

# Appendices to the Appraisal of Sustainability Site Report for Bradwell

EN-6: Revised draft National Policy Statement for Nuclear Power Generation

## **Appraisal of Sustainability of the revised draft Nuclear National Policy Statement**

The Appraisal of Sustainability (AoS), incorporating Strategic Environmental Assessment, of the revised draft Nuclear National Policy Statement (Nuclear NPS) has been undertaken at a strategic level. It considers the effects of the proposed policy at a national level and the sites to be assessed for their suitability for the deployment of new nuclear power stations by 2025. These strategic appraisals are part of an ongoing assessment process that started in March 2008 and, following completion of this AoS, will continue with project level assessments when developers make applications for development consent in relation to specific projects. Applications for development consents to the Infrastructure Planning Commission will need to be accompanied by an Environmental Statement having been the subject of a detailed Environmental Impact Assessment.

**The AoS/SEA Reports are presented in the following documents:**

### **AoS Non-Technical Summary**

#### **Main AoS Report of revised draft Nuclear NPS**

Introduction  
Approach and Methods  
Alternatives  
Radioactive Waste  
Findings  
Summary of Sites  
Technical Appendices

#### **Annexes to Main AoS Report: Reports on Sites**

Site AoS Reports  
Technical Appendices

All documents are available on the website of the Department of Energy and Climate Change at <http://www.energynpsconsultation.decc.gov.uk>

This document is the Appendices to the Appraisal of Sustainability Site Report for Bradwell. These appendices have been prepared by the Department of Energy and Climate Change with expert input from a team of specialist planning and environmental consultancies led by MWH UK Ltd with Enfusion Ltd, Nicholas Pearsons Associates Ltd, Studsvik UK Ltd and Metoc plc.

# Contents

<b>Appendix 1: Sustainable Development Themes and AoS Objectives .....</b>	<b>4</b>
<b>Appendix 2: Appraisal Matrices .....</b>	<b>8</b>
<b>Appendix 3: Plans and Programmes Review (Regional).....</b>	<b>60</b>
<b>Appendix 4: Baseline Information .....</b>	<b>735</b>

## Appendix 1: Sustainable Development Themes and AoS Objectives

\* Note: additional decision-aiding questions to aid appraisal have been added in red text.

AoS/SEA Objective (Numbers refer to Scoping Report and Environmental Study)	Guide Questions
<b>Air Quality</b>	
12. To avoid adverse impacts on air quality	Will it result in the release of low level radionuclides that may adversely affect human health or biodiversity? Will it contribute to an increase in the number or expansion of AQMAs?
<b>Biodiversity and Ecosystem Services</b>	
1. To avoid adverse impacts on the integrity of wildlife sites of international and national importance 2. To avoid adverse impacts on valuable ecological networks and ecosystem functionality 3. To avoid adverse impacts on Priority Habitats and Species including European Protected Species	Will it result in the loss of habitats of international/national importance? Will it affect other statutory or non-statutory wildlife sites? Will it result in harm to internationally or nationally important or protected species? Will it adversely affect the achievement of favourable conservation status for internationally and nationally important wildlife sites? Will it affect the structure and function/ecosystem processes that are essential to restoring, securing and/or maintaining favourable condition of a feature or a site? Will the proposal enable the BAP targets for maintenance, restoration and expansion to be met? Will the proposal result in changes to coastal evolution that is otherwise needed to sustain coastal habitats? Will it result in the release of harmful substances for example oil, fuel and other pollution into waterbodies which could affect aquatic ecosystems? Will it result in the accidental migration of radionuclides which could harm aquatic or terrestrial ecosystems? Will it result in changes to stream hydrology and morphology that could affect aquatic or terrestrial ecosystems? Will it result in thermal discharges that could adversely affect aquatic ecosystems? Will it result in soil contamination that could damage aquatic or terrestrial ecosystems?
<b>Climate Change</b>	
13. To minimise greenhouse gas emissions	Will it take account of future effects and risks of climate change for example sea level rise? Will future changes in weather patterns be considered? Will it result in increased vehicular emissions (particularly carbon dioxide)? Will it result in increased emissions from asset construction, maintenance and demolition, waste recycling and disposal or other activities ? Note: Adaptation to climate change is discussed in other relevant topic appraisals, eg. biodiversity, water, flood risk.

AoS/SEA Objective (Numbers refer to Scoping Report and Environmental Study)	Guide Questions
<b>Communities: Population, Employment and Viability</b>	
4. To create employment opportunities 5. To encourage the development of sustainable communities 10. To avoid adverse impacts on property and land values and avoid planning blight	Will it create both temporary and permanent jobs in areas of need? Will it result in in-migration of population? Will it result in out-migration of population? Will it affect the population dynamics of nearby communities (age-structure)? Will it result in a decrease in property and land values as a result of a change in perceptions or blight?
<b>Communities: Supporting Infrastructure</b>	
8. To avoid adverse impacts on the function and efficiency of the strategic transport infrastructure 9. To avoid disruption to basic services and infrastructure	Will it result in changes to services and service capacity in population centres? Will it result in the direct loss of strategic road/rail/air/port infrastructure? Will it result in increased congestion/pressure on key transport infrastructure? Will it result in loss or disruption to basic services and infrastructure (for example electricity, gas)? Will it place significant pressure on local/regional waste management facilities (non-nuclear waste)?
<b>Human Health and Well-Being</b>	
6. To avoid adverse impacts on physical health 7. To avoid adverse impacts on mental health 11. To avoid the loss of access and recreational opportunities, their quality and user convenience	Will it adversely affect the health of local communities through accidental radioactive discharges or exposure to radiation. Will the storage of radioactive waste result in adverse physical and mental health effects for local communities? Will exposure to noise and vibration as a result of plant activities lead to physical and mental health impacts on nearby communities? Will it adversely affect the health of the workforce? Will the perceptions of adverse risk as a result of activities lead to adverse impacts on mental health for nearby communities? Will it result in the loss of recreational and amenity land or loss of access? Will it adversely affect the ability of an individual to enjoy and pursue a healthy lifestyle?
<b>Cultural Heritage</b>	
22. To avoid adverse impacts on the internationally and nationally important features of the historic environment. 23. To avoid adverse impacts on the setting and quality of built heritage,	Will it adversely affect historic sites of international/national importance and their setting? Will it adversely affect other historic sites of known value? Will it adversely affect landscapes of historic importance?

AoS/SEA Objective (Numbers refer to Scoping Report and Environmental Study)	Guide Questions
archaeology and historic landscapes	
<b>Landscape</b>	
24. To avoid adverse impacts on nationally important landscapes 25. To avoid adverse impacts on landscape character, quality and tranquillity, diversity and distinctiveness	Will it adversely affect landscapes within or immediately adjacent to a National Park? Will it adversely affect landscapes in or immediately adjacent to an AONB or NSA? Will it adversely affect Heritage Coast or Preferred Conservation Zones? Will it adversely affect local landscapes/townscapes of value? Will it affect the levels of tranquillity in an area? Will it adversely affect the landscape character or distinctiveness? Will it result in increased levels of light pollution?
<b>Soils, Geology and Land Use</b>	
19. To avoid damage to geological resources 20. To avoid the use of greenfield land and encourage the re-use of brownfield sites 21. To avoid the contamination of soils and adverse impacts on soil functions	Will it result in the compaction and erosion of soils? Will it lead to the removal or alteration of soil structure and function? Will it lead to the contamination of soils which would affect biodiversity and human health? Will it compromise the future extraction/ use of geological/ mineral reserves? Will it result in the loss of agricultural land? Will it lead to damage to geological SSSIs and other geological sites? Will it result in the loss of Greenfield land? Will it adversely affect land under land management agreements?
<b>Water: Hydrology and Geomorphology</b>	
15. To avoid adverse impacts on surface water hydrology and channel geomorphology (including coastal geomorphology)	Will it result in the increased sedimentation of watercourses? Will it adversely affect channel geomorphology? Will hydrology and flow regimes be adversely affected by water abstraction? Will it result in demand for higher defence standards that will impact on coastal processes? Can the higher defence standards be achieved without compromising habitat quality and sediment transport?
<b>Water: Water Quality</b> (including surface, coastal and marine)	
16. To avoid adverse impacts on surface water quality (including coastal and marine water quality) and assist achievement of Water Framework Directive objectives	Will it cause deterioration in surface water quality as a result of accidental pollution, for example spillages, leaks? Will it cause deterioration in coastal and / or marine water quality as a result of accidental pollution, for example spillages, leaks? Will it cause deterioration in surface water quality as a result of the disturbance of contaminated soil? Will it cause deterioration in coastal and / or marine water as a result of the disturbance of contaminated soil?

AoS/SEA Objective (Numbers refer to Scoping Report and Environmental Study)	Guide Questions
	Will it affect designated Shellfish Waters? Will it affect Freshwater Fish Directive sites? Will it increase turbidity in water bodies? Will it increase the temperature of the water in water bodies?
<b>Water: Water Supply and Demand</b>	
17. To avoid adverse impacts on the supply of water resources	Will it adversely affect water supply as a result of abstraction? Will it increase demand for water?
<b>Water: Groundwater Quality and Flow</b>	
18. To avoid adverse impacts on groundwater quality, distribution and flow and assist achievement of Water Framework Directive objectives	Will it cause deterioration in groundwater quality as a result of accidental pollution, for example spillages, leaks? Will it cause deterioration in groundwater quality as a result of the disturbance of contaminated soil?
<b>Flood Risk</b>	
14. To avoid increased flood risk (including coastal flood risk) and seek to reduce risks where possible	Will it result in demand for higher defence standards that will impact on coastal processes?

## Appendix 2: Appraisal Matrices

Key to Appraisal				
Key to appraisal of Strategic Effects:			Abbreviations:	
Significance		Category of effect	Timescale	
++	Major Significant	Development actively encouraged as it would resolve an existing sustainability problem. Effect considered as being of national/ international significance.	C	Construction stage
+	Minor Significant	No Sustainability constraints and development acceptable. Effect considered as being of national/ international significance.	O	Operation stage
0	No significance	Neutral effect	D	Decommissioning stage
-	Minor Significant	Potential sustainability issues; mitigation and / or negotiation possible. Effect considered as being of national/ international significance.	Likelihood	
--	Major Significant	Problematical and improbable because of known sustainability issues; mitigation or negotiation difficult and/ or expensive. Effect considered as being of national/ international significance.	H	High Likelihood
?	Uncertainty	Where the significance of an effect is particularly uncertain, for example because insufficient information is available at the plan stage to fully appraise the effects of the development or the potential for successful mitigation, the significance category is qualified by the addition of '?'	M	Medium Likelihood
			L	Low Likelihood

Note: Separate appraisal matrices have been completed for each AoS objective under the Water Quality and Resources topic but the findings are presented in an aggregated appraisal under Water Quality and Resources in the site report.



<b>Air Quality</b>	
<b>AoS Objective:</b>	
	12. To avoid adverse impacts on air quality
<b>Guide questions:</b>	
	Will it result in the release of low level radionuclides that may adversely affect human health or biodiversity? Will it contribute to the degradation of air quality – both local and transboundary?
<b>Potential Receptors:</b>	
	<ul style="list-style-type: none"> <li>• Local populations and wider regional population (human health)</li> <li>• Sensitive habitats, including Dengie, Blackwater Estuary and Colne Estuary National Nature Reserves, RAMSAR sites, SPAs and SSSIs; Essex Estuaries SAC; and Sandbeach Meadows SSSI.</li> </ul>
<b>Potential Significant Effects and Mitigation Possibilities:</b>	
<b>International/ National/ Transboundary</b>	
1.	The release of non-radioactive gaseous emissions during construction and operation is not likely to have a strategically significant effect, as effects from construction and operation will be localised (see regional/local appraisal below) and controlled through appropriate regulatory regimes and consents/permits (possibly similar in nature to those the previously operational Bradwell nuclear facility operated under) and management techniques during construction, operation and decommissioning stages.
2.	However there is potential for release of radioactive emissions, planned and accidental, during the operation and decommissioning of a new nuclear power station and interim radioactive waste storage on the site. This has potentially negative significant consequences for a wide demographic area, including the Southend-on-Sea and Basildon conurbations due to prevailing wind direction (south west). The potential effects of release of radiation are discussed in the main AoS report, however detailed modelling will be required and considered as part of the HSE and Environmental Regulators risk assessment as carried out for the consenting process. There is however an opportunity to employ any lessons learned from the decommissioning of the existing Bradwell nuclear facility (decommissioning currently underway).

## Air Quality

3. There is a small risk that increased concentrations of airborne pollutants or nutrients could have an adverse effect on adjacent sites of nature conservation interest. Any accidental or planned release of radioactive emissions may also affect sensitive ecosystems. This is discussed further in the Biodiversity and Ecosystem Sections.

### Regional/ Local

4. Air quality in Eastern England is relatively good with an average air quality index score of <3 (where 1-3 good, 4-6 moderate, 6-9 poor and 10 bad). However, pockets of relatively poor air quality exist in the region, particularly in urbanised areas and major route corridors that experience high levels of traffic flow. No Air Quality Management Areas (AQMAs) have been declared by Maldon District Council. The effect on air quality from the development is not likely to be significant, provided construction and operation is in accordance with regulatory/consenting regimes.
5. It is unlikely that the development project will lead to the designation of any new AQMAs in the region due to the duration of construction activities.
6. As with any major infrastructure project, the emission of pollutants to the atmosphere associated with transport and the generation of fine particulates and dust during construction have the potential for local nuisance and impacts on health within a zone of influence from the construction site. Air pollution can be minimised and controlled through working in accordance with good site environmental practices and managed through the use of Construction Environmental Management Plans.
7. The release of radioactive emissions from the site will be governed by HSE and the environmental regulator through the development of appropriate discharge limits, as part of the permitting under the Environmental Permitting (England and Wales) Regulations 2010 (the Radioactive Substances Act 1993 still applies in Scotland and Northern Ireland). This will be specific to the reactor type being used, alongside the siting and sensitivity of the receiving environment.
8. There is a small risk that increased concentrations of airborne pollutants or nutrients could have an adverse effect on adjacent sites of nature conservation interest. Any accidental or planned release of radioactive emissions may also affect sensitive ecosystems. This is discussed further in the Biodiversity and Ecosystem Sections.

<b>Air Quality</b>						
<b>Summary of Significant Strategic Effects:</b>			Timescale	C	O	D
			Significance	-	- ?	-?
			Likelihood	M	L	L
<p><b>Significant Effects</b></p> <ul style="list-style-type: none"> <li>• Release of non-radioactive emissions is unlikely to have a strategically significant effect on air quality</li> <li>• There is a small risk that increased concentrations of airborne pollutants or nutrients could have an adverse effect on adjacent sites of nature conservation interest.</li> <li>• Release of radioactive emissions (planned and accidental) can have a significant strategic effect on air quality, including transboundary effects. The HSE and Environmental Regulator will consider this as part of the HSE and Environmental Regulators risk assessment carried out as part of the consenting process and must be satisfied risk to public health and safety is within acceptable limits.</li> </ul>	<p><b>Mitigation and Monitoring Possibilities</b></p> <ul style="list-style-type: none"> <li>• Please refer to mitigation measures contained in the Biodiversity and Ecosystems Sections.</li> <li>• Release of radioactive emissions controlled through regulatory process and risk assessment undertaken for consenting process.</li> </ul>					

## Biodiversity and Ecosystems

### **AoS Objective:**

1. To avoid adverse impacts on the integrity of wildlife sites of international and national importance.
2. To avoid adverse impacts on valuable ecological networks and ecosystem functionality.
3. To avoid adverse impacts on Priority Habitats and Species including European Protected Species.

### **Guide questions:**

Will it result in the loss of habitats of international/national importance?

Will it affect other statutory or non-statutory wildlife sites?

Will it result in harm to internationally or nationally important or protected species?

Will it adversely affect the achievement of favourable conservation status for internationally and nationally important wildlife sites?

Will it affect the structure and function/ecosystem processes that are essential to restoring, securing and/or maintaining favourable condition of a feature or a site?

Will the proposal enable the BAP targets for maintenance, restoration and expansion to be met?

Will the proposal result in changes to coastal evolution that is otherwise needed to sustain coastal habitats?

Will it result in the release of harmful substances for example. oil, fuel and other pollution into waterbodies which could affect aquatic ecosystems?

Will it result in the accidental migration of radionuclides which could harm aquatic or terrestrial ecosystems?

Will it result in changes to stream hydrology and morphology that could affect aquatic or terrestrial ecosystems?

Will it result in thermal discharges that could adversely affect aquatic ecosystems?

Will it result in soil contamination that could damage aquatic or terrestrial ecosystems?

## Biodiversity and Ecosystems

### Potential Receptors:

#### Designated Sites

- **Essex Estuaries SAC**- immediately adjacent to the site
- **Dengie SPA/Ramsar (Mid-Essex Coast Phase 1)** – immediately adjacent to the site
- **Outer Thames Estuary SPA** – within 1km of the site
- **Colne Estuary SPA/Ramsar (Mid-Essex Coast Phase 2)** – approximately 5 km to the north of the site
- **Crouch and Roach Estuaries SPA/Ramsar (Mid-Essex Coast Phase 3)** – approximately 13 km to the south of the site
- **Blackwater Estuary SPA/Ramsar (Mid-Essex Coast Phase 4)**- immediately adjacent to the site
- **Foulness SPA/Ramsar (Mid-Essex Coast Phase 5)** – approximately 12.5 km to the south east of the site
- **Abberton Reservoir SPA/Ramsar Site** – approximately 8km to the north west of the site
- **Dengie SSSI** – immediately adjacent to the site
- **Blackwater Estuary SSSI** – immediately adjacent to the site
- **Sandbeach Meadows SSSI** – Approximately 4 km to the south east of the site.

#### Habitats considered to be potential receptors are as follows:

- Estuaries / Marine
- Mudflats and sandflats not covered by seawater at low tide
- *Salicornia* and other annuals colonising mud and sand
- Spartina swards (*Spartinion maritimae*)
- Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)
- Mediterranean and thermo-atlantic halophilous scrubs (*Sarcocornetea fruticosi*)
- Sandbanks which are slightly covered by sea water all the time
- Shell, sand and shingle spits
- Vegetated shingle
- Brackish dykes and pools
- Swamp
- Sea walls
- Coastal grazing marsh
- Reedbeds
- Saline lagoons
- Reservoir

## Biodiversity and Ecosystems

### Species which may be potential receptors:

- Bats
- Great crested newt
- Water vole
- Otter
- Badger
- Common species of reptile
- Passage and over-wintering waterfowl and breeding waterfowl, gulls and terns
- Wetland birds
- Other breeding birds could be affected locally
- Rare and uncommon plants
- Nationally important invertebrate species

### Potential Significant Effects and Mitigation Possibilities:

#### International/ National/ Transboundary

#### Disturbance (noise, light and visual)

1. The site is currently in a quiet rural location with intermittent noise from traffic the sea and wind although the coastal areas are used recreationally by the public. Potential significant effects on biodiversity may arise due to disturbance from construction activities (duration approximately 5 years). For example heavy machinery, an increase in personnel on site (expected to be between 1350 and 2500 site workers) increased vehicular movements, earthworks and excavations, and light pollution (which would be increased during the winter months). Similar activities during the de-commissioning phase (20 years) would also result in adverse impacts. During operation of the site (60 years) the level of noise in comparison would be reduced although a level of increased light pollution may remain.

Of particular concern would be impacts on the important bird assemblages of the Mid-Essex SPA/Ramsar complex, especially impacts on the Dengie SPA/Ramsar, Outer Thames Estuary SPA, and Blackwater Estuary SPA/Ramsar components which fall immediately adjacent to the site. Important populations of breeding, migrating and overwintering birds occur within these sites any disturbance could mean birds are deterred from using key roosting, feeding or breeding areas. This could result in displacement, nest failures and impacts on chances of survival. Breeding birds would be susceptible to disturbance during March – August, the main bird breeding season, whilst over-wintering birds would be susceptible during the winter

## Biodiversity and Ecosystems

months. Little Tern is known to breed within Blackwater Estuary and these birds are highly vulnerable to human disturbance which can lead to nest failure.

As the Mid-Essex SPA/Ramsar complex is closely interlinked there may also be disturbance effects on important birds moving between designated areas and within habitats outside of the designations. With regards to the latter, one example is damp grassland /coastal grazing marsh (the latter being a UK BAP Priority Habitat) which is an important feeding area for species such as dark bellied brent geese, golden plover and hen harrier. Potential impacts therefore need to be considered in a wider context as they could affect the Mid-Essex SPA/Ramsar as a whole. In addition the Abberton Reservoir SPA/Ramsar site which falls outside of the Mid-Essex SPA/Ramsar complex should also be considered as this is an important roosting and feeding area for birds which utilise the estuarine designations.

Impacts of disturbance on biodiversity will be investigated thoroughly during the EIA process for the site. Mitigation measures should seek to avoid and minimise impacts on important bird assemblages through careful design and site layout. Possible mitigation could incorporate shielding to reduce light pollution, locating particularly noisy activities away from sensitive zones, acoustic screening and timing activities to avoid sensitive periods for key bird species of SPA/Ramsar sites.

### Loss/Damage and fragmentation of important habitats

2. Construction activities, earthworks and excavations and provision of new buildings and infrastructure (for example new transmission lines) could all result in the direct loss, damage, reduction, alteration or fragmentation of important habitats. Of particular concern are habitats within the adjacent Essex Estuaries SAC (which also support important bird populations, invertebrates and plants under the Blackwater Estuary and Dengie SPA/Ramsar designations). Habitats under threat from the development include the saltmarsh and mudflat habitats which fall immediately adjacent to the site.

A proposed marine landing platform and infrastructure for cooling water culverts could mean direct loss of habitats within the SAC and Outer Thames Estuary SPA, and the species associated with them. During construction of the cooling water system trenches may need to be dug along the foreshore and seabed. In addition any upgraded coastal defence measures required could result in habitat loss. The Essex Estuaries as a whole are under threat from erosion as a result of coastal squeeze. Encroachment of development along the coastal fringe could add to this problem by altering natural coastal processes resulting in loss of estuarine habitats both in the immediate vicinity and in a wider context.

As the Mid-Essex SPA/Ramsar complex is closely interlinked there may also be effects as a result of habitat loss on important birds moving between designated areas (for example other SPA/Ramsar sites within the complex or the Abberton Reservoir SPA/Ramsar) and within habitats outside of the designations. Potential impacts therefore need to be considered in a wider context

Loss of any type of habitat (within and outside of the SAC) may have an impact on important species (for example legally protected species/UK BAP species) which utilise such habitats for example through loss of feeding grounds, roosting or resting places, severance of commuting/wildlife corridors

## Biodiversity and Ecosystems

and through food chain impacts such as loss of food sources and prey items.

Potential impacts on important habitats and species will be investigated thoroughly through the site EIA process and consideration needs to be given to habitats in the surrounding area as well as within the development footprint. Mitigation should seek to avoid and minimise impacts where possible through careful site design and layout and any upgraded coastal protection measures should seek to prevent the effects of coastal squeeze. Connectivity between sites should be maintained, as should protective buffer zones around sensitive areas. In the event of any habitats of importance being lost (such as those within the SAC/UK BAP priority habitats) these should be re-created elsewhere. Opportunities should also be sought for positive improvements for biodiversity within and around the development for example through habitat creation and enhancement.

### Water Resources and Quality - Discharge of heated water

3. Discharge of heated water into waterbodies could impact upon aquatic ecosystems due to the temperature of the water being up to 10°C warmer. Any discharge of water into the marine environment would mean discharge directly into the Essex Estuaries SAC, Outer Thames Estuary SPA and the Blackwater Estuary SPA/Ramsar sites. This could have an adverse impact on the habitats and species for which these sites are designated. For example oxygen is less soluble in water at higher temperatures and a reduction in dissolved oxygen can put aquatic life under stress. Any loss of habitats/plants or invertebrates could in turn have an impact on species such as waterfowl and waders which rely on such sources for feeding. The thermal plume associated with the discharge of heated water could also impact on species of migratory fish and distribution of marine species. There could also be local abrasion of habitats if the velocity of discharge from any outfalls is high.

The Environment Agency has a statutory duty, to ensure that the integrity of the Internationally designated sites are maintained or restored through sustainable water resources management. As part of this duty, they have to ensure that permissions (abstraction licences, discharge consents, radioactive substance authorisations, waste management licences and integrated pollution control (IPC) authorisations) do not have an adverse effect on the integrity of the designated sites

Potential impacts of heated water discharge will be investigated in detail throughout the site EIA process. Mitigation should seek to avoid and minimise impacts through careful layout and design of the outfall system and careful operation.

### Water Resources and Quality - Abstraction of water for cooling purposes

4. A waterside location is required for the site in order to achieve the most efficient cooling process. Water intake from surface waterbodies can lead to the incidental mortality of fish and other aquatic species. Fish, larvae and eggs can be sucked into condenser circuits and be subjected to heat before being returned to the sea. Abstraction of water would be directly from the adjacent designated sites of the Essex Estuaries SAC, Outer Thames Estuary SPA and Blackwater Estuary and Dengie SPA/Ramsar. Any significant effect on ecosystems such as loss of fish or invertebrate food sources could have an adverse impact on species such as the important bird assemblages for which the SPA/Ramsar sites are designated.



## Biodiversity and Ecosystems

The Environment Agency has a statutory duty, to ensure that the integrity of the Internationally designated sites are maintained or restored through sustainable water resources management. As part of this duty, they have to ensure that permissions (abstraction licences, discharge consents, radioactive substance authorisations, waste management licences and integrated pollution control (IPC) authorisations) do not have an adverse effect on the integrity of the designated sites.

Further detailed hydrological studies will be undertaken by the site nominator as part of the EIA process for the site. The design and siting of the intake system should be carefully considered so as to minimise any impacts on habitats and species of value.

### **Water Resources and Quality - Routine releases of radioactive discharges to water**

5. Routine radioactive discharges into the aquatic environment may have a negative impact on both terrestrial and aquatic ecology. Depending on dosage lethal, genetic or reproductive effects may result and the long term implications are an unknown. Radionuclides may also accumulate in organisms such as invertebrates and plants (for example shellfish or saltmarsh plants) which could have both direct and indirect effects in particular on the adjacent SAC, SPA and Ramsar sites and their interest features such as important bird assemblages. Bioaccumulation of toxins in food chains could also have an indirect effect in the context of the Mid-Essex estuaries SPA/Ramsar site as a whole due to movement of bird species between the component designated sites.

The UK has a strict regulatory framework to restrict routine discharges from nuclear power stations. The aim is to ensure that radiation doses are within internationally agreed limits. Any new power stations need permits under the Environmental Permitting (England and Wales) Regulations 2010, from the relevant environment agency before making any discharges of radioactivity into the environment. Regular monitoring is also required. (The Radioactive Substances Act 1993 still applies in Scotland and Northern Ireland).

Modern techniques to minimise radioactive discharges should be incorporated into the design of the site. Regular monitoring of water quality and the surrounding environment should also be undertaken.

### **Water Resources and Quality - Unplanned release of radiation/other impacts on water quality**

6. There is a very small risk of accidental release of radiation (either through the air, water or soil) into the environment which could affect aquatic or terrestrial fauna or flora. Of particular concern would be habitats and species within the nearby SAC, SPA and Ramsar sites as well effects on the Mid-Essex Estuary SPA/Ramsar complex as a whole. Such an event could occur during operation, interim radioactive waste storage, during decommissioning or during final transport of waste for disposal.

Other impacts may arise through accidental pollution of watercourses due to leaks or spillages. This could cause toxic contamination of aquatic or

## Biodiversity and Ecosystems

terrestrial ecology. Given the proximity of the Essex Estuaries SAC and the Blackwater Estuary, Outer Thames Estuary SPA, and Dengie SPA/Ramsar sites key interest features of these sites could be impacted, for example contaminants could have lethal effects or sub-lethal effects on aquatic organisms impairing reproduction, physiology, genetics and health, or compounds could be bio-accumulated within tissues and could subsequently enter the food chain. This could impact on the higher predators such as waders and waterfowl.

Construction activities such as the installation of the cooling water infrastructure and marine platform could also impact on water quality through re-suspension of sediments. Changes in sediment regimes could lead to increased turbidity or smothering of important habitats and the associated plant/invertebrate communities to their detriment. Likewise it is proposed that the site will need to be elevated from 3 metres to 7 metres in order to avoid any flooding. This will involve placement of soil material to build up the site level. This could lead to increase sedimentation within aquatic habitats from runoff.

As the Mid-Essex SPA/Ramsar complex is closely interlinked there may also be effects as a result of pollution on important birds moving between designated areas (for example other SPA/Ramsar sites within the complex or the Abberton Reservoir SPA/Ramsar) and within habitats outside of the designations. Potential impacts therefore need to be considered in a wider context

The operation of the site including waste storage and decommissioning activities and the transport of radioactive waste will be subject to strict regulatory controls which aim to minimise impacts of accidental release of radiation/pollutants. The likelihood of any effect is therefore considered to be low.

Further investigation into impacts of water quality on biodiversity will be undertaken as part of the EIA process for the site. During design, the layout and siting of potential sources of pollution should be carefully considered so as to minimise potential impacts on sensitive areas. During construction good site environmental management practices should be put in place to minimise risks to ecological receptors and should be implemented through a construction environmental management plan or similar document.

### Air quality

7. The development of the site may affect air quality, in particular through construction activities (approximately 5 years) as a result of increased vehicular movements. As dust impacts usually decrease with distance the most significant impacts would be expected within the site footprint itself and along haul routes to and from the development. Increase vehicular emissions and mobilisation of dust could both impact on the sensitive habitats of the adjacent SAC, SPA's and Ramsar sites as well as biodiversity in the general locality, particularly if dust is of a different acidity to the surrounding habitats which could cause alterations to underlying soil chemistry and changes to the structure of plant communities.

Further investigation into the impacts of air quality on surrounding biodiversity will be undertaken as part of the EIA process for the site. Dust impacts should be minimised through careful site design. During construction good site environmental management practices should be put in place to

## Biodiversity and Ecosystems

minimise risk to ecosystems and should be implemented through a construction environmental management plan or similar document. Possible mitigation measures could include phasing operations to avoid sensitive periods (for example for birds) and avoiding weather conditions which could encourage dust dispersal. Dust generating activities should be placed away from sensitive locations and in zones which give maximum protection from wind dispersal.

### Cumulative effects

The area around the site is currently subject to a number of high profile projects which could lead to cumulative effects on the European designated sites and on biodiversity in the area as a whole. For example the current nuclear power station adjacent to the site is in the process of being decommissioned and a proposal for a windfarm to the south east of the site is being considered.

### Regional/ Local

#### Water Resources and Quality - Additional water impacts

8. New drainage systems on or within the site could result in adverse impacts on both terrestrial and aquatic habitats during both construction and operation. Installing new drainage systems could result in physical habitat loss and increased sediment run off whilst new operating drainage systems may result in altered run off rates. This could affect hydrology and morphology of aquatic habitats and could impact on aquatic flora and fauna. In addition nutrient enrichment (for example, through any increase in waster water discharge for example) could alter the composition of habitats within aquatic ecosystems.

It is proposed that the site will be elevated from 3m to 7m to avoid the risk of flooding. There is the potential for soil material to come from a marine source, and if this is the case then there could be an impact of saline water on freshwater bodies such as ditches/ponds (if present) as well as groundwater.

If groundwater abstractions or drainage of land is required this may affect other areas of valuable habitat which are dependant on water such as coastal grazing marsh.

Further studies of any impacts of drainage on biodiversity will be undertaken as part of the EIA process for the site. Any impacts should be minimised through careful design of drainage features and during construction good site environmental practices should be put in place to minimise effects such as increased sediment run off into watercourses/systems. During construction good site environmental management practices should be put in place to minimise risks to ecological receptors and should be implemented through a construction environmental management plan or similar document.

## Biodiversity and Ecosystems

### Local Habitats and Species

9. Impacts on the internationally designated sites have been considered however development of the site could also have adverse impacts on important habitats such as BAP habitats and legally protected/BAP species within or immediately adjacent to the site.

It is unknown at the present time what habitats and species are present at a more local level. Further studies as part of the EIA process for will help to determine a baseline for predicting the effects of developing the site on habitats and species. Mitigation should seek to avoid and minimise impacts where possible through careful site design and layout. Connectivity between sites should be maintained, as should protective buffer zones around sensitive areas. In the event of any habitats of importance being lost these should be re-created elsewhere. Opportunities should also be sought for positive improvements for biodiversity within and around the development for example through habitat creation and enhancement.

#### Summary of Significant Strategic Effects:

Timescale	C	O	D
Significance	--?	--?	--?
Likelihood	M	M	M

#### Significant Effects

- Noise, visual and light disturbance, particularly during construction on fauna such as legally protected species in particular important assemblages of birds within the Essex Estuaries SAC, Outer Thames Estuary SPA, and the Blackwater Estuary and Dengie SPA/Ramsar sites. Impacts to be considered in a wider context due to bird species moving between designated sites within the Mid-Essex SPA/Ramsar complex.
  
- Loss, damage or fragmentation of important habitats and subsequent disturbance to protected species due to new buildings and infrastructure. Of particular concern is development along the coastal fringe that encroaches into Essex Estuaries SAC Outer Thames Estuary SPA, and Blackwater Estuary and Dengie SPA/Ramsar sites where marine landing platforms and cooling water infrastructure may be built as well as upgraded coastal defence. Impacts to be considered in a wider context due to bird species moving between

#### Mitigation and Monitoring Possibilities

- Mitigation measures should seek to avoid and minimise impacts on important bird assemblages through careful design and site layout. Possible mitigation could incorporate shielding to reduce light pollution, locating particularly noisy activities away from sensitive zones, acoustic screening and timing activities to avoid sensitive periods for key bird species of SPA/Ramsar sites.
  
- Mitigation should seek to avoid and minimise impacts where possible through careful site design and layout. Upgraded coastal protection measures should seek to avoid the effects of coastal squeeze, connectivity between sites should be maintained, as

Biodiversity and Ecosystems	
<p>designated sites within the Mid-Essex SPA/Ramsar complex.</p> <ul style="list-style-type: none"> <li>• Upgraded coastal protection measures and the marine landing facility could not only lead to direct habitat loss but could also exacerbate the effects of coastal squeeze which is a particular problem within the Essex Estuaries. This can present natural movement of coastal species and important habitats such as saltmarsh and can alter coastal processes such as sediment regimes in both the local and wider context. Hard flood defences can also constrain opportunities for adaptation to rising sea levels as a result of climate change.</li> <li>• Discharge of heated water into aquatic habitats could alter ecosystems. Essex Estuaries SAC, Outer Thames Estuary SPA, and Blackwater Estuary SPA/Ramsar sites of particular</li> </ul>	<p>should protective buffer zones around sensitive areas. In the event of any habitats of importance being lost (such as those within the SAC/UK BAP priority habitats) these should be re-created elsewhere. Opportunities should also be sought for positive improvements for biodiversity within and around the development for example through habitat creation and enhancement.</p> <ul style="list-style-type: none"> <li>• Require environmentally sensitive designs for all coastal defence structures and the proposed marine landing facility.</li> <li>• Strategic coastal management documents such as the Coastal Habitat Management Plan (CHaMP) and Shoreline Management Plan should be considered to help determine the best form of flood defence and upgraded coastal protection.</li> <li>• Soft engineering, managed realignment and foreshore recharge should be considered as possible flood defence techniques.</li> <li>• Reinstatement to original condition habitats affected by works</li> <li>• Mitigation should seek to avoid and minimise impacts through careful layout and design of the outfall system and careful operation.</li> <li>• The design and siting of the intake system</li> </ul>

Biodiversity and Ecosystems	
<p>concern.</p> <ul style="list-style-type: none"> <li>• Abstraction of water for cooling purposes can lead to incidental mortality of fish and aquatic invertebrates. This could have knock on effects on the interest features (particularly birds of the Blackwater Estuary and Dengie SPA/Ramsar sites and the Outer Thames Estuary SPA.</li> <li>• Routine releases of radioactive discharge into water could impact on aquatic ecosystems either directly or indirectly for example through bioaccumulation of toxins within food chains. Impacts on Essex Estuaries SAC and Blackwater Estuary SPA/Ramsar site of particular concern.</li> <li>• Accidental pollution, for example leakage of radioactive waste or other toxic compounds. Risks present throughout construction, operation and decommissioning. In addition potential impacts on water quality from construction of water cooling infrastructure could lead to re-suspension of sediments. Potential adverse impacts on biodiversity with the Essex Estuaries SAC and Blackwater Estuary and Dengie SPA/Ramsar sites of particular concern. Impacts to be considered in a wider context due to important bird species moving between designated sites within the Mid-Essex SPA/Ramsar complex and the dynamic nature of estuarine systems.</li> <li>• Reduction in air quality, particularly during construction due to increased dust and vehicle emissions. Potential impacts on local biodiversity including the Essex Estuaries SAC and Blackwater and Dengie SPA/Ramsar sites.</li> </ul>	<p>should be carefully considered so as to avoid/minimise any impacts on habitats and species of value.</p> <ul style="list-style-type: none"> <li>• Modern techniques to minimise radioactive discharges should be incorporated into the design of the site. Regular monitoring of water quality and the surrounding environment should also be undertaken.</li> <li>• During design, the layout and siting of potential sources of pollution should be carefully considered so as to avoid and minimise potential impacts on sensitive areas. During construction good site environmental management practices should be put in place to minimise risks to ecological receptors and should be implemented through an ecological mitigation and management plan or similar document.</li> <li>• Dust impacts should be minimised through careful site design. During construction good site environmental management practices should be put in place to minimise risk to ecosystems and should be implemented through an ecological mitigation and management plan or similar document. Possible mitigation measures could include phasing operations to avoid sensitive periods (for example for birds) and avoiding weather</li> </ul>

Biodiversity and Ecosystems	
<ul style="list-style-type: none"> <li>• Cumulative impacts of other high profile developments/plans in the area for example the current decommissioning of the nuclear power station adjacent to the site and a proposed wind farm development.</li> <li>• Any groundwater abstraction and construction and operation of new drainage infrastructure could impact on both terrestrial and aquatic ecosystems. Hydrology and morphology of water systems could be altered through increased sediment loading (for example from soil used to elevate the site). Groundwater abstraction could impact on habitats dependent on a groundwater sources. Essex Estuaries SAC and Blackwater Estuary SPA/Ramsar sites of particular concern</li> <li>• Impacts of a new nuclear power plant on biodiversity at the more local level are currently unknown but any protected species/important habitats on site or close by could be impacted.</li> </ul>	<p>conditions which could encourage dust dispersal. Dust generating activities should be placed away from sensitive locations and in zones which give maximum protection from wind.</p> <ul style="list-style-type: none"> <li>• Further studies as part of the EIA process will help to determine overall impacts on biodiversity.</li> <li>• Any impacts should be minimised through careful design of drainage features and during construction good site environmental practices should be put in place to minimise effects such as increased sediment run off into watercourses/systems. During construction good site environmental management practices should be put in place to minimise risks to ecological receptors and should be implemented through an ecological mitigation and management plan or similar document.</li> <li>• Mitigation should seek to avoid and minimise impacts where possible through careful site design and layout. Connectivity between sites should be maintained, as should protective buffer zones around sensitive areas. In the event of any habitats of importance being lost these should be re-created elsewhere. Opportunities should also be sought for positive improvements for biodiversity within and around the development for example through habitat creation and enhancement, in particular saltmarsh which is a threatened</li> </ul>

<b>Biodiversity and Ecosystems</b>	
	habitat within the Essex Estuaries.



## Climate Change

**AoS Objective:**

13. To minimise greenhouse gas emissions

**Guide questions:**

Will it result in increased vehicular emissions (particularly carbon dioxide)?

Will the development result in an overall reduction in greenhouse gas emissions over its life time resulting from changes in:

- Transport of people and goods
- Scope, form and methods of asset construction, maintenance and demolition
- Waste recycling and disposal
- Land management practices
- Other secondary activities in the wider local and national economy

Note: Adaptation to climate change is discussed in other relevant topic appraisals, eg. biodiversity, water, flood risk.

### Potential Receptors:

Human population and environment at all geographical scales.

### Potential Significant Effects and Mitigation Possibilities:

**International/ National/ Transboundary**

1. The effects of changes in greenhouse gas emissions as a result of the proposed development have national and international effects, particularly when combined with a wider nuclear programme. The benefits of the low carbon emissions from the operation of nuclear power stations due to this technology and that are independent of the site chosen are considered in the overarching AoS report. Emissions during the operational phase of the power station are significantly lower than that of any non-nuclear (conventional fossil fuel-powered) facility delivering equivalent power output. [1]

## Climate Change

2. During the operational phase, the carbon footprint is similar to those of wind with equivalent output but with significantly less land or area coverage.
3. This consideration is independent of any life-cycle (embodied) carbon emission analysis, which is currently outside the scope of this study.
4. Although the effects of any emissions will be felt globally, the emissions during construction and decommissioning will largely be determined by regional and local factors (for example local transport infrastructure and how the location of the site will affect transport emissions).
5. Construction and decommissioning activities will have both direct and indirect greenhouse gas emissions associated with them regardless of the location of such plants. A comparison of these construction and decommissioning related emissions to those of fossil-fuelled power plants will largely depend upon the design parameters of such plants with the exception of specific sub-activities associated with nuclear fuel and nuclear wastes.

### **Regional/ Local**

6. The provision of a nuclear power station for energy generation at the site will make a positive contribution to future local and national climate change targets. The combination of nuclear power generation with increased investment in renewable energy sources will assist in reducing greenhouse gas emissions compared to a no nuclear power facility option in the region.
7. The activities involved in the construction of the plant are likely to have a negative impact on targets for reductions in carbon from transport and construction plant. The materials incorporated in the plant will also contribute to levels of embodied carbon in the region. The extent will depend upon the methods of transport and construction adopted and on the types and quantities of materials incorporated in the plant. The indirect impacts associated with the construction phase could be higher in totality than the emissions of the construction activity itself. These include the influx of labour population, increased population vehicular usage, transport of materials, higher demand on utilities. [3]
8. Other considerations include the possibility of enhancing road and rail transport in order to accommodate development needs warranted by the new power station. The net cross-cutting impacts of emissions on biodiversity, land, water, population and health should be considered. Opportunities exist for applying better transport, material and application design aspects, which could minimise these impacts.[4]
9. Energy and climate change impacts from decommissioning the plant at the end of its life are not sensitive to the site location other than the distance that will be required to transport nuclear waste to any long-term waste Geological Depository Facility. The means of disposing of nuclear waste, including spent fuel, from new nuclear power stations is being considered as part of the Government's programme for Managing Radioactive Waste Safely.
10. The site is situated in a region that is low lying and situated within the Blackwater Estuary and is one of the driest part of the UK which makes it more susceptible to the following :

## Climate Change

- hotter and drier summers (causing greater ‘heat stress’ to buildings, utilities and the transport system), milder and wetter winters
- summer rainfall could see a drop of up to 45- 50 % decreases in soil moisture affecting agriculture, the natural environment and landscape
- winter could see rainfall increasing by up to 30 %
- a rise in sea levels of between 22-28 cm – risk of flooding and coastal erosion
- longer growing seasons with no dominant season
- lower humidity and drop in soil moisture levels potentially affecting trees and woodlands

11. The site sits in the region of East of England which ranks 5<sup>th</sup> in carbon emissions per capita but is the largest emitter per head from domestic sources. The advent of a new nuclear power plant may have positive implications on public transport infrastructure investment and improvement on the one hand and to assist in investment in the low carbon technologies in the construction sector, including domestic housing.

12. In 2007 the County Council published a document outlining their objective of reducing emissions across the entire County Council by 10 % in 2010/2011 and by 60 % by 2050 [6]. Maldon District Council is in the process of establishing a baseline for their Carbon Dioxide emissions [5].

### Summary of Significant Strategic Effects:

Timescale	C	O	D
Significance	-	++	-?
Likelihood	M	H	M

#### Significant Effects

- The reductions in greenhouse gas emissions due to the operation of nuclear power plants compared to alternative fossil fuel sources of energy will have positive long term effects during the operational stage and longer term. The cumulative benefits of a nuclear programme for climate change are further discussed in the main AoS report.
- The site is particularly susceptible to the future impacts of climate change associated with sea level rise, flooding, drought, coastal erosion and more intense storm and weather events. These events caused by climate change will be discussed further in the Flood Risk section.
- Locating a nuclear power station on site could have a positive multiplier effect on the further

#### Mitigation and Monitoring Possibilities

- Appropriate sea and coastal defence measures along with flood alleviation designs should be seriously considered. The coastal zone is affected by erosion. However maintaining the existing sea defenses may be uneconomic or unsustainable because of the long-term accumulated effects of the environment. Coastal realignment and forshore recharge are flood defense techniques that complement the natural process and can be permitted in appropriate

<b>Climate Change</b>	
<p>investment and implementation of other renewable (low carbon) energy sources in the region.</p> <ul style="list-style-type: none"> <li>• Construction activity will produce an increase in greenhouse gas emissions, but will make only a relatively small addition to the regional inventory of emissions in comparison to the low carbon energy output of the station. This is discussed in the main AoS Report.</li> <li>• The operational phase of the power station is likely to have far lower carbon footprint compared to those of fossil-fuel powered stations providing similar power output.</li> </ul>	<p>locations. [6]</p> <ul style="list-style-type: none"> <li>• The impacts during construction may be mitigated by selection of carbon-efficient forms of transport and construction. There is also the possibility of offsetting the emissions.</li> <li>• The greenhouse gas emissions arising from construction and operation should be monitored to inform carbon reduction through the lifetime of the project.</li> </ul>

1	BERR (January 2008). A White Paper on Nuclear Power. <a href="http://www.berr.gov.uk/files/file43006.pdf">http://www.berr.gov.uk/files/file43006.pdf</a>
2	Parliamentary Office of Science and Technology (October 2006). Carbon Footprint of Electricity Generation, Number 268. <a href="http://www.parliament.uk/documents/upload/postpn268.pdf">http://www.parliament.uk/documents/upload/postpn268.pdf</a>
3	HM Government (June 2008). Strategy for Sustainable Construction. <a href="http://www.berr.gov.uk/files/file46535.pdf">http://www.berr.gov.uk/files/file46535.pdf</a>
4	Steer Davies Gleave for EEDA (September 2009). Transport Economic Evidence Study. <a href="http://www.eeda.org.uk/files/TEES_Final_Report.pdf">http://www.eeda.org.uk/files/TEES_Final_Report.pdf</a>
5	Maldon District Council (September 2008). Draft Environmental Strategy. <a href="http://www.maldon.gov.uk/LivingHere/EnvironmentalHealth/Energy/Environment+Strategy.htm">http://www.maldon.gov.uk/LivingHere/EnvironmentalHealth/Energy/Environment+Strategy.htm</a>
6	Maldon District Council. Constraints. <a href="http://maldon.leadpartners.co.uk/document.aspx?chapter=2">http://maldon.leadpartners.co.uk/document.aspx?chapter=2</a>

<b>Communities: Population, Employment and Viability</b>	
<b>AoS Objective:</b>	
	<p>4. To create employment opportunities.</p> <p>5. To encourage the development of sustainable communities</p> <p>10. To avoid adverse impacts on property and land values and avoid planning blight</p>
<b>Guide questions:</b>	
	<p>Will it create both temporary and permanent jobs in areas of need?</p> <p>Will it result in in-migration of population?</p> <p>Will it result in out-migration of population? Will it affect the population dynamics of nearby communities (age-structure)?</p> <p>Will it result in a decrease in property and land values as a result of a change in perceptions or blight?</p>
<b>Potential Receptors:</b>	
	<p>Local and regional resident workforce</p> <p>Local and regional population</p>
<b>Potential Significant Effects and Mitigation Possibilities:</b>	
<b>International/ National/ Transboundary</b>	
	<p>No significant effects identified at this scale.</p>
<b>Regional/ Local</b>	
	<p>1. Short-medium term positive effects through creation of new jobs for local and regional population. The quality and quantity of employment during the construction stages (approx 5 -6 years) of the reactor will differ to the operational stage (approx 60 years), where longer-term employment will lead to quality of life benefits. Labour requirements will tail-off towards the end of the operational stage, however decommissioning will still require significant levels of labour for a minimum of 30 years. The significance of the effect is greater at the local level. At the regional level this is of minor significance,</p>

## Communities: Population, Employment and Viability

as jobs are absorbed into regional employment figures.

2. The Bradwell site ceased electricity generation in 2002 and defuelling was completed in 2006. The existing Bradwell site is in the decommissioning stage (end of care and maintenance period estimated to be 2095) but is still a significant local employer, employing approximately 250 staff [1]. A new power station may assist in offsetting job-losses from the decommissioning of the existing power station at the site -however it is noted the time difference between decommissioning and construction of any new reactor will likely require employees to seek employment elsewhere.
3. Positive effects through the provision of training, education and upskilling for employees and contractors in the region.
4. Positive multiplier effects (for both nuclear-related industry and wider industry as a result of increased demand from an incoming population). Of greater significance at the local level.
5. Some uncertainty is identified as the construction may affect the ability of other industries/projects to source labour, for example for house-building in region, potential expansion of Stansted Airport, A14 upgrade. Problems related to sourcing construction labour have been identified by the Institute of Civil Engineers [2], where predicted growth in the East of England's construction sector is higher than the national average, but the skills supply is significantly below it, particularly of highly trained and experienced engineers.
6. Likely changes to the population dynamics of local communities - with potential positive and negative effects. Effects dependent on source of labour, for example from local community or outside. Possible negative effects during construction stage as a temporary new community (construction labour) may not integrate with existing community. Longer term, new employees likely to be drawn from a wide area, including local communities and the wider area generally up to 40km radius, with less pressure on local services. Positive economic and social benefits likely as new population will require new services and facilities and will help to support existing services.
7. Potential for adverse effects on property values within close proximity to site. Mitigation possible. No evidence to suggest significant effects beyond immediate site surrounds.

<b>Communities: Population, Employment and Viability</b>						
<b>Summary of Significant Strategic Effects:</b>			Timescale	C	O	D
			Significance	+?	+?	0
			Likelihood	H	H	M
<p><b>Significant Effects</b></p> <p>Strategic effects are considered minor positive with regard to the creation of temporary jobs during construction and permanent full-time employment during operation, although some uncertainty identified as the project may lead to a shortage of local construction workers to meet the needs of other industries and major projects.</p>			<p><b>Mitigation and Monitoring Possibilities</b></p> <p>Consideration may need to be given to potential negative effects/difficulties in sourcing labour and the effects of this on the local/regional construction industry.</p>			

1	Magnox South. Magnox South Sites – Bradwell. <a href="http://www.magnoxsouthsites.com/about-us/our-sites/bradwell">http://www.magnoxsouthsites.com/about-us/our-sites/bradwell</a>
2	State of the Nation: Capacity and Skills (ICE, 2008). <a href="http://www.ice.org.uk/">http://www.ice.org.uk/</a>

## Communities: Supporting infrastructure

### AoS Objective:

8. To avoid adverse impacts on the function and efficiency of the strategic transport infrastructure
9. To avoid disruption to basic services and infrastructure

### Guide questions:

- Will it result in changes to services and service capacity in population centres?
- Will it result in the direct loss of strategic road/rail/air/port infrastructure?
- Will it result in increased congestion/pressure on key transport infrastructure?
- Will it result in loss or disruption to basic services and infrastructure (for example electricity, gas)?
- Will it place significant pressure on local/regional waste management facilities (non-nuclear waste)?

### Potential Receptors:

- Local and regional population
- Existing transportation and service infrastructure
- Existing waste management infrastructure

### Potential Significant Effects and Mitigation Possibilities:

#### International/ National/ Transboundary

1. Potential for negative effects on national transport network through congestion to A12 (T) during construction, operation and decommissioning stages. The A12 (T) is approximately 35 km from the site accessed through a network of minor B roads, and then the A414 on the approach to Chelmsford. The A141/A12 junction is a typical grade separated dumb-bell junction and provides access for the existing Park and Ride site into Chelmsford. The section of the A12 between the A130 and the A414 is a known congestion point along the corridor. It experiences between 110% and 130% of observed daily stress and this is expected to remain unchanged in the future.
2. The A130 and A127 are both dual 2-lane roads with grade-separated interchanges. Essex LTP2 includes a scheme to improve the interchange of the A130 and A13 at Sadlers Farm junction.
3. Further information is required to determine the effect on the local strategic network, including details on construction workforce, timeframes and



## Communities: Supporting infrastructure

volume of materials to be transported. However, it is clear that the capacity of the A12 (T), particularly around Chelmsford is likely to remain under significant strain during the lifetime of this project, potentially exacerbated by future planned development along the A12 corridor.

4. Mitigation measures can be implemented to minimise effects on the strategic road network through appropriate planning. This may include physical improvements, carrying of large loads outside of peak period, construction transport management plans, and green travel plans for the construction and operational workforces to encourage sustainable travel.
5. Rail/bus should also be considered as an alternative option for staff access during the operation phase using the existing link to Burnham-on-Crouch and Southminster.
6. Impacts of the transportation of nuclear waste are unknown until the location of a long-term waste geological depository facility is identified. This is being considered as part of the Government's programme for Managing Radioactive Waste Safely.
7. Impacts of the storage and disposal of nuclear waste are dealt with separately in the Main AoS Report.

### **Regional/ Local**

8. Negative effects identified for transportation network. Nature and significance of effects depend on mode of transport, and further details on construction workforce, timeframes and volume of materials to be transported.
9. Access by road is limited to a single connection, somewhat tortuous and of relatively low standard, and this may therefore be an issue. Access by road also traverses a number of small villages and settlements with obvious implications for local residents. Strategic roads providing current access to the site (the A12, A130 and A127) already suffer some peak period congestion.
10. Access to the rail network would be available from Burnham-on-Crouch and Southminster. However, further transport to the site would still require transport on local roads. The use of shuttle buses operating possibly between these local stations and the site may alleviate some pressure on the local road network.
11. Access by water would only be possible if some temporary wharf facility could be constructed at the site itself.
12. Non-nuclear construction waste will need to be further considered once details are available, including the volume and type of waste likely to be produced and transportation routes. The preparation of a Construction waste management plan will assist in minimising impacts on existing waste facilities.
13. Operational waste (non-radiological) will have impacts upon the capacity of existing waste management services, however it may be possible to extend arrangements for the existing nuclear facility and the implementation of an operational waste management plan would help to minimise any impacts.
14. Any influx of a new temporary workforce will place pressure on existing infrastructure, social and community services, as will increased population in local towns and villages in the longer term. This may require augmentation of existing services (including electricity and wastewater infrastructure) to cope with demand, however is not considered to have a significant effect. Further details regarding the sourcing of the workforce will be required to consider this at the detailed planning stage.
15. The construction and operation of a second nuclear power station at the site is likely to require additional services/connection to existing services (including electric, water and wastewater), however the location of an existing plant at the site will limit the amount of new infrastructure required. This is not considered to be a significant effect.

<b>Communities: Supporting Infrastructure</b>						
<p>16. The development of a nuclear power station at Bradwell may require new power lines to be built, or existing lines to be upgraded, to connect the facility with the National Grid. The potential impact of new or upgraded power lines will be considered in a separate Networks National Policy Statement (NPS).</p>						
<b>Summary of Significant Strategic Effects:</b>			Timescale	C	O	D
			Significance	-	-	-
			Likelihood			
<p><b>Significant Effects</b></p> <ul style="list-style-type: none"> <li>Potential for significant effects on strategic road infrastructure through increased congestion/ disruption of traffic on the A12, A130 and A127 if the cumulative effects of development in the region, including planned development along the A12 corridor and in the Thames Gateway, are considered. This may lead to increased congestion during construction, operation and decommissioning stages.</li> <li>Potential for negative effects on local access road network due to transport of large loads during construction via minor country roads.</li> </ul>			<p><b>Mitigation and Monitoring Possibilities</b></p> <ul style="list-style-type: none"> <li>Further studies will be required to assess in detail the effects on the strategic road network as well as local access roads.</li> <li>Appropriate mitigation measure to reduce the effects of transportation could include a Transport Management Plan (construction and decommissioning) and Green Travel Plan (construction, operation and decommissioning). Consideration of alternatives to road for the transport of large loads (for example transport by rail).</li> </ul>			

## Human Health and Well-Being

### AoS Objective:

6. To avoid adverse impacts on physical health.
7. To avoid adverse impacts on mental health.
11. To avoid the loss of access and recreational opportunities, their quality and user convenience.

### Guide questions:

Will it adversely affect the health of its workforce or local communities through accidental radioactive discharges or exposure to radiation during construction, operation, decommissioning and interim storage of radioactive waste on the site?

Will it lead to unacceptable community disturbance during construction, operation or decommissioning?

Are there any particularly vulnerable local communities that could be affected?

Will it help to reduce any health inequalities?

Will local perceptions of risk associated with the proposed power station lead to adverse impacts on mental health for nearby communities?

Will it adversely affect the ability of an individual to enjoy and pursue a healthy lifestyle?

### Potential Receptors:

- Temporary local and regional resident workforce during construction and decommissioning phases.
- Permanent and temporary workforce during site operational phase.
- Local and regional resident population, visiting tourists and recreational users.
- National and international resident population.

## Human Health and Well-Being

### Potential Significant Effects and Mitigation Possibilities:

#### International/ National/ Transboundary

1. National and transboundary health risks: There is a potential for any radioactive material discharged from the proposed site to travel both nationally and internationally (for example to countries on the European continent). However, current radiological monitoring of the nuclear power station that has been on the site since 1962 (see Appendix 4), suggests that the risk to the public is extremely low with total dosage from all sources (including direct radiation) currently (2007) estimated as approximately 7% of the limit specified in the Ionising Radiations Regulations 1999. With regard to transboundary effects, there is a requirement under Article 37 of the Euratom Treaty for the United Kingdom, before plant authorisation can be granted, to submit its assessment of the likely effects to a panel of European experts who decide whether contamination of the water, soil or airspace of another Member State is likely to take place.
  
2. Exposure Limits: The radiation to which members of the public are exposed by the operations of a nuclear power station is limited to 1mSv per year.<sup>1</sup> This limit applies to all members of the public, including those who receive the highest doses as a result of the location of their homes and their habits of life. It also applies to the cumulative effects of planned exposures from all sources of radiation, excluding medical exposures of patients and natural background radiation. This will need to be taken into account when planning all future power plants in terms of their size, design, position and allowed emissions and discharges. Therefore, the exposures of people living near to a new nuclear power stations have to be less than the dose limit taking into account exposures from any other nearby sites and any past controlled releases. This statutory dose limit is reinforced by the concept of ALARP (As Low As Reasonably Practicable), which is used by the nuclear regulators to reduce doses to as low as is reasonably practicable.

#### Regional/ Local

3. Health impacts from routine discharges: The strict regulatory framework, to restrict both routine discharges from nuclear power stations and direct radiation exposures to workers and the general public, should reduce potential health impacts to acceptable levels and ensure that radiation doses are well within internationally agreed limits. The relevant regulators, by means of a statutory authorisation procedure, will require the operators of nuclear plants to ensure that the exposure of workers and the public to radioactivity from nuclear sites is kept below stringent legal limits which are as low as is reasonable achievable. This system of regulation should ensure that the permitted discharges from the proposed nuclear power station at Bradwell do not cause unacceptable risk to health.

<sup>1</sup> This is through the Ionising Radiations Regulations 1999 <http://www.statutelaw.gov.uk> (which includes all activities carried out under a nuclear site licence granted by the Nuclear Installations Inspectorate under the Nuclear Installations Act 1965) [http://www.opsi.gov.uk/RevisedStatutes/Acts/ukpga/1965/cukpga\\_19650057\\_en\\_1](http://www.opsi.gov.uk/RevisedStatutes/Acts/ukpga/1965/cukpga_19650057_en_1), the Radioactive Substances Direction 2000 <http://www.defra.gov.uk/ENVIRONMENT/radioactivity/government/legislation/pdf/rsd2000.pdf> and the Radioactive Substances (Basic Safety Standards) (Scotland) Regulations 2000 <http://www.opsi.gov.uk/legislation/scotland/ssi2000/20000100.htm>

## Human Health and Well-Being

4. Transmission Lines: It is possible that the proposed power station will require additional electricity transmission lines to link its output to the national grid system. Given the current uncertainty regarding the health effects of prolonged low level exposure to electromagnetic fields (EMFs) it is recommended that, in keeping with Health Protection Agency advice<sup>2</sup>, a precautionary approach is adopted to the routing of any required power lines.
5. Risk of accident – unplanned release of radiation: During the operation of the nuclear power station, there is a risk of unplanned release of radiation into the environment leading to adverse health impacts. However, the risk of such an accident is very small because of the strict regulatory regime in the UK (referred to above) and the generic design assessment being carried out by the Health and Safety Executive (HSE). This assessment, and the Executive's input into the nuclear site licensing regime, is designed to ensure that several levels of protection and defence are provided against significant faults or failures, accident management and emergency preparedness strategies are prepared and that all reasonably practicable steps have been taken to minimise the radiological consequences of an accident.
6. Risk of accident – transport of nuclear material: The transportation of nuclear materials to and from the site increases the possibility of an accident with radiological consequences. However, the safety record for the transport of nuclear material suggests that the risks are very low. Data from the Radioactive Materials Transport Event Database (RAMTED) for the period 1958 to 2006 showed that of the recorded 850 events associated with the transport of radioactive materials no 'significant dose events' were associated with the nuclear power industry. Rather all nineteen recorded significant dose events involved the transport of industrial radiography sources that were moved without the source being properly returned to the container.
7. Health services: There is a possibility that the influx of workers required for the construction and operational phases of the proposed new power station may put a strain on local health and other services and lead to community integration and conflict issues. In order to realistically gauge whether or not this will be a problem, a review should be carried out during the planning process to determine the need for additional health service capacity and community assistance in the area.
8. Health and safety issues: The work associated with the construction and operation of a nuclear power plant at Bradwell brings with it the possibility of health and safety incidents. However, nuclear power stations are highly regulated in this regard and must not only comply with the requirements of the Health and Safety at Work Act 1974 but also with the requirements of the Nuclear Installations Act 1965 and the Ionising Radiations Regulations 1999. This means that the potential operator must have a licence from the Nuclear Installations Inspectorate (NII) before construction can begin. Such a licence will only be granted if the NII is satisfied that the power station can be built, operated and decommissioned safely with risks being kept to 'as low as reasonably practicable' (ALARP) at all times. The licence will, therefore, have conditions attached to it which will allow NII to control safety risks throughout the lifetime of the project.
9. Perception of risk: It is possible that the perception of risk associated with living or working near to a nuclear power plant could adversely affect the

<sup>2</sup> [http://www.hpa.org.uk/web/HPAwebandHPAwebStandard/HPAweb\\_C/1195733817602](http://www.hpa.org.uk/web/HPAwebandHPAwebStandard/HPAweb_C/1195733817602)

## Human Health and Well-Being

health and well-being of relevant individuals. However, there is little literature available on this potential impact which suggests that it has not been a significant problem in the past. In any event, in the case of the site, people living and working nearby have had a long time to get used to there being an adjacent nuclear plant so this is unlikely to be a significant problem at this location, although it should be noted that some local community concern is likely, as evident from the activities of local opposition groups and a recent high profile prosecution in February 2009 of the previous site operator (Magnox Electric) for unauthorised releases of radioactive waste at Bradwell.

10. Recreation: With regard to recreation, there is a potential impact associated with the coastal path which passes the site. It is likely that this path may need to be closed during some phases of power station construction but this effect will be temporary and can readily be mitigated by providing a bypass path around the site.
  
11. Community well-being: Maldon District is not a particularly deprived area, but education deprivation and barriers to housing and services are greater than the English average. The siting of a new nuclear power station at Bradwell should help to alleviate these deprivations somewhat as more jobs will be created in the area leading to an increase in community wealth, additional housing and other associated neighbourhood infrastructure.
  
12. Community disturbance: The presence of, and more particularly the construction of, a nuclear power station at the nominated site is certain to increase community disturbance to some degree when compared to the current situation. Potential disturbances in the construction phase include noise and vibration, dust and increased traffic although these effects would be temporary. Construction noise will be variable and transient in nature and will need to be mitigated by the use of good construction practice, regulation and timing of construction operations, the use of noise controlled plant and equipment and noise and vibration monitoring. There is also likely to be some disturbance associated with increased traffic during the operational and decommissioning phases of the power station. These effects should be considered, and mitigated if necessary, during the planning stage of the power station project by considering the adoption of an environmental management plan for the construction phase and an appropriate transport plan for all project phases. In particular, significant benefits would result if potential sources of noise emissions could be reduced through a combination of engineering design solutions.
  
13. Employment: Whilst employment levels in Maldon District are relatively high compared to the rest of England, there are still people seeking work in this area and the region in general. As has been demonstrated<sup>3</sup>, being in work can contribute to individual healthiness and, more particularly, being unemployed can be harmful to health in both a mental and physical sense. The development of a new nuclear power station at Bradwell can thus be expected to improve the general mental and physical health and well-being of the area's population by providing more short term (construction and decommissioning phases) and long term (operational phase) work opportunities.

	Timescale	C	O	D
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<sup>3</sup> Waddell G and Burton K (2006): 'Is work good for your health and well-being?', TSO, London

<b>Human Health and Well-Being</b>						
Summary of Significant Strategic Effects:			Significance	+	+	+
			Likelihood	M	M	M
<b>Significant Effects</b>	<b>Mitigation and Monitoring Possibilities</b>					
<ul style="list-style-type: none"> <li>• The rigorous system of regulating routine radioactive discharges from the potential nuclear power station at Bradwell should ensure that there are no unacceptable risks to health when the plant is operating normally</li> <li>• The possibility of local and regional health risks from the likely permitted discharges from the proposed new Bradwell power station</li> <li>• The potential for electromagnetic fields generated by any required additional power lines to cause adverse health effects in the local and regional population</li> <li>• The potential requirement for appropriate additional health service capacity for the influx of both construction and operational workers</li> <li>• The construction and operation of the proposed nuclear power station may lead to unacceptable community disturbance</li> <li>• It is likely that the presence of a new nuclear power station at Bradwell will lead to an increase in employment, community wealth, additional housing and other associated neighbourhood infrastructure – these positive effects are likely to be much more significant than any potential negative consequences assuming any effects on population health are not realised</li> </ul>	<ul style="list-style-type: none"> <li>• Ensure potential cumulative effects are calculated and assessed when planning and consenting all future nuclear power plants</li> <li>• Carry out a review of local health provision to ensure it is adequate for the expected influx of power station workers</li> <li>• Ensure a construction environmental management plan and an all-phase travel plan are produced, observed and monitored</li> <li>• Ensure sufficient monitoring of power station discharges and effects on local health is undertaken throughout the operational and decommissioning phases of the project</li> </ul>					

## Cultural Heritage

### AoS Objective:

22. To avoid adverse impacts on the internationally and nationally important features of the historic environment.
23. To avoid adverse impacts on the setting and quality of built heritage, archaeology and historic landscapes

### Guide questions:

- Will it adversely affect historic sites of international/national importance and their setting?
- Will it adversely affect other historic sites of known value?
- Will it adversely affect landscapes of historic importance?

### Potential Receptors:

- Scheduled Monuments
- Listed Buildings
- Conservation Areas
- Historic Landscape
- Archaeology



## Cultural Heritage

### Potential Significant Effects and Mitigation Possibilities:

#### **International/ National/ Transboundary**

The nearest scheduled monuments are a Saxon coastal fish weir and a Roman-Saxon Shore Fort with Anglo-Saxon monastery, both of which lie within 1.5 km. A potential effect on their settings may arise from the development of a new nuclear power station, as for other scheduled monuments in the wider vicinity.

There are 2 Grade I and 6 Grade II\* listed buildings within an approximate distance of 5 km of the site and a potential effect on their settings may arise from the development. These include the Grade I listed Chapel of St Peter, the subject of an annual Christian pilgrimage, which lies within 1.5 km to the east.

Adverse effects on the settings of the monuments and listed buildings closest to the site would be minimised by locating the power station development adjacent to the existing power station in the west of the site. Mitigation possibilities also include appropriate landscaping / planting schemes to reduce adverse setting effects.

#### **Regional/ Local**

A Conservation Area exists at West Mersea and there is a potential setting effect.

There are around 124 Grade II listed buildings within an approximate 5km distance of the site and there may be an effect on their settings.

Some of the fields within the site are shown on a 19<sup>th</sup> century Ordnance Survey map and there is potential for historic landscape to exist.

Iron Age/Roman salt-working sites are located close to and possibly within the site and Early Medieval activity is also suspected in close vicinity. A Roman road may also lie to the south. RAF Bradwell Bay, a former World War II airfield, lies within the site and the lines of the former runways can still be seen. Wartime buildings are also believed to survive. The presence of these features indicates prehistoric and historic activity within and close to the site. As such the area is likely to be considered of at least local to regional archaeological importance.

Operational effects include potential setting effects on historic assets in the wider vicinity.

If a buried archaeological resource exists significant effects to this resource are possible during decommissioning as excavations are likely to be required.

Adverse effects on the settings of the Conservation Area and listed buildings closest to the site would be minimised by locating the power station development

<b>Cultural Heritage</b>						
<p>adjacent to the existing power stations in the west of the site. Mitigation possibilities also include appropriate landscaping / planting schemes to reduce adverse setting effects. It is likely that a detailed archaeological investigation of the area will be required, including intrusive investigation (for example trial trenching and detailed recording). A survey of buildings and features associated with the airfield will also probably be required in order to fully assess their significance.</p>						
<b>Summary of Significant Strategic Effects:</b>			Timescale	C	O	D
			Significance	-?	-?	+?
			Likelihood	M	M	M
<p><b>Significant Effects</b></p> <ul style="list-style-type: none"> <li>• If a buried archaeological resource, historic landscape and any structures and features associated with the wartime airfield are present the main effects would be at a local to regional scale but within the footprint of the nominated new facility. Effects would be permanent and irreversible.</li> <li>• The effects of the development of the wartime airfield and potential historic landscape would be at a local to regional scale but within the footprint of the nominated facility. Effects would be permanent and irreversible.</li> <li>• Immediately surrounding the site, there may be potential effects on the settings of historic assets. The significance will depend on distance, topography and the ability to mitigate.</li> </ul>			<p><b>Mitigation and Monitoring Possibilities</b></p> <ul style="list-style-type: none"> <li>• Detailed investigations (trial trenching etc.) may be required prior to construction, with an excavation and/or watching brief potentially required prior to and during the construction phase.</li> <li>• Detailed survey of the wartime airfield will be required prior to construction.</li> <li>• Potential adverse setting effects on heritage assets may be minimised through siting the development adjacent to the existing power station and through appropriate landscaping/planting schemes.</li> </ul>			

## Landscape

### AoS Objective:

- 24. To avoid adverse impacts on Nationally important landscapes.
- 25. to avoid adverse impacts on landscape character, quality and tranquillity, diversity and distinctiveness.

### Guide questions:

- Will it adversely affect landscapes within or immediately adjacent to a National Park?
- Will it adversely affect landscapes in or immediately adjacent to an AONB or NSA?
- Will it adversely affect Heritage Coast or Preferred Conservation Zones?
- Will it adversely affect local landscapes/townscapes of value?
- Will it affect the levels of tranquillity in an area?
- Will it adversely affect the landscape character or distinctiveness?

### Potential Receptors:

- Dedham Vale Area of Outstanding Natural Beauty (22.9km)
- Policy CC7 Special Landscape Area (Maldon District Adopted Replacement Plan, November 2005)
- Policy CC11 The coastal zone (Maldon District Adopted Replacement Plan, November 2005)
- Landscape character of the area. The site is situated within:
  1. Greater Thames Estuary (No 81) National Character Area. (Natural England)
  2. D7 Bradwell Drained Estuarine Marsh (Braintree, Brentwood, Chelmsford, Maldon, and Uttersford Landscape character Assessments)
- The surrounding landscape character of the areas:
  1. Northern Thames Basin (No 111) 'sub character Essex Heathlands' (Natural England)
  2. E2 Tillington and Latchingdon Coastal farmland (Maldon Landscape Character Assessment)
  3. D6 Ramsay drained estuarine marsh (Maldon Landscape Character Assessment)
  4. D8 Dengie drained estuarine marsh (Maldon Landscape Character Assessment)

## Landscape

- The visual amenity of residents and publically accessible areas including:
  - Surrounding urban areas, farmsteads, and individual residential properties, affording clear open views within their immediate environment (namely West Mersea, Tollesbury, Southminster, Maylandsea, Brightlingsea, Maldon, Jaywick, St Osyth).
  - Distant urban areas, farmsteads, and individual residential properties, affording views within their immediate environment, which are likely to be within 15 km
  - Surrounding public rights of way (including adjacent coastal footpath) and local road users
  - Coastline
  - Shipping lanes
  - Railways
  
- The site falls within an areas defined as ‘Most tranquil’ by CPRE, although the presence of the existing Bradwell Power Station may affect the local experience of tranquillity.

*Note: Refer to Cultural Heritage assessment for consideration of the potential effects of the development on scheduled ancient monuments, listed buildings, the Historic Park and Gardens and Conservation Areas that may fall within 5km from the site.*

### Potential Significant Effects and Mitigation Possibilities:

#### **International/ National/ Transboundary**

1. There are no anticipated effects upon other countries likely to arise from the site. France is 130 km away.
  
2. Dedham Vale Area of Outstanding Natural Beauty is situated approximately 23 km away to the north east of the site. The operation of a new nuclear power station on this site may add to the existing building visual mass in some possible distant views from the AONB, but at this distance, any effects are anticipated to be negligible

## Landscape

### Regional/ Local

3. As the site is situated adjacent to the existing power station, the impact is likely to increase the existing development footprint and be more prominent and extensive in the landscape. When the existing power station is decommissioned, the impact of the new power station is anticipated to be similar to the view presently experienced.
4. There are likely to be significant visual effects upon the local landscape character, including direct and indirect effects on the locally designated Special Landscape Areas and 'The Coastal Zone'. The open nature of the area is likely to mean that it is visually sensitive to the addition of a new power station, which would potentially be highly visible from adjacent character areas.
5. It is anticipated that prominent views of the new power station would extend as far as 15 km. Views beyond that would either be interrupted by landform, urban development, or vegetation cover.
6. Diminishing visual effects are likely to be obtained beyond 15-20 km, and it is likely that the main reactor building would appear more as a reference point within the landscape, rather than degrading local landscape character from these distances.
7. On the site itself, there appears to be local historic integrity in the landscape features, including evidence of historic field boundaries, comprising water-filled ditches and remnants of old sea walls. Overall, this character area and its landscape features could have a high sensitivity to change. Local character is protected by local plan policies, and the site itself is protected within a 'Special Landscape Areas' (SLA).
8. There appears to be an opportunity for the landscape mitigation for the site, to respond to the suggested landscape management guidelines from the 'D7 Bradwell Drained Estuarine Marsh' character area within Braintree, Brentwood, Chelmsford, Maldon and Uttersford Landscape Character Assessments, September 2006.
9. Due to the location, likely scale and massing of the proposals, and the open flat landscape character in which the site is located, landscape and visual effects are unlikely to be fully mitigated.
10. The Local Authority landscape character assessments identify, conserving the open undeveloped character of the area, limiting the impacts of development on adjacent character areas to avoid visual intrusion. The scale and massing of the development have limited potential for mitigation. However, consideration of siting, detailed layout and positioning may have potential to reduce impacts.
11. To reduce visual intrusion upon the landscape it is recommended that:
  - The main nuclear reactor building is positioned adjacent to the existing Bradwell nuclear reactor, to avoid significant broadening of landscape impacts across the large site;

## Landscape

- Ancillary buildings, infrastructure and lighting are sited to avoid the most visually prominent edges of the coast;
  - Where possible, the positioning of large scale units should be close to one another, to avoid broadening of landscape impact over the large site;
  - Landscape measures should be utilised to 'soften' and visually reduce the potential visual impacts of ancillary infrastructure, including car parking;
  - Associated lighting in what is generally a dark sky context (away from the existing power station) could also be effectively mitigated through directional and shielded light units;  
Any marine landing stations or associated works on the coast could be positioned away from the most visually prominent locations;
  - The scale and massing of new buildings should be limited to the minimum requirements for the units;
  - Opportunities should be taken to conserve and promote the use of building materials on ancillary buildings in keeping with local vernacular landscape character.
12. The following landscape protection and enhancement measures could be considered to limit direct landscape impacts and to compensate for potential adverse effects:
- Conserve and enhance the ecological structure of ditches, dykes, and drains within the character area through avoidance;
  - Retain and provide new areas of drained marsh;
  - Seek to incorporate existing hedgerows and protection measures, consider reinstatement and proposals for new native hedgerows. Remnants of Elm hedgerows are important to the distinctiveness of the area;
  - Seek to incorporate existing trees and protection measures, and proposals for new tree planting, including replacing dead English Elm with Native species characteristic to the area;
  - Consider the potential for creation of new inter-tidal habitats (such as saltmarsh) through Managed Realignment (with regard to information set out within the Crouch and Blackwater Estuary Flood Management Strategy : Essex Estuarine Strategy).
13. Road improvements in the area that may be required, are likely to be intrusive within an open landscape where views are expansive. Landscaping should be sympathetic to the open, flat agricultural character of the area, whilst also seeking to reduce the visual impact of road improvements (such as lane widening, roundabouts, highway signage, etc). One of the aims of 'Greater Thames character area' is to plant shelter belts copses, and this provides an opportunity to appropriately locate and visually reduce highway works. Native/indigenous hedgerow and tree planting could be considered.
14. With the above potential mitigation in place, local site landscape impacts could be reduced to a slight adverse to neutral level after decommissioning. However, there are still likely to be some localised long term adverse effects, together with some uncertainty over future land use requirements on decommissioned sites, given the timescales involved.

Landscape						
Summary of Significant Strategic Effects:			Timescale	C	O	D
			Significance	-	-	0?
			Likelihood	H	H	H
<p><b>Significant Effects</b></p> <ul style="list-style-type: none"> <li>No International or National landscape designations will be adversely affected.</li> <li>During construction and operation of a new nuclear power station at the site, the main effects are likely to be on local landscape character, protected by local planning policy by Special Landscape Area (SLA) and 'Coastal Zone' policy areas.</li> <li>Due to the open, flat landscape, and the location of the site, on the edge of a headland, a visually prominent location, it is anticipated that views could extend as far as 15km. A new powerstation situated near to the existing power station is likely to have adverse additional local landscape and visual impacts until the existing power station site can be fully decommissioned.</li> <li>The decommissioning of the facilities may allow some landscape restoration of previously developed areas in the long term, however, long term land uses for the restored areas are difficult to predict.</li> </ul>	<p><b>Mitigation and Monitoring Possibilities</b></p> <ul style="list-style-type: none"> <li>Given the potential scale and massing of buildings proposed on the site it is highly unlikely that local landscape and visual impacts can be fully mitigated during construction or operational phases.</li> <li>The appears to be some potential to locate the nuclear reactor and other large scale buildings and infrastructure close to each other to avoid broadening of likely adverse effects.</li> <li>There are opportunities for landscape protection and enhancement through retaining, protecting or enhancing ditches, dykes, grassland, native hedgerows and trees, and by creating new inter-tidal habitats and drained marsh. Enhancements could be delivered through an Integrated Land Management Plan for the British Energy estate.</li> <li>The decommissioning of the facilities may allow some landscape restoration of previously developed areas in the long term, however, long term land uses for the restored areas are difficult to predict.</li> </ul>					

## Soils, Geology and Land use

### AoS Objective:

- 19. to avoid damage to geological resources
- 20. to avoid the use of greenfield land and encourage the re-use of brownfield sites
- 21. to avoid the contamination of soils and adverse impacts on soil functions

### Guide questions:

- Will it result in the compaction and erosion of soils?
- Will it lead to the removal or alteration of soil structure and function?
- Will it lead to the contamination of soils which would affect biodiversity and human health?
- Will it compromise the future extraction/ use of geological/ mineral reserves?
- Will it result in the loss of agricultural land?
- Will it lead to damage to geological SSSIs and other geological sites?
- Will it result in the loss of Greenfield land?
- Will it adversely affect land under land management agreements?

### Potential Receptors:

Two significant designated sites, which include geological as well as biological, interests, lie within the local vicinity. These are Dengie SSSI and Blackwater Estuary SSSI.

Essex Estuaries SAC – adjacent to and potentially (to be confirmed by nomination) within the site.

Dengie (Mid Essex Coast) Phase 1 and Phase 4 SPA - adjacent to and potentially (to be confirmed by nomination) within the site

Dengie NNR – adjacent to the site.



<b>Soils, Geology and Land use</b>	
<b>Potential Significant Effects and Mitigation Possibilities:</b>	
<b>International/ National/ Transboundary</b>	
1.	The site potentially lies within/adjacent Dengie SSSI and Blackwater Estuary SSSI, Essex Estuaries SAC. Dengie (Mid Essex Coast) Phase 1 and Phase 4 SPA and Dengie NNR. Construction activities and operational activities are likely to have a detrimental effect to the short/medium term soil quality within the area of the proposed development. Compaction/removal/alteration of soils is likely to affect the soil quality within these designated sites, which may also affect biodiversity; however this is addressed in the appraisal of Biodiversity.
2.	As highlighted above Dengie SSSI and Blackwater Estuaries SSSI are both geological designations of note within the local vicinity.
3.	The loss of greenfield land is not considered to be significant on a national level.
<b>Regional/ Local</b>	
4.	The soils in the local area adjacent to the site lie within a region classified to be of Moderate to low fertility by the National Soils Resources Institute. Any development is unlikely to have a local effect on agricultural land use. The soils could potentially be returned to an equivalent agricultural grade but reinstating the original soils matrix is unlikely. The extent of the loss of agricultural land is unlikely to be significant in a national context. Soils could be returned to a similar agricultural importance once the site has been decommissioned however the original soils matrix is unlikely to be restored.
5.	Construction of new plant upon greenfield sites. The loss of greenfield land is likely to be of local significance.
6.	The potential for future radioactive contamination of soils as a result of the nomination is not covered as part of this assessment, but is covered by the additional research being undertaken as part of the wider radioactive waste issue. The site would fall within National Permitting requirements and therefore management of the site in order to prevent the contamination of soils would be covered by these legislative requirements. Contamination and effects on human health would also be covered by this investigation.
7.	An historic airfield remains to the south of the existing power station, and presents a risk of contaminated soils to any proposed above or below ground infrastructure. This risk would be assessed during any site specific EIA and any additional site investigations recommended.

<b>Soils, Geology and Land use</b>						
<b>Summary of Significant Strategic Effects:</b>			Timescale	C	O	D
			Significance	-?	-?	-?
			Likelihood	M	M	M
<p><b>Significant Effects</b></p> <p>The construction of the power station and associated infrastructure (including transmission lines/towers) will lead to the direct loss of soil structure. This may include impacts on soils that maintain terrestrial habitats, including designated nature conservation sites; the Dengie SSSI and Blackwater Estuary SSSI, Essex Estuaries SAC. Dengie (Mid Essex Coast) Phase 1 and Phase 4 SPA and Dengie NNR. This is considered further in the Biodiversity appraisal.</p>	<p><b>Mitigation and Monitoring Possibilities</b></p> <p>Limitation of the footprint of the development reducing the area of soils affected. Avoidance of any soils within designated sites of ecological importance</p>					

<b>Water: Hydrology and Geomorphology</b>	
<b>AoS Objective:</b>	
	15. To avoid adverse impacts on surface water hydrology and channel geomorphology (including coastal geomorphology)
<b>Guide questions:</b>	
	<p>Will it result in the increased sedimentation of watercourses?</p> <p>Will it adversely affect channel geomorphology?</p> <p>Will hydrology and flow regimes be adversely affected by water abstraction?</p> <p>Will it result in demand for higher defence standards that will impact on coastal processes?</p> <p>Can the higher defence standards be achieved without compromising habitat quality and sediment transport?</p>
<b>Potential Receptors:</b>	
	Local and district resident population and tourists, local and district ecosystems in river, estuarine and coastal waters and on the foreshore.
<b>Potential Significant Effects and Mitigation Possibilities:</b>	
<b>International/National/Transboundary.</b>	
	The potential effects on surface water hydrology and fluvial, estuarine and coastal geomorphology are likely to be limited to the coastline within approximately 10-20km of the site. It will be necessary, however, to undertake a data collection and modelling exercise to confirm the spatial extent of this impact.
<b>Regional/Local</b>	
1.	During the life span of the proposed nuclear power station, due to the risks of flooding (see Flood Risks appraisal table below), and as a result of potential sea-level rises, the site is likely to require the construction of new coastal defences. These defences would be designed to counteract the effects of existing estuarine and coastal processes, but are likely to have the secondary effect of impacting the movement of sediment in the estuary system and along the coast. These may have further effects on estuary and marine ecosystems. The effects are likely to continue as long as the defences need to be maintained to protect the site. It is likely, however, that after a period of time, a new, stable equilibrium condition will be attained. It is not possible to assess whether these effects will be positive or negative without further information on the proposed design of the defences, and a more detailed investigation of the local and regional estuarine and coastal physical processes/dynamics. The effects of the construction and long-term

## Water: Hydrology and Geomorphology

presence of upgraded coastal defences on coastal process, hydrodynamics and sediment transport along the coast could be reduced or possibly eliminated by the adoption of suitable, environmentally-friendly designs.

2. The provision of cooling water for the proposed power station may require excavation/dredging in the foreshore and estuarine waters to enable the construction of a channel and/or pipeline for the abstraction and return of the cooling water. Construction disturbance associated with these works may have the short-term effect of accelerated delivery of sediment to water bodies during construction. Over the longer-term, during operation, there is the possibility that the discharge of cooling water may affect local estuarine / coastal hydrodynamics and sedimentation processes. The effects of construction and operation of the cooling water system on coastal processes and hydrodynamics and sediment transport could be reduced or potentially eliminated by suitable design and construction methods.
  
3. The potential effects of the development on the local river network includes construction or modification of the local drainage network through local diversion of small watercourses and drainage ditches, the removal of ditch vegetation and associated bank collapse, and increased loading of channel banks from construction machinery. During construction there is also a risk of increased sediment transfer to water courses from excavated areas and stockpiles. In addition, there is the risk of increased transfer of sediment from site drainage and from dredging activities to water bodies. The development is also likely to affect surface water run-off through increasing the surface of impermeable areas (for example roads and car parking areas). These potential adverse effects may, however, be reduced by suitable mitigation methods, for example, Sustainable Drainage Systems (SuDs), including the use of permeable pavements, and retention ponds or swales to retain drainage water and sediments.

### Summary of Significant Strategic Effects:

Timescale	C	O	D
Significance	-	-	-
Likelihood	M	M	M

#### Significant Effects

- New coastal defence works which may potentially impact on estuary and coastal processes, hydrodynamics and sediment transport, and any indirect effects on internationally designated habitats.
- Works to provide (and discharge) cooling water on coastal processes, hydrodynamics and sediment transport, and any indirect effects on internationally designated habitats.

#### Mitigation and Monitoring Possibilities

- Suitable design of flood defence works
- Use of SuDs.
- Selection of appropriate construction methods

**Water: Water Quality (including surface, coastal and marine)**

**AoS objective:**

16. To avoid adverse impacts on water quality (including surface, coastal and marine water quality) and to help meet the objectives of the Water Framework Directive.

**Guide questions:**

- Will it cause deterioration in surface water quality as a result of accidental pollution, for example spillages, leaks?
- Will it cause deterioration in coastal and / or marine water quality as a result of accidental pollution, for example spillages, leaks?
- Will it cause deterioration in surface water quality as a result of the disturbance of contaminated soil?
- Will it cause deterioration in coastal and / or marine water as a result of the disturbance of contaminated soil?
- Will it affect designated Shellfish Waters?
- Will it affect Freshwater Fish Directive sites?
- Will it increase turbidity in water bodies?
- Will it increase the temperature of the water in water bodies?

**Potential Receptors:**

Local and district resident population and tourists, local and district ecosystems in river, estuarine and coastal waters and on the foreshore. Regional and international receptors could potentially be affected by releases of persistent contaminants.

**Potential Significant Effects and Mitigation Possibilities:**

**International/National/Transboundary**

Not significant.

**Water: Water Quality (including surface, coastal and marine)**

**Regional/Local**

1. The main liquid discharges from proposed new power station at the site during routine operation will be treated effluent from the wastewater treatment plant and the return of cooling water to the sea at elevated temperatures. The EA will be responsible for consenting the discharges and it is anticipated that they will seek to apply standards that ensure that the discharges lead to no deterioration in water quality or meet the statutory water quality standards (whichever is the most stringent).
2. In the case of the discharge of cooling water it is unlikely to be feasible to eliminate some changes in thermal conditions locally. Detailed appraisal of the proposals for disposal of cooling water will be required to assess the significance of this effect. The existing power station with cooling water discharges is being decommissioned adjacent to the site.
3. Liquid waste streams are separated from the radioactive materials; accordingly radioactive materials are not expected to be present in any of the routine discharges of liquid waste. It is expected that liquid discharges will be treated to standards set by the EA to ensure compliance with all relevant legislation.

**Summary of Significant Strategic Effects:**

Timescale	C	O	D
Significance	-	-	?
Likelihood	M	M	M

**Significant Effects**

- Thermal impact of cooling water discharges. This effect is of local and regional significance.

**Mitigation and Monitoring Possibilities**

- Thermal discharges will need to be consented by the EA. The discharge quality will need to comply with existing standards or meet the no deterioration standard.

<b>Water: Water Supply and Demand</b>	
<b>AoS objective:</b>	
17. To avoid adverse impacts on the supply of water resources.	
<b>Guide questions:</b>	
Will it adversely affect water supply as a result of abstraction? Will it increase demand for water?	
<b>Potential Receptors:</b>	
Local and district resident population and tourists. District ecosystems dependent surface water features.	
<b>Potential Significant Effects and Mitigation Possibilities:</b>	
<b>International/National/Transboundary.</b>	
Not significant.	
<b>Regional/Local</b>	
1.	The site lies within the confined Chalk aquifer boundary but has not been assessed at this site. The Chalk is overlain by the London Clay Formation and then the Essex Gravel Formation, which forms a local minor aquifer. Groundwater from the Essex Gravel Formation is not currently used for water supply hence the development is not expected to have an impact on groundwater water supply in the area. The construction and operation of a new nuclear power station at Bradwell may increase demand for potable supplies both at the site and in local communities where the workforce will live. Depending on the nature of the demand and the potential efficiency savings, there may be implications for meeting this demand. However, this is unlikely to be significant in the operational phase where the numbers of additional workers is smaller; it may be more significant during the construction period when a substantial increase in the local population is likely.
2.	The site is located within the Essex and Suffolk Water (ESW) 'Essex' Water Resource Zone (WRZ) where there is a significant water supply deficit throughout the planning period to 2034/5, unless two new resource developments planned for this zone are successfully implemented. With successful promotion of the full Abberton Scheme and the Chigwell Bulk Supply, the Essex WRZ will move into surplus of supply over demand from 2014 until

### Water: Water Supply and Demand

2035, and the increased water supply required at the site may be derived from within the existing ESW 'Essex' WRZ. If these resource developments are not implemented then the increased water supply required at the site would probably be derived from outside the existing ESW 'Essex' WRZ with water transferred from adjacent resource zones. This may require new resource developments in the adjacent resources zones, hence additional water supply could potentially impact on local aquatic ecosystems (including in designated nature conservation sites) within and downstream of aquifers or catchments used to provide additional water.

#### Summary of Significant Strategic Effects:

Timescale	C	O	D
Significance	-	0	0
Likelihood	M	H	H

#### Significant Effects

- Increased demand during the construction phase.
- Similar significant effects are likely to apply to wastewater production from the site.

#### Mitigation and Monitoring Possibilities

- Studies to ensure that capacity of water and wastewater infrastructure in the WRZ is sufficient.



## Water: Groundwater Quality and Flow

**AoS Objective:**

18. To avoid adverse impacts on groundwater quality, distribution and flow and to help meet the objectives of the Water Framework Directive

**Guide questions:**

Will it cause deterioration in groundwater quality as a result of accidental pollution, for example spillages, leaks?  
 Will it cause deterioration in groundwater quality as a result of the disturbance of contaminated soil?

**Potential Receptors:**

Local and district resident population and tourists, local and district ecosystems with connections to groundwater.

**Potential Significant Effects and Mitigation Possibilities:**

**International/National/Transboundary.**

Not significant.

**Regional/ Local**

1. The major aquifer present at the site is the confined Chalk Formation but this is overlain by the London Clay Formation and then the Essex Gravel Formation, which forms a local minor aquifer. The London Clay acts as an aquitard between the Chalk and the Essex Gravel, preventing any groundwater pathways. There are no groundwater source protection zones located close to the site.
2. The Essex Gravel Formation could be used locally for private water supplies, and discharges from this groundwater body may support local groundwater dependent surface water aquatic ecosystems. Localised groundwater pathways are likely to exist, hence accidental discharges or construction disturbance at the site could cause deterioration in groundwater quality and flow quantity to the Essex Gravel minor aquifer. The thickness of the London Clay beneath the site should prevent any pathway between localised groundwater and the confined Chalk major aquifer.
3. If increased water supply is required at the site, and the amount needed were to exceed the potential surplus expected within the Essex WRZ from

<b>Water: Groundwater Quality and Flow</b>						
<p>2014 onwards, then an additional water supply would probably be derived from outside the existing Essex WRZ, with water transferred from adjacent resource zones. This may require new resource developments in the adjacent resource zones. If additional supplies were derived from groundwater bodies, this could lead to impacts on local groundwater dependent surface water features and aquatic ecosystems, including internationally and nationally designated water-related nature conservation sites (see Biodiversity).</p>						
<b>Summary of Significant Strategic Effects:</b>			Timescale	C	O	D
			Significance	-	-	<b>0</b>
			Likelihood	M	M	M
<p><b>Significant Effects</b></p> <ul style="list-style-type: none"> <li>Potential impacts on local groundwater bodies.</li> </ul>			<p><b>Mitigation and Monitoring Possibilities</b></p> <ul style="list-style-type: none"> <li>Studies to ensure that local groundwater bodies are investigated and suitable design is adopted to mitigate potential impacts.</li> </ul>			

<b>Flood Risk</b>	
<b>AoS Objective:</b>	
	14. To avoid increased flood risk (including coastal flood risk) and seek to reduce risks where possible
<b>Guide questions:</b>	
	Will it result in demand for higher defence standards?
<b>Potential Receptors:</b>	
	Site workers. Local, District ecosystems in estuarine waters.
<b>Potential Significant Effects and Mitigation Possibilities:</b>	
	<b>International/ National/ Transboundary</b>
	<b>Regional/ Local</b>
1.	The site is located partially in Flood Zone 1 and partially in Flood Zone 3. It is likely through the impacts of climate change on sea level rise that flood risk to the site will increase in future.
2.	There are a number of defences in this area, comprising of a mixture of hard defences and earth embankments. The average condition of these defences is 'good condition in need of improvement'. The average standard of protection of these defences is 1 in 5, well below the Environment Agency SOP requirement of 1 in 200 for tidal areas. To mitigate against flood risk for the lifetime of the development, ongoing maintenance and improvement of these defences may be required, which may affect coastal processes, especially given the existing issues in the estuary associated with flood embankments constraining natural processes, and also with the defences being at risk from increased erosion as a result of increased tidal velocities.
3.	To mitigate against the above effects, any improvement in existing or construction of new defences will require appropriate design, construction and management. Local land raising of the site is also a mitigation option.

<b>Flood Risk</b>						
<b>Summary of Significant Strategic Effects:</b>			Timescale	C	O	D
			Significance	-	-	-
			Likelihood	H	H	H
<p><b>Significant Effects</b></p> <ul style="list-style-type: none"> <li>Main effects are through the continued management and improvement of existing defences which will affect coastal processes.</li> </ul>			<p><b>Mitigation and Monitoring Possibilities</b></p> <ul style="list-style-type: none"> <li>It may be possible to mitigate these effects appropriate management and techniques for improving the existing defences.</li> </ul>			

## Appendix 3: Plans and Programmes Review (Regional)

### Revised Regional Spatial Strategy for the East of England 2008 - 2021 (Government Office for the East of England, 2008) – Revoked July 2010<sup>4</sup>

The revised RSS for the East of England outlines sub-regional policy and guidance for the environment, housing, transport and the economy and employment. In particular it seeks to reduce the region's impact on, and exposure to, the effects of climate change and to put in place a development strategy with the potential to support continued sustainable growth beyond 2021. It also incorporates the Regional Transport Strategy for the East of England.

In particular, the spatial strategy seeks to ensure that development:

- maximises the potential for people to form more sustainable relationships between their homes, workplaces, and other concentrations of regularly used services and facilities, and their means of travel between them; and
- respects environmental limits by seeking net environmental gains wherever possible, or at least avoiding harm, or (where harm is justified within an integrated approach to the guiding principles set out above) minimising, mitigating and/or compensating for that harm.

#### *Economic Development:*

- 131,000 jobs are to be created in Essex for the plan period of 2001 – 2021 and 56,000 jobs are planned for the mid Essex area, including Maldon, Chelmsford and Braintree.

#### *Housing:*

- By 2021, 127,000 homes will be built in Essex and the Southend and Thurrock Unitary Authorities. 2400 of these are to be built in Maldon which is situated approximately 15km to the west of Bradwell Power Station across the Blackwater Estuary.

#### *Transport:*

- The strategic and regional road networks should be improved, managed and maintained in accordance with priorities for the strategic and regional functions of the region's motorway, trunk road and primary route network. This will aim to achieve improved access to key centres, improve safety, improve the efficiency of movement of freight that cannot travel by railway and water and to mitigate environmental impacts.

<sup>4</sup> Data from the Regional Spatial Strategies (RSS) and other regional plans and strategies were used to inform the AoS reports published in November 2009. On 6 July 2010, the Secretary of State for Communities and Local Government, announced the revocation of Regional Strategies and the other documents noted with immediate effect. However, the RSS and other revoked regional documents remain a useful source of background data on regional sustainability issues, so references to these documents have been retained in later revisions of the AoS. The strategies and policies set out in the revoked regional documents may in future be taken forward by other means in local or strategic planning and applicants will need to consider this in preparing applications for development consent.

- Priority should be given to the efficient and sustainable movement of freight, maximising the proportion of freight carried by rail and water where those are the most efficient modes.

*Nature Conservation:*

- Conserve and enhance the natural, historic and built environment by positive management and protect it from development likely to cause harm;
- Adopt an approach that integrates protection and enhancement of nationally and internationally designated sites and areas while meeting the social and economic needs of local communities;
- Protect all important aspects of the countryside, including individual features, special sites, their setting, and the wider landscape;
- Promote a sustainable approach to the use of the region's natural resources;
- Secure effective protection of the environment by considering the nature and location of proposed development.
- Restore damaged and lost environmental features whenever possible.
- Must ensure that development does not have adverse effects on the integrity of sites of European or international importance for nature conservation.
- Opportunities for promoting the restoration and re-establishment of habitats and species populations may arise in conjunction with development proposals and as a result of climate change, for example saltmarsh creation on the Essex coast. Such schemes can provide accessible and attractive green spaces for local communities and visitors to enjoy.

*Historic Environment:*

- The historic environment of the East of England will be preserved and enhanced.

*Coastal Planning:*

- Shoreline Management Plans and other policies will be used to restrict development in areas liable to coastal flooding.

*Renewable Energy:*

- The RSS encourages the supply of energy from decentralised, renewable and low carbon energy sources.
- The aim is that by 2010, 10% of the region's energy and by 2020, 17% of the region's energy should come from renewable sources.

*Water Resources and Flood Risk:*

- The RSS aims to reduce water pollution, reduce the effects of floods and droughts, and ensure that most inland and coastal waters attain 'good ecological status' by 2015.
- The priorities are to defend existing properties from flooding and locate new development where there is little or no risk of flooding.

*Waste:*

- The RSS aims to minimise the impact of new developments on regional waste management requirements;
- The RSS also aims to minimise the environmental impact of waste management, including impacts arising from the movement of waste, and help secure the recovery and disposal of waste without endangering human health;
- The objectives for waste in the East of England are to eliminate the landfilling of untreated municipal and commercial waste by 2021 and secure at least the following minimum levels of recovery - municipal waste recovery of 50% at 2010 and 70% at 2015, and commercial and industrial waste recovery of 72% at 2010 and 75% at 2015.
- Account should be taken of the regional and sub regional current and future hazardous waste levels and provide suitable management to control it.

*Air Quality:*

- By managing the transport infrastructure and encouraging movement away from cars towards public transport and by improving access across the area, the RSS aims to improve air quality.

LINK: [http://www.gos.gov.uk/goee/docs/Planning/Regional\\_Planing/Regional\\_Spatial\\_Strategy/EE\\_Plan1.pdf](http://www.gos.gov.uk/goee/docs/Planning/Regional_Planing/Regional_Spatial_Strategy/EE_Plan1.pdf)

**Inventing our future - Collective action for a sustainable economy: The Regional Economic Strategy for the East of England 2008–2031 (East of England Development Agency) – Revoked July 2010<sup>5</sup>**

The Regional Economic Strategy (RES) sets out a long-term vision for the sustainable economic development of the East of England as follows:

By 2031, the East of England will be:

- Internationally competitive with a global reputation for innovation and business growth,
- a region that harnesses and develops the talents and creativity of all,
- at the forefront of the low-carbon and resource-efficient economy.

<sup>5</sup> Data from the Regional Spatial Strategies (RSS) and other regional plans and strategies were used to inform the AoS reports published in November 2009. On 6 July 2010, the Secretary of State for Communities and Local Government, announced the revocation of Regional Strategies and the other documents noted with immediate effect. However, the RSS and other revoked regional documents remain a useful source of background data on regional sustainability issues, so references to these documents have been retained in later revisions of the AoS. The strategies and policies set out in the revoked regional documents may in future be taken forward by other means in local or strategic planning and applicants will need to consider this in preparing applications for development consent.

and known for:

- exceptional landscapes, vibrant places and quality of life,
- being a confident, outward-looking region with strong,
- leadership and where communities actively shape their future.

The RES also sets out Headline Regional Ambitions, which are designed to anticipate the performance of the wider UK and world economies. These include:

- minimising the environmental and resource-use impacts of economic growth,
- recognise infrastructure constraints and pressure on public services,
- be consistent with other headline targets and objectives, other key regional strategies and public service agreements,
- take account of the region's governance structures and changing institutional landscape.

Tourism and hospitality are especially important to the rural economy. The coastline, wetlands and nature reserves of the north and east of the region are particular environmental assets. In other areas tourism is largely based on day visits to places and attractions within easy reach of London, such as the Essex Coast.

LINK: [http://www.eeda.org.uk/res/files/RES\\_Complete.pdf](http://www.eeda.org.uk/res/files/RES_Complete.pdf)

### **Sustainable Communities in the East of England 2003 (Office of the Deputy Prime Minister) – Revoked July 2010<sup>6</sup>**

This regional programme of action sets out proposals for maintaining and creating sustainable communities in the East of England.

The Key Strategic challenges for the region are stated as:

- Addressing problems of high and then rapidly rising house prices and their impact on the recruitment and retention of staff, particularly close to London and around Cambridge but spreading deeper into the region.

<sup>6</sup> Data from the Regional Spatial Strategies (RSS) and other regional plans and strategies were used to inform the AoS reports published in November 2009. On 6 July 2010, the Secretary of State for Communities and Local Government, announced the revocation of Regional Strategies and the other documents noted with immediate effect. However, the RSS and other revoked regional documents remain a useful source of background data on regional sustainability issues, so references to these documents have been retained in later revisions of the AoS. The strategies and policies set out in the revoked regional documents may in future be taken forward by other means in local or strategic planning and applicants will need to consider this in preparing applications for development consent.



- Improving transport infrastructure – railways, roads, airports and ports to meet the needs of economic growth.
- Ensuring that the benefits of economic growth are spread across the region, particularly to those urban and rural communities facing problems of deprivation and peripherality.
- Addressing the development consequences of scarce water resources throughout the region and an increasing sea level for coastal and low lying areas.

LINK: <http://www.communities.gov.uk/documents/communities/pdf/143600.pdf>

### **East of England Regional Waste Management Strategy 2002 (East of England Region Waste Technical Advisory Body) – Revoked July 2010<sup>7</sup>**

The Regional Waste Management Strategy will encourage a positive attitude to waste management in the region and will promote methods of waste reduction. The objectives of the RWMS are:

- Minimise the environmental impact of waste management
- Seek to reduce the generation of waste
- Implement the Best Practicable Environmental Option for each type of waste
- View waste as a resource and maximise the reuse, recycling and composting of waste, and extracting value from the remainder
- Secure safe treatment and disposal of hazardous and residual wastes
- Seek to secure where appropriate regional and county/unitary self-sufficiency in provision for waste management
- Enlist and encourage community support and participation

The RWMS identifies 24 policies to deal with the waste management in the East of England.

The region in making provision for its wastes will expect adjoining regions to do the same. London exports much of its waste into the surrounding regions with Essex, Thurrock and Bedfordshire taking a major share.

<sup>7</sup> Data from the Regional Spatial Strategies (RSS) and other regional plans and strategies were used to inform the AoS reports published in November 2009. On 6 July 2010, the Secretary of State for Communities and Local Government, announced the revocation of Regional Strategies and the other documents noted with immediate effect. However, the RSS and other revoked regional documents remain a useful source of background data on regional sustainability issues, so references to these documents have been retained in later revisions of the AoS. The strategies and policies set out in the revoked regional documents may in future be taken forward by other means in local or strategic planning and applicants will need to consider this in preparing applications for development consent.

LINK: <http://www.eera.gov.uk/Documents/About%20EERA/Policy/Planning%20and%20Transport/RWMS16-7.pdf>

### **Essex Biodiversity Action Plan (Essex Biodiversity Partnership)**

The Essex Biodiversity Action Plan has identified 25 species and 11 habitats within the area for which specific action plans have been produced.

LINK: <http://www.essexbiodiversity.org.uk/Default.aspx?pageid=47>

### **River Basin Management Plan - Anglian River Basin District, Environment Agency (2009)**

The River Basin Management Plan sets out what the Environment Agency, under the guidelines of the UK Water Framework Directive, aim to achieve, with regards to improving the water environment over the next 20 years. The plan focuses on the pressures facing the water environment in the Anglian River Basin District, and sets out objectives and actions for addressing them.

The key targets of the plan are:

- By 2015, 16% of surface waters (rivers, lakes, estuaries) in this river basin district are going to improve for at least one biological, chemical or physical element. This includes an improvement of over 1,700km of river, in relation to fish, phosphate, specific pollutants and other elements
- 19% of surface waters will be at good or better ecological status/potential and 45% of groundwater bodies will be at good status by 2015,
- At least 30% of assessed surface waters will be at good or better biological status by 2015

The following challenges are addressed in the plan:

- point source pollution from sewage treatment works;
- the physical modification of water bodies;
- diffuse pollution from agricultural activities;
- water abstraction;
- diffuse pollution from urban sources.

LINK: <http://wfdconsultation.environment-agency.gov.uk/wfdcms/en/anglian/Intro.aspx>

### **The Combined Essex Catchment Abstraction Management Strategy 2007 (Environment Agency)**

The Catchment Abstraction Management Strategy (CAMS) for the Combined Essex catchment sets out how the EA will manage water abstraction until 2014. It outlines where water is available, and also, if relevant, where there is need to reduce current rates of abstraction. It also outlines the policy on time-limited licences and whether existing licences should be renewed and, if so, on what terms.

The nominated site is located within the North Essex CAMS.

The Environment Agency has a statutory duty, to ensure that the integrity of the internationally designated sites are maintained or restored through sustainable water resources management. The EA has to ensure that permissions (abstraction licences, discharge consents, radioactive substance authorisations, waste management licences and integrated pollution control (IPC) authorisations) do not have an adverse effect on the integrity of any designated sites.

The EA will have a duty to ensure that any water needed for the nominated site does not impact negatively on the Essex Estuaries SAC and the Mid-Essex Coast SPA/Ramsar complex.

Each of the North and South Essex CAMS have been divided into Water Resource Zones. The most relevant zones within the North Essex CAMS have no water available for future abstraction. The most relevant zones in the South Essex CAMS do have water available for future abstractions.

LINK: <http://publications.environment-agency.gov.uk/pdf/GEAN0207BLXJ-E-E.PDF>

### **Essex County Council Local Transport Plan 2006-2011**

The 5 objectives of the Local Transport Plan are:

- Tackling Congestion: To reduce the rate and incidence of congestion and its effects on residents and businesses in Essex
- Delivering Accessibility: To enhance accessibility to key services (Education, Employment, Healthcare and Retail)
- Creating Safer Roads: To improve safety on the transport network and to enhance and promote a safer travelling environment
- Promoting Better Air Quality: To manage the impact of road and air transport on air pollution
- Enhancing Maintenance: To maintain highways and public rights of way to a standard appropriate to their use

LINK: <http://www.essexcc.gov.uk/vip8/ecc/ECCWebsite/dis/guc.jsp?channelOid=16819&guideOid=39939&guideContentOid=44746>

### Renewable Energy Strategy for Essex (Essex County Council)

The current target is that 14% of the region's electricity consumption is to come from renewable sources by 2010

The report looks at the different types of renewable energy and whether they could be used in Essex.

The renewable energy sources the document looks at are:

Renewable Energy Source	Recommendation
Wind - Onshore	That wind power as a sustainable source of renewable energy is made the subject of a public awareness campaign and consideration is given to producing in partnership with district councils and other stakeholders, a constraints map showing where wind turbines might be appropriate, subject to detailed planning considerations.
Wind – Offshore	In view of the constraints referred to, it is recommended that in partnership with the districts and stakeholders a map be produced to guide the location of future off-shore wind farms.
Hydro	It is recommended that hydro power is not an option to be considered in Essex.
Wave/Tidal	It is recommended that wave/tidal power is not suitable as a renewable energy resource in Essex.
Active Solar Heating	It is recommended that Active Solar Heating should be considered in any revision/updating of the Essex Design Guide, considered by the County Council when designing new or changing existing buildings and should be the subject of a public awareness campaign.
Photovoltaics	It is recommended that Photovoltaic systems should be considered in any revision/update of the Essex Design Guide; and also considered by the County Council when designing new buildings or changing existing ones; and should be the subject of a public awareness campaign.
Passive Solar Gain	It is recommended that Passive Solar Design should be considered in any revision/update of the Essex Design Guide; and considered by the County Council in the design of new County Council buildings; and be the subject of a public awareness campaign.
Waste to Energy – Landfill Gas	It is recommended that the use of landfill gas for energy generation is generally continued to be supported subject to planning safeguards as espoused in the Essex and Southend Waste Plan.
Anaerobic Digestion	It is recommended that a watching brief is kept as the technologies for the recovery of energy and/or heat from the incineration of waste advance, and that liaison should continue with the Environment Agency regarding pollution issues.
Biofuels	It is recommended that a watching brief is kept on existing schemes to assess their objectives and impacts.

	Consideration could also be given to the use of Bio-fuels for heat generation in new and existing County Council buildings. It is further recommended that the Government/Local Government Association (LGA) be approached with the suggestion that legislation be amended to require that the change of use of land to that for the growing of fuel crops should be the subject of planning permission.
Geothermal	It is recommended that Geothermal sources of energy are not currently an option for Essex; but that a watching brief is kept on the subject.
Combined Heat and Power (CHP)	That Essex County Council supports and encourages the principle of combined heat and power schemes in Essex, subject to planning requirements and the nature of the energy source.

LINK: [http://www.essexcc.gov.uk/vip8/ecc/ECCWebsite/content/binaries/documents/renewable\\_energy\\_strategy\\_for\\_essex.pdf](http://www.essexcc.gov.uk/vip8/ecc/ECCWebsite/content/binaries/documents/renewable_energy_strategy_for_essex.pdf)

### **Essex Minerals Development Document Issues and Options Core Strategy 2007 - 2026 (2009, Essex County Council)**

Essex has extensive deposits of sand and gravel, particularly across the northern half of the County, and Essex is the largest producer in the eastern region. Silica sand, chalk and brick clay are also worked. Marine dredged sand and gravel is dredged from licensed areas off the coastline, but there are no specialist landing facilities within the county, the nearest are on the Thames in Thurrock, and Ipswich in Suffolk.

There is an active existing mineral extraction site located at Curry Farm in Bradwell-on-Sea which helps to provide some of the basic raw materials used by the construction industry in Essex. The site is expected to be closed by 2011. There is also an active existing mineral extraction site located at Asheldham. This is expected to operate until 2016.

The Virley Channel is a key waterway for mineral imports by boat as it is more than 6m wide.

LINK:

[http://www.essexcc.gov.uk/vip8/ecc/ECCWebsite/content/binaries/documents/Planning396/MDD\\_Issues\\_and\\_Options\\_Paper\\_Compressed.pdf](http://www.essexcc.gov.uk/vip8/ecc/ECCWebsite/content/binaries/documents/Planning396/MDD_Issues_and_Options_Paper_Compressed.pdf)

*Note: The Waste Development Documents have not yet been published*

### **Essex Estuaries Coastal Habitat Management Plan 2002 (Environment Agency)**

The Essex Estuaries support significant assemblages of habitats and species which are recognised for their ecological and nature conservation importance through designation as a Special Area of Conservation (SAC) under the European Union Habitats (Council Directive 92/43/EEC) and Special Protection Areas (SPA) under the Birds Directives (Council Directive 79/409/EEC) and Ramsar sites under the Ramsar International Convention on Wetlands (1971). Coastal Habitat Management Plans (CHaMPs) form an important link in the coastal planning process for managing European and Ramsar sites.

The primary functions of the Essex Estuaries CHaMP is:

- To offer a long-term strategic view on the balance of losses and gains to habitats and species of European interest likely to result from sea level rise, and the flood and coastal defence response to it;
- To develop a response to these losses and gains by informing the strategic direction for the conservation measures that are necessary to offset predicted losses;
- Identify suitable areas for new habitats that will need to be created; and
- Make recommendations to SMPs to ensure flood and coastal defence options address the requirements of the Habitats and Birds Directives.

The nominated site could potentially have an impact on the sites protected by the CHaMP and may influence the type of protection and enhancement they receive.

LINK: <http://www.eclife.naturalengland.org.uk/champs/pdf/CHaMPs/Essex%20Final%202003.pdf>

### **Essex Estuaries Flood Management Strategies (Environment Agency)**

The Essex Estuaries are suffering coastal squeeze, i.e. the habitats (for example, saltmarshes) have been restricted by coastal defences which means they can no longer adapt to the rising sea levels by travelling further in land. This means that habitats are being lost.

The Government encourages operating bodies such as the Environment Agency to consider flood management in an integrated and sustainable way by looking at the whole of each estuary rather than individual sections. A long term plan, known as a flood management strategy has been developed for each estuary which sets out the policy and objectives for flood defence taking into account a broad range of issues.

This aids decision making about providing the most appropriate flood management schemes and the approach allows the management of the whole flood defence system more effectively.

The Essex Estuaries Flood Management Strategies are being developed.

LINK: [http://www.essex-estuaries.co.uk/about\\_ees/default.htm](http://www.essex-estuaries.co.uk/about_ees/default.htm)

### **Bradwell Wind Farm (2006, Npower Renewables)**

The proposal is for a wind farm on Land At Hockley Farm, Bradwell-on-Sea, to the south of the nominated site which would comprise 10 tri blade solid tubular turbines whose overall height, to the tip of the blade, would not exceed 121m. Each turbine would produce between 1.5-2.5 MW with an overall production of between 38,100 and 49,900 Megawatt hours of electricity per year. Also required on site would be sub-station building, anemometer mast, access track, crane hard standing and ancillary infrastructure.

The application was granted permission in 2007 after a successful appeal (against refusal by Maldon District Council in 2006 on the grounds of the 'considerable impact ... on the special nature of the open and undeveloped landscape, including the effect on the setting on the Chapel at St Peters-on-the-wall'). In 2008 the High Court ruled that there should be a re-examination of the appeal decision.

LINK: [http://www.maldon.gov.uk/LivingHere/Planning\\_New/DevelopmentControl/Appeals/Bradwell/Default.htm](http://www.maldon.gov.uk/LivingHere/Planning_New/DevelopmentControl/Appeals/Bradwell/Default.htm)

#### **Mid Essex Strategic Flood Risk Assessment, (2007, Scott Wilson)**

The Mid-Essex region comprises four districts; Maldon, Colchester, Chelmsford and Braintree and lies within the Environment Agency Anglian Region. The region comprises large areas of flat, low lying land, a quarter of which is below sea level. The region has over 160km of coastline most of which is defended from tidal flooding by sea defences. In the last 20 years only 23% of the coastal sea walls in Essex have been raised or improved (Environment Agency, online, year unknown). The River Crouch forms the southern boundary of the study area, with tidal flows through the lower part of the Crouch Estuary past the towns of Chelmsford and Maldon. The North Sea forms the majority of the eastern boundary of the study area from the estuary of the River Crouch to the River Colne. Further north of the Colne Estuary, the River Colne forms the eastern boundary. The northern boundary of the study area is defined by the River Stour with the western boundary running to the west of Chelmsford, past Roxwell, Braintree and up to Bumpstead, to the south east of Haverhill. There are numerous major rivers within the study area, including the Rivers Can, Chelmer, Brain, Stour, Colne and Crouch and their tributaries. The estuary systems of the River Crouch, Blackwater and Colne should be regarded as potential sources of tidal flood risk, as should the North Sea on the eastern boundary of the region. The Environment Agency's Flood Zone Maps (Environment Agency, 2006), which indicate the areas of the study region that are at risk from a 1 in 100-year return period flood (fluvial) and 1 in 200 year (tidal) and a 1 in 1,000 year event. Many of the coastal areas of the study region are defended against flood events by flood defences. The study area includes the towns of Colchester, Braintree, Halstead, Witham, Heybridge, Burnham-on-Crouch, South Woodham Ferrers, Maldon and Chelmsford. There are no Internal Drainage Boards within the study area. Anglian Water serves the SFRA study area for foul sewerage purposes. Both Essex and Suffolk Water and Anglian Water cover the region with regards freshwater supply and surface water drainage respectively.

Various coastal and estuary conservation designations exist in the estuaries of the River Blackwater and Colne. These range from locally designated areas such as Local Nature Reserves (LNRs), nationally important sites such as Sites of Special Scientific Interest (SSSIs) and National Nature Reserves (NNRs) to European sites of importance, e.g. Special Protection Areas (SPAs) and Special Areas of Conservation (SACs) and internationally important sites such as Ramsar sites. These designations have an important role in nature conservation providing habitats and

feeding/breeding grounds for large populations of wildfowl and wader birds. The northern Dedham Vale is also designated an Area of Outstanding Natural Beauty.

*Note: The Eco-Towns Programme – North East Elsenham plan has not been considered for this review as it is considered to be too far from the nominated site to have potential cumulative impacts.*



## Appendix 4: Baseline Information

Note: Information on Comparators and Trends is included where applicable/available.

### Air

Indicator	Data Source	Current Data	Comparators	Trend
<b>Topic: Air</b>				
<b>Regional Air Quality</b>	1,2,3	<p>Air quality in Eastern England is relatively good with an average air quality index score of &lt;3 (where 1-3 good, 4-6 moderate, 6-9 poor and 10 bad). However, pockets of relatively poor air quality exist in the region, particularly in urbanised areas and major route corridors that experience high levels of traffic flow.</p> <p>There are 68 Air Quality Management Areas (AQMAs) in the Eastern Region of England. None have been declared in Maldon District .</p> <p>One AQMA has been declared in Chelmsford, approx 30 km west of the Bradwell site. Two AQMAs have been declared in Colchester.</p> <p>The prevailing wind direction for the East of England is south-westerly.</p>		<p>The average air pollution index for the east of England has been gradually increasing since 2002. Significant pressures on meeting air quality objectives are being experienced in a number of urban areas and major route corridors.</p> <p>This is reflected in the relatively large number of AQMAs in the region and is largely a result of increasing population, traffic and congestion in the region (there has been an increase of 19 % of vehicles on the roads from 1995 – 2006).</p>

#### Key to Data Sources

<b>1</b>	<p>East of England Regional Assembly (2008). East of England Plan Review to 2031 Integrated Sustainability Appraisal. <a href="http://www.eera.gov.uk/What-we-do/developing-regional-strategies/east-of-england-plan/east-of-england-plan-review-to-2031/east-of-england-plan-review-to-2031-integrated-sustainability-appraisal/">http://www.eera.gov.uk/What-we-do/developing-regional-strategies/east-of-england-plan/east-of-england-plan-review-to-2031/east-of-england-plan-review-to-2031-integrated-sustainability-appraisal/</a> [accessed 03 March 2009] <i>NB: The East of England Regional Assembly dissolved on the 31 March 2010 and no longer functions as an organisation. From 1 April 2010, much of EERA's work was will be taken forward by a new organisation called the East of England LGA - <a href="http://www.eelga.gov.uk">www.eelga.gov.uk</a></i></p>
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<b>2</b>	UK Air Quality Archive (2009). Air Quality Management Areas. <a href="http://www.airquality.co.uk/archive/lqm/lqm.php">http://www.airquality.co.uk/archive/lqm/lqm.php</a> [accessed 03 March 2009]
<b>3</b>	Environment Agency (2009). State of the Environment – Eastern England. <a href="http://www.environment-agency.gov.uk/research/library/publications/34059.aspx">http://www.environment-agency.gov.uk/research/library/publications/34059.aspx</a> [accessed 03 March 2009]

## Biodiversity and Ecosystems

Indicator	Data Source	Current Data	Comparators	Trend
<b>Topic: Biodiversity and Ecosystems</b>				
<b>Essex<sup>8</sup> Biodiversity Action Plan</b> <b>Habitats</b>	1	A total of 10 habitat types are included within the Essex Biodiversity Action Plan. The habitats considered to be most relevant to the site are Coastal Grazing Marsh, Reedbeds, Seagrass Beds, and Saline Lagoons.		
<b>Essex Biodiversity Action Plan</b> <b>Species</b>	1	A total of 25 species are included within the Essex Biodiversity Action Plan. Of these 20 are for UK BAP Priority <sup>9</sup> species with the remainder being for species which are considered to be of local importance within Essex. Those considered to be of most relevance are: harbour porpoise, water vole, otter, bats, bright wave moth, Allis and Twaite shad and great crested newts.		
<b>Natura 2000<sup>10</sup> sites (N2K) and Ramsar<sup>11</sup> Sites</b>	2	<p>There are 7 N2K sites and 6 Ramsar sites within 20 km of the site.</p> <p>Please note that due to the sheer size of the site the Mid Essex Coast Phased SPA/Ramsar complex has been sub-divided into a number of separate phases that have been classified separately.</p> <p>The N2K sites/Ramsar sites are as follows:</p> <ul style="list-style-type: none"> <li>• <b>Essex Estuaries SAC</b> - immediately adjacent to the site</li> </ul>		

<sup>8</sup> An East of England Biodiversity Forum exists which covers Essex however they do not have a current website and limited information was available at the time of compiling this report.

<sup>9</sup> According to the new list of Priority Habitats and Species which was produced in 2008. See <http://www.ukbap.org.uk/NewPriorityList.aspx>

<sup>10</sup> **Special Areas of Conservation (SACs)** are classified under the Habitats Directive and provide rare and vulnerable animals, plants and habitats with increased protection and management. **Special Protection Areas (SPAs)** are classified under the Birds Directive to help protect and manage areas which are important for rare and vulnerable birds because they use them for breeding, feeding, wintering or migration. Together SAC's and SPA's make up the Natura 2000 series.

<sup>11</sup> **Ramsar sites**<sup>\*</sup> are designated under the Convention on Wetlands of International Importance. The broad objectives are to stem the loss and progressive encroachment on wetlands now and in the future. These are often coincident with SPA sites designated under the Birds Directive. Although RAMSAR sites are not considered part of the Natura 2000 network, they are treated the same way as Natura 2000 sites

Indicator	Data Source	Current Data	Comparators	Trend
		<ul style="list-style-type: none"> <li>• <b>Dengie SPA/Ramsar site</b> (Mid-Essex Coast Phase 1) – immediately adjacent to the site</li> <li>• <b>Outer Thames Estuary SPA</b> – within 1km</li> <li>• <b>Colne Estuary SPA/Ramsar site</b> (Mid-Essex Coast Phase 2) – approx 5 km to the north east of the site</li> <li>• <b>Crouch and Roach Estuaries SPA/Ramsar site</b> (Mid-Essex Coast Phase 3) – approx 13 km to the south of the site</li> <li>• <b>Blackwater Estuary SPA/Ramsar site</b> (Mid-Essex Coast Phase 4) – immediately adjacent to the site</li> <li>• <b>Foulness SPA/Ramsar site</b> (Mid-Essex Coast Phase 5) – approx 12.5 km to the south east of the site</li> <li>• <b>Abberton Reservoir SPA/Ramsar site</b> – approx 8 km to the north west of the site</li> </ul> <p>Collectively the Essex Estuaries SAC and the Mid-Essex Coast SPAs form the <b>Essex Estuaries European Marine Site (EMS)</b>. This is the collective term for SACs and SPAs that are covered by tidal water and protect some of the most special marine and coastal habitats and species of European importance.</p> <p>The SPA sites and Ramsar sites cover the same geographical areas and have been grouped together in this instance.</p> <p>Further details on the sites listed are provided below.</p>		
<b>Essex Estuaries SAC</b>	3	<p><b>Immediately adjacent to the site</b></p> <p>This is a large estuarine site in south-east England, and is a typical, undeveloped, coastal plain estuarine system with associated open coast mudflats and sandbanks. The site comprises the major estuaries of the Colne,</p>		<p>The draft Marine Bill was published by Defra on 3 April 2008<sup>12</sup> and proposes Marine Conservation Zones (MCZs) around certain areas of the UK. These zones will help to halt the decline in</p>

<sup>12</sup> See Details on the draft Marine Bill at <http://www.defra.gov.uk/marine/biodiversity/marine-bill.htm>

Indicator	Data Source	Current Data	Comparators	Trend
		<p>Blackwater, Crouch and Roach rivers and is important as an extensive area of contiguous estuarine habitat.</p> <p>Annex I habitats that are a primary reason for selection of this site:</p> <ul style="list-style-type: none"> <li>• Estuaries</li> <li>• Mudflats and sandflats not covered by seawater at low tide</li> <li>• <i>Salicornia</i> and other annuals colonizing mud and sand</li> <li>• Spartina swards (<i>Spartinion maritimae</i>)</li> <li>• Atlantic salt meadows (<i>Glauco-Puccinellietalia maritimae</i>)</li> <li>• Mediterranean and thermo-atlantic halophilous scrubs (<i>Sarcocornetea fruticosi</i>)</li> </ul> <p>Annex I habitats present as a qualifying feature, but not a primary reason for selection of this site</p> <ul style="list-style-type: none"> <li>• Sandbanks which are slightly covered by sea water all the time</li> </ul>		<p>biodiversity and allow the protection of habitats and species of national importance.</p> <p>MCZs would replace the existing Marine Nature Reserves and form a new type of Marine Protected Area.</p> <p>Four regional projects are currently being developed. The Essex Estuaries fall within one of these - the Eastern Channel MCZ.</p>
<p><b>Dengie SPA/Ramsar Site (Mid-Essex Coast Phase 1)</b></p>	<p>4</p>	<p><b>Immediately adjacent to the site</b></p> <p>Dengie is a large and remote area of tidal mudflat and saltmarsh at the eastern end of the Dengie peninsula, between the Blackwater and Crouch Estuaries. The saltmarsh is the largest continuous example of its type in Essex. Foreshore, saltmarsh and beaches support an outstanding assemblage of rare coastal flora. It hosts internationally and nationally important wintering populations of wildfowl and waders, and in summer supports a range of breeding coastal birds including rarities. The formation of cockleshell spits and beaches is of geomorphological interest.</p> <p>The site is designated as an SPA as it supports the following:</p> <ul style="list-style-type: none"> <li>• Internationally important assemblages of waterfowl</li> <li>• Internationally important populations of regularly occurring migratory species</li> <li>• Internationally important populations of regularly occurring Annex I species</li> </ul>		

Indicator	Data Source	Current Data	Comparators	Trend
		<p>The site is designated as a Ramsar Site as it supports:</p> <ul style="list-style-type: none"> <li>• Important saltmarsh communities</li> <li>• Rare plant and invertebrate species</li> <li>• Important bird assemblages (bar-tailed godwit, hen harrier, grey plover, knot and dark bellied brent goose)</li> </ul>		
<p><b>Colne Estuary SPA/Ramsar (Mid-Essex Coast Phase 2)</b></p>	<p>5</p>	<p><b>Approximately 5 km to the north east of the site</b></p> <p>Colne Estuary is a comparatively short and branching estuary, with five tidal arms which flow into the main river channel. The estuary has a narrow intertidal zone predominantly composed of flats of fine silt with mudflat communities typical of south-eastern estuaries. The estuary is of international importance for wintering brent geese and black-tailed godwit and of national importance for breeding little terns and five other species of wintering waders and wildfowl. The variety of habitats which include mudflat, saltmarsh, grazing marsh, sand and shingle spits, disused gravel pits and reedbeds, support outstanding assemblages of invertebrates and plants.</p> <p>The site is designated as an SPA as it supports the following:</p> <ul style="list-style-type: none"> <li>• Internationally important assemblages of waterfowl</li> <li>• Internationally important populations of regularly occurring migratory species</li> <li>• Internationally important populations of regularly occurring Annex I species</li> </ul> <p>The site is designated as a Ramsar site as it supports:</p> <ul style="list-style-type: none"> <li>• Important saltmarsh communities</li> <li>• Rare plant and invertebrate species</li> </ul>		

Indicator	Data Source	Current Data	Comparators	Trend
<b>Crouch and Roach Estuaries SPA/Ramsar (Mid-Essex Coast Phase 3)</b>	6	<ul style="list-style-type: none"> <li>• Important bird assemblages</li> </ul>	<p><b>Approximately 13 km to the south of the site</b></p> <p>The Rivers Crouch and Roach are situated in South Essex. The River Crouch occupies a shallow valley between two ridges of London Clay, whilst the River Roach is set predominantly between areas of brick earth and loams with patches of sand and gravel. The intertidal zone along the Rivers Crouch and Roach is 'squeezed' between the sea walls of both banks and the river channel. This leaves a relatively narrow strip of tidal mud unlike other estuaries in the county, which, nonetheless, is used by significant numbers of birds. One species is present in internationally important numbers (dark bellied brent geese), and other species of wader and wildfowl occur in nationally important numbers. Additional interest is provided by the aquatic and terrestrial invertebrates and by an outstanding assemblage of nationally scarce plants.</p> <p>The site is designated as an SPA as it supports the following:</p> <ul style="list-style-type: none"> <li>• Internationally important assemblages of waterfowl</li> <li>• Internationally important populations of regularly occurring migratory species</li> </ul> <p>The site is designated as a Ramsar site as it supports:</p> <ul style="list-style-type: none"> <li>• Rare plant and invertebrate species</li> <li>• Important bird assemblages</li> </ul>	
<b>Blackwater Estuary SPA/Ramsar (Mid-Essex Coast Phase 4)</b>	7	<p><b>Immediately adjacent to the site</b></p>	<p>The Blackwater Estuary is located on the coast of Essex in eastern England. It is the largest estuary in Essex and is one of the largest estuarine complexes in East Anglia. Its mud-flats are fringed by saltmarsh on the upper shores, with shingle, shell banks and offshore islands a feature of the tidal flats. The</p>	



Indicator	Data Source	Current Data	Comparators	Trend
		<p>surrounding terrestrial habitats; the sea wall, ancient grazing marsh and its associated fleet and ditch systems, plus semi-improved grassland, are of high conservation interest. The diversity of estuarine habitats results in the sites being of importance for a wide range of overwintering waterbirds, including raptors, geese, ducks and waders. The site is also important in summer for breeding terns.</p> <p>The site is designated as an SPA as it supports the following:</p> <ul style="list-style-type: none"> <li>• Internationally important assemblages of waterfowl</li> <li>• Internationally important populations of regularly occurring migratory species</li> <li>• Internationally important populations of regularly occurring Annex I species</li> </ul> <p>The site is designated as a Ramsar as it supports:</p> <ul style="list-style-type: none"> <li>• Important saltmarsh communities</li> <li>• Rare invertebrate species</li> <li>• Important bird assemblages (little tern, avocet, hen harrier, ruff, black-tailed godwit, dark bellied brent goose, dunlin, grey plover, redshank, ringed plover, shelduck, golden plover)</li> </ul>		
<p><b>Foulness SPA/Ramsar sites (Mid-Essex Coast Phase 5)</b></p>	<p>8</p>	<p><b>Approximately 12.5 km to the south east of the site</b></p> <p>Foulness is located on the coast of Essex, on the east coast of England north of the mouth of the Thames estuary. The site is part of an open coast estuarine system comprising grazing marsh, saltmarsh, intertidal mud-flats, cockle-shell banks and sand-flats. It includes one of the three largest continuous sand-silt flats in the UK. The diversity of high quality coastal habitats present support important populations of breeding, migratory and wintering waterbirds, notably very important concentrations of dark-bellied brent goose <i>Branta bernicla bernicla</i>.</p>		



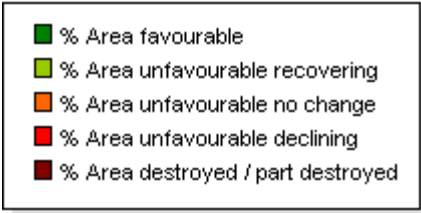
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		<p>The site is designated as an SPA as it supports the following:</p> <ul style="list-style-type: none"> <li>• Internationally important assemblages of waterfowl</li> <li>• Internationally important populations of regularly occurring migratory species</li> <li>• Internationally important populations of regularly occurring Annex I species</li> </ul> <p>The site is designated as a Ramsar site as it supports:</p> <ul style="list-style-type: none"> <li>• Important saltmarsh communities</li> <li>• Rare plant and invertebrate species</li> <li>• Important bird assemblages</li> </ul>		
<p><b>Abberton Reservoir SPA/Ramsar Site</b></p>	<p>9</p>	<p><b>Approximately 8 km to the north west of the site</b></p> <p>Abberton Reservoir is located close to the coast of Essex in eastern England. It is a large, shallow, freshwater storage reservoir built in a long, shallow valley and is the largest freshwater body in Essex. It is one of the most important reservoirs in Britain for wintering wildfowl, with a key role as a roost for wildfowl and waders feeding in adjacent estuarine areas. The site is also important for winter feeding and autumn moulting of waterbirds. The margins of parts of the reservoir have well-developed plant communities that provide important opportunities for feeding, nesting and shelter. Abberton Reservoir is important especially as an autumn arrival area for waterbirds that subsequently spend the winter elsewhere.</p> <p>The site is designated as an SPA as it supports:</p> <ul style="list-style-type: none"> <li>• Internationally important assemblages of waterfowl</li> <li>• Internationally important populations of regularly occurring migratory species</li> </ul>		

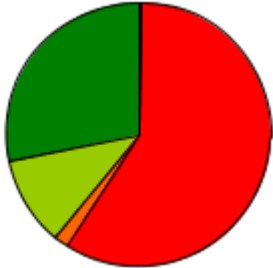
Indicator	Data Source	Current Data	Comparators	Trend												
		<ul style="list-style-type: none"> <li>Internationally important populations of regularly occurring Annex I species</li> </ul> <p>The site is designated as a Ramsar site for its important bird assemblages.</p>														
<b>Outer Thames Estuary (SPA)</b>	21	<p><b>Within 1km</b></p> <p>The Outer Thames Estuary SPA was classified in August 2010 and comprises over 3,700 square km of marine areas and sea inlets. The designated area is a 100% marine SPA.</p> <p>The SPA was designated for its nationally important wintering red-throated diver (<i>Gavia stellata</i>) population (a North-western Europe – wintering bird). The SPA was estimated to have 38% of the population of wintering red-throated diver in Great Britain peak mean over the period 1989-2006/07.</p> <p>Source: <a href="http://www.jncc.gov.uk/pdf/SPA/UK9020309.pdf">http://www.jncc.gov.uk/pdf/SPA/UK9020309.pdf</a></p>														
<b>Sites of Special Scientific Interest (SSSI)</b>	10,11	<p>There are 573 SSSIs within the east of England region of which 86 are located within Essex. The condition of SSSI land in England is assessed by Natural England. There are six reportable condition categories: favourable, unfavourable recovering, unfavourable no change, unfavourable declining, part destroyed and destroyed.</p> <p><b><u>Condition summary of SSSIs in the East of England Region ( 573 SSSIs)</u></b></p> <table border="1"> <thead> <tr> <th>% Area meeting PSA<sup>13</sup> target</th> <th>% Area favourable</th> <th>% Area unfavourable recovering</th> <th>% Area unfavourable no change</th> <th>% Area unfavourable declining</th> <th>% Area destroyed / part destroyed</th> </tr> </thead> <tbody> <tr> <td>78.19%</td> <td>64.92%</td> <td>13.27%</td> <td>8.12%</td> <td>13.67%</td> <td>0.02%</td> </tr> </tbody> </table>	% Area meeting PSA <sup>13</sup> target	% Area favourable	% Area unfavourable recovering	% Area unfavourable no change	% Area unfavourable declining	% Area destroyed / part destroyed	78.19%	64.92%	13.27%	8.12%	13.67%	0.02%		
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<sup>13</sup> The Government's Public Service Agreement (PSA) target to have 95% of the SSSI area in favourable or recovering condition by 2010.

Indicator	Data Source	Current Data	Comparators	Trend												
		<div data-bbox="568 379 987 592" style="border: 1px solid black; padding: 5px;"> <ul style="list-style-type: none"> <li><span style="color: green;">■</span> % Area favourable</li> <li><span style="color: lightgreen;">■</span> % Area unfavourable recovering</li> <li><span style="color: orange;">■</span> % Area unfavourable no change</li> <li><span style="color: red;">■</span> % Area unfavourable declining</li> <li><span style="color: brown;">■</span> % Area destroyed / part destroyed</li> </ul> </div> <div data-bbox="1048 355 1323 624" style="text-align: center;">  </div> <p data-bbox="562 767 1182 799"><b><u>Condition summary of SSSIs in Essex (86 SSSIs)</u></b></p> <table border="1" data-bbox="562 831 1827 975"> <thead> <tr> <th>% Area meeting PSA target</th> <th>% Area favourable</th> <th>% Area unfavourable recovering</th> <th>% Area unfavourable no change</th> <th>% Area unfavourable declining</th> <th>% Area destroyed / part destroyed</th> </tr> </thead> <tbody> <tr> <td>58.10%</td> <td>51.60%</td> <td>6.50%</td> <td>8.02%</td> <td>33.88%</td> <td>0.00%</td> </tr> </tbody> </table> <div data-bbox="568 1054 987 1267" style="border: 1px solid black; padding: 5px;"> <ul style="list-style-type: none"> <li><span style="color: green;">■</span> % Area favourable</li> <li><span style="color: lightgreen;">■</span> % Area unfavourable recovering</li> <li><span style="color: orange;">■</span> % Area unfavourable no change</li> <li><span style="color: red;">■</span> % Area unfavourable declining</li> <li><span style="color: brown;">■</span> % Area destroyed / part destroyed</li> </ul> </div> <div data-bbox="1048 1031 1323 1299" style="text-align: center;">  </div>	% Area meeting PSA target	% Area favourable	% Area unfavourable recovering	% Area unfavourable no change	% Area unfavourable declining	% Area destroyed / part destroyed	58.10%	51.60%	6.50%	8.02%	33.88%	0.00%		
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Indicator	Data Source	Current Data	Comparators	Trend												
		<p>There are 22 SSSIs within 20 km of the site. Of these 3 fall within 5 km and are considered to be particularly relevant to any development of the site. These are:</p> <ul style="list-style-type: none"> <li>• Blackwater Estuary SSSI – immediately adjacent to the site</li> <li>• Dengie SSSI – immediately adjacent to the site</li> <li>• Sandbeach Meadows – approximately 4 km to the south east of the site.</li> </ul> <p>Further information on each SSSI is given below.</p>														
<p><b>Dengie SSSI (forms a component part of the Essex Estuaries SAC and the Dengie SPA/Ramsar sites)</b></p>	<p>12</p>	<p><b>Immediately adjacent to the site</b></p> <p>Dengie is a large and remote area of tidal mudflat and saltmarsh at the eastern end of the Dengie Peninsula between the Blackwater and Crouch Estuaries. The saltmarsh is the largest continuous example of its type in Essex. Foreshore, saltmarsh and beaches support an outstanding assemblage of rare coastal flora. It is a resort for internationally and nationally important wintering populations of wildfowl and waders and in summer supports a range of breeding coastal birds including rarities. The formation of cockleshell spits and beaches is of geomorphological interest. The foreshore of this site from Sales Point to Holliwell point is a National Nature Reserve.</p> <p><b><u>Condition summary: Dengie SSSI</u></b></p> <table border="1" data-bbox="566 1115 1731 1278"> <thead> <tr> <th>Area meeting PSA target</th> <th>% Area favorable</th> <th>% Area unfavorable recovering</th> <th>% Area unfavorable no change</th> <th>% Area unfavorable declining</th> <th>% Area destroyed / part destroyed</th> </tr> </thead> <tbody> <tr> <td>62.77%</td> <td>62.77%</td> <td>0.00%</td> <td>0.00%</td> <td>37.23%</td> <td>0.00%</td> </tr> </tbody> </table>			Area meeting PSA target	% Area favorable	% Area unfavorable recovering	% Area unfavorable no change	% Area unfavorable declining	% Area destroyed / part destroyed	62.77%	62.77%	0.00%	0.00%	37.23%	0.00%
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Indicator	Data Source	Current Data	Comparators	Trend												
																
<p><b>Blackwater Estuary SSSI (forms a component part of the Essex Estuaries SAC and the Blackwater Estuary SPA/Ramsar sites)</b></p>	<p>13</p>	<p><b>Immediately adjacent to the site</b></p> <p>The Blackwater Estuary is the largest estuary in Essex north of the Thames. Its mud flats fringed by saltmarsh on the upper shores support internationally and nationally important numbers of wildfowl which overwinter here. Shingle and shell banks and offshore islands are also a feature of the tidal flats. The surrounding terrestrial habitats – the sea wall, ancient grazing marsh and its associated fleet and ditch systems, plus semi-improved grassland are also of high conservation interest. The rich mosaic of habitats supports an outstanding assemblage of nationally scarce plants and nationally important assemblage of invertebrates. Within the site is Blackwater Estuary National Nature Reserve.</p>														
<p><b><u>Condition Summary: Blackwater Estuary SSSI:</u></b></p>																
<table border="1"> <thead> <tr> <th data-bbox="568 1166 730 1262">% Area meeting PSA target</th> <th data-bbox="730 1166 913 1262">% Area favourable</th> <th data-bbox="913 1166 1151 1262">% Area unfavourable recovering</th> <th data-bbox="1151 1166 1388 1262">% Area unfavourable no change</th> <th data-bbox="1388 1166 1626 1262">% Area unfavourable declining</th> <th data-bbox="1626 1166 1825 1262">% Area destroyed / part destroyed</th> </tr> </thead> <tbody> <tr> <td data-bbox="568 1262 730 1310">39.26%</td> <td data-bbox="730 1262 913 1310">28.46%</td> <td data-bbox="913 1262 1151 1310">10.80%</td> <td data-bbox="1151 1262 1388 1310">1.72%</td> <td data-bbox="1388 1262 1626 1310">59.02%</td> <td data-bbox="1626 1262 1825 1310">0.00%</td> </tr> </tbody> </table>					% Area meeting PSA target	% Area favourable	% Area unfavourable recovering	% Area unfavourable no change	% Area unfavourable declining	% Area destroyed / part destroyed	39.26%	28.46%	10.80%	1.72%	59.02%	0.00%
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		<div data-bbox="568 416 987 628" style="border: 1px solid black; padding: 5px; display: inline-block;"> <ul style="list-style-type: none"> <li><span style="color: green;">■</span> % Area favourable</li> <li><span style="color: lightgreen;">■</span> % Area unfavourable recovering</li> <li><span style="color: orange;">■</span> % Area unfavourable no change</li> <li><span style="color: red;">■</span> % Area unfavourable declining</li> <li><span style="color: darkred;">■</span> % Area destroyed / part destroyed</li> </ul> </div> 														
<p><b>Sandbeach Meadows SSSI</b></p>	<p>14</p>	<p><b>Approximately 4 km to the south east of the site</b></p> <p>Sandbeach Meadows lie on alluvial deposits at the north-eastern end of the Dengie Peninsula. The area of grassland is all that remains of the once extensive grazing marshes which formed the hinterland of the nearby Dengie coastline. The seven fields are sympathetically managed and support nationally important numbers of dark-bellied brent geese in winter.</p> <p><b><u>Condition Summary: Sandbeach Meadows</u></b></p> <table border="1" data-bbox="568 927 1731 1086"> <thead> <tr> <th>% Area meeting PSA target</th> <th>% Area favorable</th> <th>% Area unfavorable recovering</th> <th>% Area unfavorable no change</th> <th>% Area unfavorable declining</th> <th>% Area destroyed / part destroyed</th> </tr> </thead> <tbody> <tr> <td>100.00%</td> <td>100.00%</td> <td>0.00%</td> <td>0.00%</td> <td>0.00%</td> <td>0.00%</td> </tr> </tbody> </table>			% Area meeting PSA target	% Area favorable	% Area unfavorable recovering	% Area unfavorable no change	% Area unfavorable declining	% Area destroyed / part destroyed	100.00%	100.00%	0.00%	0.00%	0.00%	0.00%
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Indicator	Data Source	Current Data	Comparators	Trend
		 <div data-bbox="568 379 987 592" style="border: 1px solid black; padding: 5px; margin-bottom: 10px;"> <ul style="list-style-type: none"> <li><span style="display: inline-block; width: 10px; height: 10px; background-color: green; margin-right: 5px;"></span> % Area favourable</li> <li><span style="display: inline-block; width: 10px; height: 10px; background-color: lightgreen; margin-right: 5px;"></span> % Area unfavourable recovering</li> <li><span style="display: inline-block; width: 10px; height: 10px; background-color: orange; margin-right: 5px;"></span> % Area unfavourable no change</li> <li><span style="display: inline-block; width: 10px; height: 10px; background-color: red; margin-right: 5px;"></span> % Area unfavourable declining</li> <li><span style="display: inline-block; width: 10px; height: 10px; background-color: brown; margin-right: 5px;"></span> % Area destroyed / part destroyed</li> </ul> </div>		
<b>National Nature Reserves (NNR)<sup>14</sup></b>	15, 16, 17	<p>There are 48 NNRs within the East of England Region with 7 occurring in Essex. Of these three occur within 20 km of the site.</p> <ul style="list-style-type: none"> <li>• <b>Dengie NNR</b> – Immediately adjacent to the site and a component part of the Essex Estuaries SAC and Dengie SPA/Ramsar and SSSI sites.</li> <li>• <b>Blackwater Estuary NNR</b> – comprised of two areas between 1.5 and 2 km north west of the site. The site is a component part of the Essex Estuaries SAC and Blackwater Estuary SPA/Ramsar and SSSI sites</li> <li>• <b>Colne Estuary NNR</b> – comprised of three main areas, the nearest being approximately 5.5 km to the north east of the site. The NNR is a component part of the Essex Estuaries SAC and the Colne Estuary SPA/Ramsar and SSSI sites.</li> </ul>		
<b>Local Nature Reserves (LNR)<sup>15</sup></b>	18	<p>There are 183 LNRs within the East of England Region with 45 occurring in Essex. 11 LNRs occur within 20 km of the site.</p> <ul style="list-style-type: none"> <li>• Welsh Wood – approx 17.5 km north east</li> <li>• Salary Brook – approx 15.5 km north east</li> </ul>		

<sup>14</sup>Statutory designation - NNRs represent some of the finest wildlife and geological sites in the country.

<sup>15</sup>Statutory designation - Local Nature Reserves (LNRs) are for both people and wildlife. They are places with wildlife or geological features that are of special interest locally

Indicator	Data Source	Current Data	Comparators	Trend
		<ul style="list-style-type: none"> <li>• Tiptree Parish Field – approx 11 km north west</li> <li>• Lexden Park – approx 16 km north</li> <li>• Brockwell Meadows – approx 16.5 km north west</li> <li>• Bull Meadows- approx 17 km north</li> <li>• Hilly Fields – approx 16.5 km north</li> <li>• Whet Mead – approx 17 km north west</li> <li>• Colne – approx 13 km north east</li> <li>• Spring Lane Meadows – approx 16.5 km north</li> <li>• Pickers Ditch Meadow – approx 19.25 km north east</li> </ul>		
<b>RSPB Reserves</b>	19	<p>There is one RSPB Reserve falling within the search area:</p> <ul style="list-style-type: none"> <li>• Old Hall Marshes comprises extensive grazing marshes with brackish water fleets, reedbeds, saltmarsh and two offshore islands. In winter, thousands of wildfowl come here and summer sees breeding waders. The site falls within the Blackwater Estuary SPA/Ramsar.</li> </ul>		
<b>Local Wildlife Sites</b>	N/A	Information to be obtained from a Local Records Centre at the appropriate time.		
<b>Legally protected species</b>  *EPS = European Protected Species	20	<p>The following legally protected species have been recorded within 10 km of the site (please note this excludes birds for which there are a vast number of different species)</p> <ul style="list-style-type: none"> <li>• bats (EPS)</li> <li>• water voles</li> <li>• great crested newts (EPS)</li> <li>• badger</li> <li>• otter (EPS)</li> <li>• common species of reptile (common lizard, grass snake, slow worm, adder)</li> </ul> <p>Please note that further information on species records within the area is to be obtained from a Local Records Centre at the appropriate time. The above list gives an early indication only of what may occur in the area. It is likely that</p>		



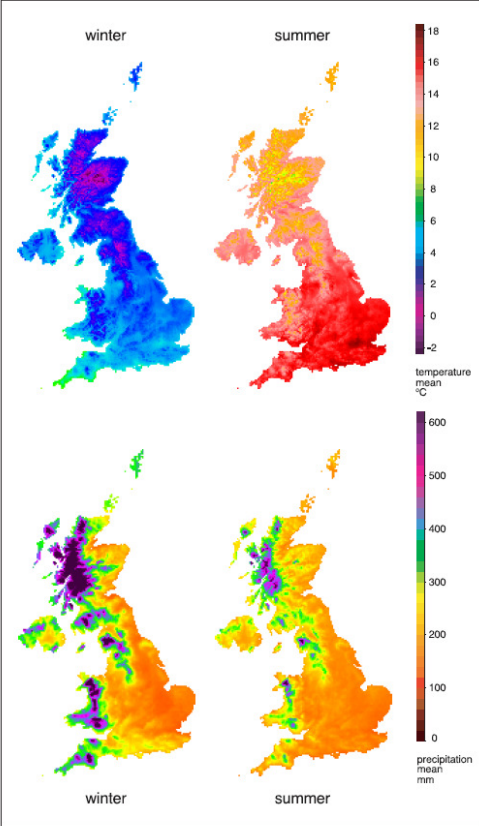
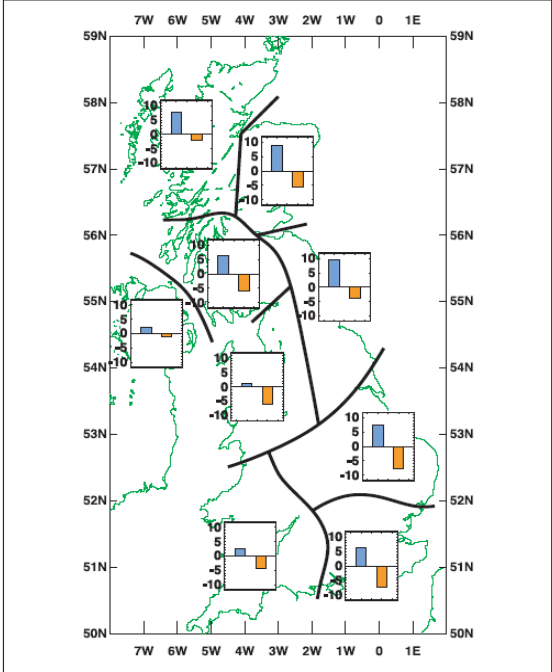
Indicator	Data Source	Current Data	Comparators	Trend
		additional species will need to be considered once further information has been obtained.		

### Key to Data Sources

1	Essex Biodiversity Project. Essex Biodiversity Action Plan. <a href="http://www.essexbiodiversity.org.uk/home.aspx">http://www.essexbiodiversity.org.uk/home.aspx</a>
2	Joint Nature Conservation Committee (JNCC). <a href="http://www.jncc.gov.uk/">http://www.jncc.gov.uk/</a>
3	JNCC. Essex Estuaries SAC information. <a href="http://www.jncc.gov.uk/protectedsites/sacselection/sac.asp?EUCode=UK0013690">http://www.jncc.gov.uk/protectedsites/sacselection/sac.asp?EUCode=UK0013690</a>
4	JNCC. Dengie SPA/Ramsar information. <a href="http://www.jncc.gov.uk/pdf/SPA/UK9009242.pdf">http://www.jncc.gov.uk/pdf/SPA/UK9009242.pdf</a> <a href="http://www.jncc.gov.uk/pdf/RIS/UK11018.pdf">http://www.jncc.gov.uk/pdf/RIS/UK11018.pdf</a>
5	JNCC. Colne Estuary SPA/Ramsar information. <a href="http://www.jncc.gov.uk/pdf/SPA/UK9009243.pdf">http://www.jncc.gov.uk/pdf/SPA/UK9009243.pdf</a> <a href="http://www.jncc.gov.uk/pdf/RIS/UK11015.pdf">http://www.jncc.gov.uk/pdf/RIS/UK11015.pdf</a>
6	JNCC. Crouch and Roach Estuary SPA/Ramsar information. <a href="http://www.jncc.gov.uk/pdf/SPA/UK9009244.pdf">http://www.jncc.gov.uk/pdf/SPA/UK9009244.pdf</a> <a href="http://www.jncc.gov.uk/pdf/RIS/UK11058.pdf">http://www.jncc.gov.uk/pdf/RIS/UK11058.pdf</a>
7	JNCC. Blackwater Estuary SPA/Ramsar information. <a href="http://www.jncc.gov.uk/pdf/SPA/UK9009245.pdf">http://www.jncc.gov.uk/pdf/SPA/UK9009245.pdf</a> <a href="http://www.jncc.gov.uk/pdf/RIS/UK11007.pdf">http://www.jncc.gov.uk/pdf/RIS/UK11007.pdf</a>
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9	JNCC. Abberton Reservoir SPA/Ramsar information. <a href="http://www.jncc.gov.uk/pdf/SPA/UK9009141.pdf">http://www.jncc.gov.uk/pdf/SPA/UK9009141.pdf</a> <a href="http://www.jncc.gov.uk/pdf/RIS/UK11001.pdf">http://www.jncc.gov.uk/pdf/RIS/UK11001.pdf</a>
10	Natural England (March 2009). SSSI Condition Summary. <a href="http://www.sssi.naturalengland.org.uk/Special/sssi/reportAction.cfm?Report=sdr18andCategory=RandReference=East+Of+England">http://www.sssi.naturalengland.org.uk/Special/sssi/reportAction.cfm?Report=sdr18andCategory=RandReference=East+Of+England</a>

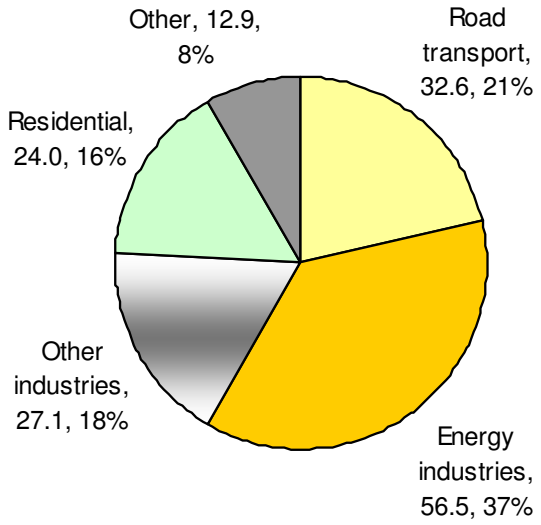
11	Natural England (March 2009). SSSI Condition Summary. <a href="http://www.sssi.naturalengland.org.uk/Special/sssi/reportAction.cfm?Report=sdrt18andCategory=CandReference=1015">http://www.sssi.naturalengland.org.uk/Special/sssi/reportAction.cfm?Report=sdrt18andCategory=CandReference=1015</a>
12	Dengie SSSI citation [online] available: <a href="http://www.sssi.naturalengland.org.uk/Special/sssi/sssi_details.cfm?sssi_id=1000735">http://www.sssi.naturalengland.org.uk/Special/sssi/sssi_details.cfm?sssi_id=1000735</a> – Natural England (May 2009). SSSI Condition Summary. <a href="http://www.sssi.naturalengland.org.uk/Special/sssi/reportAction.cfm?report=sdrt18andcategory=Sandreference=1000735">http://www.sssi.naturalengland.org.uk/Special/sssi/reportAction.cfm?report=sdrt18andcategory=Sandreference=1000735</a>
13	Blackwater Estuary SSSI citation [online] available: <a href="http://www.sssi.naturalengland.org.uk/Special/sssi/sssi_details.cfm?sssi_id=1004426">http://www.sssi.naturalengland.org.uk/Special/sssi/sssi_details.cfm?sssi_id=1004426</a> Natural England (May 2009). SSSI Condition Summary. <a href="http://www.sssi.naturalengland.org.uk/Special/sssi/reportAction.cfm?report=sdrt18andcategory=Sandreference=1004426">http://www.sssi.naturalengland.org.uk/Special/sssi/reportAction.cfm?report=sdrt18andcategory=Sandreference=1004426</a>
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15	Natural England. Information on Dengie National Nature Reserve. <a href="http://www.naturalengland.org.uk/ourwork/conservation/designatedareas/nnr/1006185.aspx">http://www.naturalengland.org.uk/ourwork/conservation/designatedareas/nnr/1006185.aspx</a>
16	Natural England. Information on Blackwater Estuary National Nature Reserve. <a href="http://www.naturalengland.org.uk/ourwork/conservation/designatedareas/nnr/1006650.aspx">http://www.naturalengland.org.uk/ourwork/conservation/designatedareas/nnr/1006650.aspx</a>
17	Natural England. Information on Colne Estuary National Nature Reserve. <a href="http://www.naturalengland.org.uk/ourwork/conservation/designatedareas/nnr/1006041.aspx">http://www.naturalengland.org.uk/ourwork/conservation/designatedareas/nnr/1006041.aspx</a>
18	Natural England. Information on Local Nature reserves in the Essex region. <a href="http://www.lnr.naturalengland.org.uk/Special/lnr/lnr_results.asp?C=15">http://www.lnr.naturalengland.org.uk/Special/lnr/lnr_results.asp?C=15</a>
19	RSPB (February 2009). Information on Old Hall Marshes Reserve. <a href="http://www.rspb.org.uk/reserves/guide/o/oldhallmarshes/index.asp">http://www.rspb.org.uk/reserves/guide/o/oldhallmarshes/index.asp</a>
20	NBN Gateway. National Biodiversity Network. <a href="http://data.nbn.org.uk/">http://data.nbn.org.uk/</a>
21	JNCC: Outer Thames Estuary SPA information. <a href="http://www.jncc.gov.uk/pdf/SPA/UK9020309.pdf">http://www.jncc.gov.uk/pdf/SPA/UK9020309.pdf</a>

# Climate Change

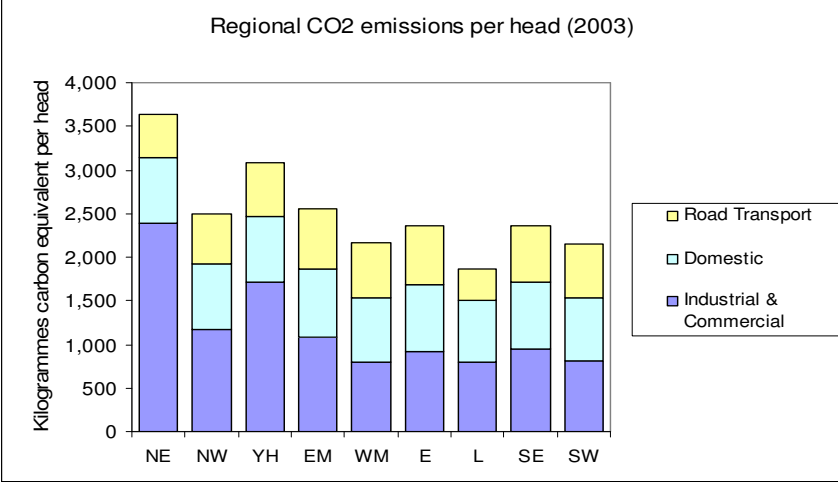
Indicator	Data Source	Current Data	Comparators	Trend
<b>Topic: Climate Change</b>				
<p><b>East of England Region Precipitation and Temperatures</b></p>	<p>1, 5</p>	<p>The 2006 East of England Regional Assembly's (EERA) Regional Economic Strategy (RES) reported that the East of England will potentially be the region most affected by climate change, as it is topographically flat and low-lying and being on the East coast makes it more vulnerable to flooding.</p> <p>If high levels of greenhouse gases continue to be emitted, the Environment Agency predicts that by 2080 the region could experience:</p> <ul style="list-style-type: none"> <li>• a rise in overall temperature between 2- 5 degrees Celsius</li> <li>• hotter and drier summers, milder and wetter winters</li> <li>• summer rainfall could see a drop of up to 45- 50 %</li> <li>• winter could see rainfall increasing by up to 30 %</li> <li>• a rise in sea levels of between 22-28 cm – potentially increasing the risk of flooding and coastal erosion</li> </ul>	 <p>Figure 18: Average observed 1961-1990 winter and summer temperature (°C, top) and precipitation (mm, bottom) in the UK. Data on a 5 km grid.</p>	 <p>Figure 12: The trend (1961 to 2000) in the fraction of the total seasonal precipitation contributed by the "most intense" precipitation events in winter (left-hand bars) and in summer (right-hand bars) for a number of UK regions. Positive (blue) numbers indicate an increasing trend in the proportion of the total precipitation that comes from the "most intense" events, i.e., "most intense" events are increasing either in frequency or in intensity. The lower bound to the class of "most intense" events is defined (separately for each season and region) by an amount (mm) calculated from the 1961 to 1990 period, namely the daily precipitation exceeded on a minimally sufficient number of days necessary to account for precisely 10 per cent of the seasonal precipitation. [Source Tim Osborn]</p>

Indicator	Data Source	Current Data	Comparators	Trend
		<ul style="list-style-type: none"> <li>• longer growing seasons with no dominant season</li> <li>• lower humidity and drop in soil moisture levels potentially affecting trees and woodlands</li> </ul>	<p>Based on UKCIP’s data from 1961 to 2000, Bradwell, being in the Region of East of England, shows fairly consistent trends in total precipitation from most intense weather-related events compared with the rest of the UK.</p> <p>These “most intense events” could have a profound effects on:</p> <ul style="list-style-type: none"> <li>• Agriculture</li> <li>• Transport</li> <li>• Infrastructure</li> <li>• Electricity transmission systems</li> </ul> <p>Variations in temperature are not necessarily higher than other regions, but when combined with precipitation, mean flooding and drought are two extreme events that may affect the region.</p>	

Indicator	Data Source	Current Data	Comparators	Trend																		
<b>Greenhouse Gas Emissions (East of England Region)</b>	3	<p>Carbon Emissions:</p> <p>A report published in 2006 by the East of England Development Agency (EEDA) referenced DEFRA's UK Greenhouse Gas Emissions for 1990 and 2004, as shown in the pie charts below.</p> <p style="text-align: center;">Carbon dioxide emission (total=160.7 MtC) by source 1990</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <caption>Carbon dioxide emission (total=160.7 MtC) by source 1990</caption> <thead> <tr> <th>Source</th> <th>Value (MtC)</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>Energy industries</td> <td>64.3</td> <td>40%</td> </tr> <tr> <td>Other industries</td> <td>30.6</td> <td>19%</td> </tr> <tr> <td>Road transport</td> <td>29.9</td> <td>19%</td> </tr> <tr> <td>Residential</td> <td>21.4</td> <td>13%</td> </tr> <tr> <td>Other</td> <td>14.5</td> <td>9%</td> </tr> </tbody> </table>		Source	Value (MtC)	Percentage	Energy industries	64.3	40%	Other industries	30.6	19%	Road transport	29.9	19%	Residential	21.4	13%	Other	14.5	9%	<p>Despite contributing 5 MtC in 2004, emissions from the East of England's Energy Industries sector have decreased overall since 1990. The road transport sector, conversely, has seen a significant increase in carbon dioxide emissions.</p>
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		<div data-bbox="562 320 1451 868" data-label="Figure"> <p style="text-align: center;">Total Regional CO<sub>2</sub> emissions by source (2003)</p> <table border="1"> <caption>Estimated data from the stacked bar chart (MtC equivalent)</caption> <thead> <tr> <th>Region</th> <th>Industrial &amp; Commercial</th> <th>Domestic</th> <th>Road Transport</th> <th>Total</th> </tr> </thead> <tbody> <tr> <td>NE</td> <td>6.0</td> <td>2.0</td> <td>1.0</td> <td>9.0</td> </tr> <tr> <td>NW</td> <td>8.0</td> <td>5.0</td> <td>4.0</td> <td>17.0</td> </tr> <tr> <td>YH</td> <td>8.5</td> <td>4.0</td> <td>3.0</td> <td>15.5</td> </tr> <tr> <td>EM</td> <td>4.5</td> <td>3.5</td> <td>3.0</td> <td>11.0</td> </tr> <tr> <td>WM</td> <td>4.0</td> <td>4.0</td> <td>3.5</td> <td>11.5</td> </tr> <tr> <td>E</td> <td>5.0</td> <td>4.5</td> <td>3.5</td> <td>13.0</td> </tr> <tr> <td>L</td> <td>6.0</td> <td>5.0</td> <td>3.0</td> <td>14.0</td> </tr> <tr> <td>SE</td> <td>7.5</td> <td>6.5</td> <td>5.0</td> <td>19.0</td> </tr> <tr> <td>SW</td> <td>4.0</td> <td>4.0</td> <td>3.0</td> <td>11.0</td> </tr> </tbody> </table> </div> <p data-bbox="555 906 1503 1027">From the graph above, the East of England is ranked 5<sup>th</sup> out of the 9 regions in the UK for CO<sub>2</sub> emissions per head. The region is the largest emitter per head from domestic sources, at 780 kilograms (kg) per head; compared to the English average of 750 kg per head.</p>	Region	Industrial & Commercial	Domestic	Road Transport	Total	NE	6.0	2.0	1.0	9.0	NW	8.0	5.0	4.0	17.0	YH	8.5	4.0	3.0	15.5	EM	4.5	3.5	3.0	11.0	WM	4.0	4.0	3.5	11.5	E	5.0	4.5	3.5	13.0	L	6.0	5.0	3.0	14.0	SE	7.5	6.5	5.0	19.0	SW	4.0	4.0	3.0	11.0	
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E	5.0	4.5	3.5	13.0																																																	
L	6.0	5.0	3.0	14.0																																																	
SE	7.5	6.5	5.0	19.0																																																	
SW	4.0	4.0	3.0	11.0																																																	

Indicator	Data Source	Current Data	Comparators	Trend																																				
		<p data-bbox="770 331 1196 357">Regional CO2 emissions per head (2003)</p>  <p data-bbox="555 842 1496 900">The table below shows the 2005 figures from the EERA's Annual Monitoring Report for 2006/2007.</p> <table border="1" data-bbox="577 919 1473 1070"> <caption data-bbox="584 922 1467 943">Table 6.6a Total emissions 2005 (m tonnes CO2)</caption> <thead> <tr> <th></th> <th>Industrial, commercial &amp; public</th> <th>Domestic</th> <th>Road transport</th> <th>Land use change &amp; forestry</th> <th>Total</th> </tr> </thead> <tbody> <tr> <td>East of England</td> <td>17</td> <td>13</td> <td>15</td> <td>1</td> <td>47</td> </tr> <tr> <td>England</td> <td>194</td> <td>122</td> <td>125</td> <td>3</td> <td>444</td> </tr> </tbody> </table> <table border="1" data-bbox="577 1094 1473 1241"> <caption data-bbox="584 1098 1467 1118">Table 6.6b Per capita emissions 2005 (tonnes CO2 per resident)</caption> <thead> <tr> <th></th> <th>Industrial, commercial &amp; public</th> <th>Domestic</th> <th>Road transport</th> <th>Land use change &amp; forestry</th> <th>Total</th> </tr> </thead> <tbody> <tr> <td>East of England</td> <td>3.2</td> <td>2.5</td> <td>2.9</td> <td>0.1</td> <td>8.7</td> </tr> <tr> <td>England</td> <td>3.9</td> <td>2.5</td> <td>2.5</td> <td>0.1</td> <td>9.0</td> </tr> </tbody> </table>		Industrial, commercial & public	Domestic	Road transport	Land use change & forestry	Total	East of England	17	13	15	1	47	England	194	122	125	3	444		Industrial, commercial & public	Domestic	Road transport	Land use change & forestry	Total	East of England	3.2	2.5	2.9	0.1	8.7	England	3.9	2.5	2.5	0.1	9.0		
	Industrial, commercial & public	Domestic	Road transport	Land use change & forestry	Total																																			
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England	3.9	2.5	2.5	0.1	9.0																																			
<b>Essex County Council</b>	2,4	The effects of climate change are likely to have a significant effect in Essex, as it is low lying (thus vulnerable to flooding) and is one of the driest parts of the																																						



Indicator	Data Source	Current Data	Comparators	Trend
<p><b>Greenhouse Gas Emissions</b></p>		<p>UK (thus vulnerable to drought).</p> <p>These effects may include:</p> <ul style="list-style-type: none"> <li>• Hotter drier summers putting public health and safety at greater risk</li> <li>• Hotter drier summers causing greater 'heat stress' to buildings, utilities and the transport system</li> <li>• Decreases in water resources</li> <li>• Decreases in soil moisture (particularly during summer and autumn) affecting agriculture, the natural environment and landscape</li> <li>• Increases in risk to people, property and the environment from flooding</li> </ul> <p>In 2007, Essex County Council published a document entitled "Our Plan for a Greener Essex". It outlines their objective of reducing emissions across the entire County Council by 10 % in 2010/2011 and by 60 % by 2050. The County's key goals, as outlined in the document, were:</p> <ul style="list-style-type: none"> <li>• Reduce emissions from Transport by 3 % year on year</li> <li>• Reduce emissions from Buildings by 3 % year on year</li> </ul>		
<b>Topic: Energy</b>				
<p><b>Energy</b></p>	<p>6,7,8</p>	<p><u>Electricity Consumption 2007 (Maldon)</u>                      Overall: 303.2 GWh (<b>0.1 % of UK</b>)                      Average Domestic Consumption: 5,620 kWh                      Average Industrial Consumption: 59,459 kWh</p> <p><u>Total Energy Consumption 2006 (Maldon)</u>                      1,211.4 GWh</p> <p><u>Electricity Consumption 2007 (East of England)</u>                      Overall: 28,257.4 GWh                      Average Domestic Consumption: 4,795 kWh                      Average Industrial Consumption: 75,083 kWh</p>		<p>Maldon's electricity consumption accounts for 0.1% of Britain's electricity consumption.</p> <p>25% of Maldon's energy consumption comes from electricity.</p> <p>The East of England Plan sets out following strategies:</p> <ul style="list-style-type: none"> <li>• "Putting in place a framework that [...] [drives] up energy efficiency and carbon performance, [...]"</li> <li>• "By 2021 the East of England [...] will reduce its impact on climate change and the environment, including through savings in energy [...]"</li> </ul>

Indicator	Data Source	Current Data	Comparators	Trend
		<p><u>Electricity Consumption 2007 (Great Britain)</u>                      Overall: 309,669.5 GWh                      Average Domestic Consumption: 4,392 kWh                      Average Industrial Consumption: 79,077 kWh</p> <p><u>Total Energy Consumption 2006</u>                      East of England: 156,267.2 GWh                      UK: 2,120,261.5 GWh</p>		<ul style="list-style-type: none"> <li>• “Objective: Maximising the energy efficiency of development and promoting the use of renewable and low carbon energy sources”</li> <li>• “Local Development Documents should support the sustainable and dynamic growth of inter-regional and intraregional sectors and business clusters including the energy cluster on the Norfolk/Suffolk coast.”</li> <li>• Local Authorities should:” Encourage the supply of energy from decentralised, renewable and low carbon energy sources [...]”</li> </ul>
<b>Renewable Energy</b>	8,9	<p><u>Energy Consumption from Renewable Sources 2006 (Maldon)</u>                      2.5 GWh (<b>0.2 %</b>)</p> <p><u>Total Energy Consumption from Renewable Sources 2006</u>                      East of England: 529.0 GWh (0.02 %)                      UK: 6,939.5 GWh (0.3 %)</p>		<p>According to the Regional Spatial Strategy (RSS), renewable energy is declining in some areas in the East of England.</p> <p>POLICY ENG2: Renewable Energy Targets:</p> <p>The development of new facilities for renewable power generation should be supported by the following targets:</p> <ul style="list-style-type: none"> <li>• By 2010, 10 % of the region’s energy equalling 820 MW excluding offshore wind.</li> <li>• By 2010, at least double the combined heat and power capacity.</li> <li>• By 2020, 17 % of the region’s energy equalling 1620 MW excluding offshore wind.</li> </ul>
<b>Current Capacity</b>	9,10	<p>Before it was closed down in 2002, Bradwell power station had a capacity of 246 MW.</p> <p>Operational power stations in the vicinity include:</p> <ul style="list-style-type: none"> <li>• Grain Power Station: oil, 1,320 MW, 32 km</li> </ul>		

Indicator	Data Source	Current Data	Comparators	Trend
		<ul style="list-style-type: none"> <li>• Medway Power Station: gas, 688 MW, 32 km</li> <li>• Kentish Flats Offshore Wind Farm: wind, 90 MW, 32 km</li> <li>• Damhead Creek power station: gas, 792 MW, 40 km</li> <li>• Kingsnorth Power Station: coal and oil, 1,985 MW, 48 km</li> <li>• Littlebrook Power Station: oil, 1,170 MW, 56 km</li> <li>• Rye House Power Station: CCGT, 715 MW, 72 km</li> <li>• Dungeness B Power Station: Nuclear, 1110 MW, 80 km</li> <li>• Sizewell B Power Station: Nuclear, 1,188 MW, 104 km</li> <li>• Little Barford Power Station: gas, 680 MW, 113 km</li> </ul> <p>The Thanet Offshore Wind Farm off the coast of Kent (40 km away) is currently being developed and will be designed to deliver 300 MW.</p>		

### Key to Data Sources

1	The East of England Regional Assembly (EERA). Final Baseline Data <sup>16</sup> . <a href="http://www.eera.gov.uk/Documents/About%20EERA/Policy/Planning%20and%20Transport/PlanHome/RPG/RPG14/SEASustainabilityAppraisal/SEA/AppBi_i_Final_Baselinedata.pdf">http://www.eera.gov.uk/Documents/About%20EERA/Policy/Planning%20and%20Transport/PlanHome/RPG/RPG14/SEASustainabilityAppraisal/SEA/AppBi_i_Final_Baselinedata.pdf</a> . NB: The East of England Regional Assembly dissolved on the 31 March 2010 and no longer functions as an organisation. From 1 April 2010, much of EERA's work was will be taken forward by a new organisation called the East of England LGA - <a href="http://www.eelga.gov.uk">www.eelga.gov.uk</a>
2	Greener Essex. Essex County Council. <a href="http://www.essexcc.gov.uk">http://www.essexcc.gov.uk</a>
3	East of England Observatory (August 2006). Climate Change and the East of England. <a href="http://insighteast.org.uk/viewResource.aspx?id=14353">http://insighteast.org.uk/viewResource.aspx?id=14353</a> [ accessed 24 April 2009]
4	CRed. Essex Carbon Reduction. <a href="http://www.rochford.gov.uk/pdf/environment_carbon_reduction.pdf">http://www.rochford.gov.uk/pdf/environment_carbon_reduction.pdf</a>

<sup>16</sup> Data from the Regional Spatial Strategies (RSS) and other regional plans and strategies were used to inform the AoS reports published in November 2009. On 6 July 2010, the Secretary of State for Communities and Local Government, announced the revocation of Regional Strategies and the other documents noted with immediate effect. However, the RSS and other revoked regional documents remain a useful source of background data on regional sustainability issues, so references to these documents have been retained in later revisions of the AoS. The strategies and polices set out in the revoked regional documents may in future be taken forward by other means in local or strategic planning and applicants will need to consider this in preparing applications for development consent.

<b>5</b>	United Kingdom Climate Impact Programme (April 2002). Climate Changing Scenarios for the United Kingdom, The UKCIP02 Scientific Report. <a href="http://www.ukcip.org.uk/images/stories/Pub_pdfs/UKCIP02_tech.pdf">http://www.ukcip.org.uk/images/stories/Pub_pdfs/UKCIP02_tech.pdf</a> [accessed 26 february 2009]
<b>6</b>	Government Office for the East of England (May 2008). East of England Plan. <a href="http://www.gos.gov.uk/goee/docs/Planning/Regional_Planning/Regional_Spatial_Strategy/EE_Plan1.pdf">http://www.gos.gov.uk/goee/docs/Planning/Regional_Planning/Regional_Spatial_Strategy/EE_Plan1.pdf</a> [ accessed 24 April 2009]
<b>7</b>	Department of Business Enterprise and Regulatory Reform (December 2008). Electricity Consumption Data at Regional and Local Authority Level <a href="http://www.berr.gov.uk/energy/statistics/regional/regional-local-electricity/page36213.html">http://www.berr.gov.uk/energy/statistics/regional/regional-local-electricity/page36213.html</a>
<b>8</b>	Department of Business Enterprise and Regulatory Reform (October 2008). Total final energy consumption at regional and local authority level. <a href="http://www.berr.gov.uk/energy/statistics/regional/total-final/page36187.html">http://www.berr.gov.uk/energy/statistics/regional/total-final/page36187.html</a>
<b>9</b>	Department of Business Enterprise and Regulatory Reform. Nuclear Power Stations <a href="http://www.berr.gov.uk/energy/sources/nuclear/key-issues/power-stations/page47765.html/sources/nuclear/key-issues/power-stations/page47765.html">http://www.berr.gov.uk/energy/sources/nuclear/key-issues/power-stations/page47765.html/sources/nuclear/key-issues/power-stations/page47765.html</a>
<b>9</b>	Wikipedia. Power Stations in the East of England. <a href="http://en.wikipedia.org/wiki/Category:Power_stations_in_the_East_of_England">http://en.wikipedia.org/wiki/Category:Power_stations_in_the_East_of_England</a>
<b>10</b>	Wikipedia. Power Stations in the South East of England. <a href="http://en.wikipedia.org/wiki/Category:Power_stations_in_South_East_England">http://en.wikipedia.org/wiki/Category:Power_stations_in_South_East_England</a>

## Communities: Population and Economy

Indicator	Data Source	Current Data					Comparators	Trend
<b>Topic: Population</b>								
<b>Age of population</b>	1, 2		<b>Tillingham Ward</b>	<b>Maldon (Non-metropolitan District)</b>	<b>East of England</b>	<b>England</b>	The East of England had a population of 5.6 million in 2006, according to the mid-year population estimates. This was an increase of 206,000 (3.8 %) between 2001 and 2006. Over the 25 years between 1981 and 2006 the population increased by 16 %. The largest percentage change was a 48 % increase in East Cambridgeshire.	
		All People (Count)	2,181	59,418	5,388,140	49,138,831		
		People aged 0-4 (%)	4.77	5.98	5.97	5.96		
		People aged 5-7 (%)	3.85	3.99	3.79	3.74		
		People aged 8-9 (%)	2.89	2.61	2.59	2.61		
		People aged 10-14 (%)	6.56	6.68	6.51	6.57		
		People aged 15 (%)	1.88	1.24	1.23	1.27		
		People aged 16-17 (%)	3.21	2.35	2.44	2.51		
		People aged 18-19 (%)	1.74	2.01	2.22	2.40		
		People aged 20-24 (%)	4.63	4.52	5.54	6.01		
		People aged 25-29 (%)	3.58	5.03	6.29	6.65		
		People aged 30-44 (%)	21.09	22.30	22.42	22.65		
		People aged 45-59 (%)	24.71	22.52	19.52	18.88		
		People aged 60-64 (%)	5.41	5.44	4.95	4.87		
		People aged 65-74 (%)	8.80	8.28	8.64	8.35		
		People aged 75-84 (%)	4.45	5.15	5.80	5.60		
People aged 85-89 (%)	1.19	1.26	1.36	1.30				
People aged 90 and over (%)	1.24	0.62	0.66	0.64				

Indicator	Data Source	Current Data			Comparators		Trend
		Mean age of population in the area	40.25	39.53	39.12	38.60	
		Median age of population in the area	41.00	40.00	38.00	37.00	
		The population in Tillingham and Maldon are slightly older than the national and regional average. In Tillingham about 6.9% of the population are aged over 75 years and 2.4 % aged over 85 years.					
		People aged over 65 years and older make up approximately 15 % of Maldon's population this is on par with the national average.					
<b>Topic: Employment</b>							
<b>Percentage Economically Active – Employed %</b>	1, 2, 3	<b>Tillingham</b>	<b>Maldon (Non-Metropolitan District)</b>	<b>East of England</b>	<b>England</b>		
		<b>Full Time</b> 35.71	40.30	42.61	40.81		
		<b>Part Time</b> 11.47	12.86	12.48	11.81		
		In the second quarter of 2007 the employment rate (for people of working age) in the East was 77%, among the highest in the UK where the overall rate was 74 per cent.					
Full time employment levels at ward and district level are lower than the regional and national average.							
Part time working at ward level is lower than the national and regional level but it is higher at district level.							
<b>Percentage Economically Active – unemployed %</b>		<b>Tillingham</b>	<b>Maldon (Non-Metropolitan District)</b>	<b>East of England</b>	<b>England</b>		
		2.76	2.18	2.60	3.35		
		Unemployment levels at ward and district levels are lower than the national average. The ward levels are higher than the regional average.					
<b>Industry of employment</b>		<b>Tillingham</b> 100% (1,596)	<b>Maldon (Non-Metropolitan District)</b> 100% (43,056)	<b>East of England</b> 100% (3,884,104)	<b>England</b> 100% (35,532,091)		With the significant majority of businesses employing under 10 people (89% in 2001), Maldon District is in a strong position to grow in the future
<b>All persons</b>							

Indicator	Data Source	Current Data		Comparators		Trend
Agriculture/Forestry (%)		4.96	2.39	1.90	1.45	through expansion of 'home grown' businesses.
Fishing (%)		0.39	0.07	0.02	0.02	
Mining (%)		0.29	0.23	0.21	0.25	
Manufacturing (%)		11.36	16.24	14.47	14.83	
Electricity/Gas/Water Supply (%)		6.60	1.54	0.63	0.71	
Construction (%)		12.04	10.18	7.62	6.76	
Wholesale/Retail Trade (%)		12.52	16.05	17.29	16.85	
Hotels/Restaurant (%)		4.47	3.82	4.16	4.73	
Transport/Communications (%)		5.44	5.86	7.41	7.09	
Financial (%)		5.44	6.91	5.81	4.80	
Real Estate (%)		10.49	13.11	13.31	13.21	
Public Admin (%)		4.56	3.85	5.16	5.66	
Education (%)		7.57	6.67	7.32	7.74	
Health and Social Work (%)		9.42	8.41	9.68	10.70	
Other (%)		4.47	4.69	4.99	5.20	
Self Employed (%)		16.10	12.46	9.25	8.32	
<b>Socio-Economic Classifications</b>		<b>Tillingham</b>	<b>Maldon (Non-Metropolitan District)</b>	<b>East of England</b>	<b>England</b>	

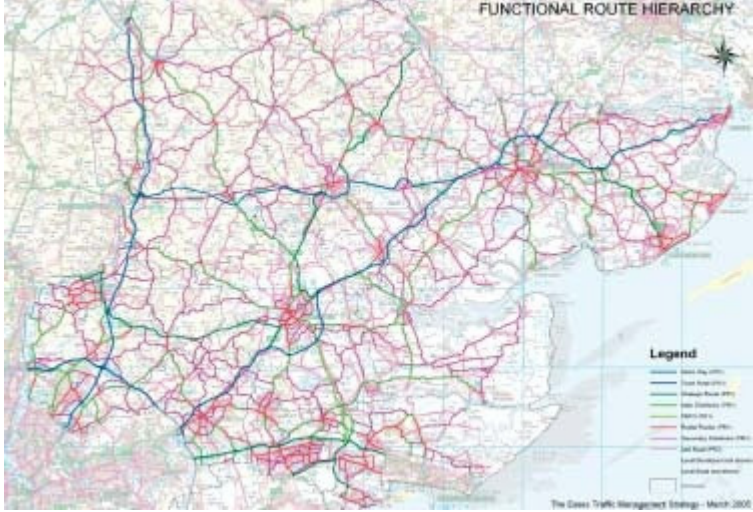
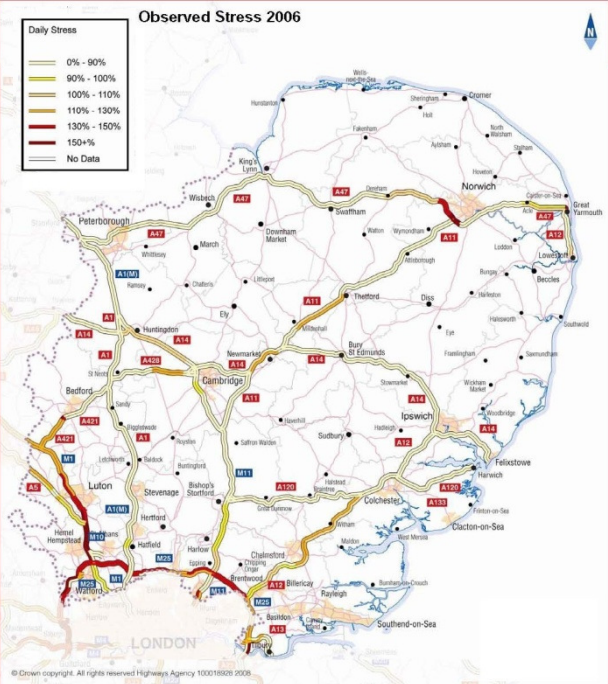
Indicator	Data Source	Current Data		Comparators		Trend
<b>2001 (% Persons aged 16-74)</b>						
Large employers and higher managerial occupations		2.69	3.78	3.81	3.50	
Higher professional occupations		5.08	5.04	5.33	5.11	
Lower managerial and professional occupations		19.17	21.02	19.86	18.73	
Semi-routine occupations		10.34	10.95	11.77	11.65	
Routine occupations		7.21	7.44	8.57	9.02	
Never Worked		1.50	1.23	1.68	2.72	
Full-time students		5.14	4.29	5.78	7.03	

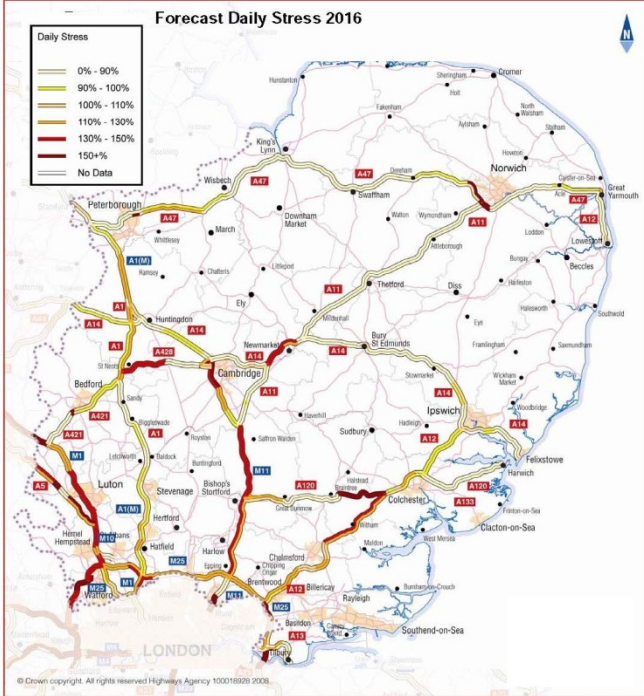
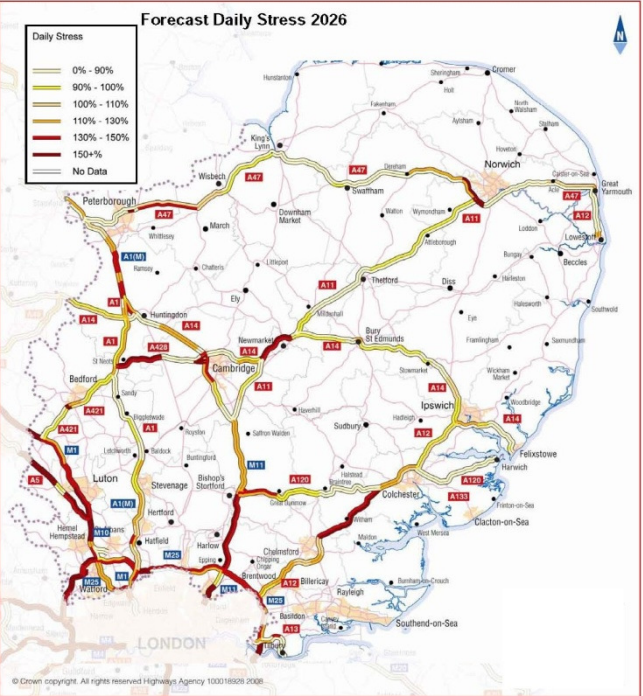
**Key to Data Sources**

<b>1</b>	Office for National Statistics (2001). Neighbourhood Statistics: Tillingham. <a href="http://neighbourhood.statistics.gov.uk/dissemination/LeadAreaSearch.do?a=7andr=1andi=1001andm=0ands=1236613640337andenc=1andareaSearchText=TillinghamandareaSearchType=14andextendedList=falseandsearchAreas=Search">http://neighbourhood.statistics.gov.uk/dissemination/LeadAreaSearch.do?a=7andr=1andi=1001andm=0ands=1236613640337andenc=1andareaSearchText=TillinghamandareaSearchType=14andextendedList=falseandsearchAreas=Search</a>
<b>2</b>	National Statistics (May 2008). Regional Profile – East of England. <a href="http://www.statistics.gov.uk/cci/nugget.asp?id=1131">http://www.statistics.gov.uk/cci/nugget.asp?id=1131</a>
<b>3</b>	Maldon District Council – Business and Employment. <a href="http://www.maldon.gov.uk/BusinessAndEmployment/default.htm">http://www.maldon.gov.uk/BusinessAndEmployment/default.htm</a>



# Communities: Supporting Infrastructure

Indicator	Data Source	Current Data	Comparators	Trend
<b>Topic: Transport</b>				
Regional freight Routes	1,4	 <p data-bbox="555 1013 907 1045"><b>Functional Route Hierarchy</b></p>	 <p data-bbox="1400 1181 1915 1212"><b>Strategic Routes – Observed Stress 2006</b></p>	

Indicator	Data Source	Current Data	Comparators	Trend
		 <p data-bbox="555 1050 1068 1082"><b>Strategic Routes – Forecast Stress 2016</b></p>	 <p data-bbox="1435 1050 1948 1082"><b>Strategic Routes – Forecast Stress 2026</b></p>	<p data-bbox="539 1217 2056 1278">Essex is crossed by strategic transport corridors connecting the major ports of Felixstowe and Harwich to London and the rest of England. The main corridors are:</p> <p data-bbox="539 1281 629 1305"><i>Roads</i></p> <ul data-bbox="539 1313 1182 1342" style="list-style-type: none"> <li>• A12 Trunk Road (London to Ipswich and beyond);</li> </ul>

Indicator	Data Source	Current Data	Comparators	Trend
		<ul style="list-style-type: none"> <li>• A13 London to Southend;</li> <li>• A127 (M25 to Southend on Sea); and</li> <li>• A130 which connects the A12 and A127</li> </ul> <p><i>Rail</i></p> <ul style="list-style-type: none"> <li>• London to Ipswich, Lowestoft and points north.</li> </ul> <p>The county road network may be characterised as:</p> <ul style="list-style-type: none"> <li>• Having high levels of congestion; with</li> <li>• Unreliable journey times; and</li> <li>• Slow overall journey speed.</li> <li>• Consequent environmental impact upon roadside communities; and</li> <li>• Variable standard of highway provision.</li> </ul>		
<b>Topic: Waste</b>				
<b>Municipal Waste</b>	2,3	<p>In 2006-07 Essex produced approximately 738,500 tonnes of municipal solid waste of which about 36% was recycled or composted. Figures for 2005-06 show that the Maldon District Council area produced about 23,700 tonnes of municipal solid waste.</p> <p>The area served by the Essex Waste Management Partnership has 6 landfill sites, 7 central composting sites and 23 recycling centres for household waste, in addition to various depots, bulking facilities and waste recovery facilities.</p> <p>Targets have been set to achieve 60% recycling by 2020 and the waste management strategy notes that investment in new technologies will be required to deliver an innovative and resource efficient waste management system. Alongside the objective for recycling, the waste management strategy sets out preferred options for new technologies. Essex favours composting technologies for source segregated systems and new treatment plants using mechanical biological treatment for the residual waste that cannot be recycled, composted or digested.</p>		<p>The Environmental Report in the waste management strategy notes that waste arisings in Essex have shown varied trends in recent years, making it difficult to predict future trends. The joint municipal waste management strategy uses a figure of 3% per annum increase in waste arisings until 2009/10, 2% increase to 2015/16 and 1% thereafter. However, the detailed analysis of each waste stream that would help refine these figures has not been undertaken.</p>

Indicator	Data Source	Current Data	Comparators	Trend
<b>Radioactive and Hazardous Waste</b>		The operation of a new nuclear power station at the site will require the interim storage of spent fuel and intermediate level waste on site for a period of approximately 100 years after operation has ceased. The arrangements for dealing with all types of radioactive and hazardous waste arising from the operation and decommissioning of new power stations, (including gaseous and liquid radioactive discharges), are appraised in Chapter 6 of the main AoS Report.		

### Key to Data Sources

<b>1</b>	Highways Agency (2008). Regional Network Report – East of England. <a href="http://www.highways.gov.uk/business/documents/RNR08_EE.pdf">http://www.highways.gov.uk/business/documents/RNR08_EE.pdf</a> [accessed 24 April 2009]
<b>2</b>	Draft joint municipal waste management strategy for Essex 2007-2032.
<b>3</b>	Essex County Council (2008). Essex Joint Municipal Waste Management Strategy: Environmental Report.
<b>4</b>	Essex County Council (2006). Second Essex Local Transport Plan (LTP2). <a href="http://www.essexcc.gov.uk/vip8/ecc/ECCWebsite/dis/guc.jsp?channelOid=16819andguideOid=39939andguideContentOid=44746">http://www.essexcc.gov.uk/vip8/ecc/ECCWebsite/dis/guc.jsp?channelOid=16819andguideOid=39939andguideContentOid=44746</a> [accessed 24 April 2009]

## Human Health and Well-Being

Indicator	Data Source	Current Data	Comparators	Trend
<b>Topic: Human Health and Well-being</b>				
<b>Community well-being</b>	1	<p>A useful gauge of the overall well-being of the area can be obtained from the various deprivation indices on the Office of National Statistics, Neighbourhood Statistics web page. This data compares the Super Output Area, Maldon 006E to England as a whole as follows:</p> <ul style="list-style-type: none"> <li>• Income deprivation slightly less than average</li> <li>• Employment deprivation less than average</li> <li>• Health deprivation less than average</li> <li>• Education deprivation slightly greater than average</li> <li>• Barriers to housing and services are much greater than average</li> <li>• Crime is much less than average (see below)</li> <li>• Living environment deprivation is approximately average.</li> </ul>		
<b>Index of multiple deprivation (2007)</b>	2	<p>The Department of Communities and Local Government's index of deprivation (an index combining a range of economic, social and housing issues into a single deprivation score) shows Maldon District Council's area ranked as 255 out of 354 (where 1 is most deprived). This ranking shows that the</p>	<p>Other local councils in Essex are ranked as follows:</p> <ul style="list-style-type: none"> <li>• Basildon is 136</li> <li>• Braintree is 239</li> <li>• Brentwood is 315</li> </ul>	

Indicator	Data Source	Current Data	Comparators	Trend																				
		Maldon area is not particularly deprived.	<ul style="list-style-type: none"> <li>• Castle Point is 249</li> <li>• Chelmsford is 312</li> <li>• Colchester is 224</li> <li>• Epping Forest is 229</li> <li>• Harlow is 121</li> <li>• Rochford is 314</li> <li>• Southend-on-Sea is 111</li> <li>• Tendring is 103</li> <li>• Thurrock is 124</li> <li>• Uttlesford is 347</li> </ul> <p>As can be seen from the above, the Maldon area ranks higher than most councils in Essex but lower than Brentwood, Chelmsford, Rochford and Uttlesford.</p>																					
<b>Age profile (mid 2006)</b>	1	<p>In the Super Output Area, Maldon 006E the age profile of the population is as follows:</p> <table border="1" data-bbox="555 911 1077 1102"> <thead> <tr> <th>Age Band (years)</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>0 – 15</td> <td>15.9</td> </tr> <tr> <td>16 – 64 (males)</td> <td rowspan="2">63.8</td> </tr> <tr> <td>16 – 59 (females)</td> </tr> <tr> <td>65+ (males)</td> <td rowspan="2">20.3</td> </tr> <tr> <td>60+ (females)</td> </tr> </tbody> </table>	Age Band (years)	Percentage	0 – 15	15.9	16 – 64 (males)	63.8	16 – 59 (females)	65+ (males)	20.3	60+ (females)	<p>These figures compare to the age profile for the UK as a whole in 2006 as follows:</p> <table border="1" data-bbox="1108 911 1630 1102"> <thead> <tr> <th>Age Band (years)</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>0 – 15</td> <td>20.1</td> </tr> <tr> <td>16 – 64 (males)</td> <td rowspan="2">61.6</td> </tr> <tr> <td>16 – 59 (females)</td> </tr> <tr> <td>65+ (males)</td> <td rowspan="2">18.3</td> </tr> <tr> <td>60+ (females)</td> </tr> </tbody> </table> <p>As can be seen from the tables, there is a smaller proportion of people in the lower age bracket (children) and a higher proportion of people in the upper age bracket (retired or approaching retirement) in the Super Output Area, Maldon 006E than in the UK as a whole. There are also slightly more people of working</p>	Age Band (years)	Percentage	0 – 15	20.1	16 – 64 (males)	61.6	16 – 59 (females)	65+ (males)	18.3	60+ (females)	
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Indicator	Data Source	Current Data	Comparators	Trend												
			age in the area than the UK average, therefore.													
<b>General health (2001)</b>	1	<p>For the census in 2001, people were asked whether their health over the preceding twelve months was 'good', 'fairly good' or 'not good'. The results for the Super Output Area, Maldon 006E were as follows:</p> <ul style="list-style-type: none"> <li>• Good – 71.0 %</li> <li>• Fairly good – 21.5 %</li> <li>• Not good – 7.5 %</li> </ul>	<p>For comparison purposes, the same data for the overall Maldon area and England are as below:</p> <table border="1"> <thead> <tr> <th></th> <th>Maldon</th> <th>England</th> </tr> </thead> <tbody> <tr> <td>Good</td> <td>71.7</td> <td>68.8</td> </tr> <tr> <td>Fairly good</td> <td>21.2</td> <td>22.2</td> </tr> <tr> <td>Not good</td> <td>7.1</td> <td>9.0</td> </tr> </tbody> </table> <p>Overall the figures for the Super Output Area, Maldon 006E and Maldon in general are comparable with those of England although a slightly greater percentage report poor health in England as a whole.</p>		Maldon	England	Good	71.7	68.8	Fairly good	21.2	22.2	Not good	7.1	9.0	
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<b>Life expectancy at birth (Jan 04 – Dec 06)</b>	1	<table border="1"> <thead> <tr> <th></th> <th>Maldon</th> </tr> </thead> <tbody> <tr> <td>Males</td> <td>77.40</td> </tr> <tr> <td>Females</td> <td>82.00</td> </tr> </tbody> </table>		Maldon	Males	77.40	Females	82.00	<table border="1"> <thead> <tr> <th>East of England</th> <th>England</th> </tr> </thead> <tbody> <tr> <td>78.30</td> <td>77.32</td> </tr> <tr> <td>82.30</td> <td>81.55</td> </tr> </tbody> </table> <p>As can be seen from above, the life expectancy in the Maldon District Council area is approximately the same as the English national average.</p>	East of England	England	78.30	77.32	82.30	81.55	Data from the same source for previous years show that these figures for life expectancy at birth in the Maldon District Council area have remained much the same for both males and females since 2001.
	Maldon															
Males	77.40															
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<b>Infant mortality (Jan 03 – Dec 05)</b>	1	Infant mortality in the Maldon District Council area for the years in question was 2.3 persons in every 1000.	This compares to the figure of 4.2 persons for the East of England region and 5.1 persons per thousand in England as a whole.	Data from the same source for previous years show that figures for infant mortality in the Maldon District Council area have risen slightly from a low in 1998-2000 but are lower than they were in 2002-04.												
<b>Proximity to</b>	3	Medical services in the area of the Bradwell														

Indicator	Data Source	Current Data	Comparators	Trend
<b>medical services</b>		<p>site are as follows:</p> <ul style="list-style-type: none"> <li>• There are two General Practitioner (GP) practices (Mersea Island Practice and Tollesbury Surgery) within 5 km of the site. Four other GP practices are within 10 km of the site.</li> <li>• Closest hospital is the St Peter's Hospital in Maldon (15.4 km) but this has no Accident and Emergency (Accident and Emergency) department</li> <li>• Nearest hospital with an Accident and Emergency department is the Broomfield Hospital, in Court Road, Chelmsford which is 29.9 km away</li> <li>• The nearest hospital providing mental health services is St Clements Hospital, Ipswich, which is 39.9 km away</li> </ul>		
<b>Education - examination results for young people (2006 – 07)</b>	1	In the Super Output Area, Maldon 006E, 50 % of pupils achieved 5 or more A* - C grade passes including English and Mathematics at GCSE or equivalent.	This compares to the figure of 54 % of students for the Maldon District Council area and 46 % of students for England as a whole.	
<b>Housing – total unfit dwellings (Apr 06)</b>	1	The total percentage of unfit dwellings in the Maldon District Council area for the year in question was 4.2 %.	This compares to a percentage of 3.2 % for the East of England region and 4.2 % for England as a whole.	Data from the same source show that the percentage of unfit dwellings has remained approximately the same since April 2001.
<b>Radioactivity monitoring</b>	4	The Food Standards Agency's annual RIFE (Radioactivity In Food and the Environment) report details the results of regular radiological monitoring carried out to ensure	The dose limit for members of the public specified in The Ionising Radiation Regulations 1999 is 1 millisievert (mSv) per year for all artificial sources of radiation.	Trends in the data noted from sampling in previous years are as follows:



Indicator	Data Source	Current Data	Comparators	Trend
		<p>that discharges of radioactivity do not result in unacceptable doses to the public. RIFE 13 relates to monitoring carried out in 2007. From this report it is possible to extract the following conclusions:</p> <ul style="list-style-type: none"> <li>• water, sediment, beach and terrestrial and marine food and animal samples were collected from around the Bradwell site in 2007</li> <li>• analysis of tritium, carbon-14 and sulphur-35 in milk, crops and fruit all showed low concentrations of artificial radionuclides although some carbon-14 samples showed slightly elevated concentrations</li> <li>• concentrations of radioactivity in freshwater were lower than the World Health Organisation's screening level for drinking water</li> <li>• the beta activity in water from a nearby coastal ditch was raised but lower than the value found in 2006</li> <li>• concentrations of artificial radionuclides in aquatic materials were low</li> </ul>	<p>Estimations of dosage levels to the public from the Bradwell sampling were as follows:</p> <ul style="list-style-type: none"> <li>• estimated dose from locally grown foodstuffs was less than 0.005 mSv</li> <li>• estimated dose to local fish and shellfish consumers was less than 0.017 mSv</li> <li>• the total dose from all sources, including direct radiation, was assessed as being 0.070 mSv</li> </ul>	<ul style="list-style-type: none"> <li>• the estimated dose from locally grown foodstuffs is the same as that assessed in 2006 (less than 0.005 mSv)</li> <li>• the dose to seafood consumers has increased slightly from the value assessed in 2006 (0.010 mSv)</li> <li>• no total assessed dose was calculated in 2006</li> </ul>
<b>Health related to nuclear installations</b>	5	<p>There has been, since 1962, a nuclear power station operating on the Bradwell site. There are, therefore, historical data which can be analysed to correlate the incidence of disease reported around this site so that it can be compared to the average prevalence of the same disease in the British population</p>	<p>For comparison purposes, the figures derived using statistics for Britain as a whole are as follows:</p> <ul style="list-style-type: none"> <li>• the expected number of cases of childhood leukaemia and non-Hodgkin lymphoma between 1969 and 1993 in a 25 km area</li> </ul>	

Indicator	Data Source	Current Data	Comparators	Trend
		<p>as a whole. Such a comparison for childhood leukaemia, non-Hodgkin lymphoma and other malignant tumours was undertaken by the Committee on Medical Aspects of Radiation in the Environment (COMARE) in 2005. The results of this study for Bradwell are as below:</p> <ul style="list-style-type: none"> <li>actual cases of childhood leukaemia and non-Hodgkin lymphoma between 1969 and 1993 in a 25 km area around the plant were 95</li> <li>actual cases of childhood solid tumours between 1969 and 1993 in a 25 km area around the plant were 148</li> </ul>	<p>around the plant was 99.21</p> <ul style="list-style-type: none"> <li>the expected number of cases of childhood tumours between 1969 and 1993 in a 25 km area around the plant was 150.71</li> </ul> <p>It was concluded, from the above statistics, that there was no evidence of excess numbers of these cases in the 25 km area which would include either primary exposure to radioactive discharges or secondary exposure from re-suspended material.</p>	

### Key to Data Sources

1	Office of National Statistics. <a href="http://neighbourhood.statistics.gov.uk/dissemination/home.do;jessionid=ac1f930c30d607c6170cbe3146ada704c9cac1978fc7?m=0ands=1236174480737andenc=1andbhcp=1andnjs=trueandnsck=trueandnsvg=falseandnswid=996">http://neighbourhood.statistics.gov.uk/dissemination/home.do;jessionid=ac1f930c30d607c6170cbe3146ada704c9cac1978fc7?m=0ands=1236174480737andenc=1andbhcp=1andnjs=trueandnsck=trueandnsvg=falseandnswid=996</a>
2	Department of Communities and Local Government. Indices of Deprivation. <a href="http://www.communities.gov.uk/communities/neighbourhoodrenewal/deprivation/deprivation07/">http://www.communities.gov.uk/communities/neighbourhoodrenewal/deprivation/deprivation07/</a>
3	NHS 'Find Services'. <a href="http://www.nhs.uk/servicedirectories/Pages/ServiceSearch.aspx">http://www.nhs.uk/servicedirectories/Pages/ServiceSearch.aspx</a>
4	Food Standards Agency (2007). Radioactivity In Food and the Environment (RIFE 13) report. <a href="http://www.food.gov.uk/science/surveillance/radiosurv/rife13">http://www.food.gov.uk/science/surveillance/radiosurv/rife13</a>
5	Committee on Medical Aspects of Radiation in the Environment (COMARE) (2005). Tenth Report. The incidence of childhood cancer around nuclear installations in Great Britain. Health Protection Agency, June 2005. <a href="http://www.comare.org.uk/comare_docs.htm">http://www.comare.org.uk/comare_docs.htm</a>

## Cultural Heritage

Indicator	Data Source	Current Data	Comparators	Trend
<b>Topic: Cultural Heritage</b>				
Scheduled Monuments	1	There are 10 Scheduled Monuments within an approximate 5 km distance of the centre of the site, the closest of which are a Saxon coastal fish weir and Othona Roman-Saxon Shore Fort with Anglo-Saxon monastery, which both lie within 1.5 km. The others include a Roman round building, 3 further coastal fish weirs and 4 decoy ponds.		
Conservation Areas	2	One Conservation Area at West Mersea is located within an approximate 5 km distance of the site.		
Listed Buildings	3 and 5	There are around 46 listed buildings within an approximate distance of 2 km of the centre of the site including the Grade I listed St. Peter's Chapel which lies within 1.5 km. The chapel is still in occasional ecclesiastical use and attracts an annual pilgrimage. There are around 132 listed buildings within an approximate 5 km distance.		
Archaeological sites	3	Iron Age/Roman salt-working sites are located close to and possibly within the site and Early Medieval activity is also suspected in close vicinity. A Roman road may also lie to the south. RAF Bradwell Bay, a former World War II airfield, lies within the site and the lines of the former runways can still be seen. Wartime buildings are also believed to still survive.		

Historic Landscape	4	Within the site and east of the World War II airfield there are some field boundaries which are shown on late 19 <sup>th</sup> century mapping and therefore potential elements of the historic landscape lie within the site. The airfield itself is also part of the historic landscape.		
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### Key to Data Sources

1	MAGIC website. <a href="http://www.magic.gov.uk">http://www.magic.gov.uk</a> [accessed 12 March 2009]
2	Colchester Borough Council (March 2004). Colchester Borough Local Plan [online], <a href="http://colchesterlocalplan.com/">http://colchesterlocalplan.com/</a> [accessed 12 March 2009]
3	Heritage Gateway. <a href="http://www.heritagegateway.org.uk">http://www.heritagegateway.org.uk</a> [accessed 12 March 2009]
4	First Edition Ordnance Survey. <a href="http://www.ordnancesurvey.co.uk/oswebsite/products/historicalmapdata/">http://www.ordnancesurvey.co.uk/oswebsite/products/historicalmapdata/</a> [accessed 24 April 2009]
5	Peter Finch. St. Peter's Chapel, Bradwell. <a href="http://www.bradwellchapel.org">www.bradwellchapel.org</a> [accessed 17 March 2009]

## Landscape

Indicator	Data Source	Current Data	Comparators	Trend
<b>Topic: Landscape</b>				
<b>National Character Area (NCA)</b>	1	<p>The site Bradwell is situated within the Greater Thames Estuary NCA (81). Key Characteristics include :</p> <ul style="list-style-type: none"> <li><i>Extensive open spaces dominated by the sky within a predominantly flat, low-lying landscape. The pervasive presence of water and numerous coastal estuaries extend the maritime influence far inland.</i></li> <li><i>Strong feeling of remoteness and wilderness persists on the open beaches and salt marshes, on the reclaimed farmed marshland and also on the mudflats populated by a large and varied bird population.</i></li> <li><i>Traditional unimproved wet pasture grazed with sheep and cattle. Extensive drained and ploughed productive arable land protected from floods by sea walls, with some areas of more mixed agriculture on higher ground.</i></li> <li><i>Open grazing pastures patterned by a network of ancient and modern reed-fringed drainage ditches and dykes, numerous creeks and few vertical boundaries such as hedges or fences.</i></li> <li><i>Hedgerows are absent from the large, rectilinear fields with trees beginning where the marsh ceases and the ground starts to rise on land overlying the London Clay Lowlands. Generally, tree cover is limited to farmsteads and dwellings on the higher, drier pockets of ground.</i></li> <li><i>Distinctive military heritage on coastline such as Napoleonic military defences and 20th century pillboxes.</i></li> <li><i>Numerous small villages and hamlets related to the coastal economy of fishing (at Mersea), boatbuilding and yachting. The historically important coastal cargo transport network of 'Thames Barges' developed as a result of settlement pattern.</i></li> <li><i>Modern day pattern of local parishes reflects the historical layout of settlements, surrounded by farmland on the higher ground inland, giving way to marsh down to the waterfront.</i></li> <li><i>Pressure on edges, particularly around major estuaries, from urban, industrial and recreational developments together with the associated infrastructure requirements often on highly visible sites against which the marshes are often viewed.</i></li> <li><i>The Thames edge marshes are themselves subject to the chaotic activity of various major developments including ports, waste disposal, marine dredging, urbanisation, mineral extraction and prominent power stations plus numerous other industry-related activities such as petrochemical complexes.</i></li> </ul> <p>The site borders the Northern Thames Basin (111), which is located immediately to the South. The sub character area for this area is the Essex Heathlands. The key characteristics of the Essex Heathlands include:</p>		

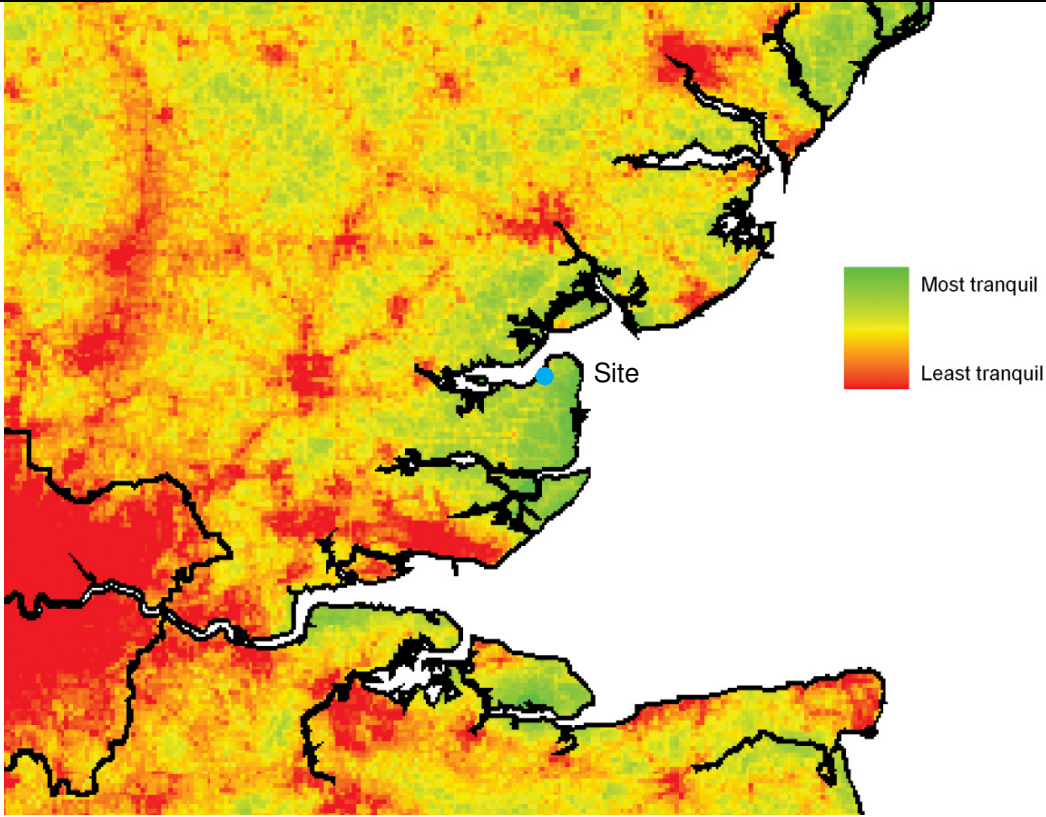
Indicator	Data Source	Current Data	Comparators	Trend
		<ul style="list-style-type: none"> <li>• <i>Intensively farmed plateau encompassing an area of former heaths and commons on soils derived from ancient river deposits, much of which has an open, often relatively treeless character.</i></li> <li>• <i>Arable farming more common to the north, although horticulture and market gardening is also quite evident, particularly around the former heaths near Colchester.</i></li> <li>• <i>Straight and regular field patterns reflect the planned characteristics of late enclosure of this area and despite the presence of arable farming many hedgerows and woodlands have been retained.</i></li> <li>• <i>Abundance of archaeological features and remains identified by cropmarks and overlain by later physical features including hedgerows.</i></li> <li>• <i>Clusters of woodland, many of which are semi-natural and of ancient origin.</i></li> <li>• <i>Intricate pattern of hidden creeks and small valleys extending the influence of the coastal marshes inland.</i></li> </ul>		
<b>Nationally Designated Landscape</b>	2	<p>The site and its immediate surroundings are not within or near any National Parks, Area of Outstanding Natural Beauty (AONB), Heritage Coasts or any other National designation.</p> <p>The closest Area of Outstanding Natural Beauty (AONB) is:</p> <ul style="list-style-type: none"> <li>• Dedham Vale Area of Outstanding Natural Beauty, situated 22.9 km to the North East</li> <li>• Suffolk Coast and Heaths Area of Outstanding Natural Beauty, situated 27 km to the North West</li> </ul> <p>The closest National Park is:</p> <ul style="list-style-type: none"> <li>• The Broads National Park, situated 86.6 km to the North East</li> </ul>		
<b>Local Landscape Character Areas</b>	3	<p>The site at Bradwell is within a local area covered by the 'Braintree, Brentree, Brentwood, Chelmsford, Maldon and Uttlesford Landscape Character Assessments', September 2006, which includes defined landscape areas in and immediately around the site. The site is identified as falling within Bradwell Drained Estuarine Marsh' landscape character area (hatched red) in the following figure.</p>		

Indicator	Data Source	Current Data	Comparators	Trend
		 <p data-bbox="542 1241 1357 1273"><b>D7 Bradwell Drained Estuarine Marsh' landscape character area</b></p> <p data-bbox="542 1310 1397 1342">The stated characteristics of 'D7 Bradwell Drained Estuarine Marsh' are:</p>		

Indicator	Data Source	Current Data	Comparators	Trend
		<p>'Key Characteristics</p> <ul style="list-style-type: none"> <li>• <i>Flat, low-lying land immediately behind sea wall defences.</i></li> <li>• <i>Mostly arable farmland on former reclaimed marsh intersected by linear ditches and dykes.</i></li> <li>• <i>Absence of trees except around farmsteads.</i></li> <li>• <i>Sense of huge sky, sound of birds, tranquillity, and panoramic views across the marshland and out to sea.</i></li> <li>• <i>Isolated farms; restricted access provided by a very few lanes; absence of settlements'.</i></li> </ul> <p>'Visual Characteristics</p> <ul style="list-style-type: none"> <li>• <i>Bradwell Nuclear Power Station and its pylons dominate the skyline as a visual landmark in the northern reaches of the area, visible from great distances over the surrounding flatlands, especially when lit at night.</i></li> <li>• <i>St Peter-on-the-Wall church is visible from the surrounding flatlands.</i></li> <li>• <i>Strong sense of being windswept and desolate.</i></li> <li>• <i>Visual relief is offered by views on a clear day looking inland to the wooded slopes on the north shore of the Blackwater Estuary as well as northwards to Mersea Island and the open sea to the north and east.'</i></li> </ul> <p>Three other character areas are situated within close proximity to the site. These are:</p> <ul style="list-style-type: none"> <li>• 'E2 Tillingham and Latchingdon Coastal Farmland'</li> <li>• 'D6 Ramsay drained estuarine marsh'</li> <li>• 'D8 Dengie drained estuarine marsh'</li> </ul>		
<b>Relevant Local Designations and Policies</b>	4	<p>The site is situated within Maldon District Council's administrative area. The site is visible from 3 administrative areas to the North, including Colchester Borough across the Blackwater estuary, from which a large number of views are potentially gained. Braintree District and Tending District are situated approximately 15-20 km away from the site.</p> <p>Maldon District Council's Adopted Replacement Local Plan (November 2005):</p> <p>The following local landscape policies are directly applicable to the site:</p> <ul style="list-style-type: none"> <li>• Policy CC6 - Landscape protection</li> </ul>		



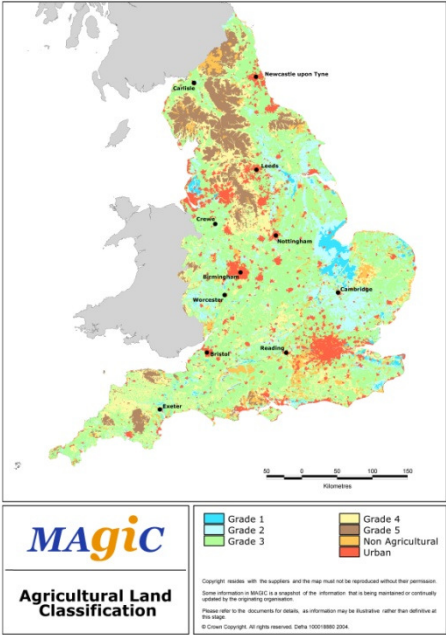
Indicator	Data Source	Current Data	Comparators	Trend
		<ul style="list-style-type: none"> <li>• Policy CC7 - Special Landscape Areas. <i>“Within Special Landscape Areas permission will not be given for development unless its location, siting, design, materials and landscaping conserve or restore the character of the area in which the development is proposed”</i>. The local plan references the Maldon landscape character assessments (September 2006) as describing the key characteristic components of the landscape. The site appears to be partly located within the ‘Dengie Marshes’ SLA identified under this policy.</li> <li>• Policy CC11 – The site is partly located within the defined ‘Coastal Zone’, within which development will only be permitted if :               <ol style="list-style-type: none"> <li>1. <i>It requires a coastal location or is associated with an existing use within the coastal zone;</i></li> <li>2. <i>The Location, siting, design, materials and landscaping would not adversely affect the open and rural character of the area, its historic features and wildlife;</i></li> <li>3. <i>It has minimal impact on views into and out of the area;</i></li> <li>4. <i>It meets an essential overriding local need which cannot be met within the settlement development boundaries and;</i></li> <li>5. <i>Every reasonable effort is made to use previously developed land and/or buildings in preference to undeveloped land.</i></li> </ol> </li> </ul> <p>The site may have intervisibility with the following additional identified policy areas. These policies and designations have been assessed to take into consideration these areas and their settings:</p> <ul style="list-style-type: none"> <li>• Policy CC7 - Special Landscape Areas (There are a number of these in the surrounding area)</li> <li>• Policy CC9 - Maldon Riverside Area</li> <li>• Policy CC10 - Historic Landscape Features</li> <li>• Policy CC11- The Coastal Zone</li> </ul> <p>Adopted Review Colchester Borough Local Plan (March 2004) <a href="http://www.colchester.gov.uk/">http://www.colchester.gov.uk/</a></p> <ul style="list-style-type: none"> <li>• Policy CO1 – Countryside</li> <li>• Policy C02 - AONB</li> <li>• Policy C03 – The countryside conservation area</li> <li>• Policy CE10 – West Mersea</li> </ul>		

Indicator	Data Source	Current Data	Comparators	Trend
<p><b>Tranquil Areas</b></p>	<p>5</p>	 <p><b>Local tranquillity at the site and its surrounding area.</b></p> <p>The site is identified as falling within a 'most tranquil' zone, although the existing Bradwell Power Station may affect the perception of tranquillity locally.</p>		

## Key to Data Sources

1	Natural England. Landscape Character Areas . <a href="http://www.naturalengland.org.uk/ourwork/landscape/englands/character/default.aspx">http://www.naturalengland.org.uk/ourwork/landscape/englands/character/default.aspx</a> [accessed 24 April 2009]
2	Natural England. AONB's, National Parks and Heritage Coasts. <a href="http://www.naturalengland.org.uk/ourwork/conservation/designatedareas/default.aspx">http://www.naturalengland.org.uk/ourwork/conservation/designatedareas/default.aspx</a> [accessed 24 April 2009]
3	Maldon District Council (September 2006). Braintree, Brentree, Brentwood, Chelmsford, Maldon and Uttlesford Landscape Character Assessments'. <a href="http://www.maldon.gov.uk/LivingHere/Planning_New/SpatialPlanning/LDF/Background/Landscape+Character+Assessment.htm">http://www.maldon.gov.uk/LivingHere/Planning_New/SpatialPlanning/LDF/Background/Landscape+Character+Assessment.htm</a>
4	Maldon District Council (November 2005). Adopted Replacement Local Plan. <a href="http://maldon.leadpartners.co.uk/">http://maldon.leadpartners.co.uk/</a>
5	Campaign to Protect the Rural England. Tranquillity and tranquil areas. <a href="http://www.cpre.org.uk/campaigns/landscape/tranquillity/national-and-regional-tranquillity-maps">http://www.cpre.org.uk/campaigns/landscape/tranquillity/national-and-regional-tranquillity-maps</a>

## Soils, Geology and Land Use

Indicator	Data Source	Current Data	Comparators	Trend
<b>Topic: Soils</b>				
<b>Agricultural Land Classification</b>	1	<p>Please refer to the map. The Magic map produced by DEFRA in 2004 indicates the current agricultural grade of lands in England and Wales. These grades are Agricultural land classification Grades 1-5, non-agricultural and Urban.</p> <p>The area is noted to have been managed under DEFRA's Environmental Stewardship Scheme (agri-environmental scheme) to conserve wildlife and landscape features.</p> <p>National Soils Research Institute (Report available)</p> <ul style="list-style-type: none"> <li>• Hurst Soils</li> <li>• Coarse and fine loamy permeable soils mainly over gravel variably affected by groundwater</li> <li>• River terrace gravel</li> <li>• Soils seasonally waterlogged by fluctuating groundwater and with relatively rapid lateral saturated conductivity</li> <li>• Permanent grassland, deciduous wood land and rough grazing in the South East Region; cereals and horticultural crop</li> </ul>		
<b>Soils</b>				
<b>Topic: Geology</b>				
<b>Geological SSSIs</b>	3	There are a number of Geological SSSIs within the local vicinity which are the Dengie SSSI and Blackwater Estuary SSSI.		
<b>Geology and Land Quality</b>	2	Envirocheck Report (Report available)		

Indicator	Data Source	Current Data	Comparators	Trend
		<ul style="list-style-type: none"> <li>• Geological Risks The local Geology is Tidal Flat Deposits, Beach and Tidal Flat Deposits and Head underlain by London Clay Formation.</li>   <li>No mineral abstraction has been recorded locally.</li>   <li>Based on the information within the Envirocheck report the geological risks are;</li> <ul style="list-style-type: none"> <li>• Moderate risk for the Potential for Compressible Ground Stability Hazards.</li> <li>• Very low risk for the Potential for Landslide Ground Stability Hazards.</li> <li>• Very low to moderate risks for the Potential for Running Sand Ground Stability Hazards.</li> <li>• Low to moderate risks for the Potential for Shrinking or Swelling Clay Ground Stability Hazards.</li> </ul> </ul> <ul style="list-style-type: none"> <li>• Environmental Hazards Based on the Envirocheck report the main environmental hazards are two Integrated Pollution Prevention and Control Registered Waste Sites within 1 km of the site.</li> </ul> <ul style="list-style-type: none"> <li>• Historic Land Use: Historic maps ranging from the 1880's to current were studied. The only major industrial use in the area is RAF Bradwell Bay airfield to the south of the existing power station, within the site.</li> </ul>		

### Key to Data Sources

<b>1</b>	Cranfield University (26 February 2009). National Soils Research Institute Report 27374310 (Report available on request)
<b>2</b>	Landmark (26 February 2009). Envirocheck Report 27374310_1_1 (Report available on Request).
<b>3</b>	Natural England Nature on the Map web site. <a href="http://www.natureonthemap.org.uk/map.aspx?m=nreserves">http://www.natureonthemap.org.uk/map.aspx?m=nreserves</a> [ assessed on 5 March 2009]

## Water Quality and Resources

Indicator	Data Source	Current Data	Comparators	Trend
<b>Topic: Water</b>				
<b>Current State of the Waters in the Anglian River Basin District</b>	1, 2	<p>In the Anglian River Basin District (RBD) draft River Basin Management Plan (dRBMP) report, prepared by the Environment Agency (EA), 5% of rivers (by length) meet the requirements for good ecological status or good ecological potential. The main reasons being high phosphate levels, low dissolved oxygen levels, low invertebrate counts and low fish counts. In total, 15 % of all surface waters are designated as artificial and 56 % of all surface waters are designated as heavily modified.</p> <p>A greater number of groundwater bodies (65 % by number) meet the requirements for good chemical status, while 57% of lakes and 37 % of canals meet the requirements for good status or good potential. Currently none of the RBD coastal and estuarine water bodies are achieving either good ecological status or good ecological potential.</p> <p>The Anglian dRBMP predicts that by 2015, 7.5 % of rivers (by length) will reach good status or good potential. The groundwater situation is expected to remain unchanged by 2015. Although the EA assume little change in the status of coastal and estuarine water bodies by 2015, the EA target in 2027 is that all water bodies will achieve good status or good potential.</p> <p>The site is located within the Combined Essex Zone (CEZ) of the Anglian RBD. Currently 11 km of rivers (approximately 2% by length) in this zone are achieving either good ecological status or good ecological potential. The EA are expecting little change by 2015. The target for 2027 is that all water bodies in the CEZ will achieve good status or good potential. The CEZ lies within the counties of Essex and Suffolk as well as a small part of Cambridgeshire. It encompasses the rivers and tributaries of the Stour, Colne, Pant/Blackwater, Chelmer, Crouch and Roach, along with the smaller catchments of Sixpenny, Tenpenny, Holland and Asheldham Brook.</p> <p>The Ely Ouse to Essex Transfer Scheme (EOETS) augments flows in the River Stour and River Pant/Blackwater to enable the public water supply abstractions to take place when natural flows in the rivers are not sufficient. The water environment is used for a variety of activities including recreation, public water supply, fisheries and conservation. The area is rich in landscape and wildlife heritage and most of the coast is of international importance for nature conservation.</p> <p>Key centres of growth are planned through the catchment. By 2021, an additional 27,000 homes are planned at Colchester, Chelmsford, Basildon and Southend. These will place cumulative pressures on water resources and on estuaries into which they discharge treated effluent, and development actions will be required to achieve good ecological status and prevent deterioration of water bodies. In addition, there are major port developments at Harwich and the redevelopment of Shellhaven (in the adjacent</p>		

Indicator	Data Source	Current Data	Comparators	Trend																								
		<p>Thames River Basin District) that could have potential impacts, for example, on estuarine fisheries. Again, mitigation actions will be required to ensure no deterioration. Flood alleviation schemes along the coast offer opportunities to create new coastal habitat, for example, salt marshes through the managed realignment of coastal flood defences.</p> <p>Groundwater is an important resource in the Anglian RBD, however, only approximately 3 % of total water supplied in the CEZ comes from groundwater. The main pressures on groundwater are abstraction for drinking water supply, agriculture and industry, and contamination with nitrates and saline water near to the coast. Currently 65 % of groundwater bodies achieve good chemical status and 68 % achieve good quantitative status.</p> <p>The EA has set out several plans for the region:</p> <ul style="list-style-type: none"> <li>• to maintain 68 % of groundwater at good quantitative status and 65 % at good chemical status to 2015;</li> <li>• to achieve good status in all groundwater by 2027;</li> <li>• to modify or revoke all abstraction licences adversely affecting the conservation features of Natura 2000 sites by 2015;</li> <li>• to investigate the need for the actions required to modify abstraction licences for those surface and groundwater bodies where there is a high risk that groundwater abstraction may be limiting good ecological or good qualitative status by 2015.</li> </ul> <p>Local information relevant to the Water Framework Directive (WFD) for the area in close proximity to the site, taken from the EA web site, is summarised in the table below:</p> <table border="1" data-bbox="555 959 1525 1187"> <thead> <tr> <th rowspan="2">Sector</th> <th colspan="2">Ecological Quality</th> <th colspan="2">Chemical Quality</th> </tr> <tr> <th>Current</th> <th>Predicted 2015</th> <th>Current</th> <th>Predicted 2015</th> </tr> </thead> <tbody> <tr> <td>Groundwater: Essex Gravels</td> <td>Poor (Quantitative)</td> <td>Poor (Quantitative)</td> <td>Poor</td> <td>Poor</td> </tr> <tr> <td>Estuarine</td> <td>Moderate</td> <td>Moderate</td> <td>High</td> <td>Good</td> </tr> <tr> <td>Coastal</td> <td>Moderate</td> <td>Moderate</td> <td>High</td> <td>Good</td> </tr> </tbody> </table> <p>There are a number of rivers on the Dengie peninsular including Asheldham Brook This catchment has not yet been assessed under WFD and no results are available for any single monitoring points.</p> <p>The site is located next to the Blackwater estuary. The current ecological status of the estuary is assessed as moderate. This is not</p>			Sector	Ecological Quality		Chemical Quality		Current	Predicted 2015	Current	Predicted 2015	Groundwater: Essex Gravels	Poor (Quantitative)	Poor (Quantitative)	Poor	Poor	Estuarine	Moderate	Moderate	High	Good	Coastal	Moderate	Moderate	High	Good
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Indicator	Data Source	Current Data	Comparators	Trend
		<p>expected to change by 2015. The current chemical status of the estuary is assessed as high. This is expected to change to good by 2015.</p> <p>The boundary between estuarine and coastal waters occurs approximately 1 km east of the site. The current ecological status of the coastal water is assessed as moderate. This is not expected to change by 2015. The current chemical status of the coastal water is assessed as high. This is expected to change to good by 2015.</p> <p>A major aquifer is not present at a reasonable depth at the site. The Confined Chalk, which is overlain by London Clay, occurs at a large depth and is unlikely to be a water supply aquifer at this location. The Essex Gravel Formation is present, overlying the London Clay and may form a locally important aquifer. The London Clay prevents any connection between the Essex Gravel and the Chalk. Under the WFD classification, the Essex Gravel groundwater is currently assessed as poor (quantitative) and the chemical quality has also been assessed as poor. The status is not expected to improve by 2015. There are no groundwater source protection zones located in the vicinity of the site.</p>		
<p><b>Current State of the Waters in the Combined Essex CAMS</b></p>	<p>3</p>	<p>The site is located within the Combined Essex Catchment Abstraction Management Strategy (CAMS) area, and the Consultation Report was prepared in February 2007. The site is located within the North Essex CAMS area but is outside any of the assessed Water Resource Management Units (WRMU) and Groundwater Management Units (GWMU), i.e. it is located in a non-assessed area. The boundary with the South Essex CAMS area is located within 2 km to the south of the site. The site is located within the boundary of the Confined Chalk aquifer, however the aquifer has not been assessed at this location. The Confined Chalk is overlain by London Clay. The London Clay is overlain by the Essex Gravel deposits, which may form a local shallow aquifer.</p> <p>Water related sites in close proximity to the site are listed below:</p> <ul style="list-style-type: none"> <li>• water related Sites of Special Scientific Interest (SSSI) occur at Blackwater Estuary and Dengie;</li> <li>• water related Special Area of Conservation (SAC) occur at Essex Estuaries (Blackwater Estuary);</li> <li>• water related Special Protection Area (SPA) occur at Blackwater Estuary and Dengie (both part of the Mid-Essex Coast SPA); and</li> <li>• water related Ramsar sites occur at Blackwater Estuary and Dengie.</li> </ul> <p>The site is located on the tip of the southern coastline of the Blackwater Estuary which is the largest estuary in Essex and one of the largest estuarine complexes in East Anglia. Its mud-flats are fringed by saltmarsh on the upper shores, with shingle, shell banks and offshore islands a feature of the tidal flats. The Blackwater Estuary is an integral component of the phased Mid-Essex Coast SPA.</p>		

Indicator	Data Source	Current Data	Comparators	Trend
		<p>Dengie SSSI/SPA is located approximately 2 km to the east of the site. It is a large and remote area of tidal mudflat and saltmarsh at the eastern end of the Dengie peninsula, between the Blackwater and Crouch Estuaries. The saltmarsh is the largest continuous example of its type in Essex.</p>		
<p><b>Water Demand and Availability Projected to 2024</b></p>	<p>4</p>	<p>The assessment of demand and supply occurs at the level of a Water Resource Zone (WRZ). A WRZ is defined by the EA as ‘the largest possible zone in which all resources, including external transfers, can be shared and hence the zone in which all customers experience the same risk of supply failure from a resource shortfall’.</p> <p>The site is located in Essex and Suffolk Water’s ‘Essex’ WRZ. The Essex resource zone is bounded by the Thames Estuary in the south and the Essex coastline as far north as Salcott in the east. The zone stretches as far north as Silver End and as far west as the London Boroughs of Redbridge, Barking and Havering. The zone includes the towns of Southend-on-Sea, Chelmsford, Witham, Brentwood, Billericay, Basildon, Grays, Dagenham and Romford.</p> <p>The water resources include the Essex rivers Chelmer, Blackwater, Stour and Roman River which support pumped storage reservoirs at Hanningfield and Abberton, and treatment works at Langford, Langham, Hanningfield and Layer. The remaining water sourced from inside the Essex resource zone (approximately 3 % of total water supplied in the zone) is derived from groundwater via Chalk well and adit sources in the south and south west of the zone at Linford, Stifford, Dagenham and Roding, each with on-site treatment.</p> <p>Water transferred into the Essex supply area from outside the area comes from two main sources; the Chigwell raw water bulk supply from Thames Water Utilities, and the EOETS. Approximately 20 % of water supplied in Essex is provided via a raw water bulk transfer provided by Thames Water Utilities from the Lea Valley reservoirs. The supply network in Essex is highly integrated, with a large degree of flexibility for moving water around the zone to where it is required.</p> <p>In a dry year, up to a third of the water supplied in Essex is derived from the EOETS, and the contribution from the EOETS combined with the Chigwell bulk supply equate to over half the water supplied within the Essex supply area. Additionally in dry periods the EA may operate its river support schemes, particular when transfers via Denver are limited or not possible. The two schemes with potential to support river flows in Essex are the Great Ouse Groundwater Scheme (GOGS) and the Stour Augmentation Groundwater Scheme (SAGS).</p>		

Indicator	Data Source	Current Data	Comparators	Trend
		<p>The Essex zone remains in deficit over the whole planning horizon to 2034/5. For both dry year and normal year planning scenarios, supply is currently insufficient to meet demand (both including and excluding any allowance for target headroom). With no action this situation is set to worsen over the planning horizon, due to declining baseline water supply and increasing demand. Baseline supply declines over time due to the effects of climate change.</p> <p>With no interventions, existing supply deficits under the dry year planning scenario would increase from 18.8 MI/d at base year, throughout the planning horizon reaching 54.8 MI/d in 2034/35 assuming no headroom requirement, and 84.1 MI/d assuming the current headroom requirement. Under the normal year planning scenario these deficits would rise from 10 MI/d at base year to 49.8 MI/d and 79.1 MI/d respectively.</p> <p>There are two new resource developments planned for this zone within the planning horizon. These are the Abberton Scheme and an increased Chigwell Bulk Supply via the Upper Thames Major Resource Development by Thames Water Utilities. With the successful promotion of the full Abberton Scheme, the Essex WRZ will move into surplus of supply over demand from 2014 until 2027/28 when, on current forecasts, the Chigwell Bulk Supply will be required to maintain this surplus. If these two options are not implemented then under sustained dry weather conditions in the future, drought measures may not be sufficient and supply failures could result.</p>		
<b>Sensitive Areas – Urban Waste Water Directive</b>	5	<p>There are three identified Shellfish Waters in close proximity, located in channels that feed into the estuary: Strood Channel, Tollesbury Channel and Salcott Channel. A large area of the Blackwater estuary itself, adjacent to the site, is marked as designated Shellfish Waters on a 1999 schedule but it is not shown on the 2007 maps. There are Bathing Waters at West Mersea, 3km to the north of the site and across the Blackwater at West Mersea. The quality of these Bathing Waters has not been classified.</p>		
<b>Coastal processes and sediments</b>		<p>The east coast of England, including the site at Bradwell, is influenced by the semi-diurnal tide of the Atlantic Ocean which transfers energy to the North Sea from both the north and the south (via the English Channel). The general direction of transport by both waves and tidal currents is towards the south. The southern part of the east coast has a higher tidal range and greater tidal currents than locations further north.</p> <p>The site is located on the estuary of the River Blackwater. The area is made up of enclosed reclaimed marshes which are protected from inundation by an embankment and associated drainage. The existing power station is raised up 4m above the surrounding land. There is limited sediment seaward of the embankment as it is in constant contact with wave energy. There is no natural resilience to erosion at the site, but a jetty provides some protection from wave erosion, leading to the build up of sand and shell ridges in front of the existing power station.</p>		

## Key to Data Sources

1	Environment Agency (December 2008). Draft River Basin Management Plan, Anglian River Basin District. <a href="http://wfdconsultation.environment-agency.gov.uk/wfdcms/en/anglian/Intro.aspx">http://wfdconsultation.environment-agency.gov.uk/wfdcms/en/anglian/Intro.aspx</a> [accessed 24 April 2009] <sup>17</sup>
2	Environment Agency. Water Framework Directive (WFD) maps. <a href="http://maps.environment-agency.gov.uk/wiyby/wiybyController?topic=wfd_riversandlayerGroups">http://maps.environment-agency.gov.uk/wiyby/wiybyController?topic=wfd_riversandlayerGroups</a> [accessed 24 April 2009]
3	Environment Agency (February 2007). The Combined Essex Catchment Management Strategy. <a href="http://publications.environment-agency.gov.uk/pdf/GEAN0207BLXJ-E-E.PDF">http://publications.environment-agency.gov.uk/pdf/GEAN0207BLXJ-E-E.PDF</a> [accessed 24 April 2009]
4	Northumbrian Water Limited (Jan 2009). Periodic Review Of Price Limits 2009, Draft Water Resources, Management Plan, Essex and Suffolk Water Area. <a href="http://www.eswater.co.uk/ESW_PR09_Draft_Water_Resources_Management_Plan.pdf">http://www.eswater.co.uk/ESW_PR09_Draft_Water_Resources_Management_Plan.pdf</a>
5	DEFRA (October 2007). Water Quality: Sewage Treatment in the UK - Sensitive Areas: Shellfish Waters and Freshwater Fish. <a href="http://webarchive.nationalarchives.gov.uk/20080305115859/http://www.defra.gov.uk/environment/water/quality/uwwtd/sensarea/shellfish/index.htm">http://webarchive.nationalarchives.gov.uk/20080305115859/http://www.defra.gov.uk/environment/water/quality/uwwtd/sensarea/shellfish/index.htm</a>

<sup>17</sup> The data used in this assessment are taken from the Draft River Basin Management Plan, which was the most up to date plan available at the time of writing. Draft plans were presented to the Government for approval in September 2009 and were subsequently published in December 2009.

## Flood Risk

Indicator	Data Source	Current Data	Comparators	Trend
<b>Topic: Flood Risk</b>				
<b>Flood Risk</b>	1	Part of the site is in Flood Zone 1 'low probability', but is largely in Flood Zone 3, 'High Probability', as indicated on the Environment Agency's Floodmap. This means that the site is at risk from tidal flooding from the Blackwater Estuary with an annual probability of flooding of > 0.5% in any one year.		Flood risk is expected to increase in the UK due to the predicted changes in climate leading to more intense rainfall events, wetter winters, rising sea levels and coastal erosion. Scenarios of climate change for the UK were published by the United Kingdom Climate Impacts Programme (UKCIP) in 1998 and 2002.
	2	There are a number of defences in this area, comprising of a mixture of hard defences and earth embankments. The average condition of these defences is 'good condition in need of improvement'. The average standard of protection of these defences is 1 in 5, well below the Environment Agency Standard Operating Procedures (SOP) requirement of 1 in 200 for tidal areas.		'The Climate of the UK and Recent Trends 2008' by the Met Office, provided the following general comments in relation to trends in climate change and how this might affect flood risk:
	3	Given the flood risk and important intertidal habitat in this area there are strategies for the management of the Estuary, 'Essex Estuarine Strategies'. The estuary suffers from poor flushing on the low ebb tides, resulting in deposition of sediment and a decrease in channel depth. Flood embankments make this problem worse, as they constrain the estuary processes. As tidal velocities increase erosion becomes a dominant feature of the estuary channel which puts a strain on the existing flood defences. Future flood management must be sustainable.		<ul style="list-style-type: none"> <li>• Global sea level rise has accelerated between mid 19th century and mid 20th century and is now about 3mm per year</li> <li>• All regions in the UK have experienced an increase over the past 45 years in the contribution to winter rainfall from heavy precipitation events; in summer all regions except North East England and North Scotland show decreases</li> <li>• Sea level rise around the UK rose by about 1mm/per year in the 20th century, corrected for land movement. The rate for the 1990s and 2000s has been higher than this</li> </ul> <p>Most recently in June 2009, UKCIP launched the latest UK Climate Change Predictions 2009</p>

Indicator	Data Source	Current Data	Comparators	Trend
				<p>(UKCP09). These give information about climate change but not directly about flood risk. The key findings on climate change confirm the trends highlighted in the 2008 report and suggest:</p> <ul style="list-style-type: none"> <li>• All areas of the UK get warmer, and the warming is greater in summer than in winter.</li> <li>• There is little change in the amount of precipitation that falls annually, but it is likely that more of it will fall in the winter, with drier summers for much of the UK.</li> <li>• Sea levels rise and the rise is greater in the south of the UK than in the north.</li> </ul>

### Key to Data Sources

1	Environment Agency. Floodmap. <a href="http://maps.environment-agency.gov.uk/wiyby/wiybyController?x=580500.0andy=223500.0andtopic=floodmapandep=mapandscale=4andlocation=Bradwell,%20Essexandlang=eandlayerGroups=defaultandtextonly=off">http://maps.environment-agency.gov.uk/wiyby/wiybyController?x=580500.0andy=223500.0andtopic=floodmapandep=mapandscale=4andlocation=Bradwell,%20Essexandlang=eandlayerGroups=defaultandtextonly=off</a> [accessed 24 April 2009]
2	Braintree District Council, Chelmsford Borough Council, Colchester Borough Council and Maldon District Council (October 2007). Mid Essex Strategic Flood Risk Assessment: Main Report (prepared by Scott Wilson). <a href="http://www.maldon.gov.uk/NR/rdonlyres/FBEA1797-D9AF-47DF-BB7E-D8D833D45EE2/11501/00MainReport.pdf">http://www.maldon.gov.uk/NR/rdonlyres/FBEA1797-D9AF-47DF-BB7E-D8D833D45EE2/11501/00MainReport.pdf</a>
3	Environment Agency. Essex Estuarine Strategies. <a href="http://www.essex-estuaries.co.uk/blackwater_colne/default.htm">http://www.essex-estuaries.co.uk/blackwater_colne/default.htm</a>

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