Revision Schedule

Habitat Regulations Assessment
August 2010

Rev	Date	Details	Prepared by	Reviewed by	Approved by
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1 Introduction

1.1 The Habitats Directive applies the precautionary principle to Natura 2000 sites (Special Areas of Conservation, SACs, and Special Protection Areas, SPAs; as a matter of UK Government policy, Ramsar sites[1] are given equivalent status). The need for Appropriate 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 (**Box 1**). 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.

Box 1. The legislative basis for Appropriate Assessment

Habitats Directive 1992

"*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*."

Article 6 (3)

Conservation of Habitats and Species Regulations 2010

"*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 … The authority shall agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the European site*".

1.2 Scott Wilson has been appointed by Wirral Borough Council ("the Council") to assist in undertaking a Habitat Regulations Assessment (HRA) of the potential effects of the Local Development Framework Core Strategy, on the Natura 2000 network and Ramsar sites.

1.3 The LDF will supersede the current Unitary Development Plan. The current Unitary Development Plan was adopted in 2000 and the majority of policies and proposals are "saved" until the LDF Development Plan Documents (DPDs) come into effect. The Council's aim is to adopt an LDF Core Strategy from December 2011.

1.4 This document reports on the Draft Preferred Options Report of the Wirral Core Strategy. Earlier HRA work associated with the earlier Spatial Options Report is reported elsewhere (Wiral MBC, November 2009) but has been used to inform this HRA.

1.5 Chapter 2 of this report explains the process by which the HRA has been carried out. Chapter 3 explores the relevant pathways of impact resulting from the scale of development that will be delivered in Wirral. Chapters 4 to 13 provide the Appropriate Assessment for the Core Strategy as a whole organised on the basis of one chapter per European site, except where multiple sites overlap in a particular geographic area

[1] Wetlands of International Importance designated under the Ramsar Convention 1979

(e.g. Ribble & Alt Estuaries SPA and Ramsar sites). Each chapter begins with a consideration of the interest features and ecological condition of the site and environmental process essential to maintain site integrity. An assessment of the Core Strategy in respect of each European site is then carried out and avoidance and mitigation strategies proposed where necessary. The key findings are summarised in Chapter 14: Conclusions.

Wirral Core Strategy

1.6 The Wirral Core Strategy is a long term planning document that will set the framework for future development and investment in Wirral over the next 15 to 20 years. Once adopted, the Core Strategy will form part of the Local Development Framework for the Borough. The Core Strategy will be used as the basis for determining individual planning applications and for other decisions taken under the Planning Acts.

1.7 The Council began preparing a Core Strategy for Wirral in July 2005. Initial consultation was undertaken to identify the Borough's strengths, weaknesses, opportunities, threats and local needs. The findings were then prioritised by a series of public workshops held in November 2006. Additional consultation with under-represented groups took place during summer 2007. Formal consultation on Issues, Vision and Objectives took place in February 2009 and on Spatial Options in January 2010.

1.8 This HRA is being undertaken on the Draft Preferred Options Report (Cabinet 22nd July 2010) which sets out the Council's Preferred Options for a long-term spatial strategy for the Borough. It represents the first formal statement of what the Council expects to include within a Core Strategy Development Plan Document for Wirral.

1.9 The Council's preferred option for the plan period is fifteen years from estimated date of adoption (December 2011) with an anticipated plan period of April 2012 to March 2027.

1.10 It should be noted that the Core Strategy is being prepared in a period of rapid change. Changes identified in the Core Strategy (since the publication of the Core Strategy Spatial Options Report in January 2010) include: changes to national policy, changes to national economy, changes in national statistics, progress in major developments and the revocation of the Regional Spatial Strategy.

1.11 Whilst some broad locations for development are identified in this Core Strategy Preferred Options Report, the allocation of individual sites will be implemented through a subsequent Site Allocations DPD. Appendix 1 lists the Preferred Options, and provides a summary (and HRA Screening) of each Preferred Option. It identifies the Preferred Options which have been 'screened out' from more detailed consideration in this report – those with no potential for effects on European Sites. The screened out Preferred Options are: 1, 7, 9, 13, 15, 16, 17, 18, 19 and 20, along with Preferred Spatial Objectives 3,4,5 and 6

1.12 The key aspects of the Core Strategy that are subject to HRA screening in this report are therefore:

- The intention to prepare Settlement Area Policies (Preferred Option 2) for eight distinct Settlement Areas identified through the Borough, setting out:
    - the number, scale, type and broad location of new housing development;

- the number, scale, type and broad location of new employment development priorities for existing centres;
- priorities for maintaining local distinctiveness; and
- priorities for green infrastructure.

- A broad 'Spatial Vision' (Preferred Option 3) with associated Spatial Objectives including the locations for focus of economic revitalisation; housing growth and market renewal; flood risk; establishing a new city neighbourhood in Birkenhead;
- A 'Broad Spatial Strategy' (Preferred Option 4) covering above with additional consideration for port development; tourism development; and development of rural sites;
- The provision of 3,750 net new dwellings over the fifteen year period from April 2012 to March 2027, at a rate of 1250 net new dwellings per five year period (Preferred Option 5) the distribution of housing (Preferred Option 6) and order of preference for the phasing of housing across the Borough and with respect to brownfield/Greenfield land (Preferred Option 8);
- Criteria for the determination of planning applications for Gypsy and Traveller Accommodation (Preferred Option 10)
- The safeguarding of up to 177ha of additional development land for new employment-related development during the plan period April 2012 to March 2027, with a distribution split between Birkenhead - (50%); Bromborough – (40%) and Other estates and centres - 10%. (Preferred Option 11, in accordance with Settlement Area Policies);
- The proposed network of shopping centres in the Borough (Preferred Option 12)
- Decentralisation of energy, encouraging energy efficiency and the use and development of renewable, decentralised and low carbon energy (Preferred Option 14);
- Strategic location of mixed use, industrial, residential, office and leisure development within the New City Neighbourhood around Birkenhead and Wirral Waters (Preferred Option 21).

1.13 It is important to note that the population of Wirral is not actually expected to increase over the Core Strategy period despite the delivery of new housing (it may either stabilise or continue its current declining trend), but the relative demographic distribution is likely to change leading to a shift from a younger population to an older population and a greater number of smaller households.

2 Methodology

Introduction

2.1 This section sets out our approach and methodology for undertaking the HRA. Habitat Regulations Assessment itself operates independently from the Planning Policy system, being a legal requirement of a discrete Statutory Instrument. Therefore there is no direct relationship to PPS12 and the 'Test of Soundness'. The HRA process that we have adopted has been designed to ensure that the HRA is: a) compliant; b) accepted by key stakeholders including Natural England and the Countryside Council for Wales; c) has clear recommendations that can be used by the Council to develop their plan; and d) has a clear record of the process undertaken, providing the necessary evidence base for the plan.

A Proportionate Assessment

2.2 Project-related HRA often requires bespoke survey work and novel data generation in order to accurately determine the significance of adverse effects, that is, to look beyond the risk of an effect to a justified prediction of the actual likely effect and to the development of avoidance or mitigation measures.

2.3 However, the draft CLG guidance[2] makes it clear that when implementing HRA of land-use plans, the Appropriate Assessment (AA) should be undertaken at a level of detail that is appropriate and proportional to the level of detail provided within the plan itself:

"*The comprehensiveness of the [Appropriate] assessment work undertaken should be proportionate to the geographical scope of the option and the nature and extent of any effects identified. An AA need not be done in any more detail, or using more resources, than is useful for its purpose. It would be inappropriate and impracticable to assess the effects [of a strategic land use plan] in the degree of detail that would normally be required for the Environmental Impact Assessment (EIA) of a project*."

2.4 In other words, there is a tacit acceptance that appropriate assessment can be tiered and that all impacts are not necessarily appropriate for consideration to the same degree of detail at all tiers (**Figure 1**).

2.5 For an LDF Core Strategy the level of detail concerning the developments that will be delivered is usually insufficient to make a highly detailed assessment of significance of effects. For example, precise and full determination of the impacts and significant effects of a new settlement will require extensive details concerning the design of the town, including layout of greenspace and type of development to be delivered in particular locations, yet these data will not be decided until subsequent stages.

2.6 The most robust and defensible approach to the absence of fine grain detail at this level is to make use of the precautionary principle. In other words, the plan is never given the benefit of the doubt; it must be assumed that a policy/measure is likely to have an impact leading to a significant adverse effect upon a European site unless it can be clearly established otherwise.

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

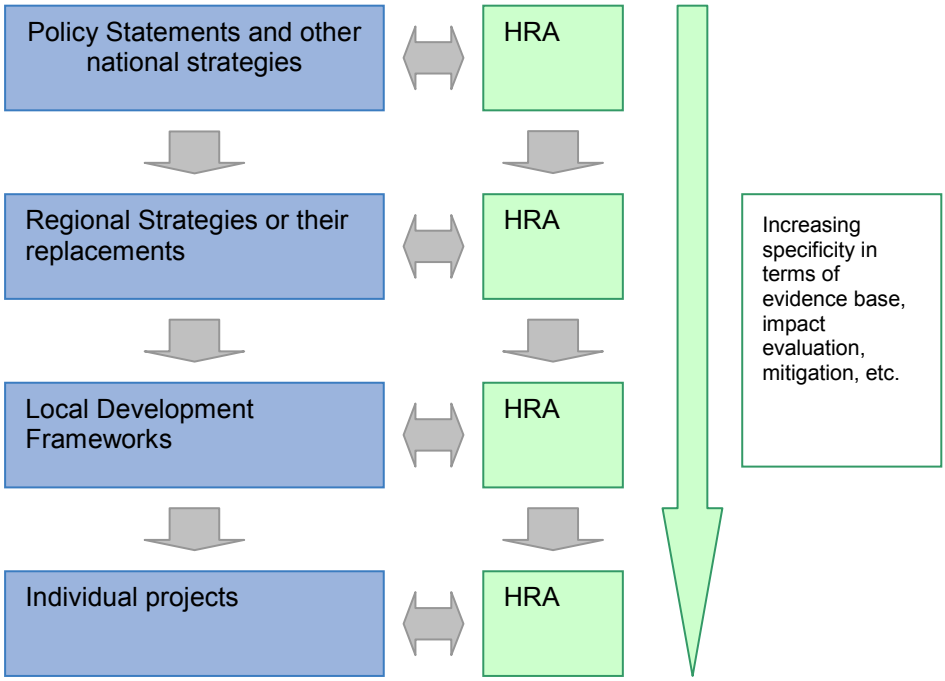


Figure 1: Tiering in HRA of Land Use Plans

The Process of HRA

2.7 The HRA is likely to be carried out in the continuing absence of formal Government guidance. CLG released a consultation paper on AA of Plans in 2006[3]. As yet, no further formal guidance has emerged.

2.8 **Figure 2** 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.

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

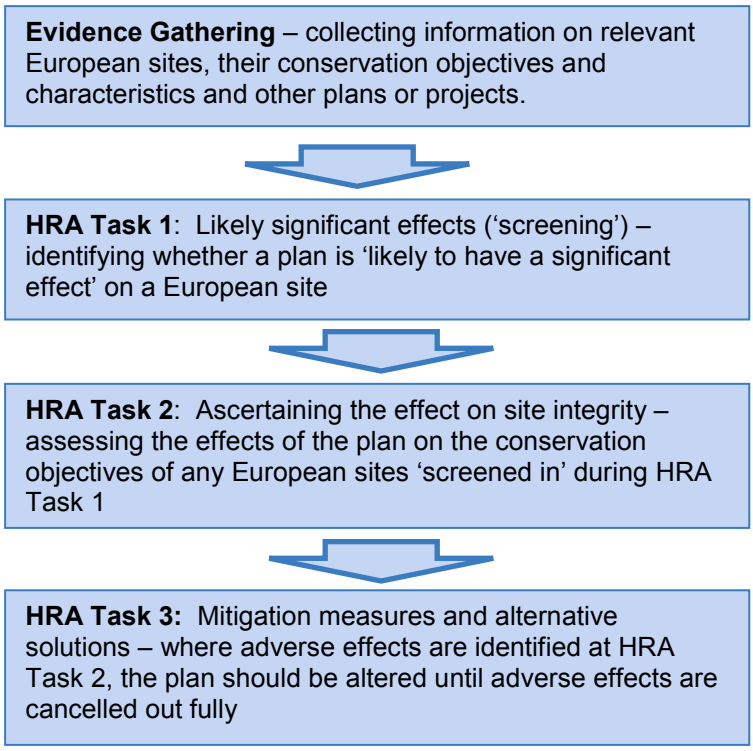


Figure 2: Four-Stage Approach to Habitat Regulations Assessment

2.9 In practice, we and other practitioners have discovered that this broad outline requires some amendment in order to feed into a developing land use plan such as a Core Strategy. The following process has been adopted for carrying out the subsequent stages of the HRA.

Stage Two: Likely Significant Effect Test (Screening)

2.10 The first stage of any Habitat Regulations Assessment is a Likely Significant Effect (LSE) test - essentially a high level 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*?"

2.11 The objective is to 'screen out' those plans and projects (or site allocations/policies) 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 or pathway for an adverse interaction with European sites.

2.12 Habitat Regulations Assessment Interim Screening was undertaken by Wirral Metropolitan Borough Council in November 2009 on the Core Strategy Development Plan Document. The Core Strategy was screened in with respect to likely significant effects on the Natura 2000 sites listed below in Table 1.

2.13 The screening stage is summarised in Appendix 1 to this document which lists the policy number; a summary of the policy itself and the reasons for individual policies being screened in or out in relation to potential impacts on European sites.

Stages 3 and 4: Appropriate Assessment and Mitigation

2.14 With regard to those European sites where it was not considered possible to 'screen out' the Core Strategy without detailed appraisal, it was necessary to progress to the later 'Appropriate Assessment' stage to explore the adverse effects and devise mitigation. The steps involved in this are detailed in Box 2.

Box 2. The steps involved in the Appropriate Assessment exercise undertaken for the Wirral Core Strategy

1. Explore the reasons for the European designation of these sites.
2. Explore the environmental conditions required to maintain the integrity of the selected sites and become familiar with the current trends in these environmental processes.
3. Gain a full understanding of the plan and its policies and consider each policy within the context of the environmental processes – would the policy lead to an impact on any identified process?
4. Decide if the identified impact will lead to an adverse effect.
5. Identify other plans and projects that might affect these sites in combination with the Plan and decide whether any adverse effects that might not result from the Plan in isolation will do so "in combination".
6. Develop measures to avoid the effect entirely or, if not possible, to mitigate the impact sufficiently that its effect on the European site is rendered effectively inconsequential.

2.15 In evaluating significance, Scott Wilson has relied on its professional judgement as well as stakeholder consultation.

2.16 The level of detail concerning developments that will be permitted under land use plans will never be sufficient to make a detailed quantification of adverse effects. Therefore, we have again taken a precautionary approach (in the absence of more precise data) assuming as the default position that if an adverse effect cannot be confidently ruled out, avoidance or mitigation measures must be provided. This is in line with CLG guidance that the level of detail of the assessment, whilst meeting the relevant requirements of the Habitats Regulations, should be 'appropriate' to the level of plan or project that it addresses (see Figure 2 for a summary of this 'tiering' of assessment).

2.17 When undertaking this part of the assessment it is essential to bear in mind the principal intention behind the legislation i.e. to ensure that those projects or plans which in themselves have minor impacts are not simply dismissed on that basis, but are evaluated for any cumulative contribution they may make to an overall significant effect. In practice, in combination assessment is therefore of greatest relevance when the plan would otherwise be screened out because its individual contribution is inconsequential.

Physical scope of the HRA

2.18 The physical scope of the HRA is as shown in Table 1. The location of these European Sites with respect to the Wirral Borough Boundary and Plan Area is illustrated in Figures 3 and 4 (Welsh SAC site locations are shown approximately as, at the time of writing, it was not possible to confirm boundaries with the Countryside Commission of Wales).

2.19 The plan area corresponds to the Wirral Borough Boundary which includes extensive intertidal areas, especially along the Dee and North Wirral coasts. The physical scope has been largely determined by previous HRA Screening on the Issues Visions and Objectives Core Strategy Report (Wirral November 2009) with the opinions of Natural England and Countryside Council for Wales received through consultation on that HRA Screening Report also taken forward. River Eden SAC has been added based on potential water abstraction pathways, identified through wider work undertaken by Scott Wilson.

Table 1: Physical scope of the HRA

European site	Reason for inclusion
Dee Estuary SPA/Ramsar/SAC	Located within Wirral Borough and immediately adjacent to the plan area, with potential pathways of impacts through direct disturbance of qualifying species; waste water discharges; water abstraction; port activity; coastal squeeze and loss of supporting habitat; recreational activities; aerial emissions and renewable energy schemes.
Mersey Estuary SPA/Ramsar	Located within Wirral Borough and immediately adjacent to the plan area, with potential pathways of impacts through direct disturbance of qualifying species; waste water discharges; water abstraction; port activity; coastal squeeze and loss of supporting habitat; Liverpool John Lennon Airport, recreational activities; aerial emissions and renewable energy schemes.
Mersey Narrows and North Wirral Foreshore pSPA/Ramsar	Located within Wirral Borough and immediately adjacent to the plan area, with potential pathways of impacts through direct disturbance of qualifying species; waste water discharges; water abstraction; port activity; coastal squeeze and loss of supporting habitat; recreational activities; aerial emissions and renewable energy schemes.
Liverpool Bay SPA	Located immediately adjacent to the Wirral, with potential pathways of impacts through waste water discharges; port activity; coastal squeeze and loss of supporting habitat; recreational activities and renewable energy schemes.
Sefton Coast SAC	Located within Merseyside with hydraulic connections to the Mersey (within Wirral Borough Core Strategy Area) with potential pathways of impacts through waste water discharges; recreational activities and renewable energy schemes.
Ribble & Alt Estuaries	

SPA and Ramsar site	Located within Merseyside with hydraulic connections to the Mersey (within Wirral Borough Core Strategy Area) with potential pathways of impacts through waste water discharges; port activity; recreational activities and renewable energy schemes.
River Dee & Bala Lake SAC	Located within 15km of Wirral Borough, potential pathways of impacts identified through water abstraction.
Martin Mere SPA	Whilst this is located approximately 20km north of Wirral, any renewable energy policies (e.g. wind turbines), alone or in combination have the potential to affect flight paths of qualifying bird species.
Berwyn and South Clwyd Mountains SAC and Berwyn SPA	Potential pathways of impacts arising through changes in air quality
River Eden SAC	Haweswater Lake (to which the River is hydrologically connected) is likely to form part of the future water supply for Merseyside, so there are potential pathways of impacts through water abstraction.

2.20 No other pathways to European sites have been identified.

2.21 Thought was given to including the following European sites, but these were scoped out of further assessment by previous HRA Screening on the Issues Visions and Objectives Core Strategy Report (Wirral November 2009), in agreement with Natural England and the Countryside Council for Wales. No realistic pathway has been identified between the Core Strategy and these sites.

- Deeside and Buckley Newt Site SAC
- Halkyn Mountain Newt Site SAC
- Alyn Valley Woods SAC
- Oak Mere SAC
- West Midland Mosses SAC

2.22 Further details regarding the interest features and vulnerabilities of the European sites included within the scope of the HRA are given below.

2.23 All baseline data relating to these European Sites presented in subsequent sections of this Report is taken from Joint Nature Conservancy Council websites (JNCC) unless otherwise stated. A full reference list of sites used is given in Section 15 (References).

The 'in combination' scope

2.24 It is a requirement of the Regulations that the impacts and effects of any land use plan being assessed are not considered in isolation but in combination with other plans and projects that may also be affecting the European site(s) in question. In practice, 'in combination assessment' is of greatest importance when the DPD would otherwise be screened out because the individual contribution is inconsequential. It is neither practical nor necessary to assess the 'in combination' effects of the DPD within the context of all other plans and projects within the region. The principal other plans and projects that we are considering are:

Projects

- Gwynt Y Mor Offshore Windfarm Project;
- Peel Ports 'Super Port';
- Liverpool John Lennon Airport expansion;
- The Mersey Gateway: Proposed 2nd Mersey Crossing (Halton);
- Proposed incinerators at Runcon and Ince Marches;
- Frodsham Windfarm;
- Thornton to Switch Island Link Road;
- Crosby Water Centre, Seaforth Terminal and possible visitor centres at Formby/Marshside;

Plans

- The Wales Spatial Plan;
- Draft West Cheshire and North East Wales Sub-Regional Spatial Strategy (2007);
- Liverpool City Region Renewable Energy Capacity Study;
- North West England & North Wales Shoreline Management Plan 2;
- Liverpool LDF Core Strategy;
- Cheshire West and Chester LDF Core Strategy;
- Knowsley LDF Core Strategy;
- Sefton LDF Core Strategy;
- Halton LDF Core Strategy;
- St Helens Core Strategy;
- Flintshire Unitary Development Plan + Proposed Modifications;
- Denbighshire Unitary Development Plan + Local Development Plan;
- Mersey Heartlands Growth Point Programme of Delivery (Wirral and Liverpool);
- Merseyside Joint Waste Development Plan Document;
- Greater Manchester Joint Waste Development Framework;
- Power from Mersey;
- Dee Catchment Abstraction Management Strategy;
- Dee Draft River Basin Management Plan;

- North West River Basin Management Plan;
- United Utilities Water Resource Management Plan;
- West Lancashire Core Strategy;
- Great Ormes Head to Formby Point Shoreline Management Plan (under review);
- Formby Point to River Wyre Shoreline Management Plan (under review);
- Wales Transport Plan; and
- Liverpool and Wirral Waters Development masterplans.

2.25 In practice, 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 Merseyside authorities Cheshire West and Chester, West Lancashire and North Wales over the lifetime of the Core Strategy, other transport priorities and renewable energy policies.

Table 2. Housing to be delivered within Merseyside under current Core Strategy plans

Local Authority	*Annual housing average*	*Total housing from 2003 to 2021*
Merseyside	**4,470**	**80,460**
Liverpool	1,950	35,100
Knowsley	450	8,100
Halton	600 (until 2017), then 500	12,400
St Helens	570	10,260
Wirral	500	9,000
Sefton	500	9,000[4]

2.26 With regard to the specific issue of water resources, the long distance transfer pathways that exist for the supply of water to the Merseyside area and the fact that these same pathways or water sources also supply parts of North Wales, the West Midlands, Manchester, Cumbria and Cheshire, means that development across a much broader area must be considered in relation to 'in combination' impacts on water resources, as follows:

- North East Wales – specific housing levels to be delivered are not mentioned in the Wales Spatial Plan or its 2008 update but a significant increase is likely;
- Greater Manchester area – 185,800 homes to be delivered across Manchester, Salford, Oldham, Rochdale, Tameside, Stockport, Trafford, Congleton, Macclesfield, Bolton, Bury and Wigan between 2003 and 2021;
- West Midlands – potentially up to 445,600 additional homes across the region until 2026;
- West Cumbria – 11,640 homes to be delivered across Allderdale, Barrow-in-Furness and Copeland between 2003 and 2021;

[4] In addition to the 9,000 to be delivered to 2021, the Core Strategy includes a further 2,500 to be delivered by 2026

- Cheshire – 31,800 homes to be delivered across Crewe & Nantwich, Chester, Ellesmere Port & Neston and Vale Royal between 2003 and 2021, over half (17,955) within Cheshire West and Chester.

2.27 It should be noted that, while the broad potential impacts of these other projects and plans will be considered, we do not propose carrying out HRA on each of these plans – we will however draw upon existing HRAs that have been carried out for surrounding regions and plans.

3 Pathways of Impact

Introduction

3.1 In carrying out an HRA it is important to avoid confining assessment to effectively arbitrary boundaries (such as Local Authority boundaries) but to use an understanding of the various ways in which land use plans can impact on European sites by following the pathways along which development can be connected with European sites, in some cases many kilometres distant. Briefly defined, pathways are routes by which a change in activity associated with a development can lead to an effect upon a European site. It is also important to bear in mind CLG guidance which states that the AA should be '*proportionate to the geographical scope of the [plan policy]*' and that '*an AA need not be done in any more detail, or using more resources, than is useful for its purpose*' (CLG, 2006, p.6[5]).

3.2 The following indirect pathways of impact are considered relevant to the HRA of the Core Strategy.

Disturbance

3.3 Habitat Regulation Assessments of Core Strategies tend to focus on recreational sources of disturbance as a result of new residents or an increasingly aging population with more leisure time available. While this is a key factor, other sources of disturbance associated with an increase in commercial development, road transport adjacent to sensitive sites or increases in shipping and aircraft movement may also result.

3.4 There have been several papers published that empirically demonstrate that damage to vegetation in woodlands and other habitats can be caused by vehicles, walkers, horses and cyclists:

- Wilson & Seney (1994)[6] 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)[7] conducted experimental off-track trampling in 18 closed forest, dwarf scrub and meadow and grassland communities (each tramped between 0 and 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

[5] Department for Communities and Local Government. 2006. *Planning for the Protection of European Sites: Appropriate Assessment*. http://www.communities.gov.uk/index.asp?id=1502244
[6] 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
[7] 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

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 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)[8] 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)[9] 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.

3.5 The total volume of dog faeces deposited on sites can be surprisingly large. For example, at Burnham Beeches National Nature Reserve over one year, Barnard[10] estimated the total amounts of urine and faeces from dogs as 30,000 litres and 60 tonnes respectively. The specific impact on the New Forest has not been quantified from local studies; however, the fact that habitats for which the SAC is designated appear to already be subject to excessive nitrogen deposition[11], suggests that any additional source of nutrient enrichment (including uncollected dog faeces) will make a cumulative contribution to overall enrichment. In sites that are heavily used by dog walkers, degradation of valuable habitat types near car parks, entrance points and tracks can be seen that is attributable to nutrient enrichment. Such enrichment is visible near the main car parks around Chobham Common NNR in Surrey, for example, where heathland is lost and coarse grasses predominates. Any such contribution must then be considered within the context of other recreational sources of impact on sites.

Direct disturbance of wildlife

3.6 This section concerns itself primarily with bird disturbance as the only other animal for which internationally important sites covered in this report are designated are the great crested newt and natterjack toad, which are relatively unaffected by noise and visual activity associated with recreation.

Breeding birds

3.7 Concern regarding the effects of disturbance on birds stems from the fact that they are expending energy unnecessarily and the time they spend responding to disturbance is

[8] 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.
[9] 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
[10] Barnard, A. (2003) Getting the Facts - Dog Walking and Visitor Number Surveys at Burnham Beeches and their Implications for the Management Process. Countryside Recreation, 11, 16 - 19
[11] UK Air Pollution Information Ssystem. www.apis.ac.uk

time that is not spent feeding[12]. 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[13]. Moreover, the more time a breeding bird spends disturbed from its nest, the more its eggs are likely to cool and the more vulnerable they, or any nestlings, are to predators.

Wintering birds

3.8 The potential for disturbance may be less in winter than in summer, in that there are often a smaller number of recreational users. In addition, the consequences of disturbance at a population level may be reduced because birds are not breeding. However, winter activity can still cause important disturbance, especially as birds are particularly vulnerable at this time of year due to food shortages, such that disturbance which results in abandonment of suitable feeding areas through disturbance can have severe consequences. Several empirical studies have, through correlative analysis, demonstrated that out-of-season (October-March) recreational activity can result in quantifiable disturbance:

- Tuite et al[14] found that during periods of high recreational activity, bird numbers at Llangorse Lake decreased by 30% as the morning progressed, matching the increase in recreational activity towards midday. During periods of low recreational activity, however, no change in numbers was observed as the morning progressed. 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[15] 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[16] 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 observed greater recreational activity on surrounding water bodies at weekends relative to week days. However, in this study, recreational activity was not quantified in detail, nor were individual recreational activities evaluated separately.
- Tuite et al[17] 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

[12] Riddington, R. *et al.* 1996. The impact of disturbance on the behaviour and energy budgets of Brent geese. *Bird Study* 43:269-279
[13] Gill, J.A., Sutherland, W.J. & Norris, K. 1998. The consequences of human disturbance for estuarine birds. *RSPB Conservation Review* 12: 67-72
[14] 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
[15] 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
[16] 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
[17] 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

of the most sensitive species to disturbance. The greatest impact on winter wildfowl numbers was associated with sailing/windsurfing and rowing.

Other activities causing disturbance

3.9 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[18].

3.10 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 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[19].

3.11 Activities other than recreation may also lead to disturbance of wildlife. Of relevance to the Wirral Core Strategy for example would be noise and visual disturbance from ports and airports, and potentially disturbance from wind farms. Disturbance and displacement from feeding and areas has been demonstrated with regard to wintering geese[20], curlew and hen harriers[21].

3.12 The sensitivity of wildlife to the noise of roads and aircraft varies greatly from species to species. However road and airport/aircraft noise can cause some wildlife – notably a range of grassland and woodland birds - to avoid areas near them, reducing the density of those animal populations[22]. Elsewhere, reduced breeding success has been recorded.

3.13 Large structures (e.g. a new bridge over the Mersey Estuary, offshore and onshore wind turbines), have the potential to alter bird flight paths (e.g. hunting flight paths for raptors, bird migratory paths, regular flight paths between roosting and feeding sites, and foraging routes for bats etc. This may result in a collision risk barrier effect or displacement which could make birds either vulnerable to predation or loss of vital energy stores.

3.14 Animals can also be disturbed by the movement of ships. For instance, a DTI study of birds of the North West coast noted that: "Divers and scoters were absent from the mouths of some busier estuaries, notably the Mersey... Both species are known to be susceptible to disturbance from boats, and their relative scarcity in these areas... may in part reflect the volume of boat traffic in these areas"[23].

3.15 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

[18] Riley, J. 2003. Review of Recreational Disturbance Research on Selected Wildlife in Scotland. Scottish Natural Heritage.
[19] 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
[20] Langston, R.H.W & Pullan, J.D. (2003). Effects of Wind Farms on Birds: Nature and Environment No. 139. Council of Europe.
[21] Madders, M. & Whitfield, D.P. 2006. Upland raptors and the assessment of wind farm impacts. Ibis 148 (Suppl. 1), 43-56.
[22] Kaseloo, P. A. and K. O. Tyson. 2004. Synthesis of Noise Effects on Wildlife Populations. FHWA Report.
[23] DTI (2006). Aerial Surveys of Waterbirds in Strategic Wind Farm Areas: 2004/05 Final Report

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.

3.16 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.

3.17 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 3, which compiles 'tolerance distances' from across the literature. 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. Tolerance distances are unknown for many birds and simple extrapolation to other species is not advised.

Table 3 - 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. [1] Tydeman (1978), [2] Keller (1989), [3] Van der Meer (1985), [4] Wolff et al (1982), [5] Blankestijn et al (1986).[24]

	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]	
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]

[24] Tydeman, C.F. 1978. *Gravel Pits as conservation areas for breeding bird communities*. PhD thesis. Bedford College
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
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.
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
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
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]

Mechanical/abrasive damage and nutrient enrichment

3.18 Most types of aquatic or terrestrial European sites can be affected by trampling, which in turn causes soil compaction and erosion. Walkers with dogs contribute to pressure on sites through nutrient enrichment via dog fouling and also have potential to cause greater disturbance to fauna as dogs are less likely to keep to marked footpaths and also tend to move in a more erratic manner. Motorcycle scrambling and off-road vehicle use can cause more serious erosion, as well as disturbance to sensitive species. Boats can also cause some mechanical damage to intertidal habitats through grounding.

Atmospheric pollution

3.19 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.

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.)	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.
Nitrogen oxides	Nitrogen oxides are mostly produced in	Deposition of nitrogen compounds

Pollutant	Source	Effects on habitats and species
NO_x	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.	(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.

3.20 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) as shipping.

3.21 Ammonia emissions are dominated by agriculture, with some chemical processes also making notable contributions. As such, it is unlikely that material increases in SO_2 or NH_3 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[25]. Emissions of NOx could therefore be reasonably expected to increase as a result of greater vehicle use as an indirect effect of the LDF.

3.22 According to the World Health Organisation, the critical NOx concentration (critical threshold) for the protection of vegetation is 30 μgm^{-3}; the threshold for sulphur dioxide

[25] 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

is 20 μgm^{-3}. In addition, ecological studies have determined 'critical loads'[26] of atmospheric nitrogen deposition (that is, NOx combined with ammonia NH_3).

3.23 The National Expert Group on Transboundary Air Pollution (2001)[27] 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 SO_2 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 SO_2.
- 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.

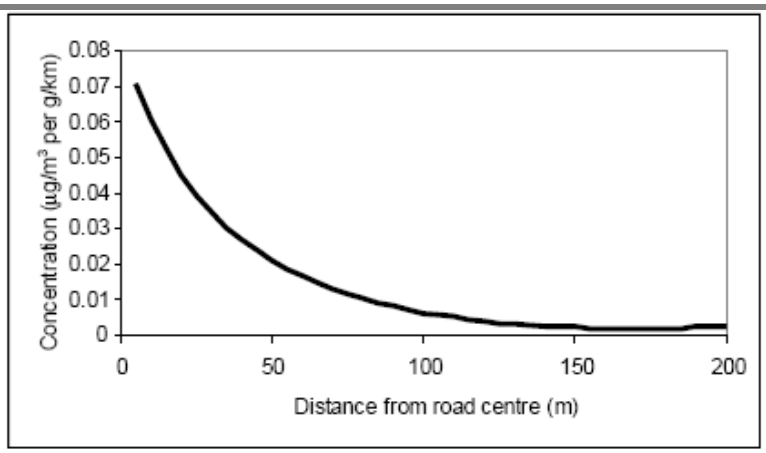
3.24 Grice et al[28] [29] do however suggest that air quality in the UK will improve significantly over the next 15 years due primarily to reduced emissions from road transport and power stations.

Local air pollution

3.25 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*"[30].

Figure 5. Traffic contribution to concentrations of pollutants at different distances from a road (Source: DfT)

[26] The critical load is the rate of deposition beyond which research indicates that adverse effects can reasonably be expected to occur
[27] National Expert Group on Transboundary Air Pollution (2001) Transboundary Air Pollution: Acidification, Eutrophication and Ground-Level Ozone in the UK.
[28] 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.
[29] 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.
[30] www.webtag.org.uk/archive/feb04/pdf/feb04-333.pdf



3.26 This distance (200m) 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 traffic generated by development under the Core Strategy. Such a distance threshold cannot currently be applied to shipping emissions and we must therefore restrict ourselves to assuming that the presence of a pathway indicates a possible issue.

Diffuse air pollution

3.27 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 range locally acting pollutants'* [31] 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.

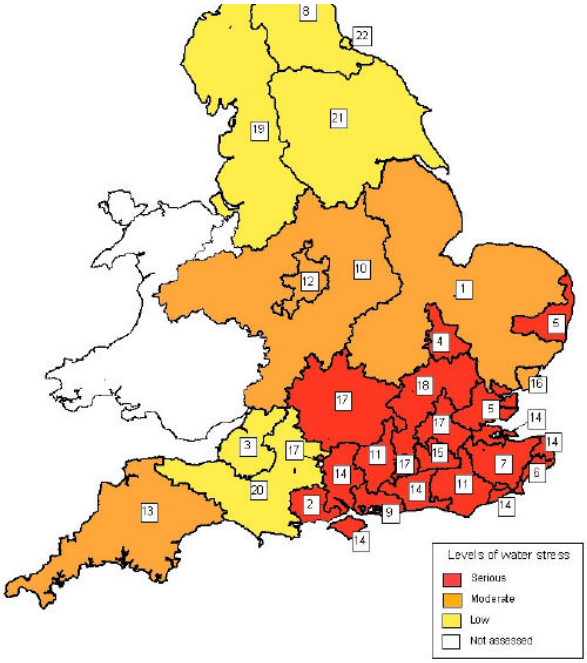
3.28 In the light of this and our own knowledge and experience, it is considered reasonable to conclude that it must be the responsibility of higher-tier plans to set a policy framework for addressing the cumulative diffuse pan-authority air quality impacts, partly because such impacts stem from the 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.

[31] English Nature (16 May 2006) letter to Runnymede Borough Council, 'Conservation (Natural Habitats &c.) Regulations 1994, Runnymede Borough Council Local Development Framework'.

Water resources

3.29 The North West is generally an area of low water stress (see Figure 6).

Figure 6. Areas of water stress within England. It can be seen from this map that Merseyside is classified as being an area of low water stress (coded yellow).[32]



3.30 Initial investigation indicates that Wirral lies within United Utilities' Integrated Resource Zone which serves 6.5 million people in south Cumbria, Lancashire, Greater Manchester, Merseyside and most of Cheshire. The Integrated Zone is supplied with around 1800 Ml/d of drinking water, of which about 500 Ml/d comes from water sources in Wales, about 600 Ml/d comes from sources in Cumbria, and the rest from sources in other parts of North West England. It constitutes a large integrated supply network that enables substantial flexibility in distributing supplies within the zone. The construction of the 'west to east link' will further aid this flexibility and thus break the traditional division in which Greater Manchester received water from Cumbria and Merseyside received water from the River Dee (which lies partly in England and partly in Wales) and from purely Welsh sources (e.g. Lake Vyrnwy).

3.31 In exploring water resource issues relating to Welsh European sites for St Helens Council, we determined from United Utilities that approximately 75% of St. Helens potable water supply is currently abstracted from the River Dee, 20% is abstracted from Lake Vyrnwy and only 5% is abstracted from sites in Cumbria. It is likely that similar proportions relate to Wirral although this is likely to change in the future as a result of the greater flexibility provided by the west-east link. In any case, Cumbrian and Welsh sources will still be involved in one ratio or another in water supply to Wirral.

[32] Figure adapted from Environment Agency. 2007. Identifying Areas of Water Stress. http://publications.environment-agency.gov.uk/pdf/GEHO0107BLUT-e-e.pdf

3.32 The River Dee is a Special Area of Conservation and flows into the Dee Estuary which is also designated as a SAC as well as a SPA (and pSPA extension) and Ramsar site. Four water companies abstract from sources that affect the River Dee including United Utilities (UU), Dee Water Valley, Welsh Water and Severn Trent Water. Excessive abstraction from the Dee could therefore result in sufficient drawdown of water to damage the interest features of the River Dee and Bala Lake SAC (through desiccation, fish entrapment or a deterioration in water quality due to the lower proportion of freshwater to sediment) and in turn reduce freshwater flows into the Dee Estuary to such a degree as to damage the interest features of that site through an increase in salinity.

3.33 In the future as a result of the west-east link, Merseyside (including Wirral) will obtain a much greater proportion of its water supply from Lake District sources. This is likely to involve Haweswater as a principal reservoir. Haweswater is within the catchment of the River Eden SAC and thus we have also included consideration of drawdown and reduced flow impacts on this designated site in this report.

Water quality

3.34 The Sewage Treatment Works (STWs) that serve Wirral all discharge into the Mersey downstream of the Mersey Estuary SPA/Ramsar site and upstream of the Liverpool Bay pSPA and within close proximity to the Mersey Narrows & North Wirral Foreshore SPA and pRamsar, with the exception of the Heswall STW which discharges into the Dee Estuary SPA/SAC/Ramsar site.

3.35 Increased amounts of housing or business development can lead to reduced water quality of rivers and estuarine environments. Sewage and industrial effluent discharges can contribute to increased nutrients on European sites leading to unfavourable conditions. In addition, diffuse aquatic pollution, partly from urban run-off, has been identified during an Environment Agency Review of Consents process as being a major factor in causing unfavourable condition of European sites.

3.36 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:

- 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; in the freshwater environment, phosphorus is usually a principal cause of eutrophication.
- 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, and subsequently bird life.

- Increased discharge of treated sewage effluent can result both in greater scour (as a result of greater flow volumes) and in high levels of macroalgal growth, which can smother the mudflats of value to SPA birds.

3.37 For sewage treatment works close to capacity, further development may increase the risk of effluent escape into aquatic environments. In many urban areas, sewage treatment and surface water drainage systems are combined, and therefore a predicted increase in flood and storm events could increase pollution risk.

3.38 However, it is also important to note that the situation is not always simple – for sites designated for waterfowl, a STW discharge can actually be a useful source of food and birds will often congregate around the outfall[33]. In addition, while nutrient enrichment does cause considerable problems on the south coast (particularly in the Solent) due to the abundance of smothering macroalgae that is produced, it is not necessarily a problem in other areas where the macroalgae are broken up by tidal wave action and where colder and more turbid water limit the build-up in the first place.

3.39 Nonetheless, at this screening stage water quality impacts are considered to be an issue that requires investigation.

Port and Channel Construction, Maintenance Shipping and Dredging

3.40 The construction and maintenance of ports and inland shipping channels poses a number of environmental risks[34]. Of particular importance is the dredging necessary to permit large vessels to enter ports, or to maintain inland channels. In natural estuaries and harbours, there is a balance between sediment transported out to sea and that which flows in with rivers and runoff, which tends to maintain an equilibrium depth. Often this is not deep enough to allow vessels safe passage, so navigational channels and harbours are dredged to deepen them. Because natural forces will tend to build up sediment until the channels and port return to their equilibrium, dredging to maintain safe depth is an ongoing maintenance activity. The need for such dredging is likely to increase in the future as ships become larger and require deeper ports or as inland water transport grows in importance.

3.41 Dredging poses direct threats to the areas in which it occurs. It introduces sediment into the adjacent water column, which is then re-deposited on the bottom. This has a variety of usually short-term effects on pelagic fish and the benthic community. The suspended sediment increases turbidity, decreasing light penetration and photosynthetic activity. Dredging can also have longer term effects on water circulation patterns, particularly in estuarine areas where water circulation determines the distribution of fresh and salt water, patterns of dissolved oxygen, and other water quality parameters. Changes in salinity can affect the viability of freshwater wetlands and tidal marshes, with consequent impacts on the distribution of marine life. Changes in water circulation patterns can also alter sediment accumulation, thus affecting all ecosystems in the immediate area[35].

[33] Anecdotal observation from the authors work on numerous sewage treatment works around the county (particularly London) and bird surveys undertaken by the author and colleagues on such sites

[34] OECD (ORGANISATION FOR ECONOMIC CO-OPERATION AND DEVELOPMENT (1997) The Environmental Effects of Freight available from http://www.oecd.org/dataoecd/14/3/2386636.pdf (Accessed June 2010)(p17)

[35] Marine Board, Commission on Engineering and Technical Systems, National Research Council (1985), Dredging Coastal Ports: An Assessment of the Issues. (Washington, D.C.: National Academy Press) (pp124-128)

3.42 Dredging for marine minerals has occurred in UK waters for many years, in response to the need for sand and gravel used as construction aggregate and for beach replenishment, including the Mersey. Mersey Silt has historically been identified as having a possible contribution to the supply of construction aggregates in north-west England[36] including as a concreting or mortaring sand as coarse aggregate or bricks.

3.43 The development of Ports and greater use of shipping for freight has the potential to result in disturbance of sediment releasing legacy heavy metal pollution (mercury, lead, cadmium and other poisons) that is bound into the sediment, or other introduction of these metals. Policies that encourage more freight by shipping also have the potential to result in pollution through fuel emissions, and accidental spillages.

3.44 As a precaution these pathways have been considered in this report.

Coastal squeeze

3.45 Rising sea levels can be expected to cause intertidal habitats (principally saltmarsh, sand dunes and intertidal mudflats) to migrate landwards. However, in built-up areas, such landward retreat is often rendered impossible due the presence of the sea wall and other flood defences. In addition, development frequently takes place immediately behind the sea wall, so that the flood defences cannot be moved landwards to accommodate managed retreat of threatened habitats. The net result is that the quantity of saltmarsh, sand dunes and mudflat adjacent to built-up areas will progressively decrease as sea levels rise. This process is known as 'coastal squeeze'. In areas where sediment availability is reduced, the 'squeeze' also includes an increasingly steep beach profile and foreshortening of the seaward zones.

3.46 Intertidal habitat loss is mainly occurring in the south and east of the country, particularly between the Humber and Severn. Northwest England, south Wales, the Solent in Hampshire, the southeast around the Thames estuary and large parts of East Anglia are also affected but to a lesser degree.

3.47 Defra's current national assessment is that the creation of an annual average of at least 100 ha of intertidal habitat associated with European sites in England that are subject to coastal squeeze, together with any more specifically identified measures to replace losses of terrestrial and supra-tidal habitats, is likely to be required to protect the overall coherence of the Natura 2000 network. This assessment takes account of intertidal habitat loss from European sites in England that is caused by a combination of all flood risk management structures and sea level rise. The assessment will be kept under review taking account of the certainty of any adverse effects and monitoring of the actual impacts of plans and projects[16].

3.48 Coastal squeeze cannot be assessed in detail until actual site allocations exist, but it can be at least broadly considered in the HRA of the Core Strategy.

Summary of Screening

3.49 All preferred options within the Core Strategy were screened for potential conflicts within European sites. A number of the preferred options were 'screened out' as there

[36] P.F.G. Banfill* and A.C. Benson (Department of Building Engineering),(1979). Alternative aggregate materials: Properties of Mersey Silt Building and Environment (Volume 14, Issue 3, 1979, Pages 203-208)
[16] Defra. 2005. Coastal Squeeze – Implications for Flood Management.
http://www.defra.gov.uk/environ/fcd/policy/csqueeze.pdf

was no potential for any of these policy options to result in adverse effects on European sites. The full screening table for the preferred options is contained within Appendix 1.

3.50 The following preferred option policies were deemed to require consideration as they may lead to adverse effects on European sites, generally because they promote and determine the location or scale of development (particularly housing and commercial development):

- 2: Settlement Area Policies
- 3: Spatial Vision (with respect to the following Spatial Objectives):
  - Spatial Objective 1 - Economic Revitalisation
  - Spatial Objective 2 - Housing Growth and Market Renewal
  - Spatial Objective 7 - New City Neighbourhood
- 4: Broad Spatial Strategy
- 5: Local Housing Targets
- 6: Distribution of Housing
- 8: Order of Preference
- 10: Gypsies and Travellers
- 11: Distribution of Employment
- 12: Retail Network
- 14: Decentralised Energy
- 21: Strategic Locations

3.51 It should be noted that only policies that have the potential for negative impacts on European sites are screened in for assessment. Those policies that might have a beneficial effect are referred to where appropriate in the following chapters, but have not been actually assessed. This is due to the fact that HRA is only concerned with adverse effects.

4 The Dee Estuary SAC, SPA & Ramsar site, pSPA Extension

4.1 The Dee Estuary SPA, Ramsar site and SAC is located immediately adjacent to the Plan area within the Wirral Borough Boundary (See Figures 3 and 4). An extension to the Dee Estuary forms a proposed SPA[37]. The Dee is a large funnel-shaped sheltered estuary and is one of the top five estuaries in the UK for wintering and passage waterfowl populations. The Dee Estuary site covers over 13,000ha and is the largest macro-tidal coastal plain Estuary between the larger Severn Estuary and the Solway Firth. The Dee Estuary is hyper-tidal with a mean spring tidal range of 7.7m at the mouth. The site has extensive areas of intertidal sand-flats, mud-flats and saltmarsh. In areas where agricultural use has not occurred, the saltmarshes grade into transitional brackish and swamp vegetation on the upper shore. The site also supports three sandstone islands (the Hilbre islands) which have important cliff vegetation and maritime heathland and grassland. The two sides of the Estuary show a marked difference between the industrialised usage of the Welsh coastal belt and the residential and recreational English side.

4.2 The Dee Estuary supports internationally important numbers of waterfowl and waders. The estuary is an accreting system and the extent of saltmarsh continues to expand as the estuary seeks to achieve a new equilibrium situation following large-scale historical land-claim at the head of the estuary which commenced in the 1730s. Nevertheless, the estuary still supports extensive areas of intertidal sand and mudflats as well as saltmarsh. Where land-claim has not occurred, the saltmarshes grade into transitional brackish and freshwater swamp vegetation, on the upper shore. The site includes the three sandstone islands of Hilbre with their important cliff vegetation and maritime heathland/grassland. The site also includes an assemblage of nationally scarce plants and the sandhill rustic moth *Luperina nickerlii gueneei*, a British Red Data Book species. The two shorelines of the estuary show a marked contrast between the industrialised usage of the coastal belt in Wales and residential and recreational usage in England.

Reasons for Designation

4.3 The Dee Estuary qualifies as a SAC for both habitats and species. Firstly, the site contains the following Habitats Directive Annex I habitats:

- Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation;
- Mudflats and sandflats not covered by seawater at low tide;
- *Salicornia* and other annuals colonising mud and sand - The Dee Estuary is representative of pioneer glasswort *Salicornia spp.* saltmarsh in the north-west of the UK. *Salicornia spp*. saltmarsh forms extensive stands in the Dee, especially on the more sandy muds where there is reduced tidal scour. It mainly occurs on the seaward fringes as a pioneer community, and moving landwards usually forms a transition to common saltmarsh-grass *Puccinellia maritima* saltmarsh (SM10). There is also a low frequency of *Salicornia spp*. extending well inland. Associated species often include annual sea-blite *Suaeda maritima* and hybrid scurvy grass *Cochlearia x hollandica*.

[37] Barbara McCarthy, Natural England (2009), *Pers. comms*, Telephone call 5th June 2009

- Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) - The Dee Estuary is representative of H1330 Atlantic salt meadows in the north-west of the UK. It forms the most extensive type of saltmarsh in the Dee, and since the 1980s it has probably displaced very large quantities of the non-native common cord-grass *Spartina anglica*. The high accretion rates found in the estuary are likely to favour further development of this type of vegetation. The saltmarsh is regularly inundated by the sea; characteristic salt-tolerant perennial flowering plant species include common saltmarsh-grass *Puccinellia maritima*, sea aster *Aster tripolium*, and sea arrowgrass *Triglochin maritima*. In a few areas there are unusual transitions to wet woodland habitats.

4.4 Secondly, the site contains the following Habitats Directive Annex II habitats and species:

- Estuaries
- Annual vegetation of drift lines
- Vegetated sea cliffs of the Atlantic and Baltic coasts
- Embryonic shifting dunes
- Shifting dunes along the shoreline with *Ammophila arenaria* (`white dunes`)
- Fixed dunes with herbaceous vegetation (`grey dunes`)
- Humid dune slacks
- Sea lamprey *Petromyzon marinus*
- River lamprey *Lampetra fluviatilis*
- Petalwort *Petalophyllum ralfsii*

4.5 The Dee Estuary also qualifies as a SPA supporting:

During the breeding season:

- Common Tern *Sterna hirundo*, 277 pairs representing at least 2.3% of the breeding population in Great Britain (5 year mean 1991-95);
- Little Tern *Sterna albifrons*, 56 pairs representing at least 2.3% of the breeding population in Great Britain (RSPB, 5 year mean 1991-95).

On passage:

- Sandwich Tern Sterna *sandvicensis,* 818 individuals representing at least 5.8% of the population in Great Britain (5 year mean 1991-95);
- Redshank *Tringa totanus*, 8,451 individuals representing at least 4.8% of the Eastern Atlantic - wintering population (5 year peak mean 1991/2 - 1995/6).

Over winter:

- Bar-tailed Godwit *Limosa lapponica*, 1,013 individuals representing at least 1.9% of the wintering population in Great Britain (5 year peak mean 1991/2 - 1995/6)

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

- Black-tailed Godwit *Limosa limosa islandica*, 1,739 individuals representing at least 2.5% of the wintering Iceland - breeding population (5 year peak mean 1991/2 - 1995/6);
- Curlew *Numenius arquata*, 4,028 individuals representing at least 1.2% of the wintering Europe - breeding population (5 year peak mean 1991/2 - 1995/6);
- Dunlin *Calidris alpina alpina*, 22,479 individuals representing at least 1.6% of the wintering Northern Siberia/Europe/Western Africa population (5 year peak mean 1991/2 - 1995/6);
- Grey Plover *Pluvialis squatarola*, 2,193 individuals representing at least 1.5% of the wintering Eastern Atlantic - wintering population (5 year peak mean 1991/2 - 1995/6);
- Knot *Calidris canutus*, 21,553 individuals representing at least 6.2% of the wintering Northeastern Canada/Greenland/Iceland/Northwestern Europe population (5 year peak mean 1991/2 - 1995/6);
- Oystercatcher *Haematopus ostralegus*, 28,434 individuals representing at least 3.2% of the wintering Europe & Northern/Western Africa population (5 year peak mean 1991/2 - 1995/6);
- Pintail *Anas acuta*, 6,498 individuals representing at least 10.8% of the wintering Northwestern Europe population (5 year peak mean 1991/2 - 1995/6);
- Redshank *Tringa totanus*, 6,382 individuals representing at least 4.3% of the wintering Eastern Atlantic - wintering population (5 year peak mean 1991/2 - 1995/6);
- Shelduck *Tadorna tadorna*, 6,827 individuals representing at least 2.3% of the wintering Northwestern Europe population (5 year peak mean 1991/2 - 1995/6);
- Teal *Anas crecca*, 5,918 individuals representing at least 1.5% of the wintering Northwestern Europe population (5 year peak mean 1991/2 - 1995/6);

4.7 The Dee Estuary is also designated as a SPA for regularly supporting 130,408 individual waterfowl (5 year peak mean 1991/2 - 1995/6)[38].

4.8 In addition to the SPA designation the Dee Estuary is also designated as a Ramsar site by meeting Ramsar criteria 1, 5 and 6 as follows:

- Extensive intertidal mud and sand flats (20 km by 9 km) with large expanses of saltmarsh towards the head of the estuary;
- Supporting an overall bird assemblage of international importance; and
- Supporting the following species at levels of international importance: shelduck, oystercatcher, curlew, redshank, teal, pintail, grey plover, red knot, dunlin, bar-tailed godwit, black-tailed godwit and turnstone.

4.9 The historic trends and current pressures on the site are summarised below.

Historic Trends and Current Pressures

4.10 The majority of the site is in the ownership and sympathetic management of public bodies and voluntary conservation organisations. Unlike most western estuaries,

[38] The Ramsar citation sheet identifies the waterfowl population as 74,230 using slightly more recent data (5 year peak mean 1998/99-2002/2003). However, this is still more than the 20,000 needed for consideration as being internationally important.

sizeable areas of saltmarsh in the Dee remain ungrazed and therefore plant species that are susceptible to grazing are widespread. This distinctive flora would therefore be sensitive to an increase in grazing pressure. The intertidal and subtidal habitats of the estuary are broadly subject to natural successional change, although shellfisheries and dredging are a current concern. Threats to the estuary's conservation come from its industrialised shorelines on the Welsh side and the impact of adjacent historic industrial use. These include land contamination from chemical and steel manufacture and localised water quality problems. Remediation works are being undertaken. Contemporary issues relate to dock development and navigational dredging, coastal defence works and their impact on coastal process, regulation of shellfisheries, and the recreational use of sand dunes and saltmarshes.

4.11 The environmental pressures upon the Dee Estuary SAC, SPA & Ramsar site are mainly:

- overgrazing of ungrazed/little grazed saltmarsh;
- certain recreational activities in sensitive areas at sensitive times such as shellfishing (in terms of loss of material from the food chain) and dog walking (in terms of disturbance of waterfowl)
- water quality threats from ex-industrial usage and agriculture;
- physical loss and alteration of coastal processes due to navigational dredging;
- 'coastal squeeze' from land reclamation and coastal flood defences and drainage used in order to develop coastal land, and from sea level rise;
- introduction of non-native species; and
- risk of excessive abstraction resulting in a decrease in freshwater flows into the estuary, reducing drinking and bathing habitat for birds and increasing the salinity in localised areas.

Summary Screening: Key potential pressures from Wirral

4.12 The following potential impacts of the LDF Core Strategy upon Dee Estuary SAC/SPA/Ramsar were identified during the summary screening detailed in Appendix 1. These are:

- direct disturbance to qualifying bird species;
- waste water discharges;
- water abstraction;
- dock, port and channel construction, maintenance shipping and dredging;
- coastal squeeze and loss of supporting habitat,
- recreational activities;
- air pollution; and
- renewable energy.

Appropriate Assessment

Direct Disturbance of Qualifying Bird Species and Damage to Habitat

Appropriate Assessment

4.13 Policies within the Core Strategy seek to target tourism and recreation on the coastline (Policy 4 Spatial Strategy). It should be noted that whilst the Core Strategy does seek to provide a net gain of 3,750 dwellings, the population of Wirral or other Boroughs within Merseyside is not actually expected to increase over the lifetime of the Core Strategy. However there will be a demographic shift from a younger population to an older population. It could be argued that an ageing population will have more leisure time to engage in recreational activities. This is particularly the case when considering that for the purposes of HRA development within Wirral must not be considered in isolation but in combination with the 70,000 dwellings that will be delivered across Merseyside and those to be delivered in North Wales over the same time period under other Local Development Framework Core Strategies.

4.14 Exposure to abrasion varies across the Dee Estuary and it can be attributed to three main sources, one of which is recreational pressures focussed on the upper shore (the other two sources are dredging operations and fisheries (in particular the commercial gathering of cockles)). Abrasion from recreational activity is considered to result in a deterioration of[39]:

- the following SAC features: estuary; intertidal mudflats; and sandflats, Atlantic salt meadow, annual vegetation and drift lines.
- the following SPA interest features: Annex 1 Species; Migratory species; waterbird assemblages; and
- the following Ramsar site interest features: Criterion 5 (Regularly supports 20,000 or more waterbird species) and Criterion 6 (Regularly supports 1% or more of a species or sub-species of waterbird)

4.15 Abrasion can physically damage individual marine organisms and plants, as well as causing deterioration to the structure of saltmarshes and sediment communities. The sensitivity to abrasion is moderate for the majority of the estuary's features, though annual vegetation of drift lines is highly sensitive to abrasion due to the potential for damage to succulent plants and their root systems. Abrasion of muddy soft sediment communities can alter the habitat structure and may lead to a change in species composition, though clean sand communities have only low sensitivity. Excessive damage may ultimately result in the destabilisation of the sediment and lead to rapid erosion. Lampreys and hard substrate communities are considered to have a low sensitivity to the effects of abrasion.

4.16 Bait digging for lugworms and collection of razor fish, as with cockling, disturb the sediment through digging and to a lesser extent trampling. They may be sustainable where traditional methods are employed; however, a distinction should be made between traditional activities and commercial exploitation of the resource. The latter may impact on the favourable condition of the European marine site.

[39] Natural England, Countryside Council for Wales and Welsh Assembly Government (January 2010) 'The Dee Estuary European Marine Site'

4.17 Walking, horse riding, use of motorcycles, quad biking, and sand yachts which contribute to abrasion, in particular during the summer months between Gronant and Point of Ayr and between West Kirby and Hoylake.

4.18 Annex I species, important migratory species and species of the waterbird assemblage are all considered highly vulnerable to abrasion of the intertidal mudflats and sandflats. Similarly all groups are considered moderately vulnerable to the abrasion of shingle ridges, though as a result of different combinations of sensitivity and exposure.

4.19 Birds utilising areas of saltmarsh within the estuary are considered to have a medium exposure to disturbance. As with the intertidal mud and sand flats much disturbance is associated with recreational activities occurring towards the top of the marsh, including dog walking, fishing, motorcycle scrambling and the flying of model aircraft. Noise from recreational activities also results in disturbance to Annex 1 species utilising habitats between the Gronant dune system at Talacre and the shingle spit at Point of Ayr.

4.20 New residential developments, leading to an increase in population, and provision of green infrastructure may lead to increased use of areas both within Natura 2000 sites, and other areas that support qualifying bird species. Waterside development projects also have the potential to cause direct disturbance to birds during both the construction process, and in the long term through sustained use of areas adjacent to regular feeding or roosting areas. There are likely to be cumulative disturbance impacts to birds through an increase in noise, vibration and lighting, as well as disturbance or injury from pets such as dogs and cats.

4.21 The majority of the western coastline of the Wirral has been identified as important for a number of qualifying bird species, with important feeding sites for mixed waders adjacent to the coastline from Heswall up to Hoylake, while valuable feeding sites for lapwing are identified around Little Neston and Parkgate. High water roost sites for a number of wader species have also been identified close to Heswall and West Kirby, with grey plover and bar-tailed godwit preferring land to the north of Wirral at West Kirby, while black-tailed godwit prefer the area adjacent to the coastline at Heswall. Teal and pintail favour feeding and loafing sites adjacent to and to the south of Heswall while there is an important low water feeding area for shelduck close to the shore between Heswall and West Kirby.[40]

4.22 Waterside developments, in particular, also have the potential to impact on qualifying bird species through both direct habitat loss of important roosting/feeding areas outside of existing Natura 2000 sites and through alteration of the landscape, affecting viewlines.

4.23 In meeting the needs of gypsies and travellers (Policy 10), HRA Screening identified a pathway for direct disturbance on the Dee Estuary SAC/SPA/Ramsar/pSPA Extension, depending on the location of allocated sites. However, this policy does state that the criteria for setting out the determination of planning applications for this are likely to include other environmental considerations.

4.24 The Core Strategy will include a general policy to encourage energy efficiency and the use and development of renewable, decentralised and low carbon energy within the Wirral (Policy 14). HRA Screening identified that, should this include wind turbine construction, a pathway exists through the construction of onshore/offshore turbines to disrupt flight paths and displace qualifying bird species. Disturbance issues associated

[40] Dee Estuary European Site. Regulation 33 Advice Jan 2010

with maintenance activities were also identified. However, impacts from wind turbine developments depend greatly on the siting of the turbines and no specific sites have yet been identified.

4.25 In-combination effects of direct disturbance to qualifying bird species could be experienced due to proposed development on the North Wales coast. This could result in greater detrimental impacts on qualifying bird species due to increased levels of disturbance; or disturbance of previously undisturbed areas due to residential/industrial development and/or improved opportunities for recreation. It is therefore clear that all the local authorities need to work together during production of their development plan documents to limit any potential for detrimental impacts on qualifying species due to disturbance of important roosting/feeding areas along this coast.

Recommendations for amendments to policy

4.26 Where increased recreational use is predicted to cause adverse impacts on a site, or important off-site supporting habitat, avoidance and mitigation should be considered by Wirral Borough Council. Avoidance of recreational impacts at European sites involves location of new development away from such sites which is clearly not possible in Wirral given that according to the England Leisure Day Visits surveys, day visitors typically travel up to 25.5km to visit the coast for the day. Where avoidance is not possible, an alternative approach is for the local authority in question (i.e. Wirral MBC) to manage tourism and recreational use of the coastlines. Mitigation will usually involve a mix of access management, habitat management and provision of alternative recreational space, but this cannot be delivered wholly by Wirral in isolation:

- *Access management* – restricting access to some or all of a European site - is not usually within the remit of the Borough Council and restriction of access may conflict with a range of Government policies on access to open space, and Government objectives for increasing exercise, improving health etc. However, active management of access may be possible, for example as practised on nature reserves.
- *Habitat management* - improved habitat management can improve the general health and condition of European sites and thus reduce their vulnerability to recreational pressure if coupled with other measures;
- *Provision of alternative recreational space* can help to attract recreational users away from sensitive European sites, and reduce additional pressure on them. Some species for which European sites have been designated are particularly sensitive to dogs, and many dog walkers may be happy to be diverted to other, less sensitive, sites. However the location and type of alternative space must be attractive for users to be effective.

4.26.1 Although Preferred Option 16 (Development Management) refers to the *"impact on wider environmental requirements*" being one of the main issues when considering the appropriateness of any new development or land allocation, there is no specific reference to protected sites, protected species or other important areas for nature conservation. The Policy does state that "*further advice on the application of these requirements will, where necessary, be set out in Supplementary Planning Documents*" (SPDs). To ensure that an adequate policy framework exists to enable the delivery of the necessary measures to mitigate adverse effects on the Dee Estuary from recreational sources the Core Strategy should include a commitment to work with the other Merseyside Authorities, MEAS, Natural England, Countryside Council for

Wales and other partners (such as the Welsh local authorities surrounding the Dee Estuary) to devise a framework for the delivery of

- Suitably located Green Infrastructure where this will prove effective; and
- Enhanced access management to the European sites, to be informed by the collation of visitor survey data etc and which will need to be in place before the publication of the Site Allocations DPD.

4.26.2 For the Dee Estuary an appropriate framework may already exist through the forthcoming European Marine Site Management Scheme, which, if it follows the pattern of other EMS Management Schemes will include recreation/access management within its remit.

4.26.3 The delivery of enhanced access management and GI will need to be phased alongside delivery of housing and a mechanism established for monitoring effectiveness and amending the measures being delivered. The contribution of each authority should be based upon their contribution to recreational activity in each site or (where this info is not yet available) their relative populations and proximity to the site. In general therefore the devising of such a strategy (whether it is part of a specific future SPD or not) will need to be well advanced by the time the Site Allocations DPD is adopted as some strategic greenspace and a possible contribution to funding access management may need to be associated with particular sites.

4.26.4 If the above recommendations to manage access are implemented, it is concluded that there will be no adverse effect on the integrity of the Dee Estuary SAC/SPA/Ramsar/pSPA extension through direct disturbance as a result of any of the policies proposed within the Core Strategy.

Water Quality

Appropriate Assessment

4.27 As a European Marine Site, the Dee Estuary is sensitive to water pollution. This includes a wide range of pollutants that could arise through waste water discharge including toxic contamination (synthetic and non synthetic compounds), and non toxic contamination (including inorganic and organic nutrient loading, thermal regime, turbidity and salinity).

4.28 Policies contained within the core strategy can contribute to a rise in inorganic and organic nutrients present within the Dee Estuary through[41]:

- river input - pollutants flowing into the estuary from the River Dee and other watercourses in the catchment influenced by agricultural runoff, sewage discharges and industry in the catchment;
- direct discharge – pollutants are discharged into the estuary from the numerous water treatment works and combined sewerage outfalls situated around its shores. In addition there are inputs of paper pulp fibres from paper mills.

4.29 In 2001, the Dee Estuary from Chester Weir to its mouth was proposed by the Environment Agency Wales as a Sensitive Area to Eutrophication under the Waste Water Treatment Directive, as the estuary exceeded chemical and biological criteria indicative of eutrophic conditions. Evidence for eutrophication includes chemical data, reduced dissolved oxygen concentration in summer and elevated nitrogen

[41] Natural England, Countryside Council for Wales and Welsh Assembly Government (January 2010) 'The Dee Estuary European Marine Site'

concentrations in winter, Chlorophyll-a measurements, and evidence of algal scum. Two algal blooms were reported within the estuary between 1999 and 2001.

4.30 Recent investigations of faunal communities in the vicinity of the wastewater treatment works around the estuary found that the composition of these communities was generally classified as unbalanced and slightly polluted.

4.31 In the upper estuary the picture is further complicated by an interaction between nutrient loading and river flows. Nutrient levels in the canalised section of the lower river are believed to be particularly high due to sewage discharges and their limited dilution by freshwater river flow. During low flows and periods of warm weather, elevated water temperatures may still combine with the high nutrient levels to create suitable conditions for an algal bloom, causing oxygen depletion. This set of circumstances has resulted in fish kills in the upper estuary in the past.

4.32 On the basis of evidence used to support the proposal to designate the Dee Estuary as a Sensitive Area to Eutrophication it was determined that all the sub-features that are subject to frequent inundation are highly exposed to changes in both organic and inorganic nutrient loading. These sub-features are: subtidal sediment communities and rocky shore communities; all three mudflat and sandflat sub-features; *Salicornia* and other annuals colonising mud and sand; and the low to mid marsh communities of Atlantic salt meadow. The ephemeral, upper and high marsh communities and vegetated drift.

4.33 Annex I SPA species are also considered highly vulnerable to inorganic enrichment of the estuary channels and intertidal flats and moderately vulnerable with respect to saltmarsh. The migratory species and species of the waterbird assemblage are also considered highly vulnerable to enrichment of the estuary channels, intertidal flats and rocky shore communities and moderately vulnerable with respect to saltmarsh.

4.34 There are a series of wastewater treatment works around the estuary discharging effluent from the populations around the Dee Estuary including West Kirby and Heswall. Although the sewage is treated, toxic contaminants remain. Zinc loadings in sewage effluent discharged to the estuary are much higher than other metals, with Chester and Queensferry wastewater treatment works being the major contributors.

4.35 Many toxic compounds, especially synthetic compounds such as PCBs, are known to have toxic effects even in very low concentrations, and a high degree of bioaccumulation can occur within many benthic organisms. Such compounds may then ‘biomagnify’ as they are transferred along the food chain if these organisms are predated upon. Thus, even relatively low concentrations of contaminants in discharges can cause impacts upon features towards the top of the food chain such as wading birds. The problem of biomagnification is compounded by the fact that many synthetic compounds such as PCBs are very stable in the environment and are rarely degraded.

4.36 Estuarine species and communities are generally highly sensitive to synthetic toxic compounds such as pesticides, PCBs (polychlorinated biphenyls) and biocides such as TBT (tributyltin). The effects of individual synthetic compounds upon many species found within the habitats of the Dee Estuary are poorly understood, but there is evidence from elsewhere of synthetic compounds causing high levels of toxicity to a variety of marine organisms

4.37 Studies of synthetic compounds within the species and habitats of the Dee Estuary have provided mixed results. In a general investigation into relative water quality in estuarine waters of the UK, the Dee Estuary was ranked the ninth most contaminated

out of the 10 estuaries investigated. However, a narrower study looking at concentrations of two chemical products emitted during industrial production and from incinerators and car exhausts, polychlorinated dibenzo-para-dioxins (PCDDs) and polychlorinated dibenzofurans (PCDFs), found that concentrations within the Dee Estuary were the highest of the six estuaries studied. Grey seals (*Halichoerus grypus*) may be regarded as being at the top of the food chain within the Dee Estuary, and therefore most likely to bioaccumulate contaminants within their tissues.

4.38 In addition the intertidal mudflats and sandflats may be exposed to smothering in localised areas from jetting and flushing of drainage outfalls. Siltation can result from particulate matter being carried in effluent discharged into the estuary, or from maintenance dredging and dredged spoil disposal. Most estuarine communities are not considered to be particularly sensitive to siltation, as estuaries are naturally silty environments. However, hard substrate communities are the exception to this rule, being highly sensitive to siltation. Gravel and clean sand communities, and annual vegetation of drift lines are also moderately sensitive; though the latter is unlikely to be frequently exposed. Silt in the water column can smother or block the feeding and respiratory organs of marine invertebrates living in the substrate. It can also affect recruitment processes of both marine flora and fauna and can contribute to a reduction in light penetration through the water column.

4.39 Lamprey species are considered highly sensitive to changes in the thermal regime. This is because their upstream migration is thought to be temperature dependent, relying on the detection of a small change in water temperature, as well as the interaction between water temperature and oxygen levels described above. Only subtidal sediment and hard substrate communities have moderate sensitivity to changes in the thermal regime, other communities have lower sensitivity. Although there are several warm water discharges around the estuary, including cooling water outfalls from two power stations in the upper estuary channel, their effects upon the temperature regime of the estuary are believed to be localised. Heat energy is a dissipating 'pollutant' in this context, thus the impact of these outfalls is thought to be concentrated around the point of discharge. The habitat features of the European marine site were therefore determined to have at most a low exposure to changes in thermal regime. However, the lamprey species were considered to have potentially moderate levels of exposure, as they must pass along the full length of the channel to complete their life cycle. Therefore, the river and sea lamprey were determined to be highly vulnerable to changes in thermal regime, while the other features have only low vulnerability.

4.40 Although the overall theme for the west of the Borough is one of restraint, Policies encouraging housing growth on West Kirby and Hoylake (Policy 2, 3, 4, 5, 6, 8), the development of West Kirby and Hoylake and town centres and industrial growth in these areas (Policy 2, 4, 11) have the potential to exacerbate these factors which are contributing to a deterioration in qualifying SAC, SPA and Ramsar features. While the population of Wirral is not currently expected to increase over the Core Strategy period part of the purpose of the Core Strategy is to encourage redevelopment and investment to reverse this trend, mainly in the east of the Borough. As a precaution we have therefore concluded that Core Strategy policies could lead to an increased demand on wastewater treatment infrastructure. Promoting local production and food security as identified in Policy 3 Spatial Vision also has the potential to impact on water quality if this leads to further intensification of agriculture which could result in increased nutrient run-off into sensitive area.

4.41 Regeneration of coastal towns in Flintshire, on the North Wales coast, could result in cumulative impacts on water quality within the Dee Estuary in-combination with

developments on the Wirral. North East Wales sub-regional strategy provides for up to 7500 new homes in Flintshire.

Recommendations for amendment to policy

4.42 It should be noted that the majority of the processes that could result in a deterioration of water quality (unregulated waste water discharges, surface water runoff and pollution from construction activities) are either regulated through statutory requirements or can be mitigated through standard construction techniques and environmental good practice. These impacts are therefore unlikely.

4.43 Avoiding an adverse effect is largely in the hands of the water companies (through their investment in future sewage treatment infrastructure) and the Environment Agency (through their role in consenting effluent discharges). However, local authorities can also contribute through ensuring that sufficient wastewater treatment infrastructure is in place prior to development being delivered through the Core Strategy. In the case of Wirral, this is alluded to in:

- Policy 16 Development Management which states: *The Core Strategy will set out a list of the main issues that will need to be addressed when considering the appropriateness of any new development proposal or land allocation. This list of main issues will include: ……"impact on wider environmental requirements including quality of air, land and water, sustainable construction and waste management*."; and

- *Policy 17* – Developer Contributions which states that *"The types of provision likely to be required will include: ……water services [including flooding, supply disposal, sustainable drainage and prevention of pollution."*

4.44 However, it is considered that this allusion needs to be expanded upon in order to provide a firm commitment with regard to the linking of housing delivery to delivery of necessary infrastructure that will ensure that an adverse effect on European sites is avoided. Preferred Option 7 in the Core Strategy should make specific reference to the fact that subsequent policies should seek the phasing of development so as to ensure that it only takes place once any new water treatment infrastructure, or appropriate retro-fitted technology (e.g. nitrate removal) necessary to service the development while avoiding an adverse effect on European sites, is in place. The Core Strategy should also indicate how this need will be determined and delivered through interaction with other authorities (United Utilities, the Environment Agency etc) i.e. through a Water Cycle Strategy.

4.44.1 With the controls already in place in the Core Strategy in relation to water quality, as well as general controls on water discharge and the consents process controlled by the Environment Agency, together with the additional protection provided through more stringent requirements relating to water quality as recommended above, it is concluded that there will be no significant impact on the Dee Estuary through reduced water quality due to any of the policies within the Core Strategy.

Water Abstraction

Appropriate Assessment

4.44.2 Development proposed within the Core Strategy is likely to result in increased water use, notably as a consequence of housing and business development under Policies 2, 3, 4, 5, 6, 8, 11, 12, 21).

4.44.3 Changes in salinity as a result of excessive freshwater abstraction of the River Dee is identified as a factor (alongside changes in turbidity and thermal regime described in water quality) that may cause deterioration and disturbance to Dee Estuary SAC, SPA and Ramsar features of interest[42]. In addition lamprey species may directly be sucked up by large abstractions such as those for power station cooling systems (although it should be noted that Powergen and National Power stations in the upper estuary were designed to avoid fish entrapment).

4.44.4 It is therefore reasonable to consider impacts from damaging levels of abstraction to supply housing in Wirral when considered in combination with development elsewhere in United Utilities Integrated Resource Zone and development outside the zone that will receive water from the same sources (e.g. abstraction from the River Dee in relation to development in North Wales).

4.44.5 The United Utilities Water Resource Management Plan (September 2009) indicates that the water available for use in the Integrated Resource Zone is expected to reduce by 24.8 Ml/d between 2009/10 and 2014/15. Without water efficiency measures or new resources the initial supply/demand balance for the Integrated Resource Zone is calculated to be in deficit by 8 Ml/day by 2024/25. However, from reading the Water Resource Management Plan, it does appear that increased abstraction from the Dee or any other European sites beyond the current licensed volumes is not part of United Utilities' intended future supply strategy[43], which rather depends on a mixture of demand management and increased abstraction from groundwater as follows:

- construction of a bi-directional pipeline, known as the "West-to-East Link", between Merseyside and North Manchester which is due to be in operation by 2012. This will help United Utilities maintain adequate supplies to Greater Manchester and Merseyside, if there is a need to temporarily reduce supply from a major reservoir, for example due to maintenance work or drought conditions;

- help customers save 9 Ml/d by 2014/15 (increasing later on to 12 Ml/d), through a base service water efficiency programme;

- achieve a water demand reduction of 10 Ml/d in a dry year by 2014/15 (increasing to 22 Ml/d by 2034/35) as a result of the expected scale of voluntary metering of households;

- non-household customers in the Integrated Zone are expected to reduce water demand by 87 Ml/d by 2014/15 (141 Ml/d by 2034/35) due to the effects of the economic downturn and as part of their continuing water efficiency programmes.

4.44.6 United Utilities enhanced plans identified as part of their economic programme to maintain adequate supply-demand balances are:

- further reducing leakage by 23 Ml/d by 2034/35;

- a programme of economic water efficiency measures to save 4 Ml/d by 2034/35; and

[42] Natural England, Countryside Council for Wales and Welsh Assembly Government (January 2010) 'The Dee Estuary European Marine Site'

[43] Mark Smith of United Utilities North & Central Area Water Asset Management Team confirmed in a personal communication on 27/07/09 that abstraction from the Dee will not exceed the current licensed volume. The current licensed volume was subject to the Environment Agency's Review of Consents process and no reductions were considered necessary. It can therefore be concluded that no adverse effects on the River Dee (either alone or 'in combination') will result from the United Utilities abstraction.

- implementing water source enhancements of 48 Ml/d by 2034/35[44].

4.44.7 It can therefore be concluded that since no increased abstraction from European sites will be required in order to service new development in Wirral (or elsewhere within the Integrated Supply Zone) that significant effects on the Dee Estuary SAC, SPA or Ramsar site can be concluded to be unlikely. Risk of abstraction at inappropriate times of the year (such as periods of low flow) will be prevented by the Environment Agency's licensing regime and Review of Consents process.

4.45 In the future as a result of the west-east link, Merseyside (including Wirral) will obtain a much greater proportion of its water supply from Lake District sources. This is likely to reduce the impacts associated with abstraction for housing and industry on the Dee further.

4.45.1 New strategic water resource options will need to be in place prior to any developments where additional abstraction impacting European sites would otherwise be required. Unlike most of the indirect impacts on European sites that can derive from development (e.g. from recreational pressure or vehicle exhaust emissions) and which are generally not covered by any independent assessment or consenting regime, water supply is covered by a detailed abstraction licensing and Review of Consents process controlled by the Environment Agency. One of the principal functions of this regime is to ensure that the abstraction of water at volumes, rates or times of year that would result in adverse effects on internationally designated sites do not take place.

4.45.2 Avoiding adverse effects on European sites as a result of increased scales of abstraction to supply new housing must therefore principally be the responsibility of the water companies through their Water Resource Management Plans, water supply operations and abstraction licence applications and the Environment Agency through their licensing regime and Review of Consents process.

4.45.3 Clearly the concept of strategic forward planning of development requires local authorities to play their part in ensuring the pressures on available water resources are minimised as far as is practical, rather than relying entirely on the Environment Agency licensing regime, and this is the context within which the Wirral Core Strategy can deliver measures on its own account to supplement those avoidance strategies that will be implemented by the Environment Agency and water company as part of their wider resource planning roles. This it seeks to do primarily through encouraging water efficiency in new developments. Specifically, Policy 15 (Better Design) promotes sustainable construction and design including water conservation. Within this Policy, a specific reference could be made to a requirement for new development to achieve a minimum of Level 4 under Code for Sustainable Homes to ensure that water issues are adequately considered.

4.45.4 Additional mitigation to ensure no detrimental impacts on Natura 2000 sites through water abstraction could be implemented through phasing of new developments (Policy 7). Therefore, if it became apparent that abstraction of water to supply the new developments had the potential to affect water levels in the protected sites during the period of the Core Strategy, the location and/or extent of future developments would need to be reviewed.

4.45.5 With the controls already in place in the Core Strategy in relation to water issues, and with additional protection provided through more stringent requirements on water resources as recommended above, it is concluded that there will be no significant

[44] Widnes groundwater (22.7 Ml/d), Southport groundwater (22.5 Ml/d) and Oldham groundwater (2.5 Ml/d)

impact on the Dee Estuary through abstraction of water related to future development on the Wirral.

Dock, Port and Channel Construction, Maintenance, Shipping and Dredging

Appropriate Assessment

4.46 The Wirral Core Strategy promotes greater use of ports and docks, recognising an importance for cargo handling and freight movements as an opportunity to maximise the potential for off-road transport; and contribute towards a sub-regional "SuperPort" (Policies 4, 7, 21).

4.47 Within the Dee, historic discharges are likely to have left a legacy of pollution due to the persistent nature of many of the contaminants released. Therefore these discharges have a bearing upon our assessment of current exposure. Much of this historic contamination of the estuary is likely to be bound within the sediments. Contemporary activities resulting in the disturbance of such contaminated sediments can therefore have an impact upon the levels of toxic substances available to estuarine communities. Historic industry has also left a legacy of contaminated land around the estuary that still presents problems due to contaminants leaching into the estuary, as well as the suspected historic contamination of intertidal sediments. Synthetic substances present at contaminated land sites include asbestos and a variety of solvents.

4.48 Construction of ports, or docks on land around the estuary, greater use of hydraulically connected waters for shipping, or dredging of sediments to allow for the movement of larger ships have the potential to disturb sediments or contaminants into the Estuary. Dredging and disposal of sediment also has the capacity to cause the smothering of benthic communities resulting in physical loss. It should be noted that the spatial strategy identifies that the proposed docks and ports are on the Mersey Estuary side of the Wirral Borough, rather than the Dee Estuary. It is therefore likely that this potential impact is less of an issue than for neighbouring Mersey Estuary SPA/Ramsar. However until spatial allocations are finalised under a forthcoming DPD, this potential impact cannot be dismissed.

4.49 Selective extraction is the removal of a particular type of substrate from within a habitat or community, for example the removal of fine sand from the gravel and clean sand sub-feature. This may also include more indiscriminate removal of habitat such as that involved in dredging to allow port access. Such impacts are described below (Coastal Squeeze and Loss of Supporting Habitats). All the estuarine communities within the site are considered to be moderately sensitive to selective extraction, except the rocky shore communities, which are considered highly sensitive due to their dependence on a fixed substrate.

4.50 The Dee Estuary is also potentially quite exposed to accidental chemical or oil spillage and maritime pollution due to its proximity to shipping access routes to the Port of Mostyn and the Mersey Ports, as well as the development of the Liverpool Bay oil and gas field. Policies that encourage greater use of these ports therefore do pose a risk for accidental spillage of chemicals, in addition to fuel emissions.

4.51 Dredging poses direct threats to the areas in which it occurs. It introduces sediment into the adjacent water column, which is then redeposited on the bottom. This has a variety of usually short-term effects on pelagic fish and the benthic community. The suspended sediment increases turbidity, decreasing light penetration and photosynthetic activity. Dredging can also have longer term effects on water

circulation patterns, particularly in estuarine areas where water circulation determines the distribution of fresh and salt water, patterns of dissolved oxygen, and other water quality parameters. Changes in salinity can affect the viability of freshwater wetlands and tidal marshes, with consequent impacts on the distribution of marine life. Changes in water circulation patterns can also alter sediment accumulation, thus affecting all ecosystems in the immediate area[45].

Recommendation for amendments to policy

4.52 Based on this evidence it is clear that policies contained within the Core Strategy which encourage the development of docks and ports, and/or result in greater ship movements (either larger ships or new shipping routes which may require navigational dredging, or a greater number of ships creating more ship wash and erosion) have the potential to result in significant impacts on qualifying features of Dee Estuary SAC/SPA/Ramsar/pSPA extension. The impacts from these will differ and will thus require different mitigation. The Core Strategy is able to set the framework for these, but the details of specific measures would require further development at a project level, particularly since this will include authorities other than Wirral. Broadly, mitigation that could be designed into the design and management of new dock/port development may include:[46]

- environmental policy, reviews and management systems;
- information and codes of conduct;
- ensuring safety;
- emergency response procedures;
- provision of information on Natura 2000 sites;
- zoning of activities;
- re-routing via alternative navigation channels;
- protection of intertidal features from ships wash using breakwaters and other structures;
- compliance with regulations covering cargo operations and promotion of good practice; and
- managing anchoring.

4.53 Where there is evidence that ship or boat wash is causing erosion of designated intertidal flats or saltmarsh habitat, and where other appropriate measures have been considered and applied, a further management option that may be considered is to protect the intertidal features by creating structures, such as breakwaters, bunds or mounds of sediments on the intertidal areas. Harwich Harbour Authority has applied this approach in Trimley Marshes on the Stour/Orwell Estuary[47]. Such an approach to protecting marine features may also provide a beneficial use for dredged materials. However, the potential impacts on local hydrodynamics and ecology should be considered. This should not be considered where the costs of undertaking such a scheme would greatly outweigh the potential environmental gain. Furthermore, the potential application of this approach may be limited by the need for a grant aid to fund this work and by land ownership issues.

[45] Marine Board, Commission on Engineering and Technical Systems, National Research Council (1985), Dredging Coastal Ports: An Assessment of the Issues. (Washington, D.C.: National Academy Press) (pp124-128)
[46] http://www.ukmarinesac.org.uk/activities/ports/ph3_3_1.htm
[47] http://www.ukmarinesac.org.uk/activities/ports/ph3_3_1.htm

4.54 A further method of minimising ships' wash in the proximity of vulnerable shores might be to place moorings in the area to reduce speeds. This is a particularly useful approach where small speedboats and personal watercraft are a potential problem. Other variables which influence ships' wash, such as propeller wake, ship design and hull form, are outside the scope and powers of any port authority.

4.55 Although Policies 15 (Better Design) and 16 (Development Management) refer to sustainable construction and design and impacts on wider environmental requirements, it is considered that, due to the sensitivity of the estuarine habitats and species, a more specific commitment is required to ensure no adverse impact on the integrity of the surrounding Natura 2000 sites from port development and activity. Therefore, a commitment in the Core Strategy should be given to ensure the development of new docks and ports, and any associated channel construction or dredging activity will be permitted subject only to the completion of a project based Appropriate Assessment. This would need to include a thorough consideration of impacts relating to construction (including potential disturbance of sediments and hydrodynamic modelling if required), operational impacts (including anticipated changes in boat traffic and associated impacts) with necessary mitigation in construction, design and management.

4.55.1 If the protective measures within the Core Strategy for the environment are strengthened as suggested above, with a commitment for a project level Appropriate Assessment for development of new docks and ports and associated channel construction and dredging activity, it is concluded that there will be no significant impact on the Dee Estuary through these activities related to policies within the Core Strategy.

Coastal Squeeze and Loss of Supporting Habitat

Appropriate Assessment

4.56 The Core Strategy identifies areas of land immediately adjacent to coastal habitats for economic revitalisation and housing growth. Whilst this is predominantly based around the eastern side of the Wirral (i.e. adjacent to the Mersey Estuary rather than the Dee Estuary), development focus on Hoylake and West Kirby has the potential to contribute to coastal squeeze.

4.57 Furthermore, land outside of the Dee Estuary SAC/SPA/Ramsar boundaries may serve as important supporting habitat, such as off-site roosting areas for qualifying bird species, i.e. areas where qualifying bird species roost that are not within the designated site boundaries. Loss of such land would also have the potential to result in impacts. Development between these important off-site areas and the Estuary itself could also impact on flight paths, making the supporting habitat less accessible to the birds. These important roosting/feeding areas need to be identified and considered prior to permission being granted for any developments to ensure no long-term detrimental impact on the populations of qualifying bird species.

4.58 Direct physical loss may result from a range of activities causing the removal or smothering of the interest features. The Dee Estuary is a complex system comprising one of the largest estuaries in the UK and supporting several estuarine habitat types, each of which contributes to the biodiversity of the system. In turn, these habitats support a rich variety of marine communities, many of which are dependent upon the ecological functioning of other communities. Therefore physical loss of any single habitat as a result of activities such as coastal development could have wider implications for the survival of other communities, thus detrimentally affecting the

favourable condition of the European site directly. This could result in a direct deterioration of qualifying SAC/SPA/Ramsar/pSPA extension features.

4.59 The Dee Estuary SPA provides important nesting, feeding and roosting habitats for Annex I species, and feeding and roosting habitat for important migratory species and species comprising the waterbird assemblage. The loss by removal (though coastal squeeze) or smothering of any of the supporting habitats (described in water quality), on which they depend, is likely to result in the loss of nesting and roosting sites and/or the reduction of food resources. It could also result in increased competition for food and space in areas that are already occupied, and ultimately reduce bird numbers on the estuary.

4.60 Wetland Bird Survey (WeBS) data[48] for the nearest WeBS Core Count area known as Meols and Leasowe Lighthouse Fields shows that the wet grasslands in this area of the north Wirral coast are utilised by wintering waterfowl. The predominant species are mallard, lapwing (flocks of almost 2,000 birds have been recorded), black-headed gull and herring gull but the data also indicate that several of the wintering/passage bird species for which the Dee Estuary SPA/Ramsar and Mersey Narrows & North Wirral Foreshore pSPA/pRamsar site were designated do use the site – particularly redshank (a 5-year peak monthly count of 112 birds constituting 7% of the Mersey Narrows & North Wirral Foreshore pSPA population) and curlew (5-year peak monthly count of 151 birds, approximately 3.7% of the Dee Estuary SPA population[49]), but also small numbers of, grey plover (0.1% of the Dee Estuary SPA population), oystercatcher (0.1% of the Dee Estuary SPA population), dunlin (0.04% of the Dee Estuary SPA population) and turnstone (0.8% of the Mersey Narrows & North Wirral Foreshore pSPA population).

4.61 Physical loss of habitat within the SAC/SPA/Ramsar boundaries may arise from developments such as infrastructure construction and modification, coastal protection works, and land claim (e.g. as put forward by Policies 2, 3 and 4). In these instances the physical loss would occur when areas of habitat are used for new purposes. In addition coastal developments and other anthropogenic activities may also cause the indirect loss of estuarine habitats through the interruption of existing coastal processes such as sediment transport. Sediments will enter the estuary either suspended in the water column, in the case of fine sand and silt, or moving along the seabed as 'bedload' in the case of coarser sand and gravel. Sediment supply may be interrupted either at source, for example by placing coastal defences in front of soft cliffs, or during transport where structures such as groynes in particular may disrupt and intercept the movement of bedload sediment. Such interruptions to sediment supply may occur either within the site or outside it. Eventually a lack of sediment supply will tend to cause habitat deterioration and then erosion. Indirect physical loss can also arise from changes to the estuaries morphology affecting the hydro-dynamic regime, for example widening or deepening of channels at the mouth of an estuary may increase the volume of water entering the estuary causing the erosion of sub-tidal sediments or sandbanks higher up the estuary.

4.62 In the future the hard frontages such as embankments and sea walls found along much of the estuary coastline will compromise its ability to evolve in response to rising sea levels and climate change. This will result in the erosion of saltmarsh and other

[48] Data were supplied by the Wetland Bird Survey (WeBS), a joint scheme of the British Trust for Ornithology, The Wildfowl & Wetlands Trust, Royal Society for the Protection of Birds and Joint Nature Conservation Committee (the last on behalf of the Countryside Council for Wales, the Environment and Heritage Service, Natural England and Scottish Natural Heritage)
[49] Data on the SPA population are derived from the SPA Review section of the JNCC website http://www.jncc.gov.uk/default.aspx?page=2053

intertidal communities. This process of coastal squeeze may result in significant loss of estuarine habitats in the long term, yet in the medium term it is likely that the estuary will continue to accrete and that the effects of coastal squeeze will not be apparent. Thus although the impacts from coastal squeeze may eventually be extensive they are not taken into account in the assessment of current exposure presented here.

4.63 Development pressures still exist within the estuary that could result in removal of areas of the intertidal mudflats and sandflats. Those areas close to existing terrestrial development may be most at risk. Recent examples of developments resulting in the removal of areas of this feature include the expansion of the Port of Mostyn, development of the West Kirby Marine Lake and the tipping of coal waste on the upper shore at Point of Ayr. There is well documented evidence of the migration of the main channel towards the Welsh shoreline, which has resulted in the loss of saltmarsh habitat in this area. This can be attributed to coastal squeeze between the main navigation channel and the sea wall. In addition removal of intertidal mudflat and sandflat communities may also occur due to capital or maintenance dredging operations associated with improving and maintaining vessel access to the Port of Mostyn. Even where dredged material is returned to the estuary, this may lead to direct loss of affected invertebrate communities due to burying or smothering. Mechanical changes to channel structure and flow may also result in consequential changes to the pattern of erosion, scour and deposition elsewhere within the affected channel.

4.64 Due to the severity of the effects of physical loss, all the estuary's habitat communities are considered to be highly sensitive to removal. Lamprey species are also considered highly sensitive to their own 'removal' for example by entrapment in abstracted waters.

4.65 Loss of additional areas of supporting habitat for qualifying bird species could also occur as a result of development policies on the north Wales coast. These in-combination effects could result in far greater effects due to cumulative losses, with birds having to travel greater distances between feeding and roosting sites.

Recommendations for amendments to policy

4.66 Preferred Spatial Objective 6 states that new development will be directed away from areas liable to flooding, which could provide valuable habitat to birds, and Policy 4 Broad Spatial Strategy states that *"The focus within rural areas will be on re-using existing buildings … While protecting local distinctiveness and preserving biodiversity, landscape, heritage and other local features of importance*." Development management will also consider the impact on wider environmental requirements (Policy 16). These policies suggest that protection of supporting habitat would be considered in development proposals, but this protection should be strengthened by referring specifically to protection of supporting habitat and ensuring that these important areas are identified prior to any specific development sites being agreed. If supporting habitat were to be lost to any development then the applicant would need to determine a) how significant it was (i.e. whether it was used by more than 1% of the population) and to provide alternative habitat to replace it in a location that was reasonably close to the estuary.

4.67 Mitigation for coastal squeeze should include:

- Ensuring that new development is not delivered in locations which would require a change in coastal defence policy that might compromise natural coastal processes (e.g. from No Active Intervention to Hold the Line or Advance the Line); and

- Preventing development being delivered in areas that may compromise locations identified for managed retreat as set out in the Environment Agency Coastal Habitats Management Plan (CHaMP) and Regional Habitat Creation Programme.

4.68 The vast majority of roosting and feeding sites that have been identified for qualifying species from the Dee Estuary are already included within the boundaries of the various designations. However, two feeding sites for curlew have been identified outside the boundaries on the western Wirral: one in fields at the northern end of Piper's Lane to the north of Heswall and one further to the south close to Haddon Hall Farm to the east of Ness Botanic Gardens. These two areas should be identified within the Core Strategy as important supporting habitat for qualifying bird species which must be taken into consideration when assessing any impacts from development proposals. Efforts must be made to identify any other important off-site roosting/breeding/feeding habitats for qualifying species from the Dee Estuary that occur within the Wirral Borough boundary before the Site Allocations DPD is adopted. A commitment should be given within the Core Strategy to identify all important areas of supporting habitat and to assess any impacts on these areas, and thereby potential impacts on qualifying species, prior to permitting any future development. The Site Allocation Document should include appropriate mechanisms to ensure the loss of such sites is adequately assessed and mitigated. Wirral should also work in conjunction with other Local Authorities to ensure there is no conflict with development of supporting areas outside the Wirral boundary.

4.68.1 Due to the mitigation already provided within the Core Strategy, in relation to development of foreshore areas and development management, together with the additional measures referred to above for protecting valuable supporting habitats, it is considered that there will be no significant impact on the Dee Estuary through coastal squeeze and/or loss of supporting habitat related to policies within the Core Strategy.

Air Pollution

Appropriate Assessment

4.68.2 Development proposed within the Core Strategy may result in increased car use, notably as a consequence of housing and business development. (Policies 2, 3, 4, 5, 6, 8, 11, 12). A rise in vehicle movements, particularly within 200m of the Dee Estuary has the potential to result in an increase in atmospheric nitrogen deposition. Policy 5 identifies 3,750 net new dwellings over the fifteen year period from April 2012 to March 2027; however, only a minority (2%) will be focused on Hoylake and West Kirby adjacent to the Dee Estuary (Policy 6). Policy 11 (Employment Distribution) identifies 177ha of additional development land for new employment-related development during the plan period April 2012 to March 2027, although 90% of this is within Birkenhead and Bromborough. It is therefore reasonable to assume that the rise in vehicle movements as a result of the core strategy are more likely to be focused around the eastern side of the Borough (around Birkenhead and Bromborough) where economic and housing development will be focused. As such it is considered that vehicle exhaust emissions as a result of development within Wirral will not lead to adverse effects on the Dee Estuary SAC/SPA/Ramsar site.

4.69 Natural England identify atmospheric deposition as a contributing factor to the deterioration of SAC features of interest in the Dee Estuary, but this is attributed primarily to the burning of fossil fuels associated in particular with two power stations and the Padeswood Cement Works which lie close to the estuary, rather than vehicle

emissions[50]. It is possible that the district heating scheme proposed by policy 4 (decentralised energy), and other CHP developments that arise from this policy have the potential to contribute to atmospheric emissions and nitrogen deposition but given that conventional domestic/commercial boilers (as opposed to industrial processes) typically contribute approximately 4% of NOx and sulphur emissions[51], this is likely to be effectively inconsequential.

4.70 In combination effects on the Dee Estuary from air pollution could result from industrial operations, such as emissions from the proposed incinerators at Runcorn and Ince Marshes. However, these already have planning permission and industrial air emissions are heavily regulated so it is considered unlikely that such an effect would occur in practice, as permission would not be granted for any developments likely to release high levels of damaging emissions. There are also potential in combination effects from development along the north Wales coast, as the prevailing wind direction is west to east, therefore any emissions resulting from industrial development in north Wales could be deposited within the Dee Estuary. However, this is outside the control of Wirral Council.

4.71 The Core Strategy already includes Policy 16 on Development Management, which requires impacts of new developments on the wider environment, including quality of air, land and water, sustainable construction and waste management, to be assessed. Emissions to air are also highly regulated so with these protection measures already in place it is concluded that there would be no significant impact on the Dee Estuary through air pollution as a result of any policies within the Core Strategy.

Renewable Energy

Appropriate Assessment

4.72 The inclusion of wind turbines may be taken forward as part of the renewable energy policy (Decentralised Energy Policy 14). Specific requirements for individual land allocations will be included in a site allocations Development Plan Document. Nevertheless, the potential to result in impacts on qualifying features of interest includes:

- the potential to encroach on coastal land or result in physical loss of land (described above);
- construction of onshore/offshore turbines as part of renewable energy policies has the potential to disrupt flight paths and displace qualifying bird species. There are also disturbance issues associated with maintenance activities;
- there may be water quality issues arising during the construction of offshore wind farm arrays, and maintenance activities also have the potential to result in water quality issues (described above);
- renewable energy policies have the potential to result in deterioration of air quality through emissions, depending on location. It could also be argued that some renewable energy policies would improve air quality by reducing the need for power stations fuelled by fossil fuels;

4.73 Policy 14 (Decentralised Energy) promotes energy efficiency and the use and development of renewable, decentralised and low carbon energy and states that

[50] Natural England, Countryside Council for Wales and Welsh Assembly Government (January 2010) 'The Dee Estuary European Marine Site'
[51] 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

opportunities to utilise tidal power in the River Mersey will be encouraged subject to appropriate environmental controls. This has the potential to impact in a variety of ways through release of contaminated sediments; disturbance to invertebrate in-fauna; alterations to sediment patterns, water levels and salinity which could all have a significant impact on the habitats and species for which the surrounding Natura 2000 sites, including the Dee Estuary SAC, are designated, although the greatest impact would be on the Mersey Estuary SPA and Ramsar itself.

4.74 The Feasibility Report for the Mersey Tidal Power Scheme[52] makes reference to the La Rance Basin in Brittany as the only site in the world where the ecological impact of a tidal power scheme can be assessed over the long-term. It states that during the construction period the estuary was virtually isolated from the open sea for a period of three years (1963-66) with only a small sanitary draw off flow from inside the basin provided. The period was marked by tidal suppression, significant fluctuations in water salinity and by heavy sedimentation complemented by increased rates of organic matter accumulation, which combined to result in an almost total disappearance of estuarine sea flora and fauna. The experience at La Rance demonstrates that an ecologically successful tidal power plant depends on the adequacy of the construction and operational strategy, and respect for biological balances. It should of course be noted that La Rance and Mersey Tidal schemes and associated estuaries are not necessarily directly comparable with each other.

Recommendations for amendments to policy

4.74.1 Preferred Option 14 states that "*specific requirements for individual land allocations will be included in a site-specific Development Plan Document".* Reference is also made to an emerging study of the capacity of the Borough to generate renewable energy which is likely to identify the proposed New City Neighbourhood as a potential priority zone for producing renewable energy through a district heating scheme. The most significant local sources of renewable energy are more likely to come from extensions to the off-shore wind farms in Liverpool Bay or tidal power within the Mersey Estuary. Therefore, it seems unlikely that any wind farms will be developed within the boundary of Wirral Borough Council, although the Tidal power scheme may fall within the Borough boundary as may cable landfall from the possible extension to Burbo wind farm.

4.75 Although the implementation of tidal power has the potential to have highly significant impacts on the habitats and species within the estuaries, development of such a scheme would be subject to strict environmental controls. At the present time, it is not possible to assess the implications of such a scheme in detail, as the project is in its early stages and even the method of power generation (e.g. barrage or some other method) is unconfirmed. However, the Core Strategy should make reference to the requirement for a project level HRA on such a scheme which would include selection of the most suitable design and its location. It is also essential that the impacts relating to construction of the scheme are distinguished from those resulting from its operation.

Conclusion

4.76 With reference to all of the above, including protection measures already in place within the Core Strategy and the additional measures proposed under the mitigation sections, it can be concluded that none of the policies contained within the Wirral Borough Core Strategy will have a adverse effect on the integrity of the Dee Estuary SAC/SPA/Ramsar/pSPA extension. However, it is noted that further assessments will

[52] Scott Wilson and EDF (Feb 2010) Mersey Tidal Power: Feasibility Study Stage 1: Options Report

need to be undertaken in relation to site selection and specific projects at a later stage to ensure that site integrity is maintained.

5 Mersey Estuary SPA and Ramsar

Introduction

5.1 Figures 3 and 4 show the location of the Mersey Estuary SPA and Ramsar site, the extent to which it is located within the Borough of Wirral, and proximity to the Core Strategy Plan Area. The Mersey Estuary is a large sheltered estuary that receives drainage from a catchment area of c.5,000km^2 encompassing the conurbations of Liverpool and Manchester, and including the River Mersey and the River Bollin and their tributaries in Cheshire and Merseyside. The Estuary covers 5023.35ha of saltmarsh and inter-tidal sand and mudflats, with limited areas of brackish marsh, rocky shoreline and boulder clay cliffs, within a rural and industrial environment. The intertidal flats and saltmarshes provide feeding and roosting sites for large and internationally important populations of waterbirds, and during the winter, the site is of major importance for duck and waders. The site is also important during the spring and autumn migration periods, particularly for wader populations moving along the west coast of Britain.

Reasons for Designation

5.2 The Mersey Estuary is designated an SPA under Article 4.1[53]

- Golden plover *(Pluvialis apricaria)*: 3,040 individuals (1.2% of GB population)

5.3 SPA Article 4.2 - winter:

- Redshank (*Tringa totanus*): 4,993 individuals (2.8% of Eastern Atlantic population)
- Dunlin (*Calidris alpina*): 48,789 individuals (3.6% of Northern Siberian / Europe / West African population
- Pintail (*Anas acuta*): 1,169 individuals (1.9% of NW European population)
- Shelduck (*Tadorna tadorna*): 6,746 individuals (2.2% of wintering NW European population)
- Eurasian teal (*Anas crecca*): 11,723 individuals (2.9% of NW European population)
- Wigeon (*Anas penelope*): 11,886 individuals (4.2% of the GB population) Black-tailed godwit (*Limosa limosa*): 976 individuals (1.6% of the Iceland population)
- Curlew (*Numenius arquata*): 1,300 individuals (1.1% of the GB population)
- Grey plover (*Pluvialis squatarola*): 1,010 individuals (2.3% of the GB population)
- Great crested grebe (*Podiceps cristatus*): 136 individuals (1.4% of the GB population)
- Lapwing (*Vanellus vanellus*): 10,544 individuals (0.7% of the GB population)

5.4 SPA Article 4.2 - on passage:

- Ringed plover (*Charadrius hiaticula*): 505

5.5 Ramsar Criterion 6, Internationally important populations of:

[53] 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

- Shelduck
- Black-tailed godwit (*Limosa limosa*)
- Redshank
- Eurasian teal
- Pintail
- Dunlin

5.6 Ramsar Criterion 5:

- 89,576 waterfowl (5-year peak mean 1998/99-2002/03)

5.7 Birdlife (2001) identify the Important Bird Area (IBA) to exceed the area currently designated as a Ramsar site, and recommend the designation expansion. This additional area is termed a 'potential Ramsar' (which precedes the 'proposed' Ramsar (pRamsar) designation). This additional area is not considered in the assessment as objectives and site boundaries are unconfirmed, however its status highlights the nature conservation value of areas of the Mersey outside of the SPA/Ramsar designation.

Historic Trends and Existing Pressures

5.8 Appendix 2 illustrates the extent of the Mersey Catchment. Water pollution has been an issue in the Mersey Estuary since at least the 18th century, when the Mersey catchment became a prime location for industrial expansion, especially the textile industry. With this there was an associated growth in bleaching, dying, and finishing trades, and paper, heavy chemical and glass industries, which are still in production to this day. All of these industries used the waterways as a means for the disposal of industrial waste, resulting in a legacy of pollutants within the River Mersey and including mercury, pesticides (e.g. DDT), and persistent organic contaminants (e.g. polychlorinated biphenyls (PCBs), pentachlorophenol (PCP)) (Mersey Basin Campaign 2004). In addition, there was surface runoff, and the discharge of domestic waste-water and sewage directly into the waterways from a large and growing human population, resulting in gross pollution[54]. The high levels of sewage discharged in to the waterways resulted in low oxygen levels and a major difficulty in improving water quality.

5.9 The problem of water pollution in the Mersey Estuary 'was probably at its worst in the 1960's' and made it the most polluted Estuary in the UK (Mersey Basin Campaign 2004). Major improvements to water quality have been realised since the formation of the Mersey Basin Campaign in 1985, which aims to 'revitalise the River Mersey and its waterfront' (Langston et al. 2006).

5.10 The major projects that brought about the improvements to water quality tackled the direct discharges of sewage into the region's waterways. New projects included: primary sewage works at Sandon Dock which replaced 28 crude sewage discharges directly into the Mersey Estuary through the MEPAS scheme (Mersey Estuary Pollution Alleviation Scheme); fine sewage screening plants on the Wirral peninsula; secondary sewage treatment and petrochemical effluent treatment plants at Ellesmere

[54] Langston, W.J., Chesman, B.S. and Burt, G.R. (2006). Characterisation of European Marine Sites. Mersey Estuary SPA. [Online]. *Marine Biological Association of the United Kingdom. Occasional Publications* **18**, 185pp. Available at: www.mba.ac.uk/nmbl/publications/occpub/pdf/occ_pub_18.pdf (accessed 15th June 2009).

Port; secondary sewage treatment plants at Widnes and Warrington; modification of the Davyhulme sewage treatment plan in Greater Manchester to treat ammonia (which may kill salmonid species); and later secondary sewage treatment plants at Birkenhead/Bromborough. Other improvements have been made, including reducing inputs of mercury, lead, cadmium, PCP and chlorinated hydrocarbons into the Estuary.

5.11 However, certain inputs remain, including:

- pesticides and herbicides from agriculture (largely dairy farming) into the upper river system;
- phthalate esters (used as plasticisers, increasing flexibility in plastics) thought to come from wastewater discharges in the upper Mersey;
- hydrocarbon contamination from oil spillage/spills from Tranmere Oil Dock/Terminal, Stanlow (Shell) Oil Refinery and oil tanks along the southern bank of the Estuary, from pipelines that run between these sites along the southern bank of the Estuary, and from oil shipping spills in the Irish Sea;
- PCBs from the River Mersey (possibly also dredge spoils); and
- PCBs from contaminated land in the catchment area (Marine Biological Association, 2006).

5.12 The General Quality Assessment (GQA) scheme, introduced by the National Rivers Authority (NRA), and replaced by the Environment Agency (EA) in 1996, monitors the water quality of rivers and canals throughout England and Wales. It assesses the chemical and biological status, nutrient levels, and aesthetic water quality from permanent sampling stations. The Mersey Basin Campaign (2005) reports on sites in the Mersey catchment that detail low (Grades D, E and F, or 'fair' to 'bad') biological and chemical river water quality; only those within the Mersey catchment – see Appendix 2 – are described here. Such sampling sites are particularly concentrated in the area between Knowsley and Manchester, including St. Helens and Wigan, although biological quality is generally poor from Liverpool to Manchester.

5.13 The main current environmental pressures upon the Mersey Estuary SPA and Ramsar site are considered to be:

- disturbance of sediment from shipping and associated activities, releasing legacy heavy metal pollution (mercury, lead, cadmium and other poisons) that is bound into the sediment, or other introduction of these metals;
- pollution via rivers and drains by both treated sewerage and untreated runoff containing inorganic chemicals and organic compounds from everyday domestic products, which 'may combine together in ways that make it difficult to predict their ultimate effect of the marine environment. Some may remain indefinitely in the seawater, the seabed, or the flesh, fat and oil of sea creatures'[55];
- pollution via commercial shipping by chemical pollution and the dumping of litter at sea;
- 'coastal squeeze' and physical loss from land reclamation and coastal flood defences and drainage used in order to develop coastal land, and from sea level rise;

[55] Langston, W.J., Chesman, B.S. and Burt, G.R. (2006). Characterisation of European Marine Sites. Mersey Estuary SPA. [Online]. *Marine Biological Association of the United Kingdom. Occasional Publications* **18**, 185pp. Available at: www.mba.ac.uk/nmbl/publications/occpub/pdf/occ_pub_18.pdf (accessed 15th June 2009).

- loss or physical damage of marine benthic habitat directly and indirectly (through changed sedimentation/deposition patterns) as a result of navigational or aggregate dredging;
- disturbance to birds from increased recreational pressure (e.g. boat or other recreational activity) and wildfowling;
- introduction of non-native species; and
- selective removal of species (e.g. bait digging, wildfowl, fishing) (Wildlife Trust 2006; Langston et al. 2006).

5.14 Although the Mersey Estuary does have a high load of nutrients mainly from diffuse sources, with levels for phosphate and nitrogen decreasing from point sources, recent modelling has shown that due to the natural turbidity of the water, there is only a low risk of excessive algal growth.

Summary Screening: Key potential pressures from Wirral

5.15 The Wirral Core Strategy has the potential to exacerbate existing key pressures being experienced by the Mersey Estuary SPA/Ramsar. Potential impacts identified during the summary screening detailed in Appendix 1 were:

- direct disturbance to qualifying bird species;
- waste water discharges;
- water abstraction;
- dock, port and channel construction, maintenance shipping and dredging;
- coastal squeeze and loss of supporting habitat,
- recreational activities;
- air pollution; and
- renewable energy.

Appropriate Assessment

Direct Disturbance of Qualifying Bird Species and Habitat Damage

Appropriate Assessment

5.16 Preferred Option 3 (Spatial Vision) refers to the fact that Wirral's potential as a visitor and tourist destination will have been focused on the quality of the Borough's natural environment; built heritage; country parks; and visitor and coastal facilities at Birkenhead, New Brighton, Leasowe, Hoylake, West Kirby and Thurstaston and along the Mersey coast. The delivery of 9,000 homes (a net increase of 3,750) over the Core Strategy period may also lead to number of households which (due to the increasing age of the borough population) may have greater leisure time available. This is particularly the case when considering that for the purposes of HRA development within Wirral must not be considered in isolation but in combination with the 70,000 dwellings that will be delivered across Merseyside and those to be delivered in North Wales over the same time period under other Local Development Framework Core Strategies.

5.17 Policy 4 (Broad Spatial Strategy) states that Tourism development will be targeted to deliver local improvements to benefit both local residents and visitors; support regeneration in Birkenhead; improve facilities and access to the coast; and increase the attractiveness of the countryside. New housing developments, together with tourism development are both likely to lead to an increase in numbers of people using coastline areas for recreation.

5.18 An increase in recreational pressure on the Mersey Estuary SPA/Ramsar has the potential to result in adverse effects on qualifying features of the SPA/Ramsar in the following ways[56]:

- abrasion (boating, anchoring, trampling), is considered to have the potential to affect internationally important assemblages of wildfowl;
- selective extraction of species (harvesting, bait digging (lugworms, mussels), recreational fishing);
- visual presence of recreational activity; and
- disturbance to birds from increased recreational pressure (e.g. boat or other recreational activity) and wildfowling.

5.19 The Mersey Estuary Conservation Group[57] identifies the 'best areas to observe bird life of the Mersey Estuary during winter'. Of the twelve sites listed, three are located within the Borough of Wirral. These are New Brighton, New Ferry and Eastham Country Park on the south shore. These sites are either within or immediately adjacent to the SPA/Ramsar designation. This list suggests that a proportion of the existing recreational pressures on the Mersey arise from visitor sites within Wirral. A significant management issue is presented by Personal Watercraft (jetskis etc) which generally operate outside regulated groups (sailing clubs etc). These launch from New Brighton and the North Wirral coast in particular.

5.20 Policies have been identified in the screening table which have the potential to encourage greater recreational use of the Mersey Estuary either due to a focus of development (and therefore population) on waterside locations, or encouraging accessibility (e.g. through green infrastructure) through these sites.

5.21 The focus of waterside development along the east coast of the Wirral is likely to increase the population of people living and working on those waterside locations immediately adjacent to the Mersey Estuary, therefore increasing the number of recreational users in these areas, particularly when considered in combination with emerging proposals for a marina on the Rock Ferry foreshore. However, much of this area is already extremely built up with docks and industrial development and access to the salt marsh areas of the Estuary itself is either prohibited or restricted thereby reducing the potential for greater direct recreational disturbance of these areas. There could be an increase in recreational boating activities on the Mersey would could impact on the qualifying features of the SPA/Ramsar through both disturbance and potential pollution from oil spills.

5.22 Policy 18 (Green Infrastructure) is likely to enhance recreational opportunities, although it does state that the implications for local areas will be set out in Settlement Area Policies which will include a list of local priorities including habitats and species, which should provide protection to the Mersey Estuary SPA/Ramsar and its qualifying features.

[56] Langston, W.J., Chesman, B.S. and Burt, G.R. (2006). Characterisation of European Marine Sites. Mersey Estuary SPA. [Online].
[57] www.merseyestuary.org.uk

5.23 It is worth noting that the recreational resource of nearby coastal areas associated with the Mersey Narrows and North Wirral Foreshore pSPA/Ramsar, Sefton Coast SAC, Ribble and Alt Estuary SPA/Ramsar and Dee Estuary SAC/SPA/Ramsar are considered to be more popular than the Mersey Estuary. This is partly due to the industrial legacy leaving a less attractive waterside location and high levels of pollution within the Mersey Estuary, and also the alternative coastal locations generally being a more popular visitor destination (offering a larger choice of recreational activities). However, in-combination adverse recreational impacts may occur.

5.24 HRA Screening identified potential pathways whereby policies within the Wirral Core Strategy have the potential to result in direct disturbance to qualifying bird species of the Mersey Estuary SPA/Ramsar. These pathways are assessed in more detail below, including a discussion on any mitigation already built into the Core Strategy.

5.25 New residential developments and provision of green infrastructure may lead to increased use of areas both within Natura 2000 sites, and other areas that support qualifying bird species. Waterside development projects also have the potential to cause direct disturbance to birds during both the construction process, and in the long term through sustained use of areas adjacent to regular feeding or roosting areas. There are likely to be cumulative disturbance impacts to birds through an increase in noise, vibration and lighting, as well as disturbance or injury from pets such as dogs and cats.

5.26 The Natura 2000 sites within the Mersey are part of a wider network of Natura 2000 sites on the west and North West coast of England and Wales, between which there is a huge exchange of birds at all times of the year. These sites extend to the Ribble and Alt Estuaries to the north and to the Dee Estuary in the south, although exchange of birds occurs on a much wider scale. Movement between sites is probably greatest during times of spring and autumn passage when these sites form part of a wider migratory network and serve as important 'stepping stones' along migratory routes, as well significant areas for wintering wildfowl[58]. It is due to this high exchange of birds between sites that impacts on one site could also have a adverse effect on the integrity of other sites within this network.

5.27 The most important factor governing bird use of the Mersey is the tidal cycle, with areas of expansive intertidal mud used extensively for feeding at low tides and areas of saltmarsh being used at high tides for roosting. Saltmarsh is also used as feeding areas for some species. Important areas identified within the Mersey Feasibility Study, Winter Bird Report which are located within the Wirral Borough Boundary are Perch Rock and New Brighton, New Ferry and Eastham along the north coast. The north-east corner of the Wirral is used extensively by a number of qualifying bird species, with Eurasian oystercatchers using the exposed sandy beach at low tide and roosting on the breakwaters and surrounding structures at high tide. Purple sandpipers also used the rocky areas, groynes and shore defences at New Brighton for feeding and roosting, and the Marine Lake area was also used as a high tide roost and for feeding on the tide line by ruddy turnstones, as well as by Eurasian oystercatchers as a high tide roost as it was relatively undisturbed.

5.28 New Ferry was found to support a good mix of both wildfowl and wading species and was the most important site on the Mersey for northern pintail and black-tailed godwit. The exposed muddy areas were used for feeding at low tide by a number of species and there is also a locally important wader roost in this area. There was also significant bird usage of the mudflats adjacent to Eastham Docks for feeding. These

[58] RSK Carter Ecological Limited (2010). Mersey Feasibility Study. Winter Bird Report

areas will all therefore be susceptible to impacts on the qualifying bird species through increased disturbance as a result of new developments and recreational activities.

5.29 In meeting the needs of gypsies and travellers (Policy 10), HRA Screening identified a pathway for direct disturbance on the Mersey Estuary SPA/Ramsar, depending on the location of allocated sites. However, this policy does state that the criteria for setting out the determination of planning applications for this are likely to include other environmental considerations.

5.30 The Core Strategy will include a general policy to encourage energy efficiency and the use and development of renewable, decentralised and low carbon energy within the Wirral (Policy 14). HRA Screening identified that, should this include wind turbine construction, a pathway exists through the construction of onshore/offshore turbines to disrupt flight paths and displace qualifying bird species. Disturbance issues associated with maintenance activities were also identified. However, impacts from wind turbine developments depend greatly on the siting of the turbines and no specific sites have yet been identified.

5.31 In-combination effects of direct disturbance to qualifying bird species could be experienced due to proposed developments along the coastline in Cheshire West and Chester, as the area around Ellesmere Port is targeted as a strategic location for development. This could result in greater detrimental impacts on qualifying bird species due to increased levels of disturbance; or disturbance of previously undisturbed areas due to residential/industrial development and/or improved opportunities for recreation. It is therefore clear that all the local authorities need to work together during production of their development plan documents to limit any potential for detrimental impacts on qualifying species due to disturbance of important roosting/feeding areas along this coast.

5.32 In combination disturbance effects to qualifying bird species of the Mersey Estuary SPA and Ramsar are also likely to be experienced through the proposed expansion of The Liverpool John Lennon Airport (JLA) and disturbance/displacement/collision of qualifying bird species due to an increase in bird scaring devices and airplanes landing closer to the SPA/Ramsar designation area, particularly since the airport masterplan suggests that impacts are occurring at current levels of airport activity. A suite of ecological surveys has been undertaken in connection with the airport expansion[59]. Aircraft currently take off or land over the mudflats adjacent to the Mersey Estuary SPA/Ramsar site. Since these flats are used by a proportion of the passage and wintering waterfowl for which the Estuary is of international importance, there are potential disturbance effects on both feeding and roosting waterfowl under the flight path.

Recommendations for amendment to policy

5.33 Where increased recreational use is predicted to cause adverse impacts on a site, or important off-site supporting habitat, avoidance and mitigation should be considered by Wirral Borough Council. Avoidance of recreational impacts at European sites involves location of new development away from such sites which is clearly not possible in Wirral given that according to the England Leisure Day Visits surveys, day visitors typically travel up to 25.5km to visit the coast for the day. Where avoidance is not possible, an alternative approach is for the local authority in question (i.e. Wirral MBC) to manage tourism and recreational use of the coastlines. Mitigation will usually involve a mix of access management, habitat management and provision of

[59] John Lennon Liverpool Airport Masterplan November 2007
http://www.liverpoolairport.com/assets/_files/documents/oct_08/peel__1224146206_12_Master_Plan_Chapter_11.pdf

alternative recreational space, but this cannot be delivered wholly by Wirral in isolation:

- *Access management* – restricting access to some or all of a European site - is not usually within the remit of the Borough Council and restriction of access may contravene a range of Government policies on access to open space, and Government objectives for increasing exercise, improving health etc. However, active management of access may be possible, for example as practised on nature reserves.
- *Habitat management* is not within the direct remit of the Council. However the Council can help to set a framework for improved habitat management by promoting cross-authority collaboration and S106 funding of habitat management. .
- *Provision of alternative recreational space* can help to attract recreational users away from sensitive European sites, and reduce additional pressure on them. Some species for which European sites have been designated are particularly sensitive to dogs, and many dog walkers may be happy to be diverted to other, less sensitive, sites. However the location and type of alternative space must be attractive for users to be effective.

5.33.1 Although Policy 16 (Development Management) refers to the *"impact on wider environmental requirements*" being one of the main issues when considering the appropriateness of any new development or land allocation, there is no specific reference to protected sites, protected species or other important areas for nature conservation. The Policy does state that "*further advice on the application of these requirements will, where necessary, be set out in Supplementary Planning Documents*" (SPDs). To ensure that an adequate policy framework exists to enable the delivery of the necessary measures to mitigate adverse effects on the Mersey Estuary from recreational sources the Core Strategy should include a commitment to work with the other Merseyside Authorities, MEAS, Natural England and other partners to devise a framework for the delivery of

- Suitably located Green Infrastructure where this will prove effective; and
- Enhanced access management to the European sites, to be informed by the collation of visitor survey data etc and which will need to be in place before the publication of the Site Allocations DPD.

5.33.2 For the Mersey Estuary an appropriate framework may already exist through a European Marine Site Management Scheme, which, if it follows the pattern of other EMS Management Schemes would include recreation/access management within its remit.

5.33.3 The delivery of enhanced access management and GI will need to be phased alongside delivery of housing and a mechanism established for monitoring effectiveness and amending the measures being delivered. The contribution of each authority should be based upon their contribution to recreational activity in each site or (where this info is not yet available) their relative populations and proximity to the site. In general therefore the devising of such a strategy (whether it is part of a specific future SPD or not) will need to be well advanced by the time the Site Allocations DPD is adopted as some strategic greenspace and a possible contribution to funding access management may need to be associated with particular sites.

5.33.4 If the above recommendations to manage access are implemented, it is concluded that there will be no adverse effect on the integrity of the Mersey Estuary SPA/Ramsar

through direct disturbance as a result of any of the policies proposed within the Core Strategy.

Water Quality

Appropriate Assessment

5.34 Policies encouraging housing, employment and industrial growth along the eastern side of the Wirral (namely Birkenhead/Bromborough) bordering the western Mersey Estuary SPA/Ramsar have the potential to contribute to a deterioration in water quality entering the Mersey Estuary. This could arise through domestic sewage and industrial effluent, exacerbating historic trends and existing pressures described above. Policy 5 seeks to result in 3,750 net new dwellings over the fifteen year period from April 2012 to March 2027, and Policy 6 seeks to focus 40% of this new housing in Birkenhead and Bromborough, and Policy 7 clearly shows a preference for phasing of housing in the east Wirral.

5.35 Moreover, Policy 11 identifies 90% of new employment land to be focused in Birkenhead/Bromborough, and Policy 21 identifies Wirral Waters and associated 'partner neighbourhoods' around Birkenhead as the location of a 'New City Neighbourhood' including mixed use and industrial development. Policies 2, 3, 4, are broad spatial policies that support this approach. Water quality impacts could occur during the construction of these sites due to the location of the development areas.

5.36 Table 5[60] summarises the water quality issues being experienced at the Mersey SPA/Ramsar site, along with the likely causes and features of interest at risk of being adversely affected.

[60] English Nature, Plymouth Marine Partnership, The Marine Biological Association (2006) *Characterisation of European Marine Site: the Mersey Estuary Special Protection Area*, Marine Biological Association Occasional Publication No18.

'contaminant'	Area	Potential Sources	Most vulnerable features/biota
1) Organotins (TBT, TPT)	Highest levels in water at the head of estuary – may reflect high suspended solids loads. Persistent in sediments throughout the estuary, with localised hotspots.	Probably multiple sources of TBT including docks (nb Birkenhead), Manchester Ship Canal, Chemical industry, WwTWs. TPT found in eels from Weston Canal (sources agricultural or manufacturing?)	Molluscs, particularly gastropods
2) Metals	No acute problems identified but Hg, Zn and Cu considered risks, especially upstream. Sediment widely above ISQG/TEL and sometimes above PEL at upper Estuary sites: reflected in bioavailability.	WwTWs, industry, urban run-off, shipping. Sediments principal sink for most metals: Modified conditions at some sites could increase bioavailability	Invertebrates (primarily molluscs and crustaceans), larval fish. Bioaccumulation in birds not evaluated but potential risks eg from organometals (alkyl Hg and Pb)
3) Nutrients	Especially toward freshwater inputs. Widnes, Eastham Locks	Freshwater and point source inputs including the Manchester Ship Canal. WwTWs discharges also important Possibly sediments – (phosphate, ammonia)	Invertebrates, fish (esp. early life stages), birds, General diversity
4) Hydrocarbons, PAHs	Poorly defined, due to lack of sampling but evidence of enrichment in sediments, notably Seacombe Ferry	Mixed petrogenic inputs from numerous discharges. Incomplete combustion of fossil fuels, refineries, run-off, boats and ships aircraft. Sediments main reservoir	Benthic invertebrates and fish (NB those in contact with sediment). No bioaccumulation data.
5) Pesticides, herbicides and other organics	Estuarine sediments an important reservoir but little information on spatial distributions within the EMS. Direct toxicity improbable, though sublethal manifestations including endocrine disruption have been demonstrated	Not quantified due to insufficient data but probably includes a significant component from industry, sewage discharges and agricultural and urban run-off. In depositional areas, sediment subsurface maxima reflect historical inputs	Invertebrates (esp. crustacea), fish The region is still a hotspot for bioaccumulation of PCBs and a number of OC pesticides: very few bioaccumulation data in EMS itself Extent of endocrine disruption not fully tested, particularly in invertebrates.

5.37 An earlier (1999) but useful indication of the location and size of waste water treatment work inputs to the Mersey Estuary shows major trade and sewage effluent to be discharged throughout the Estuary with significant inputs from Widnes, Runcorn, and Ellesmere Port as well as those in the Wirral[61]. Estimated inputs from trade effluent at that time (~650,000 m^3/day) represent just over half the amount of sewage effluent (~1,200,00 m^3/day). This is significantly greater than the neighbouring Dee Estuary with estimated trade effluents as ~50,000 m^3/day and sewage effluent ~62,000 m^3/day). There are few other European Marine Sites which have such a high level of discharge, other than the Thames and Solent in Southampton. No data on contaminants in discharges is currently available. Water quality issues are clearly a major issue currently being experienced by Mersey Estuary SPA/Ramsar. However, water companies are implementing an ongoing programme of improvements in response to water quality standards.

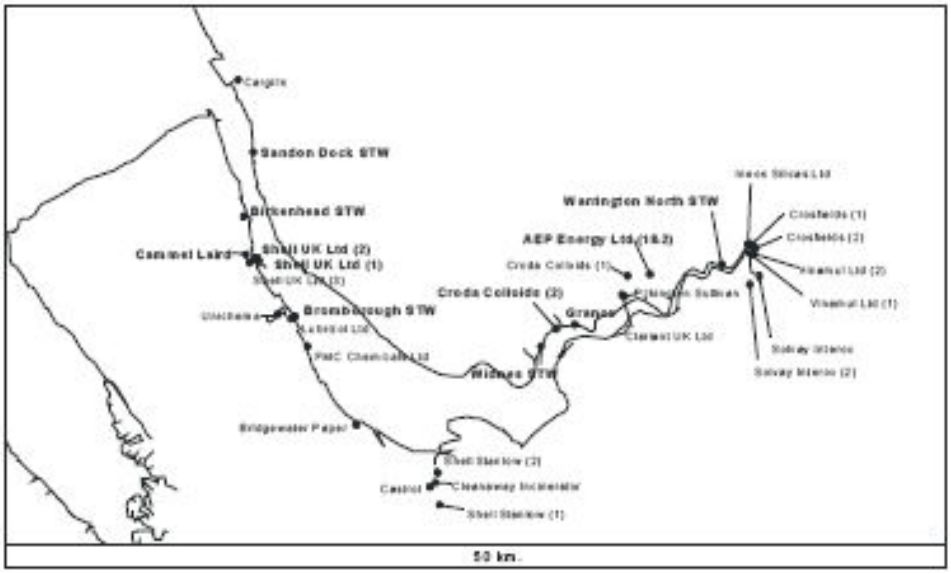
5.38 The Environment Agency is understood to have conducted its own review of sources in relation to HRA. According to Langston et al[62] the Environment Agency Review of Consents for 3886 permitted water discharges were 'screened in', and of these 919

[61] English Nature, Plymouth Marine Partnership, The Marine Biological Association (2006) *Characterisation of European Marine Site: the Mersey Estuary Special Protection Area*, Marine Biological Association Occasional Publication No18.
[62]

were taken through from Stage 2 to Stage 3 Appropriate Assessment. These included:

- Those discharges responsible for discharging the top 90% of the nutrient/BOD/ammonia load entering the Mersey Estuary;
- Those discharges discharging directly into the Mersey Estuary;
- Those discharges authorised to discharge a List 1 and/or List 2 Dangerous substance that has been found to be either exceeding or at risk of exceeding the Environmental Quality Standard in the Mersey Estuary;
- All IPC/IPPPC water discharges not already considered under the Directive.

5.39 Of the 919 discharges requiring an AA only around 380 are continuous discharges. The remainder largely represent intermittent discharges (storm sewage overflows / emergency discharges from pumping stations). Box 3 indicates the Environment Agency priority outfalls of the Mersey[63] . Whilst some priority outfalls are located in the Wirral, many are located in other plan areas, namely Halton and Liverpool.



5.40 The historic and existing pressures of the site clearly identify the combined pollution pressure from run off and waste water discharges throughout the Mersey catchment including the Upper reaches which are located well away from the Wirral. It is reasonable to identify the potential for an *in-combination* effect of the Wirral Core Strategy (above the existing baseline) on the water quality pressures being experienced in the Mersey Estuary SPA/Ramsar.

5.41 It should be noted that the Mersey Basin clean-up campaign has produced substantial improvements over the last 25 years. The Mersey is now reported to support a wide range of fish species, including migratory fish, and there has been an increase in numbers of other animals returning to the estuary including reported sightings of porpoises, grey seals and octopus. Natural England et al[64] conclude that in the absence of specific information on individual discharges, there is insufficient evidence to justify further expensive remedial action on particular sources. However, there is

[63] English Nature, Plymouth Marine Partnership, The Marine Biological Association (2006) *Characterisation of European Marine Site: the Mersey Estuary Special Protection Area*, Marine Biological Association Occasional Publication No18.
[64] English Nature, Plymouth Marine Partnership, The Marine Biological Association (2006) *Characterisation of European Marine Site: the Mersey Estuary Special Protection Area*, Marine Biological Association Occasional Publication No18.

sufficient uncertainty to justify a more targeted and detailed programme of research and surveillance to measure actual biological impacts at a variety of levels (e.g. biochemistry, bioaccumulation, biomarkers, community structure) at sites within the European Marine Sites and near priority discharges. If results indicate deleterious effects which can be attributed to known causes, then the case for remedial action against key sources (which may include multiple inputs) would be placed on a stronger scientifically sound basis. At the very least such a program would provide a benchmark for assessing future changes in the condition of the site and likely contributions from water quality.

5.42 While the population of Wirral is not currently expected to increase over the Core Strategy period part of the purpose of the Core Strategy is to encourage redevelopment and investment to reverse this trend. As a precaution we have therefore concluded that Core Strategy policies could lead to an increased demand on wastewater treatment infrastructure.

Recommendations for amendments to policy

5.43 It should be noted that the majority of the processes that could result in a deterioration of water quality (unregulated waste water discharges, surface water runoff and pollution from construction activities) are either regulated through statutory requirements or can be mitigated through standard construction techniques and environmental good practice. These impacts are therefore unlikely.

5.44 Avoiding an adverse effect is largely in the hands of the water companies (through their investment in future sewage treatment infrastructure) and the Environment Agency (through their role in consenting effluent discharges). However, local authorities can also contribute through ensuring that sufficient wastewater treatment infrastructure is in place prior to development being delivered through the Core Strategy. In the case of Wirral, this is alluded to in:

- Policy 16 - Development Management which states: *The Core Strategy will set out a list of the main issues that will need to be addressed when considering the appropriateness of any new development proposal or land allocation. This list of main issues will include: ……"impact on wider environmental requirements including quality of air, land and water, sustainable construction and waste management*."; and

- *Policy 17* – Developer Contributions which states that *"The types of provision likely to be required will include: ……water services [including flooding, supply disposal, sustainable drainage and prevention of pollution."*

5.45 However, it is considered that this allusion needs to be expanded upon in order to provide a firm commitment with regard to the linking of housing delivery to delivery of necessary infrastructure that will ensure that an adverse effect on European sites is avoided. Policy 7 in the Core Strategy should make specific reference to the fact that phasing of development is also to ensure that it only takes place once any new water treatment infrastructure, or appropriate retro-fitted technology (e.g. nitrate removal) necessary to service the development while avoiding an adverse effect on European sites, is in place. The Core Strategy should also indicate how this need will be determined and delivered through interaction with other authorities (United Utilities, the Environment Agency etc) i.e. through a Water Cycle Strategy.

5.46 With the controls already in place in the Core Strategy in relation to water issues, and with additional protection provided through more stringent requirements on water quality as recommended above, it is concluded that there will be no significant impact

on the water quality within the Mersey Estuary as a result of any policies within the Core Strategy.

Dock, Port and Channel Construction, Maintenance, Shipping and Dredging

Appropriate Assessment

5.46.1 The Wirral Core Strategy promotes greater use of ports and docks, recognising an importance for cargo handling and freight movements as an opportunity to maximise the potential for off-road transport; and contribute towards a sub-regional "SuperPort" (Policies 4, 7, 21). Development of Ports and Docks has the potential to disturb substrates which could result in circulation of synthetic chemical pollutants and heavy metals, leading to potential harm to benthic communities, aquatic invertebrates and habitats required by qualifying bird species. Furthermore greater shipping freight has the potential for increased pollution through fuel emissions/ accidental spillage. .

5.46.2 The above risks are highlighted by a study by Natural England et al[65]. The level of Tributyltin (TBT) in tidal waters exceeds the EQS at most sites, sometimes by a considerable margin. Sources include the Manchester Ship Canal, docks and shipyards, and the river Mersey itself: highest levels were at Monks Hall at the head of the tidal waterway. Sediments in docks contain hotspots which are above action limits (for safe disposal). Redistribution of these sediments must be considered a potential threat to the condition of the site. Further investigation of sources, trends and impacts has been recommended by the study.

5.46.3 Heavy metal distribution, along with PAHs, PCBs and DDT residues from historical inputs, are of significance. Enhanced loadings sometimes appear in subsurface layers in sediment cores. Dredging has been identified as a key activity that could re-expose these layers making them and their associated contaminant burdens available to organisms. The study calls for further biomonitoring of sediments (bioaccumulation and effects) and possibly to transfer of contaminants through dietary organisms to bird populations of the SPA.

5.46.4 Based on these conclusions, it is reasonable to conclude that development of docks, ports, greater ship movements through the Mersey, and any associated navigational dredging has the potential to result in impacts on qualifying features of the Mersey Estuary SPA/Ramsar.

5.46.5 With regards to greater shipping freight in the Mersey and the potential for pollution through fuel emissions/accidental spillages, it should be noted that oil pollution is a continual threat to all inshore marine habitats, and is particularly pronounced in the Mersey Estuary due to its enclosed and sheltered nature. Risks include small leaks, spills and discharges, as well as the possibility of a major accident. There are a number of ways in which oil could potentially impact on the interest features of the SPA which include intertidal habitats, shellfish beds, benthic communities, Zostera plants, eggs and planktonic larval stages of fish, molluscs and crustaceans.

5.46.6 In addition to shipping, sources also include river-borne discharges (including road runoff and atmospheric discharges). Studies have found total hydrocarbon concentrations (THC) in the Mersey to be amongst the most elevated in the UK[66]. In the mouths of the estuaries sampled (including Liverpool Bay for the Mersey), the

[65] English Nature, Plymouth Marine Partnership, The Marine Biological Association (2006) *Characterisation of European Marine Site: the Mersey Estuary Special Protection Area*, Marine Biological Association Occasional Publication No18.
[66] Kirby et al (1998) in English Nature, Plymouth Marine Partnership, The Marine Biological Association (2006) *Characterisation of European Marine Site: the Mersey Estuary Special Protection Area*, Marine Biological Association Occasional Publication No18.

highest THC levels occurred at low tide, reflecting respective dominant flows of more highly contaminated water from upstream. A variety of sources were suggested including industrial discharges and spillages from shipping and land-based sources.

5.46.7 Increased port activities and levels of shipping resulting from proposals for the Port of Liverpool and the Manchester Ship Canal have the potential to result in in-combination effects on the Mersey Estuary. However, shipping is heavily regulated so levels of activity which have the potential to result in detrimental impacts on the Mersey Estuary are highly unlikely to be approved.

Recommendations for amendments to policy

5.47 Based on this evidence it is clear that policies contained within the Core Strategy which encourage the development of docks and ports within the Mersey, and/or result in greater ship movements (either larger ships or new shipping routes which may require navigational dredging, or a greater number of ships creating more ship wash and erosion) have the potential to result in significant impacts on qualifying features of Mersey Estuary SPA/Ramsar. The impacts from these will differ and will thus require different mitigation. The Core Strategy is able to set the framework for these, but the details of specific measures would require further development at a project level, particularly since this will include authorities other than Wirral. Broadly, mitigation that could be designed into the design and management of new dock/port development may include[67]

- environmental policy, reviews and management systems;
- information and codes of conduct;
- ensuring safety;
- emergency response procedures;
- provision of information on Natura 2000 sites;
- zoning of activities;
- re-routing via alternative navigation channels;
- protection of intertidal features from ships' wash using breakwaters and other structures;
- compliance with regulations covering cargo operations and promotion of good practice; and
- managing anchoring.

5.48 Where there is evidence that ship or boat wash is causing erosion of designated intertidal flats or saltmarsh habitat, and where other appropriate measures have been considered and applied, a further management option that may be considered is to protect the intertidal features by creating structures, such as breakwaters, bunds or mounds of sediments on the intertidal. Harwich Harbour Authority has applied this approach in Trimley Marshes on the Stour/Orwell Estuary[68]. Such an approach to protecting marine features may also provide a beneficial use for dredged materials, however the potential impacts on local hydrodynamics and ecology, should be considered. This should not be considered where the costs of undertaking such a

[67] http://www.ukmarinesac.org.uk/activities/ports/ph3_3_1.htm
[68] http://www.ukmarinesac.org.uk/activities/ports/ph3_3_1.htm

scheme would greatly outweigh the potential environmental gain. Furthermore, the potential application of this approach may be limited by the need for a grant aid to fund this work and by land ownership issues.

5.49 A further method of minimising ships' wash in the proximity of vulnerable shores might be to place moorings in the area to reduce speeds. This is a particularly useful approach where small speedboats and personal watercraft are a potential problem. Other variables which influence ships' wash, such as propeller wake, ship design and hull form, are outside the scope and powers of any port authority.

5.50 It should be noted that Policy 15 (Better Design) does require energy and water conservation, as well as sustainable waste management and drainage amongst other issues, to be taken into account in the design of new developments. However it is considered that a greater commitment to this is required to ensure the development of Docks and Ports within the Mersey Estuary, and any associated channel construction or dredging activity will be permitted subject only to the completion of a project based Appropriate Assessment. This would include a thorough consideration of impacts relating to construction (including potential disturbance of sediments and hydrodynamic modelling if required), operational impacts (including anticipated changes in boat traffic and associated impacts) with necessary mitigation in construction, design and management.

Coastal Squeeze and Loss of Supporting Habitat

Appropriate Assessment

5.51 The Core Strategy identifies areas of land immediately adjacent to coastal habitats for economic revitalisation and housing growth. Preferred Option 5 seeks to result in 3,750 net new dwellings over the fifteen year period from April 2012 to March 2027, and Preferred Option 6 seeks to focus 40% of this new housing in Birkenhead and Bromborough, while Preferred Option 7 clearly shows a preference for phasing of housing in the east Wirral. In addition, Preferred Option 11 identifies 90% of new employment land to be focused in Birkenhead/Bromborough, and Preferred Option 21 identifies Wirral Waters and associated 'partner neighbourhoods' around Birkenhead as the location of a 'New City Neighbourhood' including mixed use and industrial development. Preferred Options 2, 3, 4, are broad spatial policies that support this approach, including a focus of tourism development on coastal areas. This proposed foreshore development has the potential to result in coastal squeeze.

5.52 Furthermore, land outside of the Mersey Estuary SPA/Ramsar boundaries may serve as important supporting habitat for off-site roosting areas of qualifying bird species, i.e. areas where qualifying bird species roost that are not within the designated site boundaries. Loss of such land would also have the potential to result in impacts. Development between these important off-site areas and the Estuary itself could also impact on flight paths, making the supporting habitat less accessible to the birds. These important roosting/feeding areas need to be identified and considered prior to permission being granted for any developments to ensure no long-term detrimental impact on the populations of qualifying bird species.

5.53 Work has been undertaken to establish the location of such important supporting habitat sites for qualifying bird species within Merseyside[69]. However, the majority of those areas outside the designated site boundaries are located outside the Wirral County Borough boundary so would not be directly affected by the policies within the Core Strategy for the Wirral.

[69] RSK (2010) Mersey Feasibility Study Winter Bird Report

5.54 Direct physical loss may result from a range of activities causing the removal or smothering of the interest features. The Mersey Estuary is a complex system which supports a rich variety of marine communities, many of which are dependent upon the ecological functioning of other communities. Therefore physical loss of any single habitat as a result of activities such as coastal development could have wider implications for the survival of other communities, thus detrimentally affecting the favourable condition of the European site directly. This could result in a direct deterioration of qualifying SPA/Ramsar features.

5.55 The Mersey Estuary SPA/Ramsar provides important nesting, feeding and roosting habitats for large and internationally important populations of waterbirds, and during the winter it is of major importance for ducks and waders. It is also of major importance for birds moving along the west coast of Britain during the spring and autumn migration periods. The loss by removal (through coastal squeeze) or smothering of any of the supporting habitats on which they depend, is likely to result in the loss of nesting and roosting sites and/or the reduction of food resources. It could also result in increased competition for food and space in areas that are already occupied, and ultimately reduce bird numbers on the estuary.

5.56 Physical loss of habitat within the SPA/Ramsar boundaries may arise from developments such as infrastructure construction and modification, coastal protection works, and land claim (e.g. as put forward by Preferred Options 2, 3 and 4). In these instances the physical loss would occur when areas of habitat are used for new purposes. In addition coastal developments and other anthropogenic activities may also cause the indirect loss of estuarine habitats through the interruption of existing coastal processes such as sediment transport. Sediments will enter the estuary either suspended in the water column, in the case of fine sand and silt, or moving along the seabed as 'bedload' in the case of coarser sand and gravel. Sediment supply may be interrupted either at source, for example by placing coastal defences in front of soft cliffs, or during transport where structures such as groynes in particular may disrupt and intercept the movement of bedload sediment. Such interruptions to sediment supply may occur either within the site or outside it. Eventually a lack of sediment supply will tend to cause habitat deterioration and then erosion. Indirect physical loss can also arise from changes to the estuaries morphology affecting the hydro-dynamic regime, for example widening or deepening of channels at the mouth of an estuary may increase the volume of water entering the estuary causing the erosion of sub-tidal sediments or sandbanks higher up the estuary.

5.57 Loss of additional areas of supporting habitat for qualifying bird species could also occur as a result of development policies within adjoining borough boundaries, such as Cheshire West and Chester Council. Important off-site feeding and roosting areas for qualifying species from the Mersey Estuary have been identified as Frodsham Marsh, Ince Marsh, Weaver Bend and the mudflats off Ellesmere Port[70]. Any loss of these areas could therefore have in-combination effects on the qualifying bird species, leading to greater detrimental impacts overall.

Recommendations for amendments to policy

5.58 Preferred Spatial Objective 6 states that new development will be directed away from areas liable to flooding, which could provide valuable habitat to birds, and Preferred Option 4 Broad Spatial Strategy states that "*The focus within rural areas will be on re-using existing buildings … While protecting local distinctiveness and preserving biodiversity, landscape, heritage and other local features of importance."*

[70] RSK (2010) Mersey Feasibility Study Winter Bird Report

Development management will also consider the impact on wider environmental requirements (Preferred Option 16). These policies suggest that protection of supporting habitat would be considered in development proposals, but this protection should be strengthened by referring specifically to protection of supporting habitat and ensuring that these important areas are identified prior to any specific development sites being agreed. If supporting habitat were to be lost to any development then the applicant would need to determine a) how significant it was (i.e. whether it was used by more than 1% of the population) and to provide alternative habitat to replace it in a location that was reasonably close to the estuary.

5.59 Mitigation for coastal squeeze should include:

- Ensuring that new development is not delivered in locations which would require a change in coastal defence policy that might compromise natural coastal processes (e.g. from No Active Intervention to Hold the Line or Advance the Line); and
- Preventing development being delivered in areas that may compromise locations identified for managed retreat as set out in the Environment Agency Coastal Habitats Management Plan (CHaMP) and Regional Habitat Creation Programme.

5.60 Although a number of off-site feeding and roosting sites have been identified for qualifying species from the Mersey Estuary, the majority of these do not occur within the Wirral County Borough boundary. However, there may be some important sites within Wirral itself that provide valuable supporting habitat to qualifying bird species efforts must be made to identify these areas so that they can be highlighted before the Site Allocations DPD is adopted. However, to ensure that all such sites are considered, a commitment should be given to identify all important areas of supporting habitat and to assess any impacts on these areas, and thereby potential impacts on qualifying species, prior to permitting any future development. The Site Allocation Document should include appropriate mechanisms to ensure the loss of such sites is adequately assessed and mitigated. Wirral should also work in conjunction with other Local Authorities, in particular Cheshire West and Chester Council, to ensure there is no conflict with development of supporting areas outside the Wirral boundary.

5.60.1 Due to the mitigation already provided within the Core Strategy, in relation to development of foreshore areas and development management, together with the additional measures referred to above for protecting valuable supporting habitats, it is considered that there will be no significant impact on the Mersey Estuary through coastal squeeze and/or loss of supporting habitat related to policies within the Core Strategy.

Air Pollution

Appropriate Assessment

5.60.2 Development proposed within the Core Strategy may result in increased car use, notably as a consequence of housing and business development. (Preferred Options 2, 3, 4, 5, 6, 8, 11, 12). A rise in vehicle movements, particularly within 200m of the Mersey Estuary has the potential to result in an increase in atmospheric nitrogen deposition.

5.60.3 Preferred Option 5 identifies 3,750 net new dwellings over the fifteen year period from April 2012 to March 2027, 40% focused in Birkenhead/Bromborough (Preferred Option 6). Preferred Option 11 (Employment Distribution) identifies 177ha of additional development land for new employment-related development during the plan period April 2012 to March 2027 with 90% within Birkenhead and Bromborough. It is therefore reasonable to assume that the rise in vehicle movements as a result of the

core strategy are more likely to be focused around the eastern side of the Borough (around Birkenhead and Bromborough) where economic and housing development will be focused.

5.60.4 Commercial developments within the Wirral may also contribute to aerial emissions which, due to the prevailing wind direction which is west to east, any emissions from development on the Wirral could be deposited within the Mersey Estuary or adjacent habitats.

5.60.5 In combination effects on the Mersey Estuary from air pollution could result from industrial operations, such as emissions from the proposed incinerators at Runcorn and Ince Marshes. However, these already have planning permission and industrial air emissions are heavily regulated so it is considered unlikely that such an effect would occur in practice, as permission would not be granted for any developments likely to release high levels of damaging emissions. Additional in-combination effects could result from the expansion of Liverpool Airport causing deterioration in local air quality and thus increased nitrogen and sulphur deposition.

5.60.6 However, according to the Site Relevant Critical Load function of the UK Air Pollution Information System for each bird for which the Mersey Estuary SPA was designated indicates that the current (2010) actual nitrogen deposition within the site is 11.9 kgN/ha/yr compared to a critical load (for littoral sediment the key habitat for the waterfowl population) of 20-30 kgN/ha/yr. Moreover, APIS reports that the bird species of the SPA are not considered likely to be affected by increased nitrogen deposition and may in fact be subject to a positive effect because nitrogen enrichment potentially means more prey species. Even if an adverse effect was possible it is unlikely that increases in traffic as a result of development across Merseyside would result in the very large increases in nitrogen deposition which would be required to exceed the critical load, given that road transport is currently only responsible for 7% of nitrogen deposition in the SPA.

5.60.7 The Core Strategy already includes Preferred Option 16 on Development Management, which requires impacts of new developments on the wider environment, including quality of air, land and water, sustainable construction and waste management, to be assessed. Emissions to air are also highly regulated so, with these protection measures already in place it is concluded that there would be no significant impact on the Mersey Estuary through air pollution as a result of any policies within the Core Strategy.

Renewable Energy and Tidal Energy of the Mersey

Appropriate Assessment

5.60.8 Preferred Option 14 (Decentralised Energy) promotes energy efficiency and the use and development of renewable, decentralised and low carbon energy and states that opportunities to utilise tidal power in the River Mersey will be encouraged subject to appropriate environmental controls. This has the potential to impact in a variety of ways through release of contaminated sediments; disturbance to invertebrate in-fauna; alterations to sediment patterns, water levels and salinity which could all have a significant impact on the habitats and species for which the surrounding Natura 2000 sites, including the Mersey Estuary SPA/Ramsar, are designated, although the greatest impact would be on the Mersey Estuary itself.

5.60.9 The Feasibility Report for the Mersey Tidal Power Scheme[71] makes reference to the La Rance Basin in Brittany as the only site in the world where the ecological impact of

[71] Scott Wilson and EDF (Feb 2010) Mersey Tidal Power. Feasibility Study: Stage 1: Options Report

a tidal power scheme can be assessed over the long-term. It states that during the construction period the estuary was virtually isolated from the open sea for a period of three years (1963-66) with only a small sanitary draw off flow from inside the basin provided. The period was marked by tidal suppression, significant fluctuations in water salinity and by heavy sedimentation complemented by increased rates of organic matter accumulation, which combined to result in an almost total disappearance of estuarine sea flora and fauna. The experience at La Rance demonstrates that an ecologically successful tidal power plant depends on the adequacy of the construction and operational strategy, and respect for biological balances. It must of course be borne in mind that the La Rance Scheme and the Mersey Tidal Scheme will not necessarily be directly comparable.

5.60.10 The inclusion of wind turbines may be taken forward as part of the renewable energy policy (Decentralised Energy Policy 14). Specific requirements for individual land allocations will be included in a site-specific Development Plan. Nevertheless, the potential to result in impacts on qualifying features of interest includes:

- the potential to encroach on coastal land or result in physical loss of land (described above);
- construction of onshore/offshore turbines as part of renewable energy policies has the potential to disrupt flight paths and displace qualifying bird species. There are also disturbance issues associated with maintenance activities;
- there may be water quality issues arising during the construction of offshore wind farm arrays, and maintenance activities also have the potential to result in water quality issues;
- renewable energy policies have the potential to result in deterioration of air quality through emissions, depending on location. It could also be argued that some renewable energy policies would improve air quality by reducing the need for power stations fuelled by fossil fuels.

5.60.11 In combination effects from other plans and policies could result from the proposed incinerators at Frodsham and Runcorn, as well as the proposed Frodsham Wind Farm. However, due to the prevailing west to east wind direction, air emissions are unlikely to be deposited within the Mersey Estuary, and air emissions are also strictly controlled. The precise siting of wind turbines for the proposed Frodsham windfarm could result in direct loss of areas of supporting habitat for qualifying species from the Mersey Estuary, as well as cause disturbance to flightlines and migration routes for qualifying species. However, bird movements within the Mersey Estuary and between off-site roosting/feeding areas and other Natura 2000 sites are mostly in an east/west direction or up and down the coast, rather than north to south across the estuary. However, the potential impacts from these three developments should all be required to be carefully assessed at the project level and they would not be given planning permission if there were adverse impacts predicted to occur on the integrity of the Mersey Estuary SPA/Ramsar.

Recommendations for amendments to policy

5.60.12 Preferred Option 14 states that “specific requirements for individual land allocations will be included in a site-specific Development Plan Document”. Reference is also made to an emerging study of the capacity of the Borough to generate renewable energy which is likely to identify the proposed New City Neighbourhood as a potential priority zone for producing renewable energy through a district heating scheme. The most significant local sources of renewable energy are more likely to come from extensions to the off-shore wind farms in Liverpool Bay or tidal power within the

Mersey Estuary. Therefore, it seems unlikely that any wind farms will be developed within the boundary of Wirral Borough Council.

5.60.13 Although the implementation of tidal power has the potential to have highly significant impacts on the habitats and species within the estuaries, development of such a scheme would be subject to strict environmental controls. At the present time, it is not possible to assess the implications of such a scheme, as the project is purely at the feasibility stage and the impacts are unknown. However, the Core Strategy should make reference to the requirement for a project level HRA on such a scheme which would include selection of the most suitable design and its location. It is also essential that the impacts relating to construction and decommissioning of the scheme are distinguished from those resulting from its operation.

5.60.14 Preferred Option 16 (Development Management) refers to the "impact on wider environmental requirements" being one of the main issues when considering the appropriateness of any new development or land allocation, there is no specific reference to protected sites, protected species or other important areas for nature conservation. The Policy does state that "further advice on the application of these requirements will, where necessary, be set out in Supplementary Planning Documents" (SPDs). To ensure no detrimental impact on nature conservation, it is recommended that a specific DPD be developed which would include requirements for the protection of all protected sites, protected species and other areas of value for nature conservation and biodiversity. There should be a requirement for detailed assessments to be undertaken on the potential impacts from any new developments on all areas important for nature conservation within the Wirral Borough Boundary, as well as potential impacts on sites/species outside the Borough itself but with potential impact pathways from new developments.

Conclusion

5.60.15 With reference to all of the above, including protection measures already in place within the Core Strategy and the additional measures proposed under the mitigation sections, it can be concluded that none of the policies contained within the Wirral Borough Core Strategy will have a adverse effect on the integrity of the Mersey Estuary SPA/Ramsar. However, it is noted that further assessments will need to be undertaken in relation to site selection for development as well as more detailed assessments in relation to specific projects at a later stage to ensure that site integrity is maintained.

6 Mersey Narrows & North Wirral Foreshore pSPA / pRamsar site

Introduction

6.1 The Mersey Narrows and North Wirral Foreshore pSPA and pRamsar site is approximately 2,078ha, located at the mouths of the Mersey and Dee estuaries, immediately adjacent to the Core Strategy Plan Area. The site comprises intertidal habitats at Egremont foreshore (feeding habitat for waders at low tide), man-made lagoons at Seaforth Nature Reserve (high tide roost and nesting site for terns) and the extensive intertidal flats at North Wirral Foreshore (supports large numbers of feeding waders at low tide and also includes important high-tide roost sites). The most notable feature of the site is the exceptionally high density of wintering Turnstone. The Mersey Narrows and North Wirral Foreshore has clear links in terms of bird movements with the nearby Dee Estuary SPA and Ramsar site, Ribble and Alt Estuaries SPA and Ramsar site, and (to a lesser extent) the Mersey Estuary SPA and Ramsar site (Wirral MBC, 2001).

Reasons for Designation

6.2 The Mersey Narrows and North Wirral Foreshore pSPA and pRamsar site is proposed on the grounds of its feeding and roosting habitat for non-breeding wading birds, and as a breeding site for terns (Wirral MBC, 2001). The Birds Directive Annex I species (qualifying the site under Article 4.1), which can be found in any season, are:

- Common Tern *Sterna hirundo*: 124 pairs breeding = 1.0% of the GB population; and
- Bar-tailed Godwit *Limosa lapponica*: 537 individuals wintering = 1.0% of the GB population.

6.3 The site also qualifies under Article 4.2 of the Birds Directive, as it is used regularly by 1% or more of the biogeographical populations of the following migratory species:

- Knot *Calidris canutus*: 10,661 individuals = 3.0% of NW European, NE Canadian, Greenland & Icelandic populations;
- Redshank *Tringa totanus*: 1,606 individuals = 1.1% Eastern Atlantic population; and
- Turnstone *Arenaria interpres*: 1,593, individuals = 2.3% Western Palearctic population.

6.4 Additionally, in qualifying under Article 4.2 of the Birds Directive, the site regularly supports over 20,000 individuals of a wider range of species, including dunlin, knot *Calidris canutus*, grey plover *Pluvialis squatarola*, oystercatcher *Haematopus ostralegus* and cormorant *Phalacrocorax carbo.*

6.5 The site qualifies under the Ramsar Convention under Criterion 5, regularly supporting over 20,000 waterbirds (non-breeding season, 28,841 individual waterbirds), and Criterion 6, regularly supporting 1% of the species or subspecies of waterbird in any season listed above.

Historic Trends and Current Pressures

6.6 Due to its location at the mouth of the Mersey Estuary and in the Liverpool Bay, this site has been subject to the same changes as described for the Liverpool Bay SPA and pRamsar site and the Mersey Estuary SPA and Ramsar site, in particular water quality improvements since the 1960s (especially since 1985), as well as increases in agricultural effluent pollution during this same period.

6.7 Some of the main current (as opposed to future) environmental pressures relevant to the nature conservation objectives of the Mersey Narrows and North Wirral Foreshore pSPA / pRamsar site are:

- disturbance of sediment releasing legacy heavy metal pollution (lead, cadmium, arsenic and other poisons) that is bound into the sediment;
- pollution via rivers and drains by both treated sewerage and untreated runoff containing inorganic chemicals and organic compounds from everyday domestic products, which 'may combine together in ways that make it difficult to predict their ultimate effect on the marine environment… Some may remain indefinitely in the seawater, the seabed, or the flesh, fat and oil of sea creatures';
- pollution via commercial shipping by chemical or noise pollution and the dumping of litter at sea;
- damage of marine benthic habitat directly from fishing methods;
- damage of marine benthic habitat along the North Wirral Foreshore directly or indirectly from aggregate extraction, particularly anywhere that dredging may be altering erosion/deposition patterns;
- 'coastal squeeze' (a type of coastal habitat loss) from land reclamation and coastal flood defences and drainage used in order to farm or develop coastal land, and from sea level rise;
- loss or damage of marine benthic habitat directly and indirectly (through changed sedimentation/deposition patterns) as a result of navigational dredging in order to accommodate large vessels – e.g. into the ports of Liverpool;
- harm to wildlife (especially birds) or habitat loss due to increasing proposals/demand for offshore wind turbines;
- pollution, direct kills, litter, disturbance or loss of habitat as a result of water-based recreation or other recreation activity and related development along the foreshore (Wildlife Trust, 2006);
- introduction of non-native species and translocation; and
- selective removal of species (e.g. bait digging, wildfowling, fishing) (Wildlife Trust, 2006 and Marine Biological Association, 2006).

6.8 The following potential impacts of the LDF Core Strategy upon Mersey Narrows and North Wirral Foreshore pSPA/pRamsar were identified during the summary screening detailed in Appendix 1. These are:

- direct disturbance to qualifying bird species;
- waste water discharges;
- water abstraction;
- dock, port and channel construction, maintenance shipping and dredging;

- coastal squeeze and loss of supporting habitat,
- recreational activities;
- air pollution; and
- renewable energy.

Appropriate Assessment

Direct Disturbance of Qualifying Bird Species and Habitat Damage

Appropriate Assessment

6.9 Preferred Option 3 (Spatial Vision) refers to the fact that Wirral's potential as a visitor and tourist destination will have been focused on the quality of the Borough's natural environment; built heritage; country parks; and visitor and coastal facilities at Birkenhead, New Brighton, Leasowe, Hoylake, West Kirby and Thurstaston and along the Mersey coast. The delivery of 9,000 homes (a net increase of 3,750) over the Core Strategy period may also lead to number of households which (due to the increasing age of the borough population) may have greater leisure time available. This is particularly the case when considering that for the purposes of HRA development within Wirral must not be considered in isolation but in combination with the 70,000 dwellings that will be delivered across Merseyside and those to be delivered in North Wales over the same time period under other Local Development Framework Core Strategies.

6.10 Preferred Option 4 (Broad Spatial Strategy) states that tourism development will be targeted to deliver local improvements to benefit both local residents and visitors; support regeneration in Birkenhead; improve facilities and access to the coast; and increase the attractiveness of the countryside. New housing developments, together with tourism development are both likely to lead to an increase in numbers of people using coastline areas for recreation.

6.11 An increase in recreational pressure on the Mersey Narrows and North Wirral Foreshore pSPA/pRamsar has the potential to result in adverse impacts on qualifying features of the pSPA/pRamsar in the following ways[72]:

- abrasion (boating, anchoring, trampling), is considered to have the potential to affect internationally important assemblages of wildfowl;
- selective extraction of species (harvesting, bait digging (lugworms, mussels), recreational fishing);
- visual presence of recreational activity; and
- disturbance to birds from increased recreational pressure (e.g. boat or other recreational activity).

6.12 Several online sources[73] [74]suggest that the North Wirral Foreshore is both easily accessible and well used by dog walkers and there is high pressure from recreational uses. These sources also suggest water based recreation (e.g. jet skies) to be potentially damaging. During the summer months in particular, there is a high degree of recreational use of the intertidal sandflats between West Kirby and Hoylake.

[72] Langston, W.J., Chesman, B.S. and Burt, G.R. (2006). Characterisation of European Marine Sites. Mersey Estuary SPA. [Online].
[73] http://friendsofnorthwirralcoastalpark.co.uk/
[74] http://www.wirralglobe.co.uk/news/1732173.0/

Activities practised include walking, horse riding, use of motorcycles and sand yachts[75].

6.13 Bait digging is also practised on North Wirral Foreshore and recently significant numbers of people have been observed collecting razor fish. As with cockling, such activities disturb the sediment through digging and to a lesser extent trampling. This exploitation may also be sustainable at low intensities where traditional methods are employed; however commercial exploitation of these resources may impact on the favourable condition of the European marine site through widespread disturbance of the sediment structure and changes to sediment community composition.

6.14 The Mersey Estuary Conservation Group[76] identifies the 'best areas to observe bird life of the Mersey Estuary during winter'. Of the twelve sites listed, three are located within the Borough of Wirral and one, New Brighton, lies within or immediately adjacent to the pSPA/pRamsar designation. Therefore, increased recreation has the potential to have a adverse effect on the integrity of this Natura 2000 site through physical damage to sensitive habitats and direct disturbance to birds.

6.15 Policies have been identified in the screening table which have the potential to encourage greater recreational use of the Mersey Narrows and North Wirral Foreshore area either due to a focus of development (and therefore population) on waterside locations, or encouraging accessibility (e.g. through green infrastructure) through these sites.

6.16 The focus of waterside development along the east coast of the Wirral is likely to increase the population of people living and working on those waterside locations immediately adjacent to the Mersey Narrows and North Wirral Foreshore pSPA/pRamsar, thereby increasing the number of recreational users in these areas. This could include an increase in recreational boating activities which could impact on the qualifying features of the pSPA/pRamsar through both disturbance and potential pollution from oil spills.

6.17 Preferred Option 18 (Green Infrastructure) has the potential to enhance recreational opportunities, although it does state that the implications for local areas will be set out in Settlement Area Policies which will include a list of local priorities including habitats and species, which should provide protection to the Mersey Narrows and North Wirral Foreshore pSPA/pRamsar and its qualifying features.

6.18 HRA Screening identified potential pathways whereby policies within the Wirral Core Strategy have the potential to result in direct disturbance to qualifying bird species of the Mersey Narrows & North Wirral Foreshore pSPA. These pathways are assessed in more detail below, including a discussion on any mitigation already built into the Core Strategy.

6.19 New residential developments, leading to an increase in population, and provision of green infrastructure may lead to increased use of areas both within Natura 2000 sites, and other areas that support qualifying bird species. Waterside development projects also have the potential to cause direct disturbance to birds during both the construction process, and in the long term through sustained use of areas adjacent to regular feeding or roosting areas. There are likely to be cumulative disturbance impacts to birds through an increase in noise, vibration and lighting, as well as disturbance or injury from pets such as dogs and cats.

[75] The Dee Estuary, Regulation 33 Advice
[76] www.merseyestuary.org.uk

6.20 Mersey Narrows and North Wirral Foreshore pSPA/pRamsar site is part of a wider network of Natura 2000 sites on the west and north-west coast of England and Wales, between which there is a huge exchange of birds at all times of the year. These sites extend to the Ribble and Alt Estuaries to the north and to the Dee Estuary in the south, although exchange of birds occurs on a much wider scale. Movement between sites is probably greatest during times of spring and autumn passage when these sites form part of a wider migratory network and serve as important 'stepping stones' along migratory routes, as well significant areas for wintering wildfowl[77]. It is due to this high exchange of birds between sites that impacts on one site could also have an adverse effect on the integrity of other sites within this network.

6.21 The north-east corner of the Wirral provides important low tide feeding areas and high tide roosting sites for a variety of species, including redshank and European oystercatcher which are qualifying species. Areas of expansive intertidal mud are used extensively for feeding at low tides and areas of saltmarsh used at high tides for roosting. Saltmarsh is also used as feeding areas for some species. Important areas identified within the Mersey Feasibility Study, Winter Bird Report which are located within the Wirral Borough Boundary are Perch Rock and New Brighton; New Ferry; and Eastham along the north coast. The north-east corner of the Wirral is used extensively by a number of qualifying bird species, with Eurasian oystercatchers using the exposed sandy beach at low tide and roosting on the breakwaters and surrounding structures at high tide. Purple sandpipers also used the rocky areas, groynes and shore defences at New Brighton for feeding and roosting, and the Marine Lake area was also used as a high tide roost and for feeding on the tide line by ruddy turnstones, as well as by Eurasian oystercatchers as a high tide roost as it was relatively undisturbed.

6.22 In meeting the needs of gypsies and travellers (Preferred Option 10), HRA Screening identified a pathway for direct disturbance on the Mersey Estuary SPA/Ramsar, depending on the location of allocated sites. However, this policy does state that the criteria for setting out the determination of planning applications for this are likely to include other environmental considerations.

6.23 The Core Strategy will include a general policy to encourage energy efficiency and the use and development of renewable, decentralised and low carbon energy within the Wirral (Preferred Option 14). HRA Screening identified that, should this include wind turbine construction, a pathway exists through the construction of onshore/offshore turbines to disrupt flight paths and displace qualifying bird species. Disturbance issues associated with maintenance activities were also identified. However, impacts from wind turbine developments depend greatly on the siting of the turbines and no specific sites have yet been identified.

6.24 In-combination effects of direct disturbance to qualifying bird species could be experienced due to proposed developments along other coastlines in the area including within Cheshire West and Chester, north Wales and other parts of Merseyside. This could result in greater detrimental impacts on qualifying bird species due to increased levels of disturbance; or disturbance of previously undisturbed areas due to residential/industrial development and/or improved opportunities for recreation. It is therefore clear that all the local authorities need to work together during production of their development plan documents to limit any potential for detrimental impacts on qualifying species due to disturbance of important roosting/feeding areas along this coast.

[77] RSK Carter Ecological Limited (2010). Mersey Feasibility Study. Winter Bird Report

6.25 In combination disturbance effects to qualifying bird species of the Mersey Narrows and North Wirral Foreshore pSPA/pRamsar site are also likely to be experienced through the proposed expansion of The Liverpool John Lennon Airport (JLA) and disturbance/displacement/collision of qualifying bird species due to an increase in bird scaring devices and airplanes landing closer to the SPA/Ramsar designation area. However, a suite of ecological surveys undertaken in connection with the airport expansion[78] concluded that there would be no significant impact to feeding or roosting birds using the shore adjacent to JLA, and thus no adverse effect on the integrity of the protected site. At this stage it should be noted that these conclusions have not been signed off by Natural England.

Recommendations for amendments to policy

6.26 Where increased recreational use is predicted to cause adverse impacts on a site, or important off-site supporting habitat, avoidance and mitigation should be considered by Wirral Borough Council. Avoidance of recreational impacts at European sites involves location of new development away from such sites which is clearly not possible in Wirral given that according to the England Leisure Day Visits surveys, day visitors typically travel up to 25.5km to visit the coast for the day. Where avoidance is not possible, an alternative approach is for the local authority in question (i.e. Wirral MBC) to manage tourism and recreational use of the coastlines. Mitigation will usually involve a mix of access management, habitat management and provision of alternative recreational space, but this cannot be delivered wholly by Wirral in isolation:

- *Access management* – restricting access to some or all of a European site - is not usually within the remit of the Borough Council and restriction of access may contravene a range of Government policies on access to open space, and Government objectives for increasing exercise, improving health etc. However, active management of access may be possible, for example as practised on nature reserves.
- *Habitat management* is not within the direct remit of the Council. However the Council can help to set a framework for improved habitat management by promoting cross-authority collaboration and S106 funding of habitat management.
- *Provision of alternative recreational space* can help to attract recreational users away from sensitive European sites, and reduce additional pressure on them. Some species for which European sites have been designated are particularly sensitive to dogs, and many dog walkers may be happy to be diverted to other, less sensitive, sites. However the location and type of alternative space must be attractive for users to be effective.

6.26.1 Although Preferred Option 16 (Development Management) refers to the *"impact on wider environmental requirements*" being one of the main issues when considering the appropriateness of any new development or land allocation, there is no specific reference to protected sites, protected species or other important areas for nature conservation. The Policy does state that "*further advice on the application of these requirements will, where necessary, be set out in Supplementary Planning Documents*" (SPDs). To ensure that an adequate policy framework exists to enable the delivery of the necessary measures to mitigate adverse effects on the Mersey Narrows & North Wirral Foreshore pSPA from recreational sources the Core Strategy should include a commitment to work with the other Merseyside Authorities, MEAS, Natural England and other partners to devise a framework for the delivery of

[78] John Lennon Liverpool Airport Masterplan November 2007
http://www.liverpoolairport.com/assets/_files/documents/oct_08/peel__1224146206_12_Master_Plan_Chapter_11.pdf

- Suitably located Green Infrastructure where this will prove effective; and
- Enhanced access management to the European sites, to be informed by the collation of visitor survey data etc and which will need to be in place before the publication of the Site Allocations DPD.

6.26.2 For the Mersey Narrows & North Wirral Foreshore SPA the most appropriate framework may be a European Marine Site Management Scheme, which, if it follows the pattern of other EMS Management Schemes would include recreation/access management within its remit.

6.26.3 The delivery of enhanced access management and GI will need to be phased alongside delivery of housing and a mechanism established for monitoring effectiveness and amending the measures being delivered. The contribution of each authority should be based upon their contribution to recreational activity in each site or (where this info is not yet available) their relative populations and proximity to the site. In general therefore the devising of such a strategy (whether it is part of a specific future SPD or not) will need to be well advanced by the time the Site Allocations DPD is adopted as some strategic greenspace and a possible contribution to funding access management may need to be associated with particular sites.

6.26.4 If the above recommendations to manage access are implemented, it is concluded that there will be no adverse effect on the integrity of the Mersey Narrows and North Wirral Foreshore pSPA/pRamsar through direct disturbance as a result of any of the policies proposed within the Core Strategy.

Water Quality

Appropriate Assessment

6.27 The Mersey Narrows and North Wirral Foreshore pSPA/pRamsar includes the mouth of the Mersey Estuary including Egremont Foreshore on the south bank and Seaforth on the north bank. The two areas are separated by approximately 2km but are considered to be an integral site on the basis of the constant interchange of bird populations. Therefore, policies encouraging housing, employment and industrial growth along the eastern side of the Wirral (namely Birkenhead/Bromborough) bordering the western Mersey Estuary SPA/Ramsar have the potential to contribute to a deterioration in water quality entering Mersey Narrows and North Wirral Foreshore pSPA/pRamsar. This could arise through domestic sewage and industrial effluent, exacerbating historic trends and existing pressures described above.

6.28 Preferred Option 5 seeks to result in 3,750 net new dwellings over the fifteen year period from April 2012 to March 2027, and Preferred Option 6 seeks to focus 40% of this new housing in Birkenhead and Bromborough, and Preferred Option 7 clearly shows a preference for phasing of housing in the east Wirral. Also Preferred Option 11 identifies 90% of new employment land to be focused in Birkenhead/Bromborough, and Preferred Option 21 identifies Wirral Waters and associated 'partner neighbourhoods' around Birkenhead as the location of a 'New City Neighbourhood' including mixed use and industrial development. Preferred Options 2, 3, 4, are broad spatial policies that support this approach. Water quality impacts could occur during the construction of these sites due to the location of the development areas.

6.29 While the population of Wirral is not currently expected to increase over the Core Strategy period part of the purpose of the Core Strategy is to encourage redevelopment and investment to reverse this trend. As a precaution we have therefore concluded that Core Strategy policies could lead to an increased demand on wastewater treatment infrastructure.

6.30 Table 5[79] in Section 5 of this report on the Mersey Estuary summarises the water quality issues being experienced at the Mersey SPA/Ramsar site, along with the likely causes and features of interest at risk of being adversely affected. These issues could also impact on the Mersey Narrows and North Wirral Foreshore pSPA/pRamsar due to hydraulic the connections. Similarly, any water quality issues relating to the Dee Estuary SAC/SPA/Ramsar/pSPA extension (Section 4) could also impact on the site.

6.31 The diverse invertebrate community which lives in the intertidal areas is sensitive to changes in water quality as well as water levels therefore, any impacts on water quality due to developments on the Wirral, as well as those in the surrounding areas of Halton, Liverpool and West Cheshire and Chester could have an adverse impact on the integrity of the site through a reduction in prey availability for the qualifying bird species.

Recommendations for amendments to policy

6.32 It should be noted that the majority of the processes that could result in a deterioration of water quality (unregulated waste water discharges, surface water runoff and pollution from construction activities) are either regulated through statutory requirements or can be mitigated through standard construction techniques and environmental good practice. These impacts are therefore unlikely.

6.33 Avoiding an adverse effect is largely in the hands of the water companies (through their investment in future sewage treatment infrastructure) and the Environment Agency (through their role in consenting effluent discharges). However, local authorities can also contribute through ensuring that sufficient wastewater treatment infrastructure is in place prior to development being delivered through the Core Strategy. In the case of Wirral, this is alluded to in:

- Preferred Option 16 Development Management which states: *The Core Strategy will set out a list of the main issues that will need to be addressed when considering the appropriateness of any new development proposal or land allocation. This list of main issues will include: ……"impact on wider environmental requirements including quality of air, land and water, sustainable construction and waste management*."; and

- *Preferred Option 17* – Developer Contributions which states that *"The types of provision likely to be required will include: ……water services [including flooding, supply disposal, sustainable drainage and prevention of pollution."*

6.34 However, it is considered that this allusion needs to be expanded upon in order to provide a firm commitment with regard to the linking of housing delivery to delivery of necessary infrastructure that will ensure that an adverse effect on European sites is avoided. Preferred Option 7 in the Core Strategy should make specific reference to the fact that phasing of development is also to ensure that it only takes place once any new water treatment infrastructure, or appropriate retro-fitted technology (e.g. nitrate removal) necessary to service the development while avoiding an adverse effect on European sites, is in place. The Core Strategy should also indicate how this need will be determined and delivered through interaction with other authorities (United Utilities, the Environment Agency etc) i.e. through a Water Cycle Strategy.

6.35 With the controls already in place in the Core Strategy in relation to water issues, and with additional protection provided through more stringent requirements on water quality as recommended above, it is concluded that there will be no significant impact

[79] English Nature, Plymouth Marine Partnership, The Marine Biological Association (2006) *Characterisation of European Marine Site: the Mersey Estuary Special Protection Area*, Marine Biological Association Occasional Publication No18.

on the water quality within the Mersey Narrows and North Wirral Foreshore pSPA/pRamsar site as a result of any policies within the Core Strategy.

Coastal Squeeze and Loss of Supporting Habitat

Appropriate Assessment

6.36 The Core Strategy identifies areas of land immediately adjacent to coastal habitats for economic revitalisation and housing growth. Preferred Option 5 seeks to result in 3,750 net new dwellings over the fifteen year period from April 2012 to March 2027, and Preferred Option 6 seeks to focus 40% of this new housing in Birkenhead and Bromborough, while Preferred Option 7 clearly shows a preference for phasing of housing in the east Wirral. In addition, Preferred Option 11 identifies 90% of new employment land to be focused in Birkenhead/Bromborough, and Preferred Option 21 identifies Wirral Waters and associated 'partner neighbourhoods' around Birkenhead as the location of a 'New City Neighbourhood' including mixed use and industrial development. Preferred Options 2, 3, 4, are broad spatial policies that support this approach, including a focus of tourism development on coastal areas. This proposed foreshore development has the potential to result in coastal squeeze.

6.37 Furthermore, land outside of the Mersey Narrows and North Wirral Foreshore pSPA/pRamsar boundaries may serve as important supporting habitat for off-site roosting areas of qualifying bird species, i.e. areas where qualifying bird species roost that are not within the designated site boundaries. Loss of such land would also have the potential to result in impacts. Development between these important off-site areas and the pSPA/pRamsar itself could also impact on flight paths, making the supporting habitat less accessible to the birds. These important roosting/feeding areas need to be identified and considered prior to permission being granted for any developments to ensure no long-term detrimental impact on the populations of qualifying bird species.

6.38 Wetland Bird Survey (WeBS) data[80] for the nearest WeBS Core Count area known as Meols and Leasow Lighthouse Fields shows that the wet grasslands in this area of the north Wirral coast are utilised by wintering waterfowl. The predominant species are mallard, lapwing (flocks of almost 2,000 birds have been recorded), black-headed gull and herring gull but the data also indicate that several of the wintering/passage bird species for which the Dee Estuary SPA/Ramsar and Mersey Narrows & North Wirral Foreshore pSPA/pRamsar site were designated do use the site – particularly redshank (a 5-year peak monthly count of 112 birds constituting 7% of the Mersey Narrows & North Wirral Foreshore pSPA population) and curlew (5-year peak monthly count of 151 birds, approximately 3.7% of the Dee Estuary SPA population[81]), but also small numbers of, grey plover (0.1% of the Dee Estuary SPA population), oystercatcher (0.1% of the Dee Estuary SPA population), dunlin (0.04% of the Dee Estuary SPA population) and turnstone (0.8% of the Mersey Narrows & North Wirral Foreshore pSPA population).

6.39 Work has been undertaken to establish the location of such important supporting habitat sites for qualifying bird species within Merseyside[82]. However, the majority of those areas outside the designated site boundaries are located outside the Wirral

[80] Data were supplied by the Wetland Bird Survey (WeBS), a joint scheme of the British Trust for Ornithology, The Wildfowl & Wetlands Trust, Royal Society for the Protection of Birds and Joint Nature Conservation Committee (the last on behalf of the Countryside Council for Wales, the Environment and Heritage Service, Natural England and Scottish Natural Heritage)
[81] Data on the SPA population are derived from the SPA Review section of the JNCC website http://www.jncc.gov.uk/default.aspx?page=2053
[82] RSK (2010) Mersey Feasibility Study Winter Bird Report

County Borough boundary so would not be directly affected by the policies within the Core Strategy for the Wirral.

6.40 Direct physical loss may result from a range of activities causing the removal or smothering of the interest features. The coastal/intertidal habitats form a complex system which supports a rich variety of marine communities, many of which are dependent upon the ecological functioning of other communities. Therefore physical loss of any single habitat as a result of activities such as coastal development could have wider implications for the survival of other communities, thus detrimentally affecting the favourable condition of the European site directly. This could result in a direct deterioration of qualifying pSPA/pRamsar features.

6.41 Mersey Narrows and North Wirral pSPA/pRamsar provides important feeding and roosting habitat for non-breeding wading birds as well as breeding habitat for common tern. It is also of major importance for birds moving along the west coast of Britain during the spring and autumn migration periods. The loss by removal (through coastal squeeze) or smothering of any of the supporting habitats on which they depend, is likely to result in the loss of nesting and roosting sites and/or the reduction of food resources. It could also result in increased competition for food and space in areas that are already occupied, and ultimately reduce bird numbers within the site.

6.42 Physical loss of habitat within the pSPA/pRamsar boundaries may arise from developments such as infrastructure construction and modification, coastal protection works, and land claim (e.g. as put forward by Preferred Options 2, 3 and 4). In these instances the physical loss would occur when areas of habitat are used for new purposes. In addition coastal developments and other anthropogenic activities may also cause the indirect loss of estuarine habitats through the interruption of existing coastal processes such as sediment transport. Sediments will enter the estuary either suspended in the water column, in the case of fine sand and silt, or moving along the seabed as 'bedload' in the case of coarser sand and gravel. Sediment supply may be interrupted either at source, for example by placing coastal defences in front of soft cliffs, or during transport where structures such as groynes in particular may disrupt and intercept the movement of bedload sediment. Such interruptions to sediment supply may occur either within the site or outside it. Eventually a lack of sediment supply will tend to cause habitat deterioration and then erosion. Indirect physical loss can also arise from changes to the estuaries morphology affecting the hydro-dynamic regime, for example widening or deepening of channels at the mouth of an estuary may increase the volume of water entering the estuary causing the erosion of sub-tidal sediments or sandbanks higher up the estuary.

6.43 Loss of additional areas of supporting habitat for qualifying bird species could also occur as a result of development policies within adjoining borough boundaries, such as Cheshire West and Chester Council and other Merseyside authorities. Important off-site feeding and roosting areas for qualifying species from the Mersey Estuary have been identified as Frodsham Marsh, Ince Marsh, Weaver Bend and the mudflats off Ellesmere Port[83]. Any loss of these areas could therefore have in-combination effects on the qualifying bird species, leading to greater detrimental impacts overall.

Recommendations for amendments to policy

6.44 Preferred Spatial Objective 6 states that new development will be directed away from areas liable to flooding, which could provide valuable habitat to birds, and Preferred Option 4 Broad Spatial Strategy states that "*The focus within rural areas will be on re-*

[83] RSK (2010) Mersey Feasibility Study Winter Bird Report

using existing buildings … While protecting local distinctiveness and preserving biodiversity, landscape, heritage and other local features of importance." Development management will also consider the impact on wider environmental requirements (Preferred Option 16). These policies suggest that protection of supporting habitat would be considered in development proposals, but this protection should be strengthened by referring specifically to protection of supporting habitat and ensuring that these important areas are identified prior to any specific development sites being agreed. Further mitigation should include preventing any development being delivered in areas that may compromise managed retreat areas by the Environment Agency. If supporting habitat were to be lost to any development then the applicant would need to determine a) how significant it was (i.e. whether it was used by more than 1% of the population) and to provide alternative habitat to replace it in a location that was reasonably close to the estuary.

6.45 Mitigation for coastal squeeze should include:

- Ensuring that new development is not delivered in locations which would require a change in coastal defence policy that might compromise natural coastal processes (e.g. from No Active Intervention to Hold the Line or Advance the Line); and
- Preventing development being delivered in areas that may compromise locations identified for managed retreat as set out in the Environment Agency Coastal Habitats Management Plan (CHaMP) and Regional Habitat Creation Programme.

6.46 Important off-site feeding and roosting areas for qualifying species from the Mersey Narrows and North Wirral pSPA/pRamsar need to be identified. Wetland Bird Sites (WeBS) sites listed within the Wirral include Arrowe Park Pond; Birkenhead Park; Central Park Wallasey and Meols Railway Station Pond, all of which could provide valuable supporting habitat. Other important sites both within Wirral itself and the surrounding areas that provide valuable supporting habitat to qualifying bird species should be identified so that they can be taken into consideration when considering any future development before the Site Allocations DPD is adopted. To ensure that all such sites are considered, a commitment should be given within the Core Strategy to identify all important areas of supporting habitat and to assess any impacts on these areas, and thereby potential impacts on qualifying species, prior to permitting any future development. The Site Allocation Document should include appropriate mechanisms to ensure the loss of such sites is adequately assessed and mitigated. Wirral should also work in conjunction with other Local Authorities, in particular Cheshire West and Chester Council, as well as the other Merseyside councils, to ensure there is no conflict with development of supporting areas outside the Wirral boundary.

6.46.1 Due to the mitigation already provided within the Core Strategy, in relation to development of foreshore areas and development management, together with the additional measures referred to above for protecting valuable supporting habitats, it is considered that there will be no significant impact on the Mersey Narrows and North Wirral Foreshore pSPA/pRamsar through coastal squeeze and/or loss of supporting habitat related to policies within the Core Strategy.

Air Pollution

Appropriate Assessment

6.46.2 Development proposed within the Core Strategy may result in increased car use, notably as a consequence of housing and business development. (Preferred Options 2, 3, 4, 5, 6, 8, 11, 12). A rise in vehicle movements, particularly within 200m of the

Mersey Narrows and North Wirral Foreshore area has the potential to result in an increase in atmospheric nitrogen deposition.

6.46.3 Policy 5 identifies 3,750 net new dwellings over the fifteen year period from April 2012 to March 2027, 40% focused in Birkenhead/Bromborough (Preferred Option 6). Preferred Option 11 (Employment Distribution) identifies 177ha of additional development land for new employment-related development during the plan period April 2012 to March 2027 with 90% within Birkenhead and Bromborough. It is therefore reasonable to assume that the rise in vehicle movements as a result of the core strategy are more likely to be focused around the eastern side of the Borough (around Birkenhead and Bromborough) where economic and housing development will be focused.

6.46.4 In combination effects on the Mersey Narrows and North Wirral Foreshore pSPA/pRamsar from air pollution could result from industrial operations, such as emissions from the proposed incinerators at Runcorn and Ince Marshes. However, industrial air emissions are heavily regulated so it is considered unlikely that such an effect would occur in practice, as permission would not be granted for any developments likely to release high levels of damaging emissions. Additional in-combination effects could result from the expansion of Liverpool Airport causing a deterioration in local air quality and thus increased nitrogen deposition.

6.46.5 However, according to the UK Air Pollution Information System for the grid reference in the central Wirral section of the pSPA/pRamsar site (SJ249920) nitrogen deposition is currently 9.2 kgN/ha/yr compared to a critical load (for littoral sediment the key habitat for the waterfowl population) of 20-30 kgN/ha/yr. Moreover, APIS reports that the bird species of the SPA are not considered likely to be affected by increased nitrogen deposition and may in fact be subject to a positive effect because nitrogen enrichment potentially means more prey species. Even if an adverse effect was possible it is unlikely that increases in traffic as a result of development across Merseyside would result in the very large increases in nitrogen deposition which would be required to exceed the critical load.

Renewable Energy and Tidal Energy of the Mersey

Appropriate Assessment

6.46.6 Preferred Option 14 (Decentralised Energy) promotes energy efficiency and the use and development of renewable, decentralised and low carbon energy and states that opportunities to utilise tidal power in the River Mersey will be encouraged subject to appropriate environmental controls. This has the potential to impact in a variety of ways through release of contaminated sediments; disturbance to invertebrate in-fauna; alterations to sediment patterns, water levels and salinity which could all have a significant impact on the habitats and species for which the surrounding Natura 2000 sites, including Mersey Narrows and North Wirral Foreshore pSPA/pRamsar, are designated.

6.46.7 Further details on the potential impacts of implementing a tidal power scheme on the Mersey are provided in Section 5 of this Report for the Mersey Estuary.

6.46.8 The inclusion of wind turbines may be taken forward as part of the renewable energy policy (Decentralised Energy Preferred Option 14). Specific requirements for individual land allocations will be included in a site-specific Development Plan. Nevertheless, the potential to result in impacts on qualifying features of interest includes:

- the potential to encroach on coastal land or result in physical loss of land (described above);
- construction of onshore/offshore turbines as part of renewable energy policies has the potential to disrupt flight paths and displace qualifying bird species. There are also disturbance issues associated with maintenance activities;
- there may be water quality issues arising during the construction of offshore wind farm arrays, and maintenance activities also have the potential to result in water quality issues;
- renewable energy policies have the potential to result in deterioration of air quality through emissions, depending on location. It could also be argued that some renewable energy policies would improve air quality by reducing the need for power stations fuelled by fossil fuels.

6.46.9 In combination effects from other plans and policies could result from the proposed incinerators at Frodsham and Runcorn, as well as the proposed Frodsham Wind Farm as well as off-shore windfarms in Liverpool Bay. However, due to the prevailing west to east wind direction, air emissions are unlikely to be deposited within Mersey Narrows and North Wirral Foreshore pSPA/pRamsar, and air emissions are also strictly controlled. The precise siting of wind turbines for the proposed Frodsham windfarm, as well as the off-shore windfarms in Liverpool Bay, could result in direct loss of areas of supporting habitat for qualifying species from the Mersey Narrows and North Wirral Foreshore pSPA/pRamsar, as well as cause disturbance to flightlines and migration routes for qualifying species. However, bird movements up and down the coast tend to be concentrated close to shore so the off-shore windfarms are unlikely to restrict this movement. However, the potential impacts from these developments would all be required to be carefully assessed at the project level and they would not be given planning permission if there were adverse impacts predicted to occur on the integrity of the Mersey Narrows and North Wirral Foreshore pSPA/pRamsar.

Recommendations for amendments to policy

6.46.10 Preferred Option 14 states that "specific requirements for individual land allocations will be included in a site-specific Development Plan Document". Reference is also made to an emerging study of the capacity of the Borough to generate renewable energy which is likely to identify the proposed New City Neighbourhood as a potential priority zone for producing renewable energy through a district heating scheme. The most significant local sources of renewable energy are more likely to come from extensions to the off-shore wind farms in Liverpool Bay or tidal power within the Mersey Estuary. Therefore, it seems unlikely that any wind farms will be developed within the boundary of Wirral Borough Council.

6.46.11 Although the implementation of tidal power has the potential to have highly significant impacts on the habitats and species within the estuaries, development of such a scheme would be subject to strict environmental controls. At the present time, it is not possible to assess the implications of such a scheme, as the project is purely at the feasibility stage and the impacts are unknown. However, the Core Strategy should make reference to the requirement for a project level HRA on such a scheme which would include selection of the most suitable design and its location. It is also essential that the impacts relating to construction of the scheme are distinguished from those resulting from its operation.

6.46.12 Preferred Option 16 (Development Management) refers to the "impact on wider environmental requirements" being one of the main issues when considering the appropriateness of any new development or land allocation, there is no specific

reference to protected sites, protected species or other important areas for nature conservation. The Policy does state that "further advice on the application of these requirements will, where necessary, be set out in Supplementary Planning Documents" (SPDs). To ensure no detrimental impact on nature conservation, it is recommended that a specific DPD be developed which would include requirements for the protection of all protected sites, protected species and other areas of value for nature conservation and biodiversity. There should be a requirement for detailed assessments to be undertaken on the potential impacts from any new developments on all areas important for nature conservation within the Wirral Borough Boundary, as well as potential impacts on sites/species outside the Borough itself but with potential impact pathways from new developments.

Conclusion

6.46.13 With reference to all of the above, including protection measures already in place within the Core Strategy and the additional measures proposed under the mitigation sections, it can be concluded that none of the policies contained within the Wirral Borough Core Strategy will have a adverse effect on the integrity of the Mersey Narrows and North Wirral Foreshore pSPA/pRamsar. However, it is noted that further assessments will need to be undertaken in relation to site selection for development as well as more detailed assessments in relation to specific projects at a later stage to ensure that site integrity is maintained.

7 Liverpool Bay pSPA and pRamsar

Introduction

7.1 The Liverpool Bay SPA and pRamsar site is proposed to be an approximately 198,000ha maritime site located in the Irish Sea, straddling the English and Welsh borders. The site has exposed mudflats and sandbanks in places, although the site extends up to approximately 20km from the shoreline and thus most of the area of the SPA/pRamsar site is relatively shallow water up to 20m deep. It is contiguous with a number of other European sites, including the Ribble and Alt Estuaries SPA and Ramsar site, Mersey Narrows and North Wirral Foreshore SPA and pRamsar site, and Mersey Estuary SPA and Ramsar site.

Reasons for Designation

7.2 In 2004, a study team of the Joint Nature Conservation Committee (JNCC) (referred to in citation as 'Webb et al.') produced two reports on a potential Liverpool Bay SPA, the first on the recommendation for designation, and the second on boundary options. The former reported that '*Liverpool Bay hosted populations of red-throated divers Gavia stellata and common scoter Melanitta nigra in numbers that exceeded thresholds that would qualify the site for SPA status'* (Webb et al., 2004b, p.2).

7.3 The report also mentions its potential qualification as a Ramsar site due to the large numbers of waterfowl supported (Criterion 5 regarding Article 2 of the Ramsar Convention).

7.4 Since the site is not yet a SPA, there are no nature conservation objectives provided at this stage, but they would likely be similar to those of other maritime and estuarine SPAs, particularly nearby sites such as the Mersey Estuary SPA. Such objectives are thus assumed to include:

- to prevent a significant reduction in numbers or displacement of all qualifying species of over-wintering birds from a reference level – these are:
    - red-throated diver *Gavia stellata*: 1,405 wintering individuals = 28.7% of the GB population,
    - common scoter *Melanitta nigra*: 53,454 wintering individuals = 3.3% of the GB population,
- Other species that might be judged for inclusion:
    - great-crested grebe *Podiceps cristatus*,
    - common eider *Somateria mollissima*,
    - red-breasted merganser *Mergus serrator*, and
    - little gull *Larus minutes* (Webb *et al.*, 2004b);
- to prevent significant damage to or decrease in extent of habitat, vegetation characteristics or landscape features from a reference level; and
- to maintain the presence and abundance of prey species, primarily aquatic invertebrates but also aquatic vegetation (including algae), whereby the populations do not deviate significantly from a reference level.

Historic Trends and Current Pressures

7.5 With the proposed site encompassing approximately 198,000 hectares and a range of estuarine and maritime habitat, the Liverpool Bay SPA and pRamsar site is subject to a wide range of pressures of varying spatial scope and human activity. Perhaps the most direct way to establish the proposed site's recent changes in health / ecological status is through the changing environmental pressures upon the Irish Sea.

7.6 The industrial revolution of the 19th century led to the Irish Sea being used to dispose liquid waste, including sewage and unwanted by-products of industrial processes (including mining, manufacturing, nuclear waste reprocessing and energy generation). This improved in the latter half of the 20th century, and sewage and other waste are no longer dumped offshore in an uncontrolled manner. While Liverpool Bay is hypernutrified, there is no evidence of harmful algal blooms or de-oxygenation of seawater (Environment Agency, pers. comm.).

7.7 Some of the main existing environmental pressures on the Irish Sea relevant to the nature conservation objectives of the Liverpool Bay SPA and pRamsar site are:

- disturbance of sediment releasing legacy heavy metal pollution (lead, cadmium, arsenic and other poisons) that is bound into the sediment;
- pollution via rivers and drains by both treated sewerage and untreated runoff containing inorganic chemicals and organic compounds from everyday domestic products, which 'may combine together in ways that make it difficult to predict their ultimate effect of the marine environment… Some may remain indefinitely in the seawater, the seabed, or the flesh, fat and oil of sea creatures';
- pollution via commercial shipping by chemical or noise pollution and the dumping of litter at sea;
- damage of marine benthic habitat directly from fishing methods;
- damage of marine benthic habitat directly or indirectly from aggregate extraction;
- 'coastal squeeze' (a type of coastal habitat loss) from land reclamation and coastal flood defences and drainage used in order to farm or develop coastal land, and from erosion and sea level rise;
- loss or damage of marine benthic habitat directly and indirectly (through changed sedimentation/deposition patterns) as a result of navigational dredging in order to accommodate large vessels – e.g. into the ports of Liverpool;
- harm to wildlife (especially birds) or habitat loss due to increasing proposals/demand for offshore wind turbines; and
- pollution, direct kills, litter or loss of habitat as a result of water-based recreation and related development along the foreshore (Wildlife Trust, 2006).

Key Pressures from Wirral

7.8 The following potential impacts of the LDF Core Strategy upon Liverpool Bay SPA/pRamsar were identified during the summary screening detailed in Appendix 1. These are:

- waste water discharges;
- dock, port and channel construction, maintenance shipping and dredging;

- recreational activities; and
- renewable energy.

Appropriate Assessment

Recreational Activities

Appropriate Assessment

7.9 Preferred Option 3 (Spatial Vision) refers to the fact that Wirral's potential as a visitor and tourist destination will have been focused on the quality of the Borough's natural environment; built heritage; country parks; and visitor and coastal facilities at Birkenhead, New Brighton, Leasowe, Hoylake, West Kirby and Thurstaston and along the Mersey coast. The delivery of 9,000 homes (a net increase of 3,750) over the Core Strategy period may also lead to number of households which (due to the increasing age of the borough population) may have greater leisure time available. This is particularly the case when considering that for the purposes of HRA development within Wirral must not be considered in isolation but in combination with the 70,000 dwellings that will be delivered across Merseyside and those to be delivered in North Wales over the same time period under other Local Development Framework Core Strategies.

7.10 Preferred Option 4 (Broad Spatial Strategy) states that tourism development will be targeted to deliver local improvements to benefit both local residents and visitors; support regeneration in Birkenhead; improve facilities and access to the coast; and increase the attractiveness of the countryside. New housing developments, together with tourism development are both likely to lead to an increase in numbers of people using coastline areas for recreation.

7.11 The only potential impact on Liverpool Bay SPA/pRamsar through increased recreation would be through an increase in the use of small boats for fishing or recreation. Both red-throated diver and common scoter are highly sensitive to noise and visual disturbance, boat movements, and general activity[84]. Disturbance can cause birds to cease feeding or fly away. This could result in an increase in their energy requirements at their present (disturbed) feeding sites, or they may move to an alternative less favoured feeding or roosting site. Such a response affects energy budgets and food intake rates, and possibly survival. Overwintering birds, which are frequently subject to harsh weather conditions and must lay down fat to survive, are therefore particularly sensitive to disturbance. However, currently most vessel activity is restricted to well-established areas which the birds already tend to avoid and it is likely that any increased activity would be concentrated in the same areas. It is also considered unlikely that any increase in numbers of small boats would be large enough to have a adverse effect on the integrity of the Natura 2000 site.

7.12 Liverpool Bay holds various fish of commercial importance, and extraction of the red-throated diver's main fish prey, as either target and/or bycatch species, or through recreational fishing could impact on the population. Entanglement in static fishing nets is also an important cause of death for red-throated divers in the UK waters, although the extent of this impact in Liverpool Bay is not known.

[84] Natural England and Countryside Council for Wales (September 2009) *Liverpool Bay / Bae Lerpwl pSPA Conservation Objectives from Natural England and CCW, September 2009* http://www.naturalengland.org.uk/Images/LivBay-consobj_tcm6-15189.pdf

Recommendations for amendments to policy

7.13 Where increased recreational use is predicted to cause adverse impacts on a site, or important off-site supporting habitat, avoidance and mitigation should be considered by Wirral Borough Council. Avoidance of recreational impacts at European sites involves location of new development away from such sites which is clearly not possible in Wirral given that according to the England Leisure Day Visits surveys, day visitors typically travel up to 25.5km to visit the coast for the day. Where avoidance is not possible, an alternative approach is for the local authority in question (i.e. Wirral MBC) to manage tourism and recreational use of the coastlines.

7.14 With regard to Liverpool Bay SPA this will consist primarily of access management, but this cannot be delivered by Wirral in isolation:

7.14.1 Although Preferred Option 16 (Development Management) refers to the *"impact on wider environmental requirements*" being one of the main issues when considering the appropriateness of any new development or land allocation, there is no specific reference to protected sites, protected species or other important areas for nature conservation. The Policy does state that "*further advice on the application of these requirements will, where necessary, be set out in Supplementary Planning Documents*" (SPDs). To ensure that an adequate policy framework exists to enable the delivery of the necessary measures to mitigate adverse effects on the Liverpool Bay SPA from recreational sources the Core Strategy should include a commitment to work with the other Merseyside Authorities, MEAS, Natural England, CCW and other partners (such as the north Wales coastal authorities) to devise a framework for the delivery of enhanced access management, to be informed by the collation of visitor survey data etc and which will need to be in place before the publication of the Site Allocations DPD.

7.14.2 The contribution of each authority should be based upon their contribution to recreational activity in each site or (where this info is not yet available) their relative populations and proximity to the site. In general therefore the devising of such a strategy (whether it is part of a specific future SPD or not) will need to be well advanced by the time the Site Allocations DPD is adopted as some strategic greenspace and a possible contribution to funding access management may need to be associated with particular sites.

7.15 Due to the potential for detrimental impacts on the qualifying species of Liverpool Bay from boat based recreational activities, this needs to be considered when assessing any future development proposals on the Wirral which may lead to an increase in such activity. Some form of access management may need to be implemented or controls on water based leisure activities which may be developed in relation to the new mixed-use waterside development at East Float. A commitment to this effect should be provided in the Core Strategy.

Water Quality

Appropriate Assessment

7.16 Liverpool Bay SPA/pRamsar lies adjacent to the mouths of the Mersey and Dee Estuaries. Therefore, policies encouraging housing, employment and industrial growth on the Wirral have the potential to contribute to a deterioration in water quality entering Liverpool Bay SPA/pRamsar via the Mersey and Dee. This could arise through domestic sewage and industrial effluent, exacerbating historic trends and existing pressures described above.

7.17 Policies encouraging housing growth on West Kirby and Hoylake (Preferred Options 2, 3, 4, 5, 6, 8), the development of West Kirby and Hoylake and town centres and industrial growth in these areas (Preferred Options 2, 4, 11) have the potential to result in a deterioration of water quality. In particular, heavy development along the eastern coast of the Wirral has the potential to impact on water quality through discharges. Promoting local production and food security as identified in Policy 3 Spatial Vision also has the potential to impact on water quality if this leads to further intensification of agriculture which could result in increased nutrient run-off into sensitive area.

7.18 While the population of Wirral is not currently expected to increase over the Core Strategy period part of the purpose of the Core Strategy is to encourage redevelopment and investment to reverse this trend. As a precaution we have therefore concluded that Core Strategy policies could lead to an increased demand on wastewater treatment infrastructure.

7.19 With respect to waste water discharge, non-toxic contamination through nutrient loading, organic loading and changes to the thermal regime could impact on prey species and distribution. The sensitivity of the prey species of both red-throated diver and common scoter to non-toxic contamination is considered moderate. As benthic feeders, common scoter are closely associated with the availability and condition of their shallow sandbank habitat. As such they are considered highly sensitive to its physical loss and smothering and any adverse impact on benthic communities. .

7.20 The diverse invertebrate community which lives in the intertidal areas is sensitive to changes in water quality as well as water levels therefore, any impacts on water quality due to developments on the Wirral, as well as those in the surrounding areas of Halton, Liverpool, West Cheshire and Chester and North Wales could also have an adverse impact on the integrity of the site through a reduction in prey availability for the qualifying bird species, in-combination with development proposed within the Wirral Core Strategy.

Recommendations for amendment to policy

7.21 It should be noted that the majority of the processes that could result in a deterioration of water quality (unregulated waste water discharges, surface water runoff and pollution from construction activities) are either regulated through statutory requirements or can be mitigated through standard construction techniques and environmental good practice. These impacts are therefore unlikely.

7.22 Avoiding an adverse effect is largely in the hands of the water companies (through their investment in future sewage treatment infrastructure) and the Environment Agency (through their role in consenting effluent discharges). However, local authorities can also contribute through ensuring that sufficient wastewater treatment infrastructure is in place prior to development being delivered through the Core Strategy. In the case of Wirral, this is alluded to in:

- Preferred Option 16 - Development Management which states: *The Core Strategy will set out a list of the main issues that will need to be addressed when considering the appropriateness of any new development proposal or land allocation. This list of main issues will include: ……"impact on wider environmental requirements including quality of air, land and water, sustainable construction and waste management*."; and

- *Preferred Option 17* – Developer Contributions which states that *"The types of provision likely to be required will include: ……water services [including flooding, supply disposal, sustainable drainage and prevention of pollution."*

7.23 However, it is considered that this allusion needs to be expanded upon in order to provide a firm commitment with regard to the linking of housing delivery to delivery of necessary infrastructure that will ensure that an adverse effect on European sites is avoided. Preferred Option 7 in the Core Strategy should make specific reference to the fact that phasing of development is also to ensure that it only takes place once any new water treatment infrastructure, or appropriate retro-fitted technology (e.g. nitrate removal) necessary to service the development while avoiding an adverse effect on European sites, is in place. The Core Strategy should also indicate how this need will be determined and delivered through interaction with other authorities (United Utilities, the Environment Agency etc) i.e. through a Water Cycle Strategy.

7.24 With the controls already in place in the Core Strategy in relation to water issues, and with additional protection provided through more stringent requirements on water quality as recommended above, it is concluded that there will be no significant impact on the water quality within the Liverpool Bay SPA/pRamsar site as a result of any policies within the Core Strategy.

Dock, Port and Channel Construction, Maintenance, Shipping and Dredging

Appropriate Assessment

7.25 Although no port developments are proposed within the Liverpool Bay SPA/pRamsar site, new port/dock developments on the Mersey and potential increases in levels of shipping could have indirect impacts on the qualifying features of Liverpool Bay SPA/pRamsar through disturbance of substrates which could result in circulation of synthetic chemical pollutants and heavy metals, leading to potential harm to benthic communities, aquatic invertebrates and habitats required by qualifying bird species. Furthermore greater shipping freight has the potential for increased pollution through fuel emissions/ accidental spillage.

7.26 The above risks are highlighted by a study by Natural England et al[85]. The level of Tributyltin (TBT) in tidal waters exceeds the EQS at most sites, sometimes by a considerable margin. Sources include the Manchester Ship Canal, docks and shipyards, and the river Mersey itself: highest levels were at Monks Hall at the head of the tidal waterway. Sediments in docks contain hotspots which are above action limits (for safe disposal). Redistribution of these sediments must be considered a potential threat to the condition of the site. Further investigation of sources, trends and impacts has been recommended by the study.

7.27 Heavy metal distribution, along with PAHs, PCBs and DDT residues from historical inputs, are of significance. Enhanced loadings sometimes appear in subsurface layers in sediment cores. Dredging has been identified as a key activity that could re-expose these layers making them and their associated contaminant burdens available to organisms. The study calls for further biomonitoring of sediments (bioaccumulation and effects) and possibly to transfer of contaminants through dietary organisms to bird populations of the SPA.

7.28 PCBs are toxic persistent organic pollutants used in industry as dielectric fluids for transformers, capacitors and coolants and can bioaccumulate in the sublittoral prey

[85] English Nature, Plymouth Marine Partnership, The Marine Biological Association (2006) *Characterisation of European Marine Site: the Mersey Estuary Special Protection Area*, Marine Biological Association Occasional Publication No18.

species of the common scooter and bioaccumulate/biomagnify in the fish species of the red-throated diver. If marine pollution were to occur there is the potential for exposure to PCBs to change. Although PCBs are currently banned, hotspots of PCBs include industrial estuaries and sandy environments offshore and disturbance of sediments through shipping, dock/port expansion and navigational dredging may result in their release from such hotspots.

7.29 Based on these conclusions, it is reasonable to conclude that development of docks, ports, greater ship movements through the Mersey and surrounding waters, and any associated navigational dredging has the potential to result in impacts on qualifying features of the Liverpool Bay SPA/pRamsar. As well as impacts through release of toxic sediments, there is also a danger of erosion of intertidal flats or saltmarsh habitats.

7.30 With regards to greater shipping freight in the Mersey Estuary and surrounding waters and the potential for pollution through fuel emissions/accidental spillages, it should be noted that oil pollution is a continual threat to all inshore marine habitats, and is particularly pronounced in the Mersey Estuary due to its enclosed and sheltered nature. Risks include small leaks, spills and discharges, as well as the possibility of a major accident.

7.31 Large oil and chemical spills affecting shallow sandbank habitats can have a detrimental effect on bird populations as it can affect their food sources and also the birds directly, especially during their moulting times when they are far less mobile. Sensitivity to non-synthetic compounds is therefore considered to be high. Oil on the feathers of birds could lead to loss of insulation, reduced buoyancy and possibly drowning. The possibility of a pollution event, however, has been considered and the overall assessment of exposure is considered to be low. This is a combination of 'normal' toxic contamination in the SPA plus the low risk of a catastrophic event.

7.32 Increased port activities and levels of shipping resulting from proposals for the Port of Liverpool and the Manchester Ship Canal have the potential to result in in-combination effects on Liverpool Bay SPA/pRamsar. However, shipping is heavily regulated so levels of activity which have the potential to result in detrimental impacts on Natura 2000 sites are highly unlikely to be approved.

Recommendations for amendment to policy

7.33 Based on this evidence it is clear that policies contained within the Core Strategy which encourage the development of docks and ports within the Mersey, and/or result in greater ship movements (either larger ships or new shipping routes which may require navigational dredging, or a greater number of ships creating more ship wash and erosion) have the potential to result in significant impacts on qualifying features of Liverpool Bay SPA/pRamsar. The impacts from these will differ and will thus require different mitigation. The Core Strategy is able to set the framework for these, but the details of specific measures would require further development at a project level, particularly since this will include authorities other than Wirral. Broadly, mitigation that could be designed into the design and management of new dock/port development may include[86]

- environmental policy, reviews and management systems;
- information and codes of conduct;
- ensuring safety;

[86] http://www.ukmarinesac.org.uk/activities/ports/ph3_3_1.htm

- emergency response procedures;
- provision of information on Natura 2000 sites;
- zoning of activities;
- re-routing via alternative navigation channels;
- protection of intertidal features from ships' wash using breakwaters and other structures;
- compliance with regulations covering cargo operations and promotion of good practice; and
- managing anchoring.

7.34 Where there is evidence that ship or boat wash is causing erosion of designated intertidal flats or saltmarsh habitat, and where other appropriate measures have been considered and applied, a further management option that may be considered is to protect the intertidal features by creating structures, such as breakwaters, bunds or mounds of sediments on the intertidal areas. Harwich Harbour Authority has applied this approach in Trimley Marshes on the Stour/Orwell Estuary[87]. Such an approach to protecting marine features may also provide a beneficial use for dredged materials. Intertidal recharge involves placing marine sediments on the shoreline in the intertidal region. In estuaries this often consists of muds and silts dredged from navigation channels. This practice has a number of benefits, including decreased erosion rates, the provision of additional intertidal areas for wildlife and the increased protection of sea and flood defences. However the potential impacts on local hydrodynamics and ecology, should be considered and it should not be used where the costs of undertaking such a scheme would greatly outweigh the potential environmental gain. Furthermore, the potential application of this approach may be limited by the need for a grant aid to fund this work and by land ownership issues.

7.35 A further method of minimising ships' wash in the proximity of vulnerable shores might be to place moorings in the area to reduce speeds. This is a particularly useful approach where small speedboats and personal watercraft are a potential problem. Other variables which influence ships' wash, such as propeller wake, ship design and hull form, are outside the scope and powers of any port authority.

7.36 It should be noted that Preferred Option 15 (Better Design) does require energy and water conservation, as well as sustainable waste management and drainage amongst other issues, to be taken into account in the design of new developments. However it is considered that a greater commitment to this is required to ensure the development of Docks and Ports within Merseyside, and any associated channel construction or dredging activity will be permitted subject only to the completion of a project based Appropriate Assessment. This would include a thorough consideration of impacts relating to construction (including potential disturbance of sediments and hydrodynamic modelling if required), operational impacts (including anticipated changes in boat traffic and associated impacts) with necessary mitigation in construction, design and management.

Renewable Energy and Tidal Energy of the Mersey

Appropriate Assessment

7.37 Preferred Option 14 (Decentralised Energy) promotes energy efficiency and the use and development of renewable, decentralised and low carbon energy and states that

[87] http://www.ukmarinesac.org.uk/activities/ports/ph3_3_1.htm

opportunities to utilise tidal power in the River Mersey will be encouraged subject to appropriate environmental controls. This has the potential to impact in a variety of ways through release of contaminated sediments; disturbance to invertebrate in-fauna; alterations to sediment patterns, water levels and salinity which could all have a significant impact on the habitats and species for which the surrounding Natura 2000 sites, including Liverpool Bay SPA/pRamsar, are designated.

7.38 Further details on the potential impacts of implementing a tidal power scheme on the Mersey are provided in Section 5 of this Report for the Mersey Estuary.

7.39 The inclusion of wind turbines may be taken forward as part of the renewable energy policy (Decentralised Energy Preferred Option 14). However, on-shore wind turbines would not impact on the qualifying birds for Liverpool Bay SPA/pRamsar, as they are sea birds that do not come to shore. Development of off-shore windfarms however does have the potential to result in impacts on qualifying birds, although proposals for these are not under the control of Wirral Borough Council.

7.40 In combination effects from other plans and policies could result from the proposed off-shore windfarms in Liverpool Bay as described below:

- construction of offshore turbines as part of renewable energy policies has the potential to disrupt flight paths and displace qualifying bird species. There are also disturbance issues associated with maintenance activities;
- there may be water quality issues arising during the construction of offshore wind farm arrays, and maintenance activities also have the potential to result in water quality issues.

7.41 Liverpool Bay is an attractive location for the off-shore renewal energy industry and there is evidence that red-throated divers and common scoters are displaced by the presence of the turbines and the associated activities of construction and maintenance vessels. Therefore, the precise siting of wind turbines for the proposed off-shore windfarms in Liverpool Bay could result in direct loss of habitat for qualifying species from the Liverpool Bay SPA/pRamsar, as well as cause disturbance to flightlines for qualifying species. Although there is the potential for significant impacts on both red throated diver and common scoter from the development of off-shore windfarms, this is not as a result of any policies within the Wirral Core Strategy. However, the potential impacts from these developments would all be required to be carefully assessed at the project level and they would not be given planning permission if there were adverse impacts predicted to occur on the integrity of Liverpool Bay SPA/pRamsar.

Recommendations for amendment to policy

7.42 Preferred Option 14 states that “specific requirements for individual land allocations will be included in a site-specific Development Plan Document”. Reference is also made to an emerging study of the capacity of the Borough to generate renewable energy which is likely to identify the proposed New City Neighbourhood as a potential priority zone for producing renewable energy through a district heating scheme. The most significant local sources of renewable energy are more likely to come from extensions to the off-shore wind farms in Liverpool Bay or tidal power within the Mersey Estuary.

7.43 Although the implementation of tidal power on the Mersey has the potential to have highly significant impacts on the habitats and species within Liverpool Bay SPA, development of such a scheme would be subject to strict environmental controls. At the present time, it is not possible to assess the implications of such a scheme, as the

project is purely at the feasibility stage and the impacts are unknown. However, the Core Strategy should make reference to the requirement for a project level HRA on such a scheme which would include selection of the most suitable design and its location. It is also essential that the impacts relating to construction of the scheme are distinguished from those resulting from its operation.

Conclusion

7.44 With reference to all of the above, including protection measures already in place within the Core Strategy and the additional measures proposed under the mitigation sections, it can be concluded that none of the policies contained within the Wirral Borough Core Strategy will have a adverse effect on the integrity of Liverpool Bay SPA/pRamsar. However, it is noted that further assessments will need to be undertaken in relation to site selection for development as well as more detailed assessments in relation to specific projects at a later stage to ensure that site integrity is maintained.

8 Sefton Coast SAC

Introduction

8.1 Located to the north of Liverpool, the Sefton Coast SAC (approximately 4,560ha) consists of a mosaic of sand dune communities comprising a range of ages from embryonic (i.e. dune formation) to more established communities. A number of other habitats are also present, including lagoons, estuaries and riverine environments, but also scrub, heath and coniferous woodland.

Reasons for Designation

8.2 The Sefton Coast qualifies as an SAC for both habitats and species. Firstly, the site contains the Habitats Directive Annex I habitats of:

- embryonic shifting sand dunes: considered rare, as its total extent in the United Kingdom is estimated to be less than 1,000 hectares – the Sefton Coast SAC is considered to be one of the best areas in the United Kingdom;
- shifting dunes along the shoreline with marram *Ammophila arenaria* ("white dunes"): the Sefton Coast SAC is considered to be one of the best areas in the United Kingdom;
- fixed dunes with herbaceous vegetation ("grey dunes"): the Sefton Coast SAC is considered to be one of the best areas in the United Kingdom;
- dunes with creeping willow *Salix repens ssp. argentea (Salicion arenariae*): considered rare, as its total extent in the United Kingdom is estimated to be less than 1,000 hectares – the Sefton Coast SAC is considered to support a significant presence of the species;
- humid dune slacks: the Sefton Coast SAC is considered to be one of the best areas in the United Kingdom; and
- Atlantic decalcified fixed dunes (*Calluno-Ulicetea*): considered rare, as its total extent in the United Kingdom is estimated to be less than 1,000 hectares – the Sefton Coast SAC is considered to support a significant presence.

8.3 Secondly, the site contains the Habitats Directive Annex II species petalwort *Petalophyllum ralfsii*, for which it is one of the best areas in the United Kingdom, and great-crested newt *Triturus cristatus*, for which the area is considered to support a significant presence.

Historic Trends and Current Pressures

8.4 The dune habitats of the Sefton Coast SAC are dependent upon natural erosive processes. Various human activities that interrupt natural sedimentation and deposition patterns within the Liverpool Bay have had an effect on the wildlife value of these dunes and their existence. Since as early as the 18th century, 'dredging, river training and coastline hardening have imposed a pattern of accretion and erosion on the shoreline where previous conditions were much more variable' (Liverpool Hope University College, 2006). More recently, the dunes have been partially stabilised through maintaining their natural vegetation, the planting of pine trees, and artificial sea defences for protecting the developed shorelines. Another compounding influence is that the inland lakes and mosses behind the belt of coastal dunes have

been drained and claimed for agricultural production (Liverpool Hope University College, 2006).

8.5 The environmental requirements of the Sefton Coast SAC are mainly:

- the need to reduce the fragmentation of habitats, and the impact of fragmentation, to provide stepping stones for the movement of species;
- the need to counter negative changes to low-nutrient habitats resulting from atmospheric nutrient deposition;
- the need to manage the continuing coastal erosion at Formby Point which leads to a squeeze on habitats. This management would not constitute formal defences as these would in themselves harm the dune ecosystem, but the management of pine plantations preventing dune roll-back. The dunes require sufficient space that natural possesses can maintain the important habitats through roll-back;
- the need to consider the potential impact of climate change on shorelines, wetlands and dunes;
- the need to manage abstraction from the underlying aquifer for sources such as golf courses. The aquifer is critical to some features of the site, such as the humid dune slacks and the great crested newts;
- to manage recreational pressures and direct disturbance to qualifying habitats;
- the need to develop and maintain management practices which sustain the conservation value of the area; and
- the need to avoid loss of great-crested newt habitat, and habitats being further fragmented by distance or barriers.

Key potential pressures from Wirral

8.6 The following potential impacts of the LDF Core Strategy upon Sefton Coast SAC were identified during the summary screening detailed in Appendix 1. These are:

- waste water discharges; and
- recreational activities.

Appropriate Assessment

Water Quality

8.7 Sefton Coast SAC lies adjacent to the mouth of the Mersey Estuary, therefore any policies within the Core Strategy which could have an impact on water quality within the Mersey could also impact on the Sefton Coast. If there was a significant deterioration in water quality, this could potentially contaminate the foreshore and enter the sensitive dune system. However, this is considered to be a remote possibility and, due to the inherent controls in water quality issues, the protection already provided within the Core Strategy and the distance of the site from the Wirral, this issue is not considered further.

Recreational Activities

8.8 It is possible that new residential developments, together with development of transport infrastructure in Wirral have the potential improve accessibility to Sefton

Coast SAC for recreational use, thereby exacerbating recreational pressure. A recent study on the recreational users of Sefton's Natural Coast[88] estimated half of the recreational users to be 'local residents' (i.e. residents within the Borough of Sefton) using the site for dog walking/walking/fresh air or visiting the coast. Nature based attractions including visiting the squirrels, bird watching, fishing accounted for approximately 20% of the visitors. The majority of visitors were focused on Formby and Crosby.

8.9 Unfortunately the study did not explore where the remaining 50% of visitors came from (i.e. not local residents from Sefton). It would be reasonable to assume a proportion of visitors to the SAC come from the Wirral, but it is likely that this is effectively inconsequential compared to the proportion come from the Borough of Liverpool which is much closer to Sefton Coast, and other adjacent Boroughs outside of Merseyside (e.g within Lancashire). Furthermore residents of Wirral have a choice of coastlines to visit with Mersey Narrows/North Wirral Foreshore and the Dee Estuary SPA/Ramsar/SAC as well as the Mersey Estuary itself providing similar resources. The North Wales coastline is also close by so residents of the Wirral are more likely to use these areas than travel to Sefton Coast SAC.

8.10 It is therefore considered very unlikely that development within Wirral would generate sufficient additional visits to the Sefton Coast SAC to cause adverse effect on the integrity of the site from increased recreational activities and that its contribution to any 'in combination' effect is probably inconsequential.

Conclusion

8.11 With reference to all of the above, it can be concluded that none of the policies contained within the Wirral Borough Core Strategy will have a adverse effect on the integrity of Sefton Coast SAC. However, it is noted that further assessments will need to be undertaken in relation to site selection for development as well as more detailed assessments in relation to specific projects at a later stage to ensure that site integrity is maintained.

[88] England's North West Research Service for Economic Development and Tourism (May 2009) Sefton's Natural Coast Local Users of the Coast (Version 2)

9 Ribble and Alt Estuaries SPA / Ramsar site

Introduction

9.1 The Ribble and Alt Estuaries SPA and Ramsar site is approximately 12,360ha, and consists of extensive sand- and mud-flats and, particularly in the Ribble Estuary, large areas of saltmarsh. There are also areas of coastal grazing marsh located behind the sea embankments. The saltmarshes, coastal grazing marshes intertidal sand- and mud-flats all support high densities of grazing wildfowl and are used as high-tide roosts. Important populations of waterbirds occur in winter, including swans, geese, ducks and waders. The highest densities of feeding birds are on the muddier substrates of the Ribble.

9.2 The SPA is also of major importance during the spring and autumn migration periods, especially for wader populations moving along the west coast of Britain. The larger expanses of saltmarsh and areas of coastal grazing marsh support breeding birds during the summer, including large concentrations of gulls and terns. These seabirds feed both offshore and inland, outside of the SPA. Several species of waterbird (notably pink-footed goose *Anser brachyrhynchus*) utilise feeding areas on agricultural land outside of the SPA boundary. There is considerable interchange in the movements of wintering birds between this site and Morecambe Bay, the Mersey Estuary, the Dee Estuary and Martin Mere.

Reasons for Designation

9.3 The Ribble and Alt Estuaries site is designated as an SPA for its Birds Directive Annex I species, both breeding and over-wintering, and these are:

9.4 During the breeding season:

- common tern *Sterna hirundo*: 182 pairs = 1.5% of the breeding poulation in Great Britain;
- ruff *Philomachus pugnax*: 1 pair = 9.1% of the breeding population in Great Britain;

9.5 Over winter:

- bar-tailed godwit *Limosa lapponica*: 18,958 individuals = 35.8% of the population in Great Britain;
- Bewick's swan *Cygnus columbianus ssp. bewickii*: 229 individuals = 3.3% of the population in Great Britain;
- golden plover *Pluvialis apricaria*: 4,277 individuals = 1.7% of the population in Great Britain
- whooper swan *Cygnus cygnus*: 159 individuals = 2.9% of the population in Great Britain.

9.6 It also meets the criteria for SPA designation under Article 2 of the Birds Directive, supporting internationally important populations of lesser black-backed gull *Larus fuscus*, ringed plover *Charadrius hiaticula*, sanderling *Calidris alba*, black-tailed godwit *Limosa limosa ssp. limosa*, dunlin *Calidris alpina alpina*, grey plover *Pluvialis squatarola*, knot *Calidris canutus*, oystercatcher *Haematopus ostralegus*, pink-footed goose *Anser brachyrhynchus*, pintail *Anas acuta*, redshank *Tringa totanus*, sanderling *Calidris alba*, shelduck *Tadorna tadorna*, teal *Anas crecca* and wigeon *Anas penelope*.

It also qualifies by regularly supporting up to 29,236 individual seabirds, and, over winter, 301,449 individual waterfowl.

9.7 It is additionally designated as a Ramsar site in accordance with Criterion 5 (UN, 2005) for supporting up 89,576 waterfowl (5-year peak mean 1998/99 – 2002/03), and in accordance with Criterion 6 for supporting internationally important populations of common shelduck *Tadorna tadorna*, black-tailed godwit *Limosa limosa ssp. limosa*, redshank *Tringa totanus*, Eurasian teal *Anas crecca*, northern pintail *Anas acuta* and dunlin *Calidris alpina alpina*.

9.8 The Ribble and Alt Estuaries also qualifies as Ramsar as it meets criterion 2 by supporting over 40% of the UK population of Natterjack toad. the Natterjack Toad occurs on the Sefton Coast in seaward dunes between Southport and Hightown. In 2000 it was present on 13 sites (three of which are reintroductions). The breeding population is estimated just over 1000 females.

9.9 The largest populations are on Ainsdale Sand Dunes NNR and Ainsdale and Birkdale Sandhills LNR. Natterjacks are absent from much of the dune coast and some breeding sites are relatively isolated (North Merseyside Biodiversity Action Plan, undated).

Historic Trends and Current Pressures

9.10 As an estuarine site linked with the Liverpool Bay, this site has been subject to the same changes as described for the Liverpool Bay pSPA but additionally its own unique pressures (some similar to those experienced in the Mersey Estuary). The estuaries were largely undisturbed until the 19th century, at which point there was extensive modification and dredging of the river channel for the Port of Preston, as well as landfill and drainage along the shoreline in order to increase agricultural usage of the land. The Ribble Estuary has over the past century experienced '*a general pattern of sediment accretion in the inner Estuary and erosion in outer areas*,' but the estuary has begun 'to revert to its natural state… since maintenance of the Ribble Channel for shipping ceased in 1980. There have been dramatic changes in the course of channels in the outer Estuary, and these are expected to continue. Anticipated climatic and sea level changes are likely to exaggerate existing patterns of erosion and accretion, although sea level rise is not expected to cause significant loss of intertidal land in the Ribble' (Ribble Estuary Strategy Steering Group, 1997, p.15).

9.11 The Ribble and Alt Estuaries are among 'the most popular holiday destinations in Britain,' with Blackpool as the largest resort and Southport increasing in visitors. Leisure activities include '*watersports such as sailing and windsurfing; fishing and shooting; bird watching; land yachting; and generally relaxing at the coast… enjoyed by both local people and visitors*' (Ribble Estuary Strategy Steering Group, 1997, p.10).

9.12 Some of the main environmental pressures relevant to the nature conservation objectives of the Ribble and Alt Estuaries SPA / Ramsar site are:

- loss or damage of habitat as a result of increasing off-shore exploration and production activity associated with oil and natural gas;
- over-grazing of the saltmarshes by cattle-farming;
- heavy metal pollution (lead, cadmium, arsenic and other poisons) from either industry or disturbance of sediment (legacy pollution bound into the sediment);

- pollution via rivers by agricultural effluent flowing off fields, 'leading to increased fertility of inshore waters and associated algal blooms and de-oxygenation of seawater, particularly in enclosed bays and estuaries';
- pollution via rivers and drains by both treated sewerage and untreated runoff containing inorganic chemicals and organic compounds from everyday domestic products, which 'may combine together in ways that make it difficult to predict their ultimate effect of the marine environment… Some may remain indefinitely in the seawater, the seabed, or the flesh, fat and oil of sea creatures';
- damage of marine benthic habitat directly from fishing methods;
- damage of marine benthic habitat directly or indirectly from aggregate extraction;
- 'coastal squeeze' (a type of coastal habitat loss) from land reclamation and coastal flood defences and drainage used in order to farm or develop coastal land, and from sea level rise;
- harm to wildlife (especially birds) or habitat loss due to increasing proposals/demand for offshore wind turbines;
- pollution, direct kills, litter, disturbance or loss of habitat as a result of water-based recreation or other recreation activity and related development along the foreshore[89]
- that there is disturbance to birds from aircraft, both from Blackpool Airport and from a private testing station
- introduction of non-native species and translocation;
- selective removal of species (e.g. bait digging, wildfowl, fishing) (Wildlife Trust, 2006 and Ribble Estuary Strategy Steering Group, 1997);
- interruption of dune accretion processes leading to over-stabilisation of dunes;
- the spread of rank grasses and scrub, partly caused by a decline in rabbit-grazing, further reducing suitable habitat;
- losses to development, forestry and recreational uses have reduced the area of available habitat;
- fragmentation of habitat has led to isolation of populations;
- creation of permanent water bodies in the dunes has encouraged populations of invertebrates which prey on Natterjack tadpoles and, most seriously, of Common Toads which both predate and suppress the development of Natterjack tadpoles;
- gassing of rabbits, especially on golf courses, can kill Natterjacks using burrows and removes a valuable grazing animal;
- collecting and disturbance of spawn and tadpoles can reduce metamorphic success;
- inappropriate management can cause the loss of low vegetation structure and open ground used by Natterjacks for foraging;
- water abstraction, conifers and scrub lower the water table locally and reduces the number of pools in which Natterjack tadpoles can develop to maturity.

[89] Wildlife Trust (2006) – The Wildlife Trust For Lancashire, Manchester And North Merseyside (2006). *Uses and abuses*. [Online]. Available at: http://www.lancswt.org.uk/Learning%20&%20Discovery/theirishsea/usesandabuses.htm (accessed 15th June 2009).

9.13 There is both formal and informal recreation along the Sefton Coast and intensity varies with season, event and attraction. Recreation is much more informal within the Ribble Estuary itself.

Key potential pressures from Wirral

9.14 The following potential impacts of the LDF Core Strategy upon Ribble and Alt Estuaries SPA/Ramsar were identified during the summary screening detailed in Appendix 1. These are:

- waste water discharges; and
- recreational activities

Appropriate Assessment

Water Quality

Appropriate Assessment

9.15 Ribble and Alt Estuaries SPA/Ramsar lies adjacent to the mouth of the Mersey Estuary. Therefore, policies encouraging housing, employment and industrial growth on the Wirral the SPA/Ramsar via the Mersey. This could arise through domestic sewage and industrial effluent, exacerbating historic trends and existing pressures described above.

9.16 In particular, heavy development along the eastern coast of the Wirral has the potential to impact on water quality through discharges. Promoting local production and food security as identified in Preferred Option 3 Spatial Vision also has the potential to impact on water quality if this leads to further intensification of agriculture which could result in increased nutrient run-off into sensitive areas.

9.17 With respect to waste water discharge, non-toxic contamination through nutrient loading, organic loading and changes to the thermal regime could impact on prey species and distribution. The diverse invertebrate community which lives in the intertidal areas is sensitive to changes in water quality as well as water levels therefore, any impacts on water quality due to developments on the Wirral, as well as those in the surrounding areas of Halton, Liverpool and West Cheshire and Chester could also have an adverse impact on the integrity of the site through a reduction in prey availability for the qualifying bird species, in-combination with development proposed within the Wirral Core Strategy.

Recommendations for amendment to policy

9.18 It should be noted that the majority of the processes that could result in a deterioration of water quality (unregulated waste water discharges, surface water runoff and pollution from construction activities) are either regulated through statutory requirements or can be mitigated through standard construction techniques and environmental good practice. These impacts are therefore unlikely.

9.19 Avoiding an adverse effect is largely in the hands of the water companies (through their investment in future sewage treatment infrastructure) and the Environment Agency (through their role in consenting effluent discharges). However, local authorities can also contribute through ensuring that sufficient wastewater treatment infrastructure is in place prior to development being delivered through the Core Strategy. In the case of Wirral, this is alluded to in:

- Preferred Option 16 - Development Management which states: *The Core Strategy will set out a list of the main issues that will need to be addressed when considering the appropriateness of any new development proposal or land allocation. This list of main issues will include: ……"impact on wider environmental requirements including quality of air, land and water, sustainable construction and waste management*."; and

- *Preferred Option 17* – Developer Contributions which states that *"The types of provision likely to be required will include: ……water services [including flooding, supply disposal, sustainable drainage and prevention of pollution."*

9.20 However, it is considered that this allusion needs to be expanded upon in order to provide a firm commitment with regard to the linking of housing delivery to delivery of necessary infrastructure that will ensure that an adverse effect on European sites is avoided. Preferred Option 7 in the Core Strategy should make specific reference to the fact that phasing of development is also to ensure that it only takes place once any new water treatment infrastructure, or appropriate retro-fitted technology (e.g. nitrate removal) necessary to service the development while avoiding an adverse effect on European sites, is in place. The Core Strategy should also indicate how this need will be determined and delivered through interaction with other authorities (United Utilities, the Environment Agency etc) i.e. through a Water Cycle Strategy.

9.21 With the controls already in place in the Core Strategy in relation to water issues, and with additional protection provided through more stringent requirements on water quality as recommended above, it is concluded that there will be no significant impact on the water quality within the Ribble and Alt Estuary SPA/Ramsar site as a result of any policies within the Core Strategy.

Recreational Activities

9.22 It is possible that new residential developments, together with development of transport infrastructure in Wirral have the potential to improve accessibility to Ribble and Alt Estuaries SPA/Ramsar for recreational use, thereby exacerbating recreational pressure. However, the residents of Wirral have a choice of coastlines to visit with Mersey Narrows/North Wirral Foreshore and the Dee Estuary SPA/Ramsar/SAC as well as the Mersey Estuary itself providing similar resources. The North Wales coastline is also close by so residents of the Wirral are more likely to use these areas than travel the long distance to Ribble and Alt Estuaries SPA/Ramsar.

9.23 It would be reasonable to assume a proportion of visitors to the SPA come from the Wirral, but it is likely that this is effectively inconsequential compared to the proportion come from the Borough of Liverpool which is much closer to the Ribble & Alt Estuaries, and other adjacent Boroughs outside of Merseyside (e.g within Lancashire). Furthermore residents of Wirral have a choice of coastlines to visit with Mersey Narrows/North Wirral Foreshore and the Dee Estuary SPA/Ramsar/SAC as well as the Mersey Estuary itself providing similar resources. The North Wales coastline is also close by so residents of the Wirral are more likely to use these areas than travel to Ribble & Alt Estuaries SPA.

9.24 It is therefore considered very unlikely that development within Wirral would generate sufficient additional visits to the Ribble & Alt Estuaries SPA to cause adverse effect on the integrity of the site from increased recreational activities and that its contribution to any 'in combination' effect is probably inconsequential.

Conclusion

9.25 With reference to all of the above, including protection measures already in place within the Core Strategy and the additional measures proposed under the mitigation sections, it can be concluded that none of the policies contained within the Wirral Borough Core Strategy will have a adverse effect on the integrity of the Ribble and Alt Estuaries SPA/Ramsar However, it is noted that further assessments will need to be undertaken in relation to site selection for development as well as more detailed assessments in relation to specific projects at a later stage to ensure that site integrity is maintained.

10 Berwyn and South Clwyd Mountains SAC

Reasons for Designation

10.1 Berwyn and South Clwyd Mountains qualifies as a SAC for the following Habitats Directive Annex I habitats:

- Blanket bogs;
- Dry heaths;
- Dry grasslands or scrublands on chalk or limestone;
- Very wet mires often identified by an unstable 'quaking' surface;
- Base-rich scree;
- Plants in crevices in base-rich rocks.

Historic Trends and Current Pressures

10.2 The blanket bog, heaths, fens, and grasslands have been threatened by inappropriate agricultural development including drainage, reseeding, application of fertilisers, burning, track construction and the adoption of damaging grazing regimes. These problems have been addressed successfully by means of management agreements with owners and occupiers.

10.3 Local tourist pressure and damage by recreational vehicles can cause erosion problems. This is being addressed by visitor management and wardening as well as positive management works of vegetation reinstatement on eroded areas.

10.4 The environmental pressures upon the Berwyn and South Clwyd Mountains SAC are mainly:

- Damage through erosion and fragmentation to sensitive habitats from recreational vehicles; and
- Associated potential for air quality reduction through increased recreational access.

Key potential pressures from Wirral

10.5 The following potential impacts of the LDF Core Strategy upon Berwyn and South Clwyd Mountains SAC were identified during the summary screening detailed in Appendix 1. These are:

- Air pollution.

Appropriate Assessment

Air Quality

10.6 Although the qualifying habitats within Berwyn and South Clwyd Mountain SAC are sensitive to air pollution, this site lies approximately 10 miles to the south-west of the Wirral. Therefore, due to the distance and the prevailing wind direction on the Wirral, which is west to east, it is considered that no proposed developments on the Wirral

will have a adverse effect on the integrity of Berwyn and South Clwyd Mountain SAC through a deterioration in air quality as a result of any policies within the Wirral Core Strategy. This site is therefore not considered further in this HRA.

Conclusion

10.7 With reference to the above, it can be concluded that none of the policies contained within the Wirral Borough Core Strategy will have an adverse effect on the integrity of the Berwyn and South Clwyd Mountain SAC.

11 River Dee and Bala Lake SAC

Reasons for Designation

11.1 The River Dee and Bala Lake qualifies as an SAC for both habitats and species. Firstly, the site contains the following Habitats Directive Annex I habitats:

- Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation

11.2 Secondly, the site contains the following Habitats Directive Annex II species:

- Atlantic salmon *Salmo salar*
- Floating water-plantain *Luronium natans*
- Sea lamprey *Petromyzon marinus*
- Brook lamprey *Lampetra planeri*
- River lamprey *Lampetra fluviatilis*
- Bullhead *Cottus gobio*
- Otter *Lutra lutra*

11.3 The historic trends and current pressures on the site are summarised below.

Historic Trends and Current Pressures

11.4 The habitats and species for which the site is designated are dependent on the maintenance of good water quality and suitable flow conditions. Fish species require suitable in-stream habitat and an unobstructed migration route. Otters also require suitable terrestrial habitat to provide cover and adequate populations of prey species. The site and its features have been historically threatened by practices which had an adverse effect on the quality, quantity and pattern of water flows, such as inappropriate flow regulation, excessive abstraction, deteriorating water quality from direct and diffuse pollution, eutrophication and siltation. Degradation of riparian habitats due to engineering works, agricultural practices and invasive plant species have also had localised adverse effects in the past. The Atlantic salmon population has been threatened by excessive exploitation by high sea, estuarine and recreational fisheries. Introduction of non-indigenous species has also been a risk to both fish and plant species.

11.5 The environmental pressures upon the River Dee & Bala Lake SAC are mainly:

- Deterioration in water quality and changes in flow rates due to ex-industrial runoff, discharge of treated sewage effluent (which contains elevated nitrates) and agricultural runoff;
- Risk of excessive abstraction resulting in a decrease in freshwater flows and an increase in sediment loading of water such that dehydration of interest features may occur;
- Overfishing of Atlantic salmon; and
- Introduction of invasive species.

Key potential pressures from Wirral

11.6 The following potential impacts of the LDF Core Strategy upon River Dee and Bala Lake SAC were identified during the summary screening detailed in Appendix 1. These are:

- Damaging levels of abstraction to supply housing in Wirral when considered in combination with development elsewhere in United Utilities Integrated Resource Zone and development outside the zone that will receive water from the same sources (e.g. abstraction from the River Dee in relation to development in North Wales).

Appropriate Assessment

Water Abstraction

11.7 Development proposed within the Core Strategy is likely to result in increased water use, notably as a consequence of housing and business development under Preferred Options 2, 3, 4, 5, 6, 8, 11, 12, 21). However, the United Utilities Water Resource Management Plan (September 2009) indicates that the water available for use in the Integrated Resource Zone is expected to reduce by 24.8 Ml/d between 2009/10 and 2014/15. Without water efficiency measures or new resources the initial supply/demand balance for the Integrated Resource Zone is calculated to be in deficit by 8 Ml/day by 2024/25. However, from reading the Water Resource Management Plan, it does appear that increased abstraction from the Dee or any other European sites beyond the current licensed volumes is not part of United Utilities' intended future supply strategy[90], which rather depends on a mixture of demand management and increased abstraction from groundwater as follows:

- construction of a bi-directional pipeline, known as the "West-to-East Link", between Merseyside and North Manchester which is due to be in operation by 2012. This will help United Utilities maintain adequate supplies to Greater Manchester and Merseyside, if there is a need to temporarily reduce supply from a major reservoir, for example due to maintenance work or drought conditions;

- help customers save 9 Ml/d by 2014/15 (increasing later on to 12 Ml/d), through a base service water efficiency programme;

- achieve a water demand reduction of 10 Ml/d in a dry year by 2014/15 (increasing to 22 Ml/d by 2034/35) as a result of the expected scale of voluntary metering of households;

- non-household customers in the Integrated Zone are expected to reduce water demand by 87 Ml/d by 2014/15 (141 Ml/d by 2034/35) due to the effects of the economic downturn and as part of their continuing water efficiency programmes.

11.8 United Utilities enhanced plans identified as part of their economic programme to maintain adequate supply-demand balances are:

- further reducing leakage by 23 Ml/d by 2034/35;

[90] Mark Smith of United Utilities North & Central Area Water Asset Management Team confirmed in a personal communication on 27/07/09 that abstraction from the Dee will not exceed the current licensed volume. The current licensed volume was subject to the Environment Agency's Review of Consents process and no reductions were considered necessary. It can therefore be conclude that no adverse effects on the River Dee (either alone or 'in combination') will result from the United Utilities abstraction.

- a programme of economic water efficiency measures to save 4 Ml/d by 2034/35; and

- implementing water source enhancements of 48 Ml/d by 2034/3591.

11.9 In the future as a result of the west-east link, Merseyside (including Wirral) will obtain a much greater proportion of its water supply from Lake District sources. This is likely to reduce the impacts associated with abstraction for housing and industry on the Dee further. It is therefore concluded that, since no increased abstraction from European sites will be required in order to service new development in the Wirral (or elsewhere within the Integrated Supply Zone) that there will be significant effects on the River Dee & Bala Lake SAC through abstraction of water as a result of any policies within the Wirral Core Strategy. Risk of abstraction at inappropriate times of the year (such as periods of low flow) will be prevented by the Environment Agency's licensing regime and Review of Consents process.

11.10 This issue is therefore not considered further in this HRA.

Conclusion

11.11 With reference to the above, it can be concluded that none of the policies contained within the Wirral Borough Core Strategy will have a adverse effect on the integrity of the River Dee and Bala Lake SAC.

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[91] Widnes groundwater (22.7 Ml/d), Southport groundwater (22.5 Ml/d) and Oldham groundwater (2.5 Ml/d)

12 River Eden SAC

Reasons for Designation

12.1 The River Eden in the Lake District qualifies as an SAC for both habitats and species. Firstly, the site contains the following Habitats Directive Annex I habitats:

- Oligotrophic to mesotrophic standing waters with vegetation of the *Littorelletea uniflorae* and/or of the *Isoëto-Nanojuncetea*
- Watercourses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation
- Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Alno-Padion, Alnion incanae, Salicion albae)

12.2 Secondly, the site contains the following Habitats Directive Annex II species:

- White-clawed crayfish *Austropotamobius pallipes*
- Sea lamprey *Petromyzon marinus*
- Brook lamprey *Lampetra planeri*
- River lamprey *Lampetra fluviatilis*
- Atlantic salmon *Salmo salar*
- Bullhead *Cottus gobio*
- Otter *Lutra lutra*

12.3 The historic trends and current pressures on the site are summarised below.

Historic Trends and Current Pressures

12.4 The maintenance of breeding and nursery areas for the species on this site depends on the habitat quality of streams and their margins. Many of the streams within the site suffer from overgrazing of riverbanks and nutrient run-off. This is being addressed by a number of measures, including a conservation strategy with actions to address river quality issues, and a partnership approach to funding habitat improvements. The water-crowfoot communities as well as the species are sensitive to water quality, particularly eutrophication.

12.5 Practices associated with sheep-dipping pose a potential threat at this site, and are currently under investigation. Much of the alluvial forest cover is fragmented and/or in poor condition. It is hoped to address this through management agreements or Woodland Grant Schemes with individual owners.

12.6 The habitats and species for which the site is designated are dependent on the maintenance of good water quality and suitable flow conditions. Fish species require suitable in-stream habitat and an unobstructed migration route. Otters also require suitable terrestrial habitat to provide

cover and adequate populations of prey species. The site and its features have been historically threatened by practices which had an adverse effect on the quality, quantity and pattern of water flows, such as inappropriate flow regulation, excessive abstraction, deteriorating water quality from direct and diffuse pollution, eutrophication and siltation. Degradation of riparian habitats due to engineering works, agricultural practices and invasive plant species have also had localised adverse effects in the past. The Atlantic salmon population has been threatened by excessive exploitation by high sea, estuarine and recreational fisheries. Introduction of non-indigenous species has also been a risk to both fish and plant species.

12.7 The environmental pressures upon the River Eden SAC are mainly:

- Deterioration in water quality and changes in flow rates due to agricultural runoff and discharge of treated sewage effluent (which contains elevated nitrates);
- Risk of excessive abstraction resulting in a decrease in freshwater flows and an increase in sediment loading of water such that dehydration of interest features may occur;
- Overfishing; and
- Introduction of invasive species.

Key potential pressures from Wirral

12.8 The following potential impacts of the LDF Core Strategy upon River Eden SAC were identified during the summary screening detailed in Appendix 1. These are:

- Damaging levels of abstraction to supply housing in Wirral when considered in combination with development elsewhere in United Utilities Integrated Resource Zone and development outside the zone that will receive water from the same sources.

Appropriate Assessment

Water Abstraction

12.9 Traditionally, the water supply for Merseyside comes from the River Dee and Welsh sources, while that for Greater Manchester comes from the Lake District (particularly Haweswater which is within the catchment of the River Eden). However, construction of a bi-directional pipeline, known as the "West-to-East Link", between Merseyside and North Manchester will enable greater flexibility of supply such that there will no longer be a strong split between water sources and that in the future, a much greater proportion of the water supply for the Wirral will come from Lake District sources.

12.10 However, it has been confirmed by United Utilities that one of the main reasons for the existence of the new west-east link is in response to expected reductions in the licensed abstractions from Haweswater and other Lake District sources resulting from the Environment Agency's Review of Consents process. As such, abstraction from these sources is already being revised to ensure no adverse effect on the River Eden SAC or other sensitive sites in the Lake District.

12.11 Due to the above, it is concluded that there will be no significant impacts on the integrity of the River Eden SAC through abstraction of water as a result of any policies relating to development within the Wirral Core Strategy.

Conclusion

12.12 With reference to the above, it can be concluded that, since no increased abstraction from the River Eden SAC will be required in order to service new development in Wirral (or elsewhere within the Integrated Supply Zone), none of the policies contained within the Wirral Borough Core Strategy will have a adverse effect on the integrity of the River Eden SAC.

13 Martin Mere SPA and Ramsar

Introduction

13.1 Martin Mere SPA and Ramsar (119.89 ha) is located north of Ormskirk in West Lancashire, north west England, approximately 20km north of Wirral. However, the outstanding importance of Martin Mere is as a refuge for its large and diverse wintering, passage and breeding bird community.

13.2 It occupies part of a former lake and mire that extended over some 1,300 ha of the Lancashire Coastal Plain during the 17th century. In 1972 the Wildfowl and Wetlands Trust purchased 147 hectares of the former Holcrofts Farm, consisting mainly of rough damp pasture, with the primary aim of providing grazing and roosting opportunities for wildfowl. Since acquisition the rough grazed pastures have been transformed by means of positive management into a wildfowl refuge of international importance. Areas of open water with associated muddy margins have been created, whilst maintaining seasonally flooded marsh and reed swamp habitats via water level control. In September 2002, an additional 63 hectares of land were purchased on the southern most part of the refuge at Woodend Farm, with the aid of the Heritage Lottery Fund, to restore arable land to a variety of wetland habitats including seasonally flooded grassland, reedbed, wet woodland and open water habitats.

13.3 The complex now comprises open water, seasonally flooded marsh and damp, neutral hay meadows overlying deep peat. It includes a wildfowl refuge of international importance, with a large and diverse wintering, passage and breeding bird community. In particular, there are significant wintering populations of Bewick's swan (*Cygnus columbianus bewickii*) and whooper swan (*Cygnus Cygnus*), pink-footed goose (*Anser brachyrhynchus*) and pintail (*Anas acuta*). There is considerable movement of wintering birds between this site and the nearby Ribble and Alt Estuaries SPA.

Reasons for Designation

13.4 This site qualifies for SPA under Article 4.1 of the Directive (79/409/EEC) by supporting populations of European importance of the following over wintering birds listed on Annex I of the Directive:

- Bewick's swan, 449 individuals representing at least 6.4% of the wintering population in Great Britain (5 year peak mean 1991/2 - 1995/6);
- whooper swan 621 individuals representing at least 11.3% of the wintering population in Great Britain (5 year peak mean 1991/2 - 1995/6)

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

- pink-footed goose, 25,779 individuals representing at least 11.5% of the wintering Eastern Greenland/Iceland/UK population (5 year peak mean 1991/2 - 1995/6)

- pintail 978 individuals representing at least 1.6% of the wintering North western Europe population (5 year peak mean 1991/2 - 1995/6)

13.6 The assemblage of birds present makes the site a wetland of international importance. The area qualifies under Article 4.2 of the Directive (79/409/EEC) by regularly supporting at least 20,000 waterfowl. Over winter, the area regularly supports 46,196 individual waterfowl (5 year peak mean 1991/2 - 1995/6) including: pochard (*Aythya farina*), mallard (*Anas platyrhynchos*), teal (*Anas crecca*), wigeon (*Anas penelope*), pintail pink-footed goose (*Anser brachyrhynchus*), whooper swan, and bewick's swan.

13.7 It is additionally designated as a Ramsar site in accordance with Criterion 5 (UN, 2005) for supporting up to 25,306 waterfowl (5-year peak mean 1998/99 – 2002/03) in winter, and in accordance with Criterion 6 for supporting internationally important populations of pink-footed goose *Anser brachyrhynchus*, Bewick's swan *Cygnus columbianus* ssp. *bewickii,* whooper swan *Cygnus cygnus*, Eurasian wigeon *Anas penelope* and northern pintail *Anas acuta*.

Historic Trends and Existing Pressures

13.8 Since the site's designation as a Wetland of International Importance under the Ramsar Convention and as a Special Protection Area in 1985 there has been a gradual increase in the usage of the mere by certain species of wildfowl and wading birds as a direct consequence of positive management. The site is geared towards attracting visitors, with a number of hides from which the Mere and its birds may be viewed. In addition to the wild species for which it is designated, the site holds a collection of about 1,500 captive birds of 125 species from around the world, as well as a number of other visitor attractions. This is because the site is a Wildfowl and Wetlands Trust reserve.

13.9 The environmental pressures experienced by Martin Mere in terms of its bird community are likely to be those common to all reedbed habitat. The refuge is vulnerable to the following:

- direct loss of characteristic species as a result of nutrient enrichment from agricultural fertilisers and run-off;
- loss of reedbed due to weakening of stems through poor growth conditions;
- natural succession to woodland through lack of active management;
- changes in farming practice. grazing management is largely dependent upon cattle from surrounding farms;
- reduced water level by surface and ground water abstractions or agricultural drainage, which causes the habitat to dry out and begin succession towards 'alder/willow carr woodland, hastening the overall process of succession towards broadleaved woodland' (Lancashire BAP);
- removal of reeds and other vegetation from whole stretches of watercourses (e.g. neighbouring the site) through routine management of ditches and riverbanks (in some instances);
- erosion of reedbeds due to increased recreational use of waterbodies and waterways (notably canals);

- habitat loss or degradation due to the isolation of reedbeds as a result of losses elsewhere, in turn due to the above or other factors (Lancashire BAP).

13.10 In addition, the following pressures have been documented :

- invasive plant species: Regular herbicide control of trifid burr marigold is necessary in order to prevent this plant from invading lake/scape margins to the detriment of bird populations;
- water borne disease that could affect wildfowl: water levels on the Mere are controlled to maintain optimum levels throughout the winter period, then lowered progressively in summer to expose marginal mud and the underlying damp pastures and maintain a mosaic of shallow pools. Ditches are regularly cut and dredged and all areas of pasture are positively managed under a Countryside Stewardship Scheme. Nutrients brought in with the water supply from the surrounding arable farmland and inadequate sewage treatment adds considerably to the large deposits of guano from wintering waterfowl. This results in the refuge being highly eutrophic with extremely poor water quality conditions and creates the possible risk of water borne diseases which could affect waterfowl, although no such outbreaks have been recorded. The Wildlife Trust have started to address this issue with the creation of reedbed water filtration systems and a series of settlement lagoons helps to reduce suspended solids of effluent water arising from waterfowl areas
- due to the eutrophication (described above) Martin Mere is also experiencing water quality issues. water quality issues have.

Key Pressures from Wirral

13.11 The only potential pathway in which development within Wirral could lead to effects on Martin Mere SPA and Ramsar sites is through development of wind turbines, depending on the location of the turbines and flight paths of qualifying bird species at Martin Mere.

Appropriate Assessment

Renewable Energy

13.12 Wirral is located approximately 20km south of Martin Mere SPA and Ramsar site. It is possible that the construction of wind turbines (both onshore and offshore) within Merseyside has the potential to displace the flight path of qualifying bird species, depending on their location. However, Policy 14 (Decentralised energy) states that “specific requirements for individual land allocations will be included in a site-specific Development Plan Document”. Reference is also made to an emerging study of the capacity of the Borough to generate renewable energy which is likely to identify the proposed New City Neighbourhood as a potential priority zone for producing renewable energy through a district heating scheme. The most significant local sources of renewable energy are more likely to come from extensions to the off-shore wind farms in Liverpool Bay or tidal power within the Mersey Estuary. Therefore, it seems unlikely that any wind farms will be developed within the boundary of Wirral Borough Council.

13.13 However, The Liverpool City Region Renewable Energy Study (ongoing) is identifying the location of ‘Wind Priority Zones’ and there are proposals to develop new off-shore windfarms in Liverpool Bay. It is therefore reasonable to assume that a significant cumulative ‘in combination’

impact of disturbance to qualifying bird species may arise from the construction of wind turbines in the region, although not as a result of any policies within the Wirral Core Strategy. This issue is therefore not considered further in this HRA.

Conclusion

13.14 With reference to the above, it can be concluded that, since no wind farms are to be developed within the Wirral Borough, none of the policies contained within the Wirral Borough Core Strategy will have a adverse effect on the integrity of Martin Mere SAC.

14 Conclusion

14.1 It was possible to conclude that no adverse effects would result on the following European sites:

- Sefton Coast SAC
- Berwyn & Couth Clwyd Mountains SAC
- River Dee & Bala Lake SAC
- River Eden SAC; and
- Martin Mere SPA.

14.2 It was concluded that adverse effects could occur (principally 'in combination' with other development within Merseyside) on the following European sites in the absence of amendments to Core Strategy policy through recreational disturbance, deteriorating water quality from the discharge of treated sewage effluent, coastal squeeze & loss of supporting habitat and possible impacts of renewable energy schemes:

- Dee Estuary SAC, SPA & Ramsar site
- Mersey Estuary SPA & Ramsar site
- Mersey Narrows & North Wirral Foreshore pSPA & pRamsar site; and
- Liverpool Bay pSPA & pRamsar site

14.3 It was concluded that adverse effects could occur (principally 'in combination' with other development within Merseyside) on the following European sites in the absence of amendments to Core Strategy policy through deteriorating water quality from the discharge of treated sewage effluent:

- Ribble & Alt Estuaries SPA & Ramsar site

14.4 As a result the following amendments to Core Strategy policy were recommended to address these issues and ensure that a sufficient policy framework existed to enable the avoidance or mitigation of adverse effects on European sites.

Direct Disturbance of Qualifying Bird Species and Habitat Damage

14.5 Where increased recreational use is predicted to cause adverse impacts on a site, or important off-site supporting habitat, avoidance and mitigation should be considered by Wirral Borough Council. Avoidance of recreational impacts at European sites involves location of new development away from such sites which is clearly not possible in Wirral given that according to the England Leisure Day Visits surveys, day visitors typically travel up to 25.5km to visit the coast for the day. Where avoidance is not possible, an alternative approach is for the local authority in question (i.e. Wirral MBC) to manage tourism and recreational use of the coastlines. Mitigation

will usually involve a mix of access management, habitat management and provision of alternative recreational space, but this cannot be delivered wholly by Wirral in isolation:

- *Access management* – restricting access to some or all of a European site - is not usually within the remit of the Borough Council and restriction of access may contravene a range of Government policies on access to open space, and Government objectives for increasing exercise, improving health etc. However, active management of access may be possible, for example as practised on nature reserves.
- *Habitat management* is not within the direct remit of the Council. However the Council can help to set a framework for improved habitat management by promoting cross-authority collaboration and S106 funding of habitat management.
- *Provision of alternative recreational space* can help to attract recreational users away from sensitive European sites, and reduce additional pressure on them. Some species for which European sites have been designated are particularly sensitive to dogs, and many dog walkers may be happy to be diverted to other, less sensitive, sites. However the location and type of alternative space must be attractive for users to be effective.

14.5.1 Although Preferred Option 16 (Development Management) refers to the *"impact on wider environmental requirements*" being one of the main issues when considering the appropriateness of any new development or land allocation, there is no specific reference to protected sites, protected species or other important areas for nature conservation. The Policy does state that "*further advice on the application of these requirements will, where necessary, be set out in Supplementary Planning Documents*" (SPDs). To ensure that an adequate policy framework exists to enable the delivery of the necessary measures to mitigate adverse effects on the Dee Estuary SAC, SPA & Ramsar site, Mersey Estuary SPA & Ramsar site, Mersey Narrows & North Wirral Foreshore pSPA & pRamsar site and Liverpool Bay pSPA & pRamsar site from recreational sources the Core Strategy should include a commitment to work with the other Merseyside Authorities, MEAS, Natural England and other partners to devise a framework for the delivery of

- Suitably located Green Infrastructure where this will prove effective; and
- Enhanced access management to the European sites, to be informed by the collation of visitor survey data etc and which will need to be in place before the publication of the Site Allocations DPD.

14.5.2 The most appropriate framework may be European Marine Site Management Schemes, which, if they follow the pattern of other EMS Management Schemes would include recreation/access management within their remit.

14.5.3 The delivery of enhanced access management and GI will need to be phased alongside delivery of housing and a mechanism established for monitoring effectiveness and amending the measures being delivered. The contribution of each authority should be based upon their contribution to recreational activity in each site or (where this info is not yet available) their relative populations and proximity to the site. In general therefore the devising of such a strategy (whether it is part of a specific future SPD or not) will need to be well advanced by the time the Site Allocations DPD is adopted as some strategic greenspace and a possible contribution to funding access management may need to be associated with particular sites.

Water Quality

14.6 It should be noted that the majority of the processes that could result in a deterioration of water quality (unregulated waste water discharges, surface water runoff and pollution from construction activities) are either regulated through statutory requirements or can be mitigated through standard construction techniques and environmental good practice. These impacts are therefore unlikely.

14.7 Avoiding an adverse effect is largely in the hands of the water companies (through their investment in future sewage treatment infrastructure) and the Environment Agency (through their role in consenting effluent discharges). However, local authorities can also contribute through ensuring that sufficient wastewater treatment infrastructure is in place prior to development being delivered through the Core Strategy. In the case of Wirral, this is alluded to in:

- Preferred Option 16 Development Management which states: *The Core Strategy will set out a list of the main issues that will need to be addressed when considering the appropriateness of any new development proposal or land allocation. This list of main issues will include: ……"impact on wider environmental requirements including quality of air, land and water, sustainable construction and waste management*."; and

- *Preferred Option 17* – Developer Contributions which states that *"The types of provision likely to be required will include: ……water services [including flooding, supply disposal, sustainable drainage and prevention of pollution."*

14.8 However, it is considered that this allusion needs to be expanded upon in order to provide a firm commitment with regard to the linking of housing delivery to delivery of necessary infrastructure that will ensure that an adverse effect on European sites is avoided. Preferred Option 7 in the Core Strategy should make specific reference to the fact that phasing of development is also to ensure that it only takes place once any new water treatment infrastructure, or appropriate retro-fitted technology (e.g. nitrate removal) necessary to service the development while avoiding an adverse effect on European sites, is in place. The Core Strategy should also indicate how this need will be determined and delivered through interaction with other authorities (United Utilities, the Environment Agency etc) i.e. through a Water Cycle Strategy.

Coastal Squeeze and Loss of Supporting Habitat

14.9 Preferred Spatial Objective 6 states that new development will be directed away from areas liable to flooding, which could provide valuable habitat to birds, and Preferred Option 4 Broad Spatial Strategy states that "*The focus within rural areas will be on re-using existing buildings … While protecting local distinctiveness and preserving biodiversity, landscape, heritage and other local features of importance*." Development management will also consider the impact on wider environmental requirements (Policy 16). These policies suggest that protection of supporting habitat would be considered in development proposals, but this protection should be strengthened by referring specifically to protection of supporting habitat and ensuring that these important areas are identified prior to any specific development sites being agreed. Further mitigation should include preventing any development being delivered in areas that may compromise managed retreat areas by the Environment Agency. If supporting habitat were to be lost to any development then the applicant would need to determine a) how significant it was (i.e.

whether it was used by more than 1% of the population) and to provide alternative habitat to replace it in a location that was reasonably close to the estuary.

14.10 Mitigation for coastal squeeze should include:

- Ensuring that new development is not delivered in locations which would require a change in coastal defence policy that might compromise natural coastal processes (e.g. from No Active Intervention to Hold the Line or Advance the Line); and
- Preventing development being delivered in areas that may compromise locations identified for managed retreat as set out in the Environment Agency Coastal Habitats Management Plan (CHaMP) and Regional Habitat Creation Programme.

14.11 Important off-site feeding and roosting areas for qualifying species from the Dee Estuary SAC, SPA & Ramsar site, Mersey Estuary SPA & Ramsar site, Mersey Narrows & North Wirral Foreshore pSPA & pRamsar site and Liverpool Bay pSPA & pRamsar site need to be identified so that they can be taken into consideration when considering any future development before the Site Allocations DPD is adopted. To ensure that all such sites are considered, a commitment should be given within the Core Strategy to identify all important areas of supporting habitat and to assess any impacts on these areas, and thereby potential impacts on qualifying species, prior to permitting any future development. The Site Allocation Document should include appropriate mechanisms to ensure the loss of such sites is adequately assessed and mitigated. Wirral should also work in conjunction with other Local Authorities, in particular Cheshire West and Chester Council, as well as the other Merseyside councils, to ensure there is no conflict with development of supporting areas outside the Wirral boundary.

14.11.1 Due to the mitigation already provided within the Core Strategy, in relation to development of foreshore areas and development management, together with the additional measures referred to above for protecting valuable supporting habitats, it is considered that there will be no significant impact on the Mersey Narrows and North Wirral Foreshore pSPA/pRamsar through coastal squeeze and/or loss of supporting habitat related to policies within the Core Strategy.

Renewable Energy and Tidal Energy of the Mersey

14.11.2 Preferred Option 14 states that “specific requirements for individual land allocations will be included in a site-specific Development Plan Document”. Reference is also made to an emerging study of the capacity of the Borough to generate renewable energy which is likely to identify the proposed New City Neighbourhood as a potential priority zone for producing renewable energy through a district heating scheme. The most significant local sources of renewable energy are more likely to come from extensions to the off-shore wind farms in Liverpool Bay or tidal power within the Mersey Estuary. Therefore, it seems unlikely that any wind farms will be developed within the boundary of Wirral Borough Council.

14.11.3 Although the implementation of tidal power has the potential to have highly significant impacts on the habitats and species within the estuaries, development of such a scheme would be subject to strict environmental controls. At the present time, it is not possible to assess the implications of such a scheme, as the project is purely at the feasibility stage and the impacts are unknown. However, the Core Strategy should make reference to the requirement for a project level HRA on such a scheme which would include selection of the most suitable design and its location. It is

also essential that the impacts relating to construction of the scheme are distinguished from those resulting from its operation.

14.11.4 Preferred Option 16 (Development Management) refers to the *"impact on wider environmental requirements"* being one of the main issues when considering the appropriateness of any new development or land allocation, there is no specific reference to protected sites, protected species or other important areas for nature conservation. The Policy does state that "*further advice on the application of these requirements will, where necessary, be set out in Supplementary Planning Documents*" (SPDs). To ensure no detrimental impact on nature conservation, it is recommended that a specific DPD be developed which would include requirements for the protection of all protected sites, protected species and other areas of value for nature conservation and biodiversity. There should be a requirement for detailed assessments to be undertaken on the potential impacts from any new developments on all areas important for nature conservation within the Wirral Borough Boundary, as well as potential impacts on sites/species outside the Borough itself but with potential impact pathways from new developments.

Overall conclusion

14.11.5 With these amendments in place it can be concluded that a sufficient policy framework existed to enable the avoidance or mitigation of adverse effects on European sites.

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