in safeguarding the countryside from encroachment; preserve the setting and special character of historic towns; and assist in urban regeneration while encouraging the recycling of derelict and other urban land.

Large areas of the South and South West of the council region are Green Belt, with no Green Belt areas in the Northern reaches of Essex. A total of 16 Green Belts are located in Essex.

D.8.2 Future Baseline

The NPPF highlights the different roles and character of different areas, promoting the vitality of our main urban areas, protecting the Green Belts around them, recognising the intrinsic character and beauty of the countryside and supporting thriving rural communities within it. The NPPF states that great weight should be given to conserving landscape and scenic beauty in National Parks and AONBs, which have the highest status

[105] CLG (2012) National Planning Policy Framework, Communities and Local Government. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/6077/2116950.pdf

[106] English Heritage, now known as Historic England, (2010) Climate Change and the Historic Environment

[107] www.landscapecharacter.org.uk

of protection. It identifies that planning permission should be refused for major developments in these designated areas except in exceptional circumstances and where it can be demonstrated they are in the public interest.

D.8.3 Key Issues

The key sustainability issue arising from the baseline assessment for landscape and visual amenity is:

- Landscape and designated sites should be maintained and enhanced for the enjoyment of the public.

T: +44 (0) 1235 75 3000
E: enquiry@ricardo.com
W: ee.ricardo.com