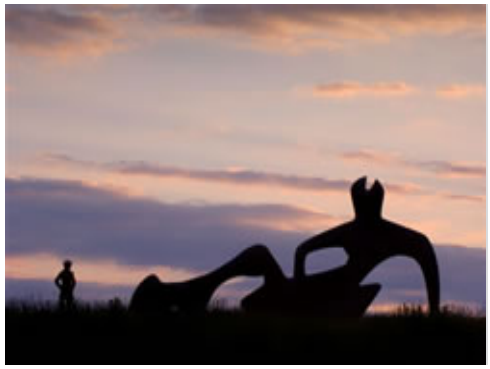
HRA for East Hertfordshire District Council

Screening Report

Final
April 2010

Prepared for

East Hertfordshire District Council

Revision Schedule

HRA Screening Report
April 2010

Rev	Date	Details	Prepared by	Reviewed by	Approved by
01	18/03/10	Draft HRA Screening Report	**Dr Graeme Down** Ecologist	**Dr James Riley** Principal Ecologist	**Dr James Riley** Principal Ecologist
02	12/04/10	Revised HRA Screening Report	**Dr Graeme Down** Ecologist	**Dr James Riley** Principal Ecologist	**Dr James Riley** Principal Ecologist
02	27/04/10	Final Screening Report	**Dr Graeme Down** Ecologist	**Dr James Riley** Principal Ecologist	**Dr James Riley** Principal Ecologist

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1 Introduction

1.1 Legislation

1.1.1 In October 2005, the European Court of Justice ruled that the UK had failed to transpose correctly the provisions of Articles 6(3) and (4) of Council Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora – the Habitats Directive – into national law. Specifically, the UK had failed to ensure that land use plans are subject to Appropriate Assessment where they might have a significant effect on a Natura 2000 site (Special Areas of Conservation, SACs and Special Protection Areas, SPAs). It is Government policy (as described in Planning Policy Statement 9: Biodiversity & Geological Conservation) for sites designated under the Convention on Wetlands of International Importance (Ramsar sites) to be treated as having equivalent status to Natura 2000 sites. As such, Appropriate Assessments should also cover these sites.

1.1.2 The need for Habitat Regulations Assessment is set out within Article 6 of the EC Habitats Directive 1992, and interpreted into British law by the Conservation of Habitats and Species Regulations 2010. The ultimate aim of the Directive is to "*maintain or restore, at favourable conservation status, natural habitats and species of wild fauna and flora of Community interest*" (Habitats Directive, Article 2(2)). This aim relates to habitats and species, not the European sites themselves, although the sites have a significant role in delivering favourable conservation status.

1.1.3 The Habitats Directive applies the precautionary principle to protected areas; plans and projects can only be permitted having ascertained that there will be no adverse effect on the integrity of the site(s) in question. This is in contrast to the SEA Directive which does not prescribe how plan or programme proponents should respond to the findings of an environmental assessment; it simply says that the assessment findings (as documented in the 'environmental report') should be 'taken into account' during preparation of the plan or programme. In the case of the Habitats Directive, plans and projects may still be permitted if there are no alternatives to them and there are Imperative Reasons of Overriding Public Interest (IROPI) as to why they should go ahead. In such cases, compensation would be necessary to ensure the overall integrity of the site network.

1.1.4 All the European sites mentioned in this document are shown in Figure 1. In order to ascertain whether or not site integrity will be affected, an HRA should be undertaken of the plan or project in question.

Box 1. The legislative basis for Habitat Regulations Assessment

Habitats Directive 1992

Article 6 (3) states that:

"Any plan or project not directly connected with or necessary to the management of the site but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subject to appropriate assessment of its implications for the site in view of the site's conservation objectives."

Conservation of Habitats and Species Regulations 2010

The Regulations state that:

"*A competent authority, before deciding to … give any consent for a plan or project which is likely to have a significant effect on a European site … shall make an appropriate assessment of the implications for the site in view of that sites conservation objectives*".

1.1.5 Following the European Court ruling, the former Office of the Deputy Prime Minister (ODPM; now CLG) indicated that the regulations implementing the Habitats Directive in the UK would be amended to ensure that HRA explicitly applies to land use plans. Planning Policy Statement (PPS) 9 states that Ramsar sites (wetlands of international importance) should receive the same protection as designated SACs and SPAs.

1.2 Scope and Objectives

1.2.1 The role of the *Natura 2000* sites (SACs, SPAs, Ramsar sites) is to provide statutory protection for terrestrial and coastal sites that are of European and global importance as a result of habitats or species contained within them. Scott Wilson has been appointed by East Hertfordshire District Council to assist in undertaking a Habitat Regulations Assessment (HRA) of the potential effects of the Core Strategy (CS) Issues and Options, on the *Natura 2000* network.

1.2.2 The CS, alongside the revised Regional Spatial Strategy (RSS) for the East of England, will define the strategic planning framework for the protection of the environment, sustainable transport priorities, and the scale, pattern and location of development within East Hertfordshire.

1.2.3 Chapter 2 explains the process by which the HRA process as a whole will be carried out, focussing on the screening (Likely Significant Effects) stage – the subject of this report. Chapter 3 introduces the European designated sites and the key conditions required to maintain their integrity. Chapter 4 explores the relevant pathways of impact that form the criteria on which Core Strategy issues and options were screened in or out of assessment. Chapter 5 presents tables covering the screening of each issue and option. Chapter 6 then summarises the conclusions of screening and makes recommendations for the next stage of Core Strategy production.

2 Methodology

2.1 Key Principles

2.1.1 This section sets out the basis of the methodology for the HRA. Scott Wilson has adhered to several key principles in developing the methodology – see Table 1.

Table 1 - Key principles underpinning the proposed methodology

Principle	Rationale
Use existing information	We will use existing information to inform the assessment. This will include information gathered as part of the SA of the emerging LDF and information held by Natural England, the Environment Agency and others.
Consult with Natural England, the Environment Agency and other stakeholders	We will ensure continued consultation with both Natural England and the Environment Agency for the duration of the assessment. We will ensure that we utilise information held by them and others and take on board their comments on the assessment process and findings.
Ensure a proportionate assessment	We will ensure that the level of detail addressed in the assessment reflects the level of detail in the LDF (i.e. that the assessment is proportionate). With this in mind, the assessment will focus on information and impacts considered appropriate to the local level.
Keep the process as simple as possible	We will endeavour to keep the process as simple as possible while ensuring an objective and rigorous assessment in compliance with the Habitats Directive and emerging best practice.
Ensure a clear audit trail	We will ensure that the AA process and findings are clearly documented in order to ensure a clearly discernible audit trail.

2.2 A Proportionate Assessment

2.2.1 The emerging LDF considers development within East Hertfordshire, and so it is appropriate that the HRA should consider implications for European designated sites within East Hertfordshire or those outside the boundaries that could be affected by such development.

2.2.2 The HRA of the East Hertfordshire emerging Core Strategy is placed in context with overarching regional spatial strategies, in this case the East of England RSS, which defines spatial development within the region, and allocates specific requirements for local development in terms of factors such as housing and employment quantity. Figure 2 below indicates a schematic of how HRAs are 'tiered.'

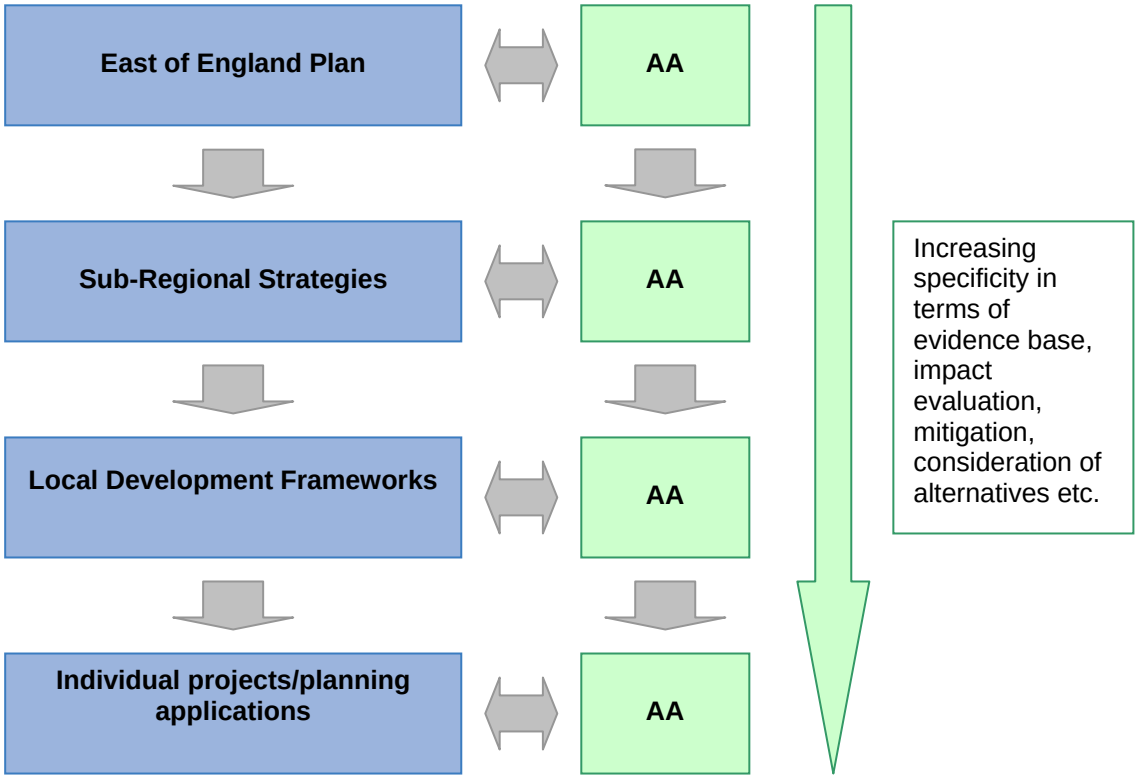

Figure 2 – 'Tiering' in Habitats Regulation Asessment

2.3 Process

2.3.1 The HRA is being carried out in the absence of formal Government guidance. Communities and Local Government released a consultation paper on Appropriate Assessment of Plans in 2006[2] . As yet, no further formal guidance has emerged.

2.3.2 Figure 3 below outlines the stages of HRA according to current draft CLG guidance. The stages are essentially iterative, being revisited as necessary in response to more detailed information, recommendations and any relevant changes to the plan until no significant adverse effects remain.

[2] CLG (2006) Planning for the Protection of European Sites, Consultation Paper

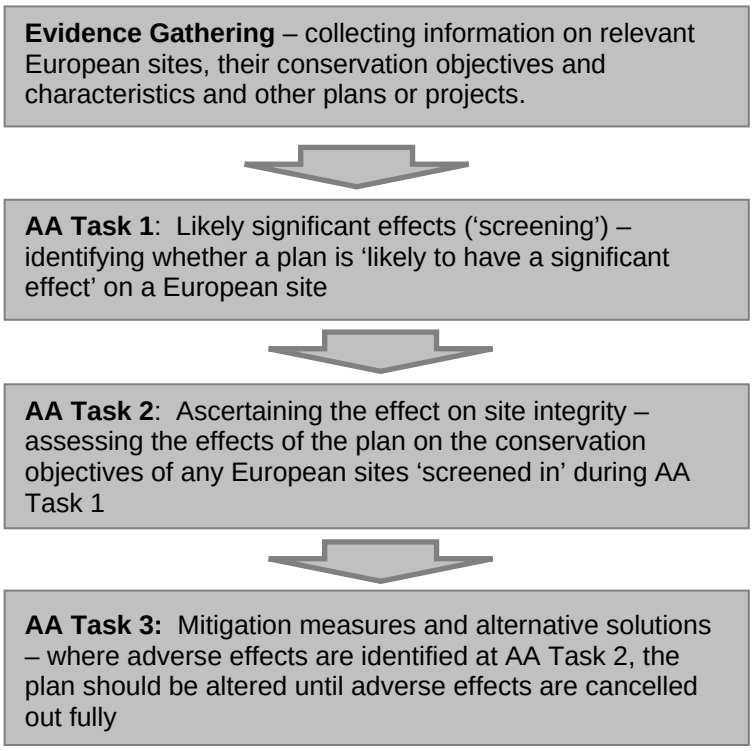

Figure 3 – Four-Stage Approach to Habitat regulations Assessment (Source: CLG, 2006)

2.4 Likely Significant Effects (LSE)

2.4.1 The first stage of any Habitat Regulations Assessment (AA Task 1) is a Likely Significant Effect (LSE) test - essentially a risk assessment to decide whether the full subsequent stage known as Appropriate Assessment is required. The essential question is:

"Is the Plan, either alone or in combination with other relevant projects and plans, likely to result in a significant effect upon European sites?"

2.4.2 The objective is to 'screen out' those plans and projects that can, without any detailed appraisal, be said to be unlikely to result in significant adverse effects upon European sites, usually because there is no mechanism for an adverse interaction with European sites.

2.4.3 That screening assessment is the purpose of this report.

2.5 Physical Scope of the Assessment

2.5.1 There is no pre-defined guidance that dictates the physical scope of an HRA of a land use plan. Therefore, in considering the physical scope of the assessment, we have been guided primarily by the identified impact pathways (using the Source-Pathway-Receptor approach) rather than by arbitrary 'zones'. Current guidance suggests that the following European sites be included in the scope of assessment:

- All sites within the authority's boundary; and
- Other sites shown to be linked to development within the authority's boundary through a known 'pathway' (discussed below)

2.5.2 Briefly defined, pathways are routes by which a change in activity within East Hertfordshire district can lead to an effect upon a European site. In terms of the second category of European site listed above, CLG guidance states that the AA should be '*proportionate to the geographical scope of the* [plan policy]'. The scope of the HRA has been informed by initial scoping work undertaken by Scott Wilson for East Hertfordshire District Council.

2.5.3 There are three European sites that lie partly within East Hertfordshire:

- Lee Valley SPA;
- Lee Valley Ramsar site; and
- Wormley-Hoddesdonpark Woods SAC

The following site also requires consideration because there is potential for CS Issues and Options to create significant effects even though the site lies outside the authority boundary:

- Epping Forest SAC

2.5.4 Eversden & Wimpole Woods SAC (located 16km to the north of East Hertfordshire) was given preliminary consideration since the barbastelle bat population at that site is known to forage well outside the site boundary. However, work undertaken for the South Cambridgeshire Biodiversity Strategy identifies the area of key importance for the barbastelle bats for which the SAC was designated. The southern-most part of this area of importance is situated approximately on a line with Whaddon and Meldreth and thus approximately 10km north of East Hertfordshire. Since the Core Strategy does not propose any development outside the district boundary this SAC is therefore not considered further.

2.5.5 The reasons for designation of these sites, together with current trends in habitat quality and pressures on the sites, are indicated in Chapter 3. All the European sites are illustrated in Figure 1.

2.5.6 In order to fully inform the screening process, a number of recent studies have been consulted to determine LSE that could arise from the East Hertfordshire CS Issues and Options. These include:

- 'Impacts of Growth on Water Quality in the East of England: Interim Report to support the RSS Review' (Entec/Environment Agency/Anglian Water, November 2009);
- 'The Impact of Housing and Water Efficiency Policies on Water Supplies to the East of England – Evidence for the Review of the East of England Plan – RSS14' (Environment Agency, March 2009);
- Rye Meads Water Cycle Study (Hyder Consultancy, October 2009);
- The East of England Regional Spatial Strategy HRA (2006); The East of England Regional Spatial Strategy: Proposed Changes and Further Proposed Changes HRA (2007); Draft Revision to the East of England Regional Spatial Strategy: HRA (March 2010);
- Recreational activity, tourism and European site recreational catchment data – where available have used data that exists for individual European sites but in many cases these do not exist. In such circumstances have used appropriate proxy data from the England Leisure Day Visits Survey in conjunction with judicious use of the precautionary principle;
- East Hertfordshire Employment Land and Policy Review (East Hertfordshire Council/Halcrow, 2008);

- Hertford and Ware Urban Transport Plan (Hertfordshire County Council, 2010);
- The UK Air Pollution Information System (www.apis.ac.uk); and
- Nature on the Map and its links to SSSI citations and the JNCC website (www.natureonthemap.org.uk)

2.6 Principal Other Plans and Projects

2.6.1 It is neither practical nor necessary to assess the 'in combination' effects of the Core Strategy within the context of all other plans and projects within Hertfordshire and the neighbouring local authorities in south Cambridgeshire and west Essex. In practice therefore, in combination assessment is of greatest relevance when the plan would otherwise be screened out because its individual contribution is inconsequential. For the purposes of this assessment, we have determined that, due to the nature of the identified impacts, the key other plans and projects relate to the additional housing and commercial/industrial allocations proposed for other relevant Cambridgeshire, Essex and Hertfordshire authorities over the lifetime of the Core Strategy.

2.6.2 The Regional Spatial Strategy for the East of England provides a good introduction to proposals for Hertfordshire as a whole, and surrounding counties. At this stage, we have identified a range of plans and projects that may act in combination with the Core Strategy.

Table 2. Housing levels to be delivered across Hertfordshire, south Cambridgeshire and west Essex under the East of England RSS, with draft figures under consultation for the Revised RSS published in March 2010

Local Authority		Total housing from 2001 to 2021	Minimum still to build April 2006 to March 2021 (average annual rates in brackets)	Draft total housing from 2011 to 2031 (annual average rates in brackets)
Broxbourne		5,600	3650 (240)	5,100 (260
Dacorum		12,000	10,140 (680)	6,100 (310)
Harlow		16,000	15,190 (1,010)	16,000 (800)
Hertsmere		5,000	3,920 (260)	5,000 (250)
North Hertfordshire		6,200	4,300 (290)	15,800 (790)
St. Albans		7,200	5,370 (360)	7,000 (350)
Stevenage		16,000	14,430 (960)	6,400 (320)
Three Rivers		4,000	2,990 (200)	4,000 (200)
Watford		5,200	3,790 (250)	5,100 (260)
Welwyn Hatfield		3,500	7,270 (480)	5,800 (290)
Epping Forest		3,500	2,290 (150)	3,200 (160)
Uttlesford		8,000	6,390 (430)	8,000 (400)
South Cambridgeshire		23,500	19,980 (1,330)	21,000 (1,050)
East Hertfordshire		**12,000**	**9860 (660)**	**11,000 (550)**

2.6.3 There are other plans and projects that are relevant to the 'in combination' assessment, most notably Thames Water's revised draft Water Resource Management Plan (2009), Essex and Suffolk Water's WRMP (2009), Three Valleys Water's WRMP (2009), Cambridge Water

Company's WRMP (2009) and the Environment Agency's Catchment Abstraction Management Strategy for the Upper Lee (2006). These are all taken into account in this assessment.

2.6.4 The Minerals and Waste Development Frameworks for Hertfordshire, Essex, London and Cambridgeshire are also of some relevance, since these may well contribute to increased vehicle movements on the road network within East Hertfordshire (and thereby contribute to air quality impacts). The Hertfordshire, Essex and Cambridgeshire Local Transport Plans to 2011 will also be important in determining vehicle movements on the highways network in the short term. However, the major impact is likely to be that of housing and commercial development within the surrounding districts as set out in Local Development Frameworks and these have therefore been the main focus of cumulative 'in combination' effects with regard to this HRA. In this context, we have also consulted the Draft Replacement London Plan (2009) and the London Plan (2004).

2.6.5 In relation to recreational pressure, the following documents have been consulted for their plans and projects that may affect European sites in combination with development in East Hertfordshire: East Hertfordshire Parks and Open Spaces Strategy 2007-2012; Lee Valley Regional Park Authority Site management Plan 2006-2011; Epping Forest Management Plan 2004-2010; Hoddesdonpark Wood Management Plan 2009-2014; Wormley Wood and Nut Wood Management Plan 2008-2013.

3 Ecological Information Regarding the European Sites

3.1 Epping Forest SAC

3.1.1 Epping Forest SAC is located approximately 10km south of East Hertfordshire district. 70% of the 1,600 hectare site consists of broadleaved deciduous woodland, and it is one of only a few remaining large-scale examples of ancient wood-pasture in lowland Britain. Epping Forest supports a nationally outstanding assemblage of invertebrates, a major amphibian interest and an exceptional breeding bird community.

Reasons for Designation

3.1.2 Epping Forest qualifies as a SAC for both habitats and species. Firstly, the site contains the Habitats Directive Annex I habitats of:

- Beech forests on acid soils: an example of such habitat toward the north-east of its UK range, containing a notable selection of bryophytes, fungi and dead-wood invertebrates;
- Wet heathland with cross-leaved heath; and
- Dry heath

3.1.3 Secondly, the site contains the Habitats Directive Annex II species Stag beetle *Lucanus cervus*, with widespread and frequent records.

Historic Trends and Current Pressures

3.1.4 Much of the value of Epping Forest stems from a long history of pollarding, and although this ceased at the end of the 19th century, re-pollarding of ancient beech trees was started in the early 1990s, and creation of maiden pollards was begun in 1995. This helped to reverse the decline of the forest's epiphytic bryophyte population. The slow recovery can also be attributed to the reduction of atmospheric pollutants since the passing of the 1956 Clean Air Act.

3.1.5 There is an active policy to leave felled timber on the ground to increase the habitat for stag beetle and other saproxylic insects. This is one of four outstanding localities for the beetle in the UK, and it is reliant on felled timber for development of its larvae, a process that takes several years.

3.1.6 In 1988, the Corporation of London, who own and manage the forest, agreed a management strategy with English Nature (now Natural England) to take forward the management. A comprehensive management plan was completed and consented in 1998. The site is subject to the provisions of the Epping Forest Act of 1878.

3.1.7 Deteriorating air quality and under-grazing are the two key pressures that currently affect the site.

Table 3: Critical nitrogen loads, actual rates of nitrogen deposition, NOx concentrations[3] and sulphur dioxide concentrations for Epping Forest SAC. Red shading indicates exceedance of thresholds.

Site	Grid reference	Most nitrogen sensitive habitat	Minimum[4] critical loads (Kg N/ha/yr)	Actual nitrogen deposition[5] (Kg N/ha/yr)	Actual NOx concentration (μgm^{-3})	Actual SO_2 concentration (μgm^{-3})
Epping Forest SAC	TL446009	Beech woodland	10	37.9	37.1	3.7

3.1.8 It should also be noted that all of the figures provided by APIS are background values modelled at $1km^2$ resolution or lower, and do not reflect the much higher pollution levels/loads which can be present within 200m of the roadside – according to Natural England, roadside NOx levels at the Wake Arms Roundabout are believed to be in excess of $100\mu gm^{-3}$.

3.1.9 It is clear from Table 3 that nitrogen deposition is already a problem within Epping Forest SAC. According to the APIS website, fully 20% of nitrogen currently deposited within Epping Forest derives from road transport exhaust emissions. It should be noted that Natural England commented when recently consulted on the HRA Scoping Report for the Hertfordshire Local Transport Plan that in their opinion 20% is likely to be a considerable underestimate. Other evidence, has suggested that the ratio between background pollution and that which is locally traffic-derived varies considerably across the Forest, but that the contribution from traffic (including that from NH_3) may be as much as 50% of the total. In addition, the background pollution, which mostly blows in from London, will also include a proportion which is derived from traffic within London. This proportion is unknown, but data in the GLA's Air Quality Strategy suggests that it may be as high as 50% of the background pollution. Therefore, the overall contribution from road traffic may potentially be in the order of 60-75% of the total[6].

3.1.10 While recreational pressure is a considerable impact in some areas, these are localised; however, funding of management on the SAC is governed largely by donation and contributions from the Corporation of London and it is likely that the ability to adequately manage recreation on the SAC will come under increasing pressure as the population of northeast London, Epping Forest and east Hertfordshire increases.

3.1.11 The environmental requirements of Epping Forest SAC are mainly:

- The need to continue to manage recreational access so as to minimise damage to the important habitats present.
- The need to counter negative changes to low-nutrient habitats resulting from atmospheric nutrient deposition. The site is adjacent to the busy M25 and is bisected by numerous 'rat runs.'
- The need to provide optimal grazing input to manage heathland and grassland habitats.
- The need to avoid water pollution

[3] Calculated as NO_2
[4] APIS provides a critical load range – on a precautionary basis, this assessment uses the lowest figure in that range
[5] To a resolution of 5 km
[6] Letter from Natural England (Gordon Wyatt) to Scott Wilson Ltd (James Riley) following consultation as part of the scoping exercise to inform the HRA of the Hertfordshire Local Transport Plan (2010)

- The need to avoid introduction of non-native species.

3.2 Lee Valley SPA and Ramsar

3.2.1 The Lee Valley comprises a series of embanked water supply reservoirs, sewage treatment lagoons and former gravel pits along approximately 24 km of the valley. These waterbodies support internationally important numbers of wintering gadwall and shoveler, while the reedbeds support a small but internationally important population of bittern. In addition to the ornithological interest, the site also qualifies as a Ramsar site on account on rare and scarce plants and invertebrates present.

3.2.2 The Lee Valley SPA/Ramsar consists of four Sites of Special Scientific Interest, of which Turnford and Cheshunt Pits SSSI, Rye Meads SSSI and Amwell Quarry SSSI all lie on the Hertfordshire/Essex border. Walthamstow Reservoirs SSSI lies within London Borough of Waltham Forest. The Special Protection Area is managed by the Lee Valley Regional Park Authority and by Thames Water.

Reasons for Designation

3.2.3 The Lee Valley site is designated as an SPA and Ramsar for its Birds Directive Annex I species that over-winter, and these are[7]:

- Bittern *Botaurus stellaris*: 6 individuals = 6% of the wintering population in Great Britain;
- Gadwall *Anas strepera*: 445 individuals = 2.6% of the wintering population in Great Britain; and
- Shoveler *Anas clypeata:* 287 individuals = 1.9% of the wintering population in Great Britain.

3.2.4 In addition, the site qualifies as a Ramsar under criterion 2 (UN, 2005), by supporting the nationally scarce plant species whorled water-milfoil *Myriophyllum verticillatum* and the rare or vulnerable invertebrate *Micronecta minutissima* (a water-boatman).

Historic Trends and Current Pressures

3.2.5 The Lee Valley is vulnerable to eutrophic water quality; but this is being addressed via AMP4 funding under the Urban Waste Water Treatment Directive and a Water Cycle Study.

3.2.6 The other main threat is that of human recreational pressure, although this is regulated through zoning of water bodies within the Lee Valley Regional Park. The majority of the site is already managed in accordance with agreed management plans in which nature conservation is a high or sole priority.

3.2.7 There is also a potential problem from over-extraction of surface water for public supply, particularly during periods of drought.

3.2.8 Presently, the SPA/Ramsar remains in favourable condition.

3.2.9 The environmental requirements of Lee Valley SPA/Ramsar are mainly:

[7] All bird count data in this document is sourced from the SPA Review site accounts as available on the Joint Nature Conservation Committee website www.jncc.gov.uk/page-1412

- The need to control recreational impacts so as to avoid bird disturbance.
- Maintenance of appropriate vegetation management through grazing, mowing and other relevant techniques.
- Continued inputs of freshwater at appropriate flow volumes
- The need to avoid further eutrophication of water bodies within the SPA/Ramsar, and to avoid any other pollution events.
- The need to avoid introduction of non-native species.
- The need to provide suitable habitat outside the boundaries of the designated area that can be utilised by key species as supporting habitats.

3.3 Wormley-Hoddesdonpark Woods SAC

3.3.1 This SAC consists of two SSSIs – Wormley-Hoddesdonpark Woods North and Wormley-Hoddesdonpark Woods South and is situated on the southern border of East Hertfordshire, with part of the SAC in Broxbourne. The semi-natural woodland is of national importance as an example of lowland south-east sessile oak/hornbeam type with the pedunculate oak/hornbeam variant also present. Additionally, small ponds and streams are important habitats for bryophytes.

Reasons for Designation

3.3.2 Wormley-Hoddesdonpark Woods qualifies as a SAC through its habitats, containing the Habitats Directive Annex I habitat:

- Oak-hornbeam forests – this is one of only two outstanding locations for such habitat in the UK.

Historic Trends and Current Pressures

3.3.3 The majority of the woods in the complex are in sympathetic ownership, with no direct threat (Hoddesdon Park Wood for example, is managed by the Woodland Trust). There is some pressure from informal recreation, and there has been limited damage in the past (for example from four-wheel drive vehicles). However, most recreation is concentrated on well-established paths. Most of the complex is covered by a High Forest Zone Plan (Hertfordshire County Council 1996) which sets out a framework for woodland management across the whole area. It aims to restore a varied age structure and natural stand types through sustainable forestry.

3.3.4 There have been some instances of fly-tipping in the recent past, and this does increase the risk on non-native species, such as cherry laurel and privet from garden waste. This has been coupled with instances of car dumping.

3.3.5 The environmental requirements of Wormley-Hoddesdonpark Woods SAC are mainly:

- The need to minimise impacts from vandalism arson, fly-tipping and dumping, and coupled with this, to avoid introduction of non-native species.
- The need to ensure that recreational levels do not lead to excessive trampling of ground flora, or increased nutrient levels through dog fouling.

- The need to ensure continued hydrological balance on the site with high-quality streams running eastward along the shallow valleys (Wormleybury Brook and Spital Brook), and several ponds.
- The need to avoid negative changes to habitats resulting from atmospheric nutrient deposition.

4 Pathways of Impact

4.1 Introduction

4.1.1 This section of the report summarises the various impact pathways that can link development in East Hertfordshire with European sites.

4.1.2 The pathways of impact considered further due to the potential for them to impact upon relevant internationally designated sites are atmospheric pollution, recreational pressure, water resources and reduced water quality. Whether they are actually likely to arise from the Core Strategy is considered later in the report.

4.2 Atmospheric Pollution

4.2.1 Current levels of understanding of air quality effects on semi-natural habitats are not adequate to allow a rigorous assessment of the likelihood of significant effects on the integrity of key European sites.

Table 4. Main sources and effects of air pollutants on habitats and species

Pollutant	Source	Effects on habitats and species
Acid deposition	SO_2, NOx and ammonia all contribute to acid deposition. Although future trends in S emissions and subsequent deposition to terrestrial and aquatic ecosystems will continue to decline, it is likely that increased N emissions may cancel out any gains produced by reduced S levels.	Can affect habitats and species through both wet (acid rain) and dry deposition. Some sites will be more at risk than others depending on soil type, bed rock geology, weathering rate and buffering capacity.
Ammonia (NH_3)	Ammonia is released following decomposition and volatilisation of animal wastes. It is a naturally occurring trace gas, but levels have increased considerably with expansion in numbers of agricultural livestock. Ammonia reacts with acid pollutants such as the products of SO_2 and NO_X emissions to produce fine ammonium (NH_4+) - containing aerosol which may be transferred much longer distances (can therefore be a significant trans-boundary issue.) Catalytic converters on vehicles are also a significant and increasing source of ammonia and are now calculated to amount to about 10% of UK emissions, although this can rise to 70-80% of the total NH_3 in urban centres. With regard to the effects on habitats and species, recent research[8] has shown that, because of its high	Adverse effects are as a result of nitrogen deposition leading to eutrophication. As emissions mostly occur at ground level in the rural environment and NH_3 is rapidly deposited, some of the most acute problems of NH_3 deposition are for small relict nature reserves located in intensive agricultural landscapes.

[8] J.N. Cape, et al. 2004. Concentrations of ammonia and nitrogen dioxide at roadside verges, and their contribution to nitrogen deposition. Environmental Pollution 132 (2004) 469–478

Pollutant	Source	Effects on habitats and species
	deposition velocity, NH_3 can contribute around half of the total N deposition within the first few metres of busy roadsides.	
Nitrogen oxides NO_x	Nitrogen oxides are mostly produced in combustion processes. About one quarter of the UK's emissions are from power stations, one-half from motor vehicles, and the rest from other industrial and domestic combustion processes.	Deposition of nitrogen compounds (nitrates (NO_3), nitrogen dioxide (NO_2) and nitric acid (HNO_3)) can lead to both soil and freshwater acidification. In addition, NO_x can cause eutrophication of soils and water. This alters the species composition of plant communities and can eliminate sensitive species.
Nitrogen (N) deposition	The pollutants that contribute to nitrogen deposition derive mainly from NO_X and NH_3 emissions. These pollutants cause acidification (see also acid deposition) as well as eutrophication.	Species-rich plant communities with relatively high proportions of slow-growing perennial species and bryophytes are most at risk from N eutrophication, due to its promotion of competitive and invasive species which can respond readily to elevated levels of N. N deposition can also increase the risk of damage from abiotic factors, e.g. drought and frost.
Ozone (O_3)	A secondary pollutant generated by photochemical reactions from NO_x and volatile organic compounds (VOCs). These are mainly released by the combustion of fossil fuels. The increase in combustion of fossil fuels in the UK has led to a large increase in background ozone concentration, leading to an increased number of days when levels across the region are above 40ppb. Reducing ozone pollution is believed to require action at international level to reduce levels of the precursors that form ozone.	Concentrations of O_3 above 40 ppb can be toxic to humans and wildlife, and can affect buildings. Increased ozone concentrations may lead to a reduction in growth of agricultural crops, decreased forest production and altered species composition in semi-natural plant communities.
Sulphur Dioxide SO_2	Main sources of SO_2 emissions are electricity generation, industry and domestic fuel combustion. May also arise from shipping and increased atmospheric concentrations in busy ports. Total SO_2 emissions have decreased substantially in the UK since the 1980s.	Wet and dry deposition of SO_2 acidifies soils and freshwater, and alters the species composition of plant and associated animal communities. The significance of impacts depends on levels of deposition and the buffering capacity of soils.

4.2.2 The main pollutants of concern for European sites are oxides of nitrogen (NOx), ammonia (NH_3) and sulphur dioxide (SO_2). NOx can have a directly toxic effect upon vegetation. In addition, greater NOx or ammonia concentrations within the atmosphere will lead to greater rates of nitrogen deposition to soils. An increase in the deposition of nitrogen from the atmosphere to soils is generally regarded to lead to an increase in soil fertility, which can have a serious deleterious effect on the quality of semi-natural, nitrogen-limited terrestrial habitats.

4.2.3 Sulphur dioxide emissions are overwhelmingly influenced by the output of power stations and industrial processes that require the combustion of coal and oil as well (particularly on a local scale) shipping. As such, it is unlikely that material increases in SO_2 emissions will be associated with Local Development Frameworks. NOx emissions, however, are dominated by the output of vehicle exhausts (more than half of all emissions). Within a 'typical' housing development, by far the largest contribution to NOx (92%) will be made by the associated road

traffic. Other sources, although relevant, are of minor importance (8%) in comparison[9]. Emissions of NOx could therefore be reasonably expected to increase as a result of greater vehicle use as an indirect effect of the LDF.

4.2.4 The National Expert Group on Transboundary Air Pollution (2001)[10] concluded that:

- In 1997, critical loads for acidification were exceeded in 71% of UK ecosystems. This was expected to decline to 47% by 2010.
- Reductions in SO2 concentrations over the last three decades have virtually eliminated the direct impact of sulphur on vegetation.
- By 2010, deposited nitrogen was expected to be the major contributor to acidification, replacing the reductions in SO2.
- Current nitrogen deposition is probably already changing species composition in many nutrient-poor habitats, and these changes may not readily be reversed.
- The effects of nitrogen deposition are likely to remain significant beyond 2010.
- Current ozone concentrations threaten crops and forest production nationally. The effects of ozone deposition are likely to remain significant beyond 2010.
- Reduced inputs of acidity and nitrogen from the atmosphere may provide the conditions in which chemical and biological recovery from previous air pollution impacts can begin, but the timescales of these processes are very long relative to the timescales of reductions in emissions.

4.2.5 Grice et al[11] [12] do however suggest that air quality in the UK will improve significantly over the next 15 years due primarily to reduced emissions from road transport and power stations.

4.2.6 For the following reasons, only NOx and ammonia are considered further as specific pollutants in this assessment:

- Despite the general association with nitrogen dioxide, ozone levels are not as high in urban areas (where high levels of nitrogen dioxide are emitted) as in rural areas. This is largely due to the long-range nature of this pollutant, which is sufficiently great that the source of emission and location of deposition often cross national boundaries. As such, low-level ozone can only be practically addressed at the national and international level.
- Sulphur dioxide concentrations are overwhelmingly influenced (82% of emissions[13]) by the output of power stations and industrial processes that require the combustion of coal and oil. None of these activities will be associated with developments under the Core Strategy.

[9] Proportions calculated based upon data presented in Dore CJ et al. 2005. UK Emissions of Air Pollutants 1970 – 2003. UK National Atmospheric Emissions Inventory. http://www.airquality.co.uk/archive/index.php
[10] National Expert Group on Transboundary Air Pollution (2001) Transboundary Air Pollution: Acidification, Eutrophication and Ground-Level Ozone in the UK
[11] Grice, S., T. Bush, J. Stedman, K. Vincent, A. Kent, J. Targa and M. Hobson (2006) Baseline Projections of Air Quality in the UK for the 2006 Review of the Air Quality Strategy, report to the Department for Environment, Food and Rural Affairs, Welsh Assembly Government, the Scottish Executive and the Department of the Environment for Northern Ireland.
[12] Grice, S., J. Stedman, T. Murrells and M. Hobson (2007) Updated Projections of Air Quality in the UK for Base Case and Additional Measures for the Air Quality Strategy for England, Scotland, Wales and Northern Ireland 2007, report to the Department for Environment, Food and Rural Affairs, Welsh Assembly Government, the Scottish Executive and the Department of the Environment for Northern Ireland.
[13] Dore CJ *et al*. (2005). UK Emissions of Air Pollutants 1970 – 2003. UK National Atmospheric Emissions Inventory. http://www.airquality.co.uk/archive/index.php

4.2.7 Therefore the main pollutants of concern for European sites from the Core Strategy are oxides of nitrogen (NOx) and ammonia (NH_3).

- NOx emissions are dominated by the output of vehicle exhausts (more than half of all emissions). Other sources, although relevant, are of minor importance (8%) in comparison[14]. NOx can have a directly toxic effect upon vegetation. In addition, greater NOx or ammonia concentrations within the atmosphere will lead to greater rates of nitrogen deposition to soils. An increase in the deposition of nitrogen from the atmosphere to soils is generally regarded to lead to an increase in soil fertility, which can have a serious deleterious effect on the quality of semi-natural, nitrogen-limited terrestrial habitats.
- Since ammonia is of relevance to European sites primarily through its effect upon nitrogen deposition, it is not considered independently of nitrogen deposition in this assessment. Conversely, since NOx can be directly toxic to plants, it is also considered separately from its influence on nitrogen deposition in this assessment.

Local Air Pollution

4.2.8 According to the Department of Transport's Transport Analysis Guidance, "Beyond 200m, the contribution of vehicle emissions from the roadside to local pollution levels is not significant"[15].

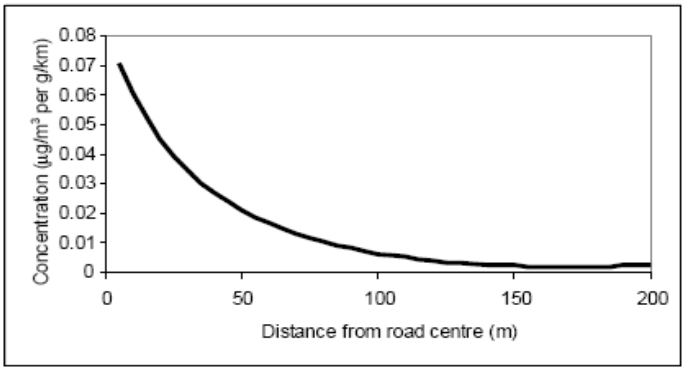

Figure 4 - Traffic contribution to concentrations of pollutants at different distances from a road (Source: DfT)

4.2.9 This is therefore the distance that has been used throughout this HRA in order to determine whether European sites are likely to be significantly affected by development under the Core Strategy.

Diffuse Air Pollution

4.2.10 In addition to the contribution to local air quality issues, development can also contribute cumulatively to an overall change in background air quality across an entire region (although individual developments and plans are – with the exception of large point sources such as power stations – likely to make very small individual contributions). In July 2006, when this issue was raised by Runnymede District Council in the South East, Natural England advised that their Local Development Framework *'can only be concerned with locally emitted and short*

[14] Proportions calculated based upon data presented in Dore CJ *et al*. (2005). UK Emissions of Air Pollutants 1970 – 2003. UK National Atmospheric Emissions Inventory. http://www.airquality.co.uk/archive/index.php
[15] www.webtag.org.uk/archive/feb04/pdf/feb04-333.pdf

range locally acting pollutants' [16] as this is the only scale which falls within a local authority remit. It is understood that this guidance was not intended to set a precedent, but it inevitably does so since (as far as we are aware) it is the only formal guidance that has been issued to a Local Authority from any Natural England office on this issue.

4.2.11 In the light of this and our own knowledge and experience, it is considered reasonable to conclude that it must be the responsibility of Regional Spatial Strategies and other higher-tier plans to set a policy framework for addressing the cumulative diffuse pan-authority air quality impacts, partly because such impacts stem from the overall quantum of development within a region (over which individual districts have little control), and since this issue can only practically be addressed at the highest pan-authority level. Diffuse air quality issues will not therefore be considered further within this HRA. The exception would be where any of the schemes/measures that are devised as part of the Core Strategy are likely to increase traffic (either number of vehicles, or congestion or proportion of HGVs) within 200m of roads outside the county boundary.

4.3 Urbanisation

4.3.1 Urbanisation effects result from increased populations within close proximity to sensitive sites. The list of urbanisation impacts can be extensive, but core impacts can be singled out:

- Increased fly-tipping - Rubbish tipping is unsightly but the principle adverse ecological effect of tipping is the introduction of invasive alien species with garden waste. Garden waste results in the introduction of invasive aliens precisely because it is the 'troublesome and over-exuberant' garden plants that are typically thrown out[17]. Alien species may also be introduced deliberately or may be bird-sown from local gardens.
- Cat predation - A survey performed in 1997 indicated that nine million British cats brought home 92 million prey items over a five-month period[18]. A large proportion of domestic cats are found in urban situations, and increasing urbanisation is likely to lead to increased cat predation.

4.3.2 The most detailed consideration of the link between relative proximity of development to European sites and damage to interest features has been carried out with regard to the Thames Basin Heaths SPA.

4.3.3 After extensive research, Natural England and its partners produced a Thames Basin Heaths 'Delivery Plan'[19] which made recommendations for accommodating development while also protecting the interest features of the SPA. This included the recommendation of implementing a series of zones within which varying constraints would be placed upon development. While the zones relating to recreational pressure expanded to 5km (as this was determined from visitor surveys to be the principal recreational catchment for this European site), that concerning other aspects of urbanisation (particularly predation of the chicks of ground-nesting birds by domestic cats) was determined at 400m from the SPA boundary. The delivery plan concluded that the adverse effects of any development located within 400m of the SPA

[16] English Nature (16 May 2006) letter to Runnymede Borough Council, 'Conservation (Natural Habitats &c.) Regulations 1994, Runnymede Borough Council Local Development Framework'.
[17] Gilbert, O. & Bevan, D. 1997. The effect of urbanisation on ancient woodlands. British Wildlife 8: 213-218.
[18] Woods, M. et al. 2003. Predation of wildlife by domestic cats *Felis catus* in Great Britain. Mammal Review 33, 2 174-188.
[19] http://www.southeast-ra.gov.uk/documents/sustainability/thames_basin_heaths/delivery_framework_march2009.pdf

boundary could not be mitigated since this was the range within cats could be expected to roam as a matter of routine and there was no realistic way of restricting their movements, and as such, no new housing should be located within this zone.

4.3.4 It should be noted that this is not directly applicable to East Hertfordshire since the main driver behind the definition of these zones was that the Thames Basin Heaths authorities are to deliver a very large quantum of housing (more than 90,000 new dwellings) over their Core Strategy periods and this may therefore lead to a very large increase in the local cat population.

4.3.5 At its closest points, East Hertfordshire is situated approximately 10km from Epping Forest SAC. However, Wormley-Hoddesdonpark Woods SAC is known to be vulnerable to urbanisation impacts and Lee Valley SPA/Ramsar lies adjacent to urban development at Hoddesdon and Hertford. As such it is considered that impacts of urbanisation require further consideration in this report.

4.4 Recreational Pressure

Trampling and Nutrient Enrichment

4.4.1 Most types of aquatic or terrestrial European site can be affected by excessive levels of recreational activity. For example, there have been several papers published that empirically demonstrate that damage to vegetation in woodlands and other habitats can be caused by high volumes of recreational users. While these are not directly referencing European sites considered within this HRA they do clearly demonstrate that trampling can be an issue for sensitive habitats:

- Wilson & Seney (1994)[20] examined the degree of track erosion caused by hikers, motorcycles, horses and cyclists from 108 plots along tracks in the Gallatin National Forest, Montana. Although the results proved difficult to interpret, it was concluded that horses and hikers disturbed more sediment on wet tracks, and therefore caused more erosion, than motorcycles and bicycles.
- Cole et al (1995a, b)[21] conducted experimental off-track trampling in 18 closed forest, dwarf scrub and meadow & grassland communities (each tramped between 0 – 500 times) over five mountain regions in the US. Vegetation cover was assessed two weeks and one year after trampling, and an inverse relationship with trampling intensity was discovered, although this relationship was weaker after one year than two weeks indicating some recovery of the vegetation. Differences in plant morphological characteristics were found to explain more variation in response between different vegetation types than soil and topographic factors. Low-growing, mat-forming grasses regained their cover best after two weeks and were considered most resistant to trampling, while tall forbs (non-woody vascular plants other than grasses, sedges, rushes and ferns) were considered least resistant. Cover of hemicryptophytes and geophytes (plants with buds below the soil surface) was heavily reduced after two weeks, but had recovered well after one year and as such these were considered most resilient to

[20] Wilson, J.P. & J.P. Seney. 1994. Erosional impact of hikers, horses, motorcycles and off road bicycles on mountain trails in Montana. Mountain Research and Development 14:77-88
[21] Cole, D.N. 1995a. Experimental trampling of vegetation. I. Relationship between trampling intensity and vegetation response. Journal of Applied Ecology 32: 203-214
Cole, D.N. 1995b. Experimental trampling of vegetation. II. Predictors of resistance and resilience. Journal of Applied Ecology 32: 215-224

trampling. Chamaephytes (plants with buds above the soil surface) were least resilient to trampling. It was concluded that these would be the least tolerant of a regular cycle of disturbance.

- Cole (1995c)[22] conducted a follow-up study (in 4 vegetation types) in which shoe type (trainers or walking boots) and trampler weight were varied. Although immediate damage was greater with walking boots, there was no significant difference after one year. Heavier tramplers caused a greater reduction in vegetation height than lighter tramplers, but there was no difference in effect on cover.
- Cole & Spildie (1998)[23] experimentally compared the effects of off-track trampling by hiker and horse (at two intensities – 25 and 150 passes) in two woodland vegetation types (one with an erect forb understorey and one with a low shrub understorey). Horse traffic was found to cause the largest reduction in vegetation cover. The forb-dominated vegetation suffered greatest disturbance, but recovered rapidly. Higher trampling intensities caused more disturbance.

4.4.2 Epping Forest SAC receives millions of visits per year. Over 50% visitors come from within 1 mile (1.6km); 96% of visitors come from within 10 miles (16km). In addition to part of East Hertfordshire district, Harlow, Broxbourne, Epping Forest, Welwyn Hatfield, Brentwood, Thurrock and several London local authorities fall within this distance, so over 60,000 new dwellings proposed within the revised East of England RSS from 2011 to 2031, plus figures for London could contribute cumulatively to a material increase in visitor numbers.

4.4.3 Recreational pressure is not currently considered to be an issue for concern at Wormley-Hoddesdonpark Woods SAC. Hoddesdonpark Woods and Wormley Wood are managed by the Woodland Trust who have management plans in place, including provision and maintenance of access to and within the woodlands.

Disturbance of Wildlife

4.4.4 Concern regarding the effects of disturbance on birds in particular, stems from the fact that they are expending energy unnecessarily and the time they spend responding to disturbance is time that is not spent feeding[24]. Disturbance therefore risks increasing energetic output while reducing energetic input, which can adversely affect the 'condition' and ultimately survival of the birds In addition, displacement of birds from one feeding site to others can increase the pressure on the resources available within the remaining sites, as they have to sustain a greater number of birds.[25] Moreover, the more time a breeding bird spend disturbed from its nest, the more its eggs are likely to cool and the more vulnerable they are to predators. Finally, regular disturbance can also render some areas of otherwise suitable habitat unavailable for nesting such that breeding territories fail to be established or are limited to sub-optimal habitat.

4.4.5 The potential for disturbance may be less in winter than in summer, in that there are often a smaller number of recreational users and birds are not breeding. However, winter activity can still cause important disturbance, especially as birds are particularly vulnerable at this time of

[22] Cole, D.N. 1995c. Recreational trampling experiments: effects of trampler weight and shoe type. Research Note INT-RN-425. U.S. Forest Service, Intermountain Research Station, Utah.
[23] Cole, D.N., Spildie, D.R. 1998. Hiker, horse and llama trampling effects on native vegetation in Montana, USA. Journal of Environmental Management 53: 61-71
[24] Riddington, R. *et al*. 1996. The impact of disturbance on the behaviour and energy budgets of Brent geese. *Bird Study* 43:269-279
[25] Gill, J.A., Sutherland, W.J. & Norris, K. 1998. The consequences of human disturbance for estuarine birds. *RSPB Conservation Review* 12: 67-72

year due to food shortages. Several empirical studies have, through correlative analysis, demonstrated that out-of-season recreational activity can result in quantifiable disturbance:

- Tuite et al[26] found that during periods of high recreational activity, bird numbers at Llangorse Lake decreased by 30% over a time period correlating with an increase in recreational activity. During periods of low recreational activity, however, no such correlation was observed. In addition, all species were found to spend less time in their 'preferred zones' (the areas of the lake used most in the absence of recreational activity) as recreational intensity increased.
- Underhill et al[27] counted waterfowl and all disturbance events on 54 water bodies within the South West London Water bodies Special Protection Area and clearly correlated disturbance with a decrease in bird numbers at weekends in smaller sites and with the movement of birds within larger sites from disturbed to less disturbed areas.
- Evans & Warrington[28] found that on Sundays total water bird numbers (including shoveler and gadwall) were 19% higher on Stocker's Lake LNR in Hertfordshire, and attributed this to displacement of birds resulting from greater recreational activity on surrounding water bodies at weekends relative to week days. However, recreational activity was not quantified in detail, nor were individual recreational activities evaluated separately.
- Tuite et al[29] used a large (379 site), long-term (10-year) dataset (September – March species counts) to correlate seasonal changes in wildfowl abundance with the presence of various recreational activities. They found that shoveler was one of the most sensitive species to disturbance. The greatest impact on winter wildfowl numbers was associated with sailing/windsurfing and rowing.

4.4.6 Human activity can affect birds either directly (e.g. through causing them to flee) or indirectly (e.g. through damaging their habitat). The most obvious direct effect is that of immediate mortality such as death by shooting, but human activity can also lead to behavioural changes (e.g. alterations in feeding behaviour, avoidance of certain areas *etc.*) and physiological changes (e.g. an increase in heart rate) that, although less noticeable, may ultimately result in major population-level effects by altering the balance between immigration/birth and emigration/death.[30]

4.4.7 The degree of impact that varying levels of noise will have on different species of bird is poorly understood except that a number of studies have found that an increase in traffic levels on roads does lead to a reduction in the bird abundance within adjacent hedgerows - Reijnen et al (1995) examined the distribution of 43 passerine species (i.e. 'songbirds'), of which 60% had a

[26] Tuite, C. H., Owen, M. & Paynter, D. 1983. Interaction between wildfowl and recreation at Llangorse Lake and Talybont Reservoir, South Wales. *Wildfowl* 34: 48-63
[27] Underhill, M.C. *et al.* 1993. *Use of Waterbodies in South West London by Waterfowl. An Investigation of the Factors Affecting Distribution, Abundance and Community Structure.* Report to Thames Water Utilities Ltd. and English Nature. Wetlands Advisory Service, Slimbridge
[28] Evans, D.M. & Warrington, S. 1997. The effects of recreational disturbance on wintering waterbirds on a mature gravel pitlake near London. International Journal of Environmental Studies 53: 167-182
[29] Tuite, C.H., Hanson, P.R. & Owen, M. 1984. Some ecological factors affecting winter wildfowl distribution on inland waters in England and Wales and the influence of water-based recreation. *Journal of Applied Ecology* 21: 41-62
[30] Riley, J. 2003. Review of Recreational Disturbance Research on Selected Wildlife in Scotland. Scottish Natural Heritage.

lower density closer to the roadside than further away. By controlling vehicle usage they also found that the density generally was lower along busier roads than quieter roads[31].

4.4.8 Activity will often result in a flight response (flying, diving, swimming or running) from the animal that is being disturbed. This carries an energetic cost that requires a greater food intake. Research that has been conducted concerning the energetic cost to wildlife of disturbance indicates a significant negative effect.

4.4.9 Disturbing activities are on a continuum. The most disturbing activities are likely to be those that involve irregular, infrequent, unpredictable loud noise events, movement or vibration of long duration. Birds are least likely to be disturbed by activities that involve regular, frequent, predictable, quiet patterns of sound or movement or minimal vibration. The further any activity is from the birds, the less likely it is to result in disturbance.

4.4.10 The factors that influence a species response to a disturbance are numerous, but the three key factors are species sensitivity, proximity of disturbance sources and timing/duration of the potentially disturbing activity.

Sensitivity of Species – Waterfowl

4.4.11 The distance at which a species takes flight when approached by a disturbing stimulus is known as the 'tolerance distance' (also called the 'escape flight distance') and differs between species to the same stimulus and within a species to different stimuli. These are given in Table 5, which compiles 'tolerance distances' from a literature review. It is reasonable to assume from this that disturbance is unlikely to be experienced more than a few hundred metres from the birds in question. In addition, the regular mechanized noise that is associated with waste sites is likely to be less disturbing that the presence of visible human activity in areas in which the birds are not used to observing such activity.

Table 5 - Tolerance distances of 21 water bird species to various forms of recreational disturbance, as described in the literature. All distances are in metres. Single figures are mean distances; when means are not published, ranges are given. Tydeman (1978)[32], Keller (1989)[33], Van der Meer (1985)[34], Wolff et al (1982)[35], Blankestijn et al (1986).[36]

	Type of disturbance		
Species	Rowing boats/kayak	Sailing boats	Walking
Little grebe		60 – 100 [1]	
Great crested grebe	50 – 100 [2]	20 – 400 [1]	
Mute swan		3 – 30 [1]	
Teal		0 – 400 [1]	

[31] Reijnen, R. et al. 1995. The effects of car traffic on breeding bird populations in woodland. III. Reduction of density in relation to the proximity of main roads. Journal of Applied Ecology 32: 187-202
[32] Tydeman, C.F. 1978. *Gravel Pits as conservation areas for breeding bird communities*. PhD thesis. Bedford College
[33] Keller, V. 1989. Variations in the response of Great Crested Grebes *Podiceps cristatus* to human disturbance - a sign of adaptation? *Biological Conservation* 49:31-45
[34] Van der Meer, J. 1985. De verstoring van vogels op de slikken van de Oosterschelde. Report 85.09 Deltadienst Milieu en Inrichting, Middelburg. 37 pp.
[35] Wolf, W.J., Reijenders, P.J.H. & Smit, C.J. 1982. The effects of recreation on the Wadden Sea ecosystem: many questions but few answers. In: G. Luck & H. Michaelis (Eds.), Schriftenreihe M.E.L.F., Reihe A: Agnew. Wissensch 275: 85-107
[36] Blankestijn, S. et al. 1986. Seizoensverbreding in de recreatie en verstoring van Wulp en Scholkester op hoogwatervluchplaatsen op Terschelling. Report Projectgroep Wadden, L.H. Wageningen. 261pp.

Species	Type of disturbance		
	Rowing boats/kayak	Sailing boats	Walking
Mallard		10 – 100 [1]	
Shoveler		200 – 400 [1]	
Pochard		60 – 400 [1]	
Tufted duck		60 – 400 [1]	
Goldeneye		100 – 400 [1]	
Smew		0 – 400 [1]	
Moorhen		100 – 400 [1]	
Coot		5 – 50 [1]	
Curlew			211 [3]; 339 [4]; 213 [5]
Shelduck			148 [3]; 250 [4]
Grey plover			124 [3]
Ringed plover			121 [3]
Bar-tailed godwit			107 [3]; 219 [4]
Brent goose			105 [3]
Oystercatcher			85 [3]; 136 [4]; 82 [5]
Dunlin			71 [3]; 163 [2]

4.4.12 Given that the Lee Valley SPA and Ramsar site are designated in part for over-wintering shoveler populations, then it will be important to determine that recreational pressure arising from increased population levels in East Hertfordshire does not contribute to LSE within a few hundred metres of these species – i.e. unsustainable water sport levels, or terrestrial activities creating visual intrusion within such distance.

4.4.13 Figures gathered for the East of England Revised RSS HRA show that from 2008-09 the Lee Valley Regional Park received 4.4 million visitors, of whom 77% arrived from a travelling distance of less than 30 minutes, and 68% travelled by car. A car journey of 30 minutes is likely to include potential visitors from the majority of East Hertfordshire, meaning that development within most of the district would have potential to attract visitors.

4.5 Water Quality

4.5.1 The quality of the water that feeds European sites is an important determinant of the nature of their habitats and the species they support. Poor water quality can have a range of environmental impacts:

4.5.2 At high levels, toxic chemicals and metals can result in immediate death of aquatic life, and can have detrimental effects even at lower levels, including increased vulnerability to disease and changes in wildlife behaviour.

- Eutrophication, the enrichment of plant nutrients in water, increases plant growth and consequently results in oxygen depletion. Algal blooms, which commonly result from eutrophication, increase turbidity and decrease light penetration. The decomposition of organic wastes that often accompanies eutrophication deoxygenates water further, augmenting the oxygen depleting effects of eutrophication. In the marine environment,

nitrogen is the limiting plant nutrient and so eutrophication is associated with discharges containing available nitrogen.

- Some pesticides, industrial chemicals, and components of sewage effluent are suspected to interfere with the functioning of the endocrine system, possibly having negative effects on the reproduction and development of aquatic life.

4.5.3 Sewage and some industrial effluent discharges contribute to increased nutrients in the European sites and in particular to phosphate levels in watercourses. Rye Meads SSSI component of the Lee Valley SPA/Ramsar site is situated within East Hertfordshire and is particularly sensitive to eutrophication (nutrient enrichment) resulting from the discharge of treated sewage effluent from Rye Meads STW. The detailed Rye Meads Water Cycle Study has indicated that the growth in the Stevenage and East Hertfordshire areas is constrained by the environmental capacity of the River Lee and associated Lee Valley SPA and by wastewater infrastructure issues in terms of timescale for delivery. The emerging policy for the revision to the existing East of England RSS notes that work on options for expanding sewage treatment capacity for the Rye Meads catchment area, will be a priority and that restrictions in capacity at Rye Meads will need to be overcome without harm to the adjacent Lee Valley Special Protection Area or its qualifying features.

4.5.4 Diffuse pollution (for example from agricultural practices or urban runoff) is a key contributor to water pollution in rivers. Through its Review of Consents process, the Environment Agency has identified diffuse pollution to be a major factor in causing unfavourable conservation status of European sites. Although agriculture remains a primary source of eutrophication and pollution, urban runoff is a significant source of aquatic contamination. The rate of conversion of land to residential use has been shown to be related to poor water quality[37].

4.6 Water Resources

4.6.1 The East of England is generally an area of high water stress (see Figure 5).

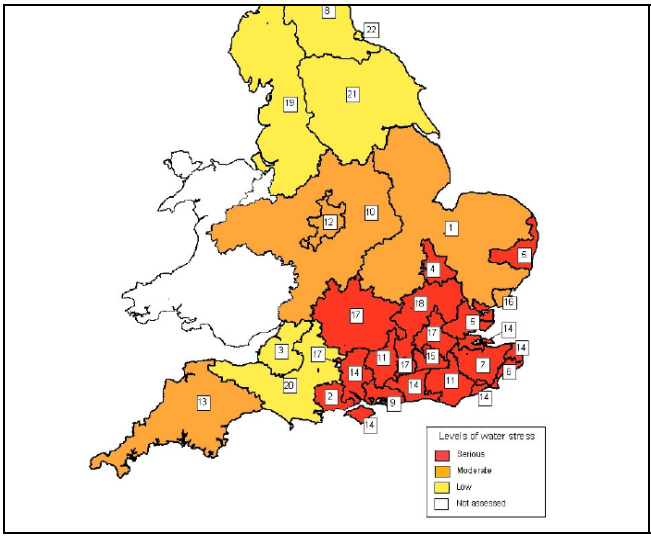

Figure 5. Areas of water stress within England. It can be seen from this map that East Hertfordshire is classified as being an area of high water stress (coded red).[38]

[37] Atasoy, M., R. Palmquist, and D. Phaneuf, Estimating the effects of urban residential development on water quality using micro data, Journal of Environmental Management 79 (2006): 399-408
[38] Figure adapted from Environment Agency. 2007. Identifying Areas of Water Stress. http://publications.environment-agency.gov.uk/pdf/GEHO0107BLUT-e-e.pdf

4.6.2 The East of England RSS revision notes that the East of England is particularly vulnerable to climate change now and in the future. It is already the driest region in the country and the predicted changes will affect the amount and distribution of rainfall, and the demand for water from all sectors. The average natural summer flows of rivers could drastically reduce; the period where groundwater resources are replenished could be shorter; and resources could become much more vulnerable. By 2050, climate change could reduce water resources by 10 - 15% on an annual average basis, and reduce summer river flows by 50 -80%. Drought and floods may become more frequent in the future. The reliability of existing reservoirs, groundwater extractions and river intakes will change. Some infrastructure, critical for providing water supplies, may be more vulnerable to flooding. The delivery of housing and economic development throughout the region could therefore result in adverse effects on many internationally designated sites in the region including those listed in preceding sections.

4.6.3 However, in a recent draft report from the Environment Agency, 'Impact of East of England Housing and Economic Growth Scenarios on Regional Water Supplies' the roll forward of the existing housing policy showed that this scenario is broadly consistent with the latest water resources management plans prepared by water companies supplying the region. Taking into consideration that much of the region's local water resources are fully developed and in some cases over-committed, and considering the impact of varying different levels of water resource aspirations in helping to meet these increased housing growth rates, nonetheless the conclusion of the report is that the housing to be delivered under the revision to the RSS could meet the water needs of the region without an adverse effect on internationally designated sites provided a range of water efficiency measures are introduced. It is important to note however, that the study did not take into account findings from the stage 3 Review of Consents process, and as such the findings must be treated with a certain degree of caution.

4.6.4 The most recent full CAMS assessment for the Upper Lee found that the Management Unit for Rivers Lee, Mimram, Beane, Ash, Rib and Upper Stort was over-abstracted.

4.6.5 Rye Meads SSSI component of the Lee Valley SPA/Ramsar site is situated within East Hertfordshire and is particularly sensitive to high levels of freshwater abstraction (resulting in a reduction in water levels within the SPA).

5 Screening Tables

5.1.1 The following tables (Tables 6-9) present the screening assessments for each Issue and Option that have been put forward for consideration. Green shading in the final column indicates a policy option that has been screened out of further consideration due to the absence of any mechanism for an adverse effect on European sites. Amber shading indicates that further investigation at Appropriate Assessment stage is required.

5.1.2 East Hertfordshire is required to deliver a minimum of 12,000 additional dwellings for the period 2001-2021 (which equates to 600 dwellings per annum over that 20 year period). The East Hertfordshire Core Strategy will run to 2031 to coincide with the review of the East of England Plan. Although not yet adopted the latest indications from the East of England Regional Authority are that East Hertfordshire will be required to deliver a minimum of 550 houses per annum from 2011-2031, which would total 11,000 over that period. Currently, the East Hertfordshire CS target is 660 houses per annum from 2021-2031, in line with the existing East of England RSS recommendations.

5.1.3 East Hertfordshire has currently developed, or committed to 5,692 dwellings of the allocation required from 2001 through to 2031.

5.1.4 In addition to general housing need, East Hertfordshire also needs to make specific provision for Gypsies & Travellers and Travelling Showpeople. Policy H3 of the East of England Plan requires the provision of 25 Gypsy & Traveller pitches for the period from 2006 to 2011, with a further 21 pitches for the period 2011 to 2021. In respect of Travelling Showpeople, nine additional plots will need to be provided to meet the requirements of East of England Plan Policy H4.

5.1.5 Employment numbers for East Hertfordshire for the period 2001 to 2031 have been forecast based on a ratio of jobs to dwellings, as set out in the East of England Plan. Starting with the housing 'to-find' figure of 18,600 for the same period, this equates to 14,266 jobs throughout the district, equivalent to 680 per year. In 2001, East Hertfordshire had 67,100 jobs, whilst in 2009 there were 67,900 jobs, an increase of only 800 jobs over the eight year period, leaving, under current projected planning, a further 13, 466 new jobs to be created. The Council has identified a requirement of 13.1 ha of new employment land by 2031 (for B1, B2 and B8 uses).

5.1.6 In terms of the availability of land, the Council aims to continue to encourage the following approach: firstly, re-use of brownfield land within existing built-up areas, followed by the use of greenfield land within existing built-up areas; and finally, the use of brownfield and greenfield land outside existing settlements. However, based on a 'Call for Sites' exercise, whichever development strategy option (see below) is deemed most appropriate, for East Hertfordshire to accommodate the East of England Plan housing requirement, there will need to be <u>significant</u> greenfield development.

5.1.7 It is anticipated that work on both a strategic and the local review of the Green Belt in East Hertfordshire will commence later in 2010 following this Issues and Options consultation. The Council believes that release of Green Belt sites will be needed in order to meet housing land requirements. A review of green belt land could have HRA implications due to pathways of

impact that may result in urbanisation, reduced air quality or increased recreational pressure on European designated sites.

5.1.8 All of the options considered below must be considered within the context of wider development, including the possibility of at least 10,000 new dwellings to the north of Harlow (from the emerging Harlow CS), but within East Hertfordshire district. Under the emerging Revised East of England RSS (2011-2031), it is likely that over 67,000 new dwellings will need to be delivered by local authorities directly adjoining East Hertfordshire, whilst a further 21,000 would be delivered in South Cambridgeshire. Further development will occur in north London authorities over this period. Almost 60,000 new jobs (21,200 in South Cambs) are also likely to be required in these areas (not including London).

5.1.9 Hertfordshire Waste Core Strategy and Site Allocations documents are at the Issues and Preferred Options stage, with consultation having taken place in 2009. The HRA process relating to these has identified that some site allocations may give rise to LSE on Lee Valley SPA/Ramsar through disturbance or reduced water resources/quality, or may affect Epping Forest SAC through reduced air quality[39]. The LDF process for minerals and waste documents will need to be considered in combination with the East Hertfordshire CS as both sets of documents evolve.

[39] Appropriate Assessment Screening for the Hertfordshire Waste Development Plan Documents: Draft report for consultation. Prepared for Hertfordshire County Council by Levett-Therivel Sustainability Consultants and Treweek Environmental Consultants, December 2006.

Table 6 – Screening of Housing and Employment Development Options

Growth Option	Commentary on Option	HRA Implications
Option A: Towns	Focuses all development in and around the five towns of Bishop's Stortford, Buntingford, Hertford, Sawbridgeworth and Ware	Impacts on the three European sites considered within the scope of this HRA are possible through similar pathways, whichever of options A-F is considered. All developments within East Hertfordshire will fall within the Upper Lee catchment and there is therefore potential for reduced water resource availability at Lee Valley SPA/Ramsar.
Option B: Towns and Larger Service Villages	Focuses growth on the five towns (see Option A) and the larger service villages all of which are regarded as being sustainable locations for development. The larger villages under consideration are: Walkern; Braughing; Puckeridge; Much Hadham; Watton-at-Stone; High Cross; Tewin; St. Margaret's; Hertford Heath; Stanstead Abbotts; Hunsdon	Development within East Hertfordshire is potentially constrained by the capacity of Rye Meads STW. New development therefore creates potential for adverse effects on water quality at Lee Valley SPA/Ramsar. Hertford, Ware and Sawbridgeworth are on the limit of the typical daily distance that visitors will travel to Epping Forest based on visitor surveys that indicate that the recreational catchment of Epping Forest is approximately 16km (the distance from within which 96% of visitors originate). Several of the larger villages, including St.Margarets and Stanstead Abbotts, and Hertford Heath (Options B, C, D and F) fall within this distance. Therefore there is some potential for increased recreational pressure on this site. Development to the east of Welwyn and Stevenage under Option E would lie beyond this range. With the exception of Buntingford, all of the towns and most of the larger villages (Options B, C, D and F) lie within the typical daily distance (based on England Day Leisure Visits data) that visitors would travel to visit Wormley-Hoddesdonpark Woods SAC, which is sensitive to recreational pressure. All of these towns and larger villages lie within the typical daily distance (based on Regional Park Authority data) that visitors will travel to visit Lee Valley SPA/Ramsar, which is designated for bird species sensitive to disturbance. Development to the east of Stevenage (Option E) is likely to lie beyond this range.
Option C: Towns, Larger Service Villages and Smaller Service Villages	Focuses on the five main towns, plus the settlement of St.Margaret's/Stanstead Abbotts for the majority of growth. Some growth would be expected at larger villages (see Option B), with limited growth at smaller settlements.	Growth at Sawbridgeworth and Bishop's Stortford in particular, will allow easy access to the M11 and consequently, the M25 past Epping Forest SAC. Therefore there is potential for reduced air quality at the SAC. Development at Hertford and Ware would potentially create increased traffic on the A10 toward London. Wormley-Hoddesdonpark Woods SAC is within 200m of this road and could be subject to reduced air quality. Development at several of the larger villages (Options B, C, D and F), including St.Margarets and Stanstead Abbotts could also have adverse effects. Several village settlements under Option F also lie along the A10.

Growth Option	Commentary on Option	HRA Implications
Option D: Towns, Larger Service Villages, Smaller Service Villages and Other Villages/Hamlets Option E: Towns, Stevenage and Welwyn Garden City Option F: Settlements within Transport Corridors	This option focuses development in the five towns and larger service villages but still disperses limited growth right across the whole of East Hertfordshire. Alongside focusing growth in the five towns, growth could be accommodated in large sustainable urban extensions located within East Hertfordshire district to the east of each of Stevenage (possibly 1000+ homes) and Welwyn Garden City. Seeks to focus growth in settlements located within the identified transport corridors including towns, larger villages and other villages. In essence, a settlement pattern based on the notion of 'beads on a string' would emerge.	Wormley-Hoddesdonpark Woods has been noted to attract some of the effects classified as urbanization, such as car dumping, and introduction of invasive species through garden waste. Development at Ware and Hertford, and the larger villages, in particular, St. Margarets, Standstead Abbotts and Hertford Heath (options B, C, D and F) could contribute to this.

Table 7 – Housing Distribution Options

Housing Distribution Option	HRA Implications
Proportional Distribution Each settlement receives a proportion of growth based on their existing number of dwellings, taking into account commitments, completions and outstanding allocations.	The conclusions for HRA are likely to reflect those for Options A-F above
Adjusted Proportional Distribution Each settlement would receive growth based on the existing number of dwellings (taking into account commitments, completions and outstanding allocations). However, the figures would be adjusted so that half of the growth allocated to the villages would be re-distributed to the towns.	The conclusions for HRA are likely to reflect those for Options A-F above
Reversed Proportional Distribution Each settlement would receive growth based on the existing number of dwellings (taking into account commitments, completions and outstanding allocations). The smaller the settlement, the larger the amount of growth it would receive. Conversely, the larger the settlement, the less growth it would receive.	Significant growth away from the current large settlements would require a re-evaluation of the screening conclusions in Table 5, particularly for Options C and D, where a small amount of growth at small settlements has been assumed.
Equal Distribution This approach simply distributes the 8,876 figure by the number of settlements under each development strategy option.	Significant growth away from the current large settlements would require a re-evaluation of the screening conclusions in Table 5, particularly for Options C and D, where a small amount of growth at small settlements has been assumed.
Distribution by Land Availability The most laissez-faire approach would see the 'to-find' figure simply distributed according to the availability of land, subject of course, to establishing the suitability of actual sites.	This approach cannot be satisfactorily screened under HRA until site allocations are proposed, since development could take place anywhere across the district. The general conclusions for Options A-F would still apply.
Distribution by Settlement Type This approach apportions an equal amount of growth to each settlement type. For example, under Option B the five towns would receive 1/2 of the growth and the Larger Service Villages would also receive 1/2 of the	Significant growth away from the current large settlements would require a re-evaluation of the screening conclusions, particularly for Options C and D, where a small amount of growth at small settlements has been assumed.

Housing Distribution Option	HRA Implications
growth. Under Option C, the split would be Towns 1/3, Larger Service Villages 1/3 and Smaller Service Villages 1/3. Housing figures would then be distributed to each settlement using one of the approaches outlined above.	

Table 8 – Screening of Developing Policy Options

Themes and Key Issues	Strategic Objectives	Policy Options to be Considered	HRA Implications
Energy and Climate Change Energy efficiency Transport emissions Renewable energy generation Decentralised energy infrastructure Avoiding development in the flood plain Reducing per-person water consumption Passive building design Local food production Green Infrastructure	**ECC1:** To mitigate climate change by reducing carbon dioxide emissions from new and existing development through an integrated approach to sustainable construction, energy efficiency and energy supply, and by encouraging use of low-emission travel alternatives including passenger transport, walking and cycling. **ECC2:** To enable communities to adapt to climate change through appropriate design measures, including landscaping, drainage, street layout and building design.	We think that the Core Strategy should include policy options that deal with the following aspects of objectives ECC1 and ECC2: * Targets for carbon savings	Generally, the aspirations presented under Theme 1 will not lead to concerns from a HRA standpoint. Strategic Objective ECC1 will include renewable energy generation and it is possible that certain types of facility could have impacts on designated sites. Wormley-Hoddesdonpark Woods SAC and Epping Forest SAC would be vulnerable to air quality reduction that can arise from schemes such as Energy from Waste. Wormley-Hoddesdonpark Woods SAC is sensitive to hydrological changes that could be associated with some types of renewable energy Lee Valley SPA/Ramsar could be affected by any renewable schemes that create potential for altered hydrology, reduced water quality, or disturbance. Birds

Themes and Key Issues	Strategic Objectives	Policy Options to be Considered	HRA Implications
			for which the site is designated could be vulnerable to blade strike from turbines. Hertford – consideration of CHP schemes – these could have potential impacts through air quality reduction at Wormley-Hoddesdonpark Woods SAC Hertford and Ware – consideration of CHP schemes – these could have potential impacts through reduced water quality or disturbance effects on Lee Valley SPA/Ramsar, dependent on type of facility and location.
People and Community Safety Concern that community spirit will be altered by new development and that newcomers will not integrate with the local community Increasing population within the district, particularly the elderly population, will increase pressure on existing services Need to maintain a mixed and balanced community Lack of access to services and facilities for disadvantaged groups, including young people, elderly people, those with	**PCS1**: To develop safe and secure communities by taking into account the need to reduce opportunities for crime and anti-social behaviour and to reduce the fear of crime across the district **PCS2:** To encourage a rich and diverse community life to enhance cohesion and maintain the thriving and vibrant communities in East Hertfordshire **PCS3:** To encourage increased communication and partnership working between town, parish, district and county councils, and community and voluntary groups, to enable community involvement in the design, development and management of places	We think that the Core Strategy should include policy options that deal with the following aspects of objectives PCS1, PCS2, PCS3, PCS4 and PCS5: * All new development to integrate and contribute to the creation of vibrant, sustainable communities * Maintaining a mixed-age population and encourage equal opportunities within new developments through providing a mix of housing (see Theme 3) * Provision of new community facilities that meet the needs of	This theme and its related issues and objectives does not create any likely significant effects under HRA

Themes and Key Issues	Strategic Objectives	Policy Options to be Considered	HRA Implications
disabilities and rural residents Public perception of crime and feeling unsafe is higher than the reality Concern about anti-social behaviour, particularly in relation to the night time economy	**PCS4:** To ensure that services can withstand pressure from increased population numbers and take measures to maintain a mixed age population, enabling young people to stay in the district and catering for the growing elderly population, to ensure a balanced community **PCS5:** To protect existing facilities and provide high quality community based services to serve all levels of dependency, in an effort to reduce social inequalities and disadvantage and to address the needs of all groups in East Hertfordshire.	disadvantaged groups (see Theme 7) * Ensure the provision of local transport services to increase accessibility to services and promote social inclusion (see Theme 6)	
Housing Access to private ownership Ageing population Imbalance in type of new housing and local housing need, particularly in rural areas	**HOU1:** To ensure flexibility of housing through minimum quality, accessibility, space, and private outdoor amenity standards **HOU2:** To ensure that the East of England Plan target of at least 600 additional dwellings per annum are delivered on suitable sites in sustainable locations that provide for a choice of housing types, sizes and tenures	We think that the Core Strategy should include policy options that deal with the following aspects of objectives HOU2, HOU3, HOU4 and HOU5: * Broad locations for housing development that could include affordable housing and for Gypsy & Travellers and Travelling Showpeople as part of the development strategy.	Although housing development per se will be a critical factor in determining LSE on European designated sites, the issues and objectives stated here for the region as a unit, do not relate directly to quantum or location of development and so do not present LSE. However, development of housing considered on the edge of Hertford, and near to Lee Valley SPA/ Ramsar could create potential for disturbance (through recreational usage) or reduced water quality (through run-off) due to close proximity to the European site.

Themes and Key Issues	Strategic Objectives	Policy Options to be Considered	HRA Implications
Integration of Gypsy & Traveller sites, affordable housing and new general needs housing into new and existing communities 10:1 average house price to income ratio Acute problems in rural areas Affordability of affordable housing - pressures to extend social rented housing to higher income groups Economic viability of providing affordable housing in new developments Restricted range of tenures Increasing need for intermediate affordable housing Urgent need for more key worker homes, specialist housing and accommodation, flexible housing, and social rented housing Families trapped in small and unsuitable housing 27% of vulnerable households are living in homes unfit for purpose	**HOU3:** To provide sufficient accommodation in sustainable locations for Gypsies & Travellers and Travelling Showpeople on sites which enable successful co-existence with settled communities and offer opportunities for social integration **HOU4:** To ensure that the specialist accommodation needs of vulnerable individuals and groups including older people are met **HOU5:** To achieve sustainable mixed communities by ensuring the delivery of sufficient affordable housing, either social rented or intermediate housing	* Provision of and approach to affordable housing including tenure split * Approach to specialist residential accommodation for older people *Further LDF documents to deal with:* *Allocation of sites for housing; Allocation of sites for Gypsy & Traveller and Travelling Showpeople's accommodation; Space Standards*	Similar issues could apply to settlements other than Hertford (such as Ware), but these are not currently detailed within the CS. In relation to villages, no locational specificity of gypsy and traveller sites is provided and no extent of provision is indicated. However, this form of development can have HRA implications (e.g. disturbance, water quality) and so it is not currently possible to screen this out.

Themes and Key Issues	Strategic Objectives	Policy Options to be Considered	HRA Implications
Need for new housing to be to 'Lifetime Homes' standards Rising need for higher density schemes across a range of types and sizes: terrace, flats, small-large family housing, etc. Amenity space, inside and out, is often unsatisfactory for people's needs			
Character Maintaining countryside openness Acknowledging the role countryside plays in creating the dispersed settlement pattern of East Hertfordshire Highly valued unique character of the various local landscapes Conserve and enhance the whole rural area Promote good design that respects the local vernacular Conserve and enhance the character of the conservation areas	**CHA1:** The whole rural area of East Hertfordshire functions as an important 'green bubble' and its openness should be maintained through the prevention of urban sprawl and inappropriate development and land use through the appropriate management of the Green Belt **CHA2:** To accept that all landscapes are influenced by human action and that they have changed and will continue to change over time. Manage this change in a sustainable manner by understanding and applying the key landscape features of each landscape character area to new development in a proactive way that does not destroy the intrinsic value of that unique landscape **CHA3:** To ensure that all new development is well designed and reflects	We think that the Core Strategy should include policy options on the following aspects of objective CHA1: * Broad locations for development (including Gypsy & Travellers) as part of the development strategy * Density * Green Belt *Maintaining the openness of the whole rural area including the Metropolitan Green Belt The Core Strategy should also deal with the broad principles of objectives	No LSE – CHA1 and 2 could be positive if they deflect recreational users from European designated sites. Later iterations of the CS will require further assessment, particularly if broad locations for development are defined.

Themes and Key Issues	Strategic Objectives	Policy Options to be Considered	HRA Implications
Protect the unique local heritage of East Hertfordshire	its local vernacular context utilising local materials and/or building styles to maintain a unique sense of place **CHA4:** To preserve and enhance the special historic character of East Hertfordshire listed buildings and conservation areas	CHA2, CHA3 and CHA4, covering the following issues: * Design * Landscape * Heritage protection	
Economy, Skills and Prosperity Changing economic base from heavy industry to office based services, research and development, and storage and distribution Competition from outside the district for investment, job growth and retail providers Retention and quality of existing employment land: pressure to convert to housing; condition and suitability of existing land for employment sites Land availability and suitability for new growth: limited land within the main settlements and competing land use requirements (e.g. housing)	**ESP1:** To attract investment and balance new housing with the creation of high-value jobs by delivering appropriate business infrastructure and employment sites for a range of business types and needs **ESP2:** To support a viable rural economy in the villages and on the land by enabling diversification whilst preserving the special character of the rural area **ESP3:** To promote the vitality and viability of the district's town centres by defining a clear and distinctive role for each one, encouraging an appropriate mix of shops, and a high quality urban environment which will appeal to residents and visitors alike **ESP4:** To support educational needs by encouraging the provision of new facilities and infrastructure in appropriate locations	We think that the Core Strategy should include policy options that deal with the following aspects of objectives ESP1, ESP2, ESP3, ESP4 and ESP5: * Broad locations for new employment land development reflecting the preferred development strategy (see Chapter 3) * Approach to managing existing stock of employment land * Hierarchy of town centres based on their defined roles and retail functions * Approach to rural diversification * Provision of and approach	Yes – in that ESP1 promotes employment growth, which can have implications for European designated sites through a range of Pathways of Impact The recognition of the increasing importance of tourism to East Hertfordshire, including a focu the natural environment must be balanced against the needs of avoidance of disturbance and recreational pressure on European designated sites. ESP5 currently only discusses towns and villages. Development discussed for all the main towns could create effects on Lee Valley SPA/Ramsar through increased demand for water supply Development discussed for Hertford, Ware and Sawbridgeworth could contribute to increased pressure on Rye Meads STW downstream, and hence water quality effects on Lee Valley SPA.s on

Themes and Key Issues	Strategic Objectives	Policy Options to be Considered	HRA Implications
Pattern of economic investment due to infrastructure and accessibility issues Weaknesses in adult learning and intense competition for school places, particularly in rural areas Lack of capacity of existing schools in the district, particularly in Hertford (primary education) and Bishop's Stortford (secondary education) Inadequate skills base within the rural area to support new enterprise and a general mismatch between skills and the labour market within East Hertfordshire Insufficient high value jobs resulting in out commuting Uneven distribution of high value jobs and employment within the district Challenge of supporting and providing for needs of small businesses Increased pressure for agricultural and rural diversification	**ESP5:** To encourage visitors to our towns and villages by promoting East Hertfordshire and its culture supported by the provision of appropriate tourist facilities	to education facilities reflecting the preferred development strategy *Further LDF documents to deal with:* *Specific locations for new employment land, and tourist facilities*	

Themes and Key Issues	Strategic Objectives	Policy Options to be Considered	HRA Implications
Competing neighbouring centres offering greater choice of large retailers Large supermarkets compete with town centre stores Large number of independent stores offering local identity and character but these are most at risk during an economic downturn Increasingly important role of tourist industry as an economic driver in East Hertfordshire taking advantage of the quality built and natural environments in the district Proximity of Stansted Airport brings economic and tourism benefits as well as issues with noise and air pollution and traffic congestion			
On The Move East-West movement restricted – both for road & rail Rural transport 'deprivation'	**OTM1:** To assist in enabling people's travel needs to be met in order that safe access to the services and amenities offered in local towns, villages, the countryside and wider destinations can be achieved by all	We think that the Core Strategy should include policy options that deal with the following aspects of objectives OTM1, OTM2, OTM3, OTM4, OTM5 and	No LSE as mostly promotes increased provision and use of public transport, walking and cycling, and minimised car usage, though it is conceivable that in order to meet the objective OTM1, some highway improvements for car usage may be required.

Themes and Key Issues	Strategic Objectives	Policy Options to be Considered	HRA Implications
Congestion in towns – especially at peak times Continuous growth in road traffic posing threat to quality of life Many transport challenges lying outside the direct control of local authorities Impact of surface access to Stansted Airport Capacity issues with existing road & rail infrastructure – especially at peak times High car ownership (lack of realistic alternatives – especially in rural areas) Parking issues – particularly in town centres & residential areas (including airport related in Bishop's Stortford) Need to achieve greater accessibility so that all people are able to reach desired destinations irrespective of personal circumstances Rail links north-south are	**OTM2:** To locate development where it will minimise the need to travel to key services and facilities such as employment, education, healthcare, retail and recreation **OTM3:** To assist in engendering modal shift from private motorised transport to sustainable integrated travel options to help relieve congestion, address car parking issues, reduce the district's carbon footprint and improve the quality of life for all **OTM4:** To help facilitate the delivery of passenger transport services that meet the travel needs of residents and employees in the district in a manner which addresses current shortfalls in provision and allows capacity to accommodate future growth **OTM5:** To support the retention and enhancement of existing walking and cycling routes and facilities and seek additional safe and attractive provision to make these means of travel more appealing to users and thereby increase modal share **OTM6:** To seek to mitigate the negative effects of aviation development and operation	OTM6: * Modal hierarchy principles * Strategic infrastructure provision * Locating development in places that enable sustainable travel choices to made and aid carbon emission reduction * Creating development that is accessible by different modes of transport and reduces car dependency * Improving accessibility to key services and facilities	

Themes and Key Issues	Strategic Objectives	Policy Options to be Considered	HRA Implications
generally good Significantly higher rail usage compared to Hertfordshire & national averages, but low uptake of bus services Off-peak services inconsistent & improved confidence in reliability required Peak crowding on trains, but ability for rail capacity to be expanded is limited due to network operation constraints Upgraded real time passenger information/fleet/station facilities required to facilitate uptake Transport network currently perceived to favour car-borne traffic – passenger transport priority should be explored Permeability issues – missing links in walking and cycling network & blockages to direct routes. High quality walking and cycling links needed between residential areas and key locations e.g. town centres, stations, schools,			

Themes and Key Issues	Strategic Objectives	Policy Options to be Considered	HRA Implications
employment etc Safety issues for cyclists on busy/narrow roads & where shared with pedestrians Lack of safe, covered storage facilities			
Health, Well Being and Play There is a need to increase and coordinate health care provision to reduce health inequalities Encouraging participation in physical activity has positive health implications Ageing population Increasing accessibility to services increases wellbeing There is a need to protect and increase the provision of open space, sport and recreation facilities to ensure that provision is accessible to all There are quantitative and qualitative deficiencies in open space provision There is a need to protect and support existing community	**HWP1:** To maintain and improve existing arts, culture and entertainment facilities and to encourage the provision of new facilities in appropriate locations **HWP2:** To support the diversity of faith communities and places of worship by protecting existing facilities and encouraging the provision of new facilities in appropriate locations **HWP3:** To protect and support existing community facilities and encourage the provision of accessible new facilities which address the specific needs of the community **HWP4:** To support the provision of good quality, accessible, health facilities to meet the needs of the community **HWP5:** To support healthy communities by protecting and enhancing existing sport, recreation and open space facilities	We think that the Core Strategy should include policy options that deal with the following aspects of objectives HWP1, HWP2, HWP3, HWP4 and HWP5: * The planned provision of open space, sport and recreation facilities to support healthy communities * The planned provision of community facilities, including places of worship, health care, arts, culture and entertainment facilities to enrich quality of life *Further LDF documents to deal with:* *Criteria for new facilities;*	No LSE – HWP5 could help to deflect users from creating recreational pressure at European designated sites, such as the Lee Valley SPA/Ramsar. It will be important for the LDF to clearly define open space standards, including functions, size and location in order to determine whether these will adequately deflect recreational pressure from sensitive designated sites.

Themes and Key Issues	Strategic Objectives	Policy Options to be Considered	HRA Implications
facilities Village shops, post offices and rural pubs should be protected as important community facilities More facilities needed for young people There is a need to maintain and improve existing arts, culture and entertainment facilities There is a need to acknowledge the diversity of faith communities and provide new facilities in the district	and providing accessible opportunities for new facilities including encouraging new water-based recreational opportunities in appropriate locations	*Protecting and enhancing existing sport, recreation and open space facilities; Setting open space provision standards to help reduce deficiencies; Securing the appropriate level of contribution towards the maintenance and creation of existing and new open space, sport, recreation, cultural and health facilities through development*	
Green There is potential conflict between development and protection of the natural environment There is a need to reconcile enhanced access to nature with protection of undisturbed habitats for wildlife There is a need to safeguard valuable habitats from development	**GRE1:** To protect and enhance the quality of the environment by mitigating the impacts of air, water, land, light, and noise pollution through measures including the sustainable reduction and management of waste and the promotion of recycling **GRE2:** To identify and promote networks of green infrastructure as a haven for wildlife as well as a recreational amenity **GRE3:** To protect water supplies and water quality from the impacts of new development	We think that the Core Strategy should include policy options that deal with the following aspects of objectives GRE1, GRE2, GRE3 and GRE4: * Protecting and enhancing water quality at new development * Water consumption targets for new development	No LSE – measures are positive and aim to protect the environment

Themes and Key Issues	Strategic Objectives	Policy Options to be Considered	HRA Implications
There is an urgent need to reduce the amount of rubbish sent to landfill Town centre traffic generates air pollution, with possible negative health effects for residents Likelihood of future water shortages if growth occurs at current levels of consumption There is danger of flash flooding near rivers due to rapid rates of surface-water run-off Seasonal drops in river water levels endanger wildlife habitats Water quality is compromised by contaminants and surface run-off from development and agriculture	**GRE4:** To mitigate flood risk by avoiding development in areas at risk of flooding and encouraging sustainable drainage	* Defining key areas of Green Infrastructure in relation to the preferred development strategy * Avoiding development in areas at risk of flooding *Further LDF documents to deal with:* *Approach to surface water drainage at new development; Pollution control*	
Monitoring and Delivery Integrated delivery of development and supporting infrastructure Ongoing process Positive steps to address key issues	**MAD1:** To ensure the timely delivery of infrastructure to support new growth and development **MAD2:** To provide a framework for continuous monitoring together with procedures and guidance to enable risk to be managed in the best way, and to provide sufficient flexibility to cope with changing circumstances and uncertainty	We think that the Core Strategy should include policy options that deal with the following aspects of objectives MAD1, MAD2, MAD3 and MAD4: * Monitoring of key targets, for example in relation to housing, energy and	No LSE – contains many positive objectives

Themes and Key Issues	Strategic Objectives	Policy Options to be Considered	HRA Implications
Impact of development in neighbouring authorities on East Hertfordshire Coordination of mainstream public funding to support development Developer contributions Contingency planning Provision of sites needed for infrastructure to support development	**MAD3:** To deliver sustainable development and ensure that social and environmental benefits are achieved through proper use of developer contributions **MAD4:** To produce and keep up to date an effective Local Development Framework based on an analysis of robust evidence to deliver the LDF vision and objectives and achieve sustainable development	climate change, water consumption, and infrastructure provision * Strategy for developer contributions towards infrastructure costs	

Table 9 – Development to the North of Harlow

Development Options	HRA Implications
Policy Led Approach (A) seeks to deliver 10,000 new dwellings to the north, 800 to the east and 100 each to the south and west Policy Led Approach (B) seeks to deliver 3,600 new dwellings to the north, 3,300 to the east, 2,800 to the west and 1,300 to the south A Criteria Led Approach seeks to deliver 6,380 new dwellings to the north-east, between Harlow and the M11, with 3,520 to the south and 1,100 to the west A Regeneration Led approach seeks to deliver 5,720 new dwellings to the north, 2,300 to the east, 2,420 to the south and 550 to the west A Transport Led Approach seeks to deliver 5,390 new dwellings to the north-east, between Harlow and the M11, with 2,530 to the north and 3,080 to the west	Impacts on the three European sites considered within the scope of this HRA are unlikely to be more affected by one of the five spatial options over any of the others. Water quality and resource impacts on the Lee Valley SPA will not be related to the spatial distribution of housing but to whether treated effluent from the new dwellings discharges to Rye Meads STW or whether the water supply strategy involves abstraction from the River Lee and its associated reservoirs. It is likely that the answer to both these questions will be the same whichever of the five spatial options is chosen. While recreational pressure impacts are dependent to an extent on the spatial distribution of housing the three internationally designated wildlife sites covered by the scope of this HRA are all sufficiently distant from Harlow, and the five spatial options sufficiently similar, that it is unlikely that any one option will result in a greater recreational impact than any other option. No spatial option (either alone or considered in the context of development elsewhere in

Taking into account socio-economic and environmental considerations the Council has identified an option (not necessarily the Preferred Option) of 5,000 new dwellings to the north-east, between Harlow and the M11, 4,000 to the north, and 1,000 each to the south and west. **This option also includes provision for an extra 6,000 dwellings to the north between 2021 and 2031, with a further 2,300 to the north-east.**	East Hertfordshire) poses insurmountable problems regarding impacts on internationally designated wildlife sites **provided that either water resource and quality issues concerning Rye Meads STW and the Lee Valley SPA can be resolved or an alternative wastewater treatment solution is arrived at.**

6 Conclusions

6.1 Screening of Issues and Options

6.1.1 It can be seen from the preceding tables that Issues and Options that consider delivery of housing, employment and infrastructure have been screened in for Appropriate Assessment. The reason for this is that these are the policies that either promote or direct the scale and spatial distribution of development within East Hertfordshire.

6.1.2 The distribution and nature of European sites within East Hertfordshire and its environs, coupled with the issues and options currently under consideration means that at this stage it is not possible to screen out any significant development within East Hertfordshire as having no LSE on the European sites. In part this is due to constraints operating on a scale greater than East Hertfordshire itself – for example road transport on the M25, and water treatment infrastructure at Rye Meads. In such situations, a more detailed Appropriate Assessment will be required, based on firmer growth options, in order to determine in combination effects, and the amount of mitigation (if any) required that is resulting from development within East Hertfordshire.

6.1.3 Emerging Issues and Options within the East Hertfordshire CS do contain Objectives and suggested policy areas that should help to mitigate any LSE, particularly in the areas of:

- Modal shift from car to other means of transport
- Open space provision
- Timely delivery of infrastructure

6.2 Next steps

6.2.1 Although at this stage of the CS development it is not possible to screen out some of the Issues and Options because pathways of impact exist whereby LSE on European sites could result, it is likely that at subsequent stages of the CS process, the more spatially specific and quantified levels of development will enable many of these concerns to be satisfied from a HRA perspective. In order to be able to conclude no LSE on the European sites considered in the Screening Report, the Council should seek to ensure the following:

- Clarification should be made as to how waste water and sewerage issues arising from proposed growth will be dealt with; specifically where this will take place, how the infrastructure requirements will be met and how this will be delivered in a timely manner. This is likely to require a commitment to engage with the Environment Agency and Thames Water at the earliest possible opportunity.
- Clarification as to the ability to meet water resource requirements to support development, so that it can be concluded that adverse impacts on the Lee Valley SPA and Ramsar sites will be avoided.
- The Council should seek to provide details within the Preferred Options of the quantum of green space, its function, and timeliness of delivery, and mechanism of delivery, building on the approaches outlined within the Issues and Options.

- The Council and its partners should continue to promote alternative modes of transport to car usage, and should consider undertaking a transport analysis of the impact of development within East Hertfordshire on the M11, which should include a projection for increased volumes (and network capacity) between Junction 8 and the M25 orbital that would result from growth within the district. This would enable an evidence-based approach to determining whether development in East Hertfordshire contributes to LSE on Epping Forest SAC through reduced air quality. A similar traffic modelling exercise could be carried out to determine the impact of development within East Hertfordshire on traffic utilising the A10 in the south of the district in order to determine whether development in East Hertfordshire could contribute to LSE on Wormley-Hoddesdonpark Woods SAC through reduced air quality.

Buntingford
Stevenage
Bishop's Stortford
Sawbridgeworth
Ware
Hertford
Harlow
Cheshunt

Ramsar Sites
Special Protection Areas
Special Areas of Conservation
East Hertfordshire District
Key Settlements
Railways
Motorway
Primary / A Road

1 Wormley-Hoddesdonpark Woods SAC
2 Epping Forest SAC
3 Lee Valley SPA
4 Lee Valley Ramsar
5 Eversden and Wimpole Woods SAC

0 2 4 6 8
Kilometres

Revision Details	By / Check	Date	Suffix

Drawing Status: FINAL

Job Title: AA FOR EAST HERTFORDSHIRE DISTRICT

Drawing Title: EUROPEAN SITES NEAR EAST HERTFORDSHIRE DISTRICT

Scale at A3: 1:190,000
Drawn: JM
Approved: GD

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Rev

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