Highways Agency
Southern Operations Division

A249 IWADE TO QUEENBOROUGH IMPROVEMENT

SCOPING STUDY FOR ENVIRONMENTAL STATEMENT

Consultation Draft

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Mott MacDonald Group
Demeter House
Station Road
Cambridge
CB1 2RS

Tel: (01223) 460660
Fax: (01223) 461007

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SCOPING REPORT FOR ENVIRONMENTAL STATEMENT

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1.0 INTRODUCTION

1.1 Background

In May 1989 the White Paper entitled 'Roads for Prosperity' set out the Government's policy for improvements to the strategic trunk road network. The A249 Iwade - Queenborough Improvement was identified in the White Paper and reaffirmed in the Government's review 'Managing the Trunk Road Programme', which was announced in November 1995.

In 1993 Ove Arup and Partners produced, for the Department of Transport a series of reports assessing the options for crossing the Swale. This Stage 1 Study determined the alignment that, either by a bridge or by a tunnel, would minimise the environmental impact on the Swale and the adjacent Minster and Ferry marshes. Because of their ecological importance most of the area is designated as a Special Protection Area (SPA), Site of Special Scientific Interest (SSSI) and Ramsar Site. The study concluded that a high level bridge was preferable to a tunnel and recommended an alignment for the road. The Study also made suggestions as to suitable forms of structure for the crossing of the Swale. In October 1994, the Secretary of State announced his Preferred Route for the scheme.

In February 1995 Mott MacDonald were appointed by the Highways Agency to develop the scheme for crossing the Swale from the 'Preferred Route' stage through to Public Inquiry. The Brief for the Stage 2 Study requires the consultant to carry out additional surveys as necessary in order to complete a full Environmental Statement in accordance with EC Directive 85/337.

Informal consultation meetings have been held on 25 May 1995 with English Nature and 28 June 1995 with RSPB to determine the scope of additional survey work required to complete the Environmental Statement.

1.2 Report Objectives

The purpose of this Scoping Report is to:

- agree the scope of the environmental assessment;
- review the existing data collected to date; and
- identify further assessment work required to produce a comprehensive Environmental Statement for the scheme.

The Scoping Report will be circulated to all Statutory Consultees so they may express their views on the scope of the assessment, mitigation methods, methodology and significance criteria.

1.3 Programme

An initial environmental work programme report for the Stage 2 commission was submitted on the 16 May 1995 and survey work carried out throughout the summer and autumn of 1995, and continuing to May 1996.

Provisional Programme dates are as follows:

- Scoping report for ES - June 1996
- Draft Volume 2 reports - June to September 1996 (individual reports will be submitted as they are completed)
- First draft Volume 1 and NTS - September 1996

- 2nd draft Volume 1 & 2 & NTS - October 1996
- Final drafts ES - November 1996
- Publication date - December 1996
- Public Inquiry - Summer 1997

1.4 Report Structure

Following this introduction, Section 2 summarises the scheme components and Section 3 presents the general methodology applied to the study. Sections 4 to 15 identify the receptors and key issues associated with each environmental resource (as defined in Volume 11 of the Design Manual for Roads and Bridges), present the methodology for assessment of potential effects and summarise work undertaken to date and that outstanding.

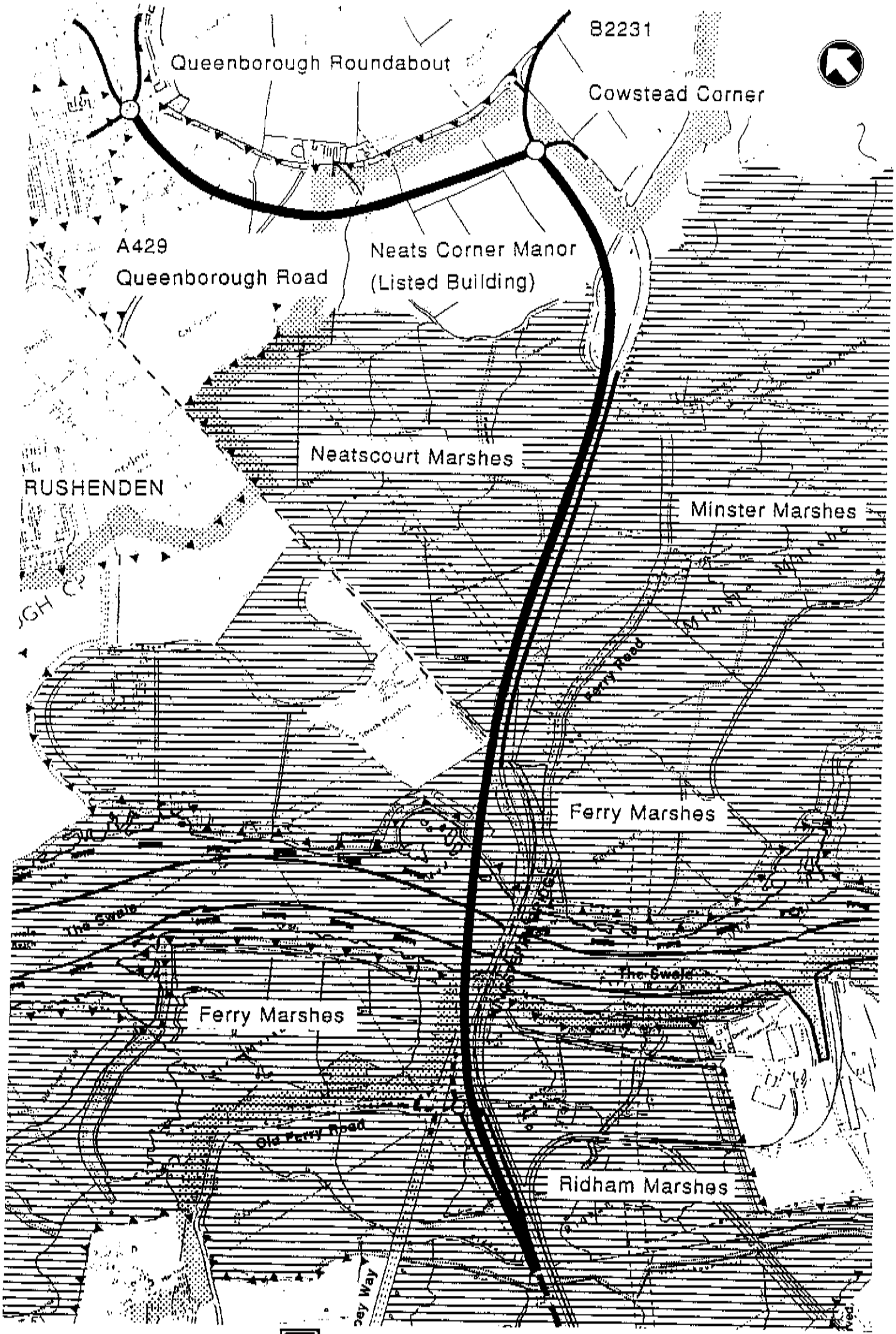
2.0 PROJECT COMPONENTS

2.1 Introduction

The preferred route for this 5 km long dual two-lane carriageway road is shown on the attached plan. It connects with the Iwade Bypass (under construction) on the mainland and crosses the Swale to the west of the existing Kingsferry Bridge on a 1.4 km long viaduct. A 29 m clearance above the high water level would be provided. From the new bridge, the route follows the line of the existing A249 to its junction with Ferry Road, and then goes northwards to a new roundabout junction near Cowstead Corner. The route then crosses the upper area of the Neatscourt Marshes, to the south of the properties on Queenborough Road, to a new roundabout junction to the west of the existing Queenborough roundabout. The Kingsferry Bridge would be retained to accommodate the railway and local traffic movements and would be linked to a new local road which would be constructed parallel and adjacent to the new trunk road and tie into the proposed new roundabout south of Cowstead Corner. The Kingsferry Bridge crossing and this new link would also provide a route for pedestrians and cyclists.

2.2 Landtake

The bridge will be supported on a series of piled foundations, requiring two piers in the mudflats either side of the Swale Channel. The north abutment will take approximately 1.2 ha of grazing marsh as it drops to ground level. The road will be built along the existing A249 alignment through the SPA, but the wider cross section will require an additional 2 ha, with a further 1.3 ha near the existing layby area. Outside the SPA, the scheme will require approximately 5.3 ha of arable land of low ecological value in the vicinity of Cowstead roundabout, and a further 4.4 ha of grazing marsh between Neats Court and Queenborough Roundabout.



ite of Special Scientific Interest
PA and Ramsar Site

Figure 2.1 LOCATION PLAN
scale 1:1250

3.0 APPROACH TO THE STUDY

3.1 Introduction

The environmental assessment studies follow the Design Manual for Roads and Bridges Volume 11, published in 1993. The procedures described in Volume 11 for a stage 3 assessment will be adopted and expanded.

In considering the environmental consequences of the proposed road improvements, it is necessary to recognise the potential environmental impacts and effects, both positive and negative on the surrounding area during construction, operation and maintenance and to assess their significance. This chapter therefore identifies the general approach which will be adopted as a basis for the environmental assessment. A more detailed description of the methodology and significance criteria applied to the evaluation of specific environmental effects is described in Chapters 4 to 15.

3.2 General Methodology

(i) Identification of Potential Impacts and Effects

A clear distinction will be made in the study between *impacts* and *effects*.

Impacts are defined as physical changes to the environment attributable to the construction and operation of the scheme (eg landtake/noise generation etc). For each environmental impact (eg water pollution, landtake) there may be a range of environmental effects which need to be considered. For example, pollution of water courses may have effects on ecology while landtake impacts will result in effects on ecology, visual quality, access etc.

Effects are defined as the end result of impacts on the ecological resources and receptors. They may be negative or positive, direct or indirect, temporary or permanent.

Potential impacts are identified through consideration of the construction and operational requirements. Identification of a significant environmental effect cannot occur without the combination of impact and receptor to that level based on quantitative assessment and professional judgement.

(ii) Spatial and Temporal Scope

Spatial: In its crudest sense the spatial scope is defined as the geographical area over which changes to the environment are likely to occur as a result of the scheme. A corridor wider than the actual area of landtake will be studied, to provide information about the context of features directly affected, to allow assessment of indirect effects and to allow for assessment of off-site impacts such as spoil disposal, construction sites and traffic routes.

Temporal: For the purposes of the assessment of environmental effects a distinction is made between temporary/construction and permanent/operational effects. For construction, the scope extends from the date of commencement of site works to the date immediately prior to the opening of the scheme. For operational effects, the scope extends from immediately after opening of the scheme to its maximum utilisation. In particular the evaluation will include an assessment of effects in years 1 and 15.

(iii) Identification of Potential Receptors

For many environmental parameters the overall effect will depend on the spatial relationship between the source and receptor. Effects will also depend on the characteristics of the receptor, as some will be more sensitive to an environmental impact than others. As far as possible the baseline studies will identify all potential environmental receptors.

(iv) Initial Appraisal of Impacts and Effects

The assessment of the significance of any effects will be a function of the severity of an impact and its interaction with a potentially sensitive receiver. For example the effect of a noise impact will not be significant if there are no receivers in the vicinity but will be significant if there are receivers which could suffer as a consequence of the noise impact. A key component in the evaluation process is therefore the development of specific criteria for determination of significance of anticipated effects. In order to describe the level of concern associated with the environmental effects and to provide a consistent approach across the environmental issues, the effects will be categorised according to a common terminology of Major, Moderate and Minor effects.

(iv) Proposal of Mitigation Measures

Where effects can be reduced to acceptable levels through the incorporation of practical and cost-effective measures these will be identified.

(v) Scoping of Further Work Requirements

The work undertaken to date largely comprises the identification of potential impacts, effects and receptors and determination of the methodology to be applied in the evaluation of such effects. Compilation of baseline data and initial appraisal of effects has been undertaken to varying extents for each of the environmental issues under consideration. An important component of the current study is to outline the outstanding works required in order to complete a full statutory EA in accordance with EC Directive 85/337.

4.0 ECOLOGY

4.1 Identification of Receptors

The ecological resources to be assessed, can be grouped into two broad categories:

- Populations of plants and animals; and
- Habitats of nature conservation interest.

Plants and Animals

The species covered by this report are those found within the study area and in particular those likely to suffer most as a consequence of the implementation of the scheme:

- Birds;
- Plants; and
- Invertebrates.

Sites and Habitats

The habitats listed below are found within the study area:

- Grazing marshes;
- Saltmarsh;
- Open water;
- Drainage ditches; and
- Arable and improved grassland.

4.2 Identification of Impacts and Effects

Impacts

Potential impacts have been identified through a consideration of the construction, operational and maintenance requirements of the scheme, eg extent of landtake, level of traffic movements etc. Many impacts that occur during the construction phase are temporary in nature, but others may be experienced throughout the operational phase in which case they are long term. The following list comprises a range of impacts which may occur as a result of the scheme and which could result in effects on ecological resources:

- temporary or permanent landtake of habitats;
- temporary or permanent severance/fragmentation of habitats or corridors;
- dust and air pollution arising from construction activities and road traffic movements once the road is operational;
- noise and vibration associated with construction activities and operation of the scheme;
- visual disturbance during both construction and operation;
- disruption to local hydrology, drainage patterns, flows and volumes of subsurface water;
- pollution of water courses during construction and operation, including accidental spillage;
- off-site spoil disposal;
- secondary effects due to induced development arising from increased accessibility to the Isle of Sheppey; and
- temporary and permanent lighting.

Effects

These impacts could lead to a set of effects on the ecological resources. Such effects have been identified as habitat or species disturbance, damage or loss caused by:

- direct landtake;
- fragmentation and or severance;
- noise, dust, visual disturbance; and
- changes in water quality and/or quantity.

4.3 Assessment Methodology

4.3.1 Establishment of Baseline Conditions

To assess the environmental effects of the scheme, it is necessary to undertake a baseline study to determine the location, extent, nature and sensitivity of ecological resources:

- review of existing projects reports and baseline surveys;
- review of citations of designated areas;
- additional field surveys;
- consultation with nature conservation bodies and other concerned parties including English Nature and Local authorities, wildlife trusts and interest groups.

The results of the desk studies and field surveys will be compiled into a project database which will contain a documentation of all features of ecological interest within the scope of the project. For presentational purposes the information will also be presented on Environmental Features Mapping.

4.3.2 Evaluative Criteria

(i) For Assessing the Importance of Ecological Resources

Habitats

The importance of ecological sites and species varies considerably and there are no universal criteria for their evaluation. The starting point for evaluating the sensitivity of the resources will be to consider their legal or quasi-legal status (such as designated sites, protected species etc). Sites may be categorised as having international, national, county or local importance as follows:

International: SPA, Ramsar, Sites listed under specific EU legislation or international treaties. Where sites have been proposed for such a designation they are considered to have the designation of such a site

National: National Nature Reserves (NNRs), SSSIs, Environmentally Sensitive Areas (ESAs)

County: Site of Nature Conservation Interest (SNCI)

The importance of resources can be further defined by use of the non-statutory criteria which are usually based upon those defined by the former Nature Conservancy Council (Ratcliffe, 1977; NCC 1989) based on consideration including species diversity, rarity, density, community, abundance, richness.

Species

The Wildlife and Countryside Act 1981 and subsequent legislation lists those species of flora and fauna subject to statutory protection. This Act also implements protection under international agreements and treaties such as the EU Birds Directive and Habitats Directive, the Ramsar Convention and the Berne Conventions. Of particular relevance to the current study are:

- protection of all wild birds, their nests and eggs; and
- offence to pick or intentionally uproot certain wild plants.

Significance is accorded to certain species as follows:

International Importance: as defined by the IUCN or listed in the Red Data Book, Red Data List. In addition, certain species and groups are recognised as internationally important under established criteria such as that adopted by the Ramsar convention

National Importance: Nationally scarce or rare as specified in the Red Data Book.

Local Importance: County scarce or rare.

(ii) For Assessing the Significance of Effects

The severity of impacts will be judged on a number of characteristics that will include magnitude, spatial extent, duration and the nature/location of the impact. The significance of effects will be determined by combining the importance and sensitivity of the ecological resources (as defined in i) with the severity of impact. It is envisaged that the assessment will use a matrix technique combined with professional judgement on a case by case basis.

Categories of significance of effect are proposed as follows:

Major
- Permanent loss affecting the biological integrity of a site of international importance; or
- permanent loss of any protected species (as defined in Schedules 5 and 8 of the Wildlife and Countryside Act 1981); or
- permanent loss of any priority habitats and species as defined under the EU Birds and Habitats Directive; or
- permanent loss to those resources within a site of national importance where the presence of those resources were the reasons for the site's designation.

Moderate
- Permanent loss of rare species (as defined in the Red Data Book); or where an international or national site suffers some damage that
- compromises the essential functioning of the habitat or species; but partial or total recovery is likely soon after the cessation of the impact: or
- where it only affects a small part of the site of national importance and to such a limited extent that the key elements of the ecosystem can continue to function; or
- permanent loss of high quality SNCI.

Minor
- Where a locally designated site suffers some damage that compromises the essential functioning of the habitat or species, but partial or total recovery is likely soon after the cessation of the impact; or

- where it only affects a small part of the site of local importance and to such a limited extent that the key elements of the ecosystem can continue to function.

4.3.3 Mitigation and Compensation

Where significant effects are predicted, mitigation and compensation measures will be recommended and could include:

- engineering refinement of the scheme during detailed design to reduce landtake and habitat loss;
- acquiring an area of ecological potential and enhancing it;
- improving conditions within the SPA by, for example, raising water levels, altering the grazing regime or removing timber telegraph poles which enabled carrion crows to more easily predate upon lapwing chicks; and
- enhancing adjacent wetland areas which are not actually within the SPA, such as sludge lagoons west of main marsh, or sensitive areas nearer Queenborough.

4.4 Work Undertaken to Date

4.4.1 Establishment of Baseline Conditions

1. Collection and review of established ecological data, particularly in relation to the statutory designations in the area (SSSI, SPA and Ramsar) source : English Nature, RSPB and Wildlife Trusts.

2. Review and assessment for accuracy and completeness of those surveys carried out by the stage 1 consultants (Arups). These are:

   Part 1 Landscape Report of Existing Conditions (Arup, Dec 1992)

   Stage 2 Environmental Appraisal Report (Final, Arup, Nov 1993)

   Literature Review on the Ecological Resources of the Site Parts 1 and 2 (Final, Ecosurveys, Dec 1992)

   Invertebrate Survey Report (Final, Ecosurveys, Sept 1993)

   Botanical Herpetological and Mammal Survey Report (Final, Ecosurveys, Sept 1993

   Intertidal Invertebrate Survey (Henderson Ecological Consultants, Apr 1992)

   Ornithological Survey: Part 1. Winter Survey Dec 1991 to March 1992 (Draft, British Trust for Ornithology, May 1992)

   Ornithological Survey: Part 2, Spring Passage and Breeding Survey 1992 and overall Evaluation, (BTO, Sept 1992)

   Ornithological Survey: Part 3, Winter and Breeding Survey (Dec 1992 to June 1993) (BTO, Aug 1993

3. Commissioning of further surveys in relation to the preferred route to fill in any gaps and extend knowledge in the light of the significance criteria. Following discussion with English Nature and RSPB the following have been commissioned:

Intertidal Invertebrate Survey

The available invertebrate survey produced by Henderson Ecological Consultants indicates that the bay is rich in marine invertebrates but the survey was carried out in April 1992, and therefore right at the end of the winter feeding period when the majority of the marine invertebrate population will have been eaten by wading birds. Therefore a late summer survey of intertidal invertebrates is required in order to assess the ornithological importance of the intertidal muds affected by the scheme.

Dr Frances Dipper has now completed a resurvey of the area and the species collected are now being analysed.

Botanical Survey

This is now complete and has shown areas of botanical interest to be inland from the Swale and especially rich in the area south of Queenborough roundabout which is outside the SPA and subject to pressure from the Swalegate Development. The nationally scarce golden samphire, *Inula crithmoides* has also been located and mapped so that it can be excluded by protective fencing from any direct impact of the works.

Winter Bird Survey

This has been commenced and involves hourly counts through the spring tide cycles. It will continue until March, and the results will be collated with the invertebrate survey.

Aquatic Invertebrate Survey

This survey has now been completed and indicates that the ditch found is particularly rich, especially those ditches of moderate salinity along the central section of the route.

4.4.2 Initial Appraisal

The scheme could give rise to loss of habitat and/or species through direct landtake or indirect habitat loss arising from disturbance, eg noise from the traffic movements. In addition changes in hydrology could have consequences in particular for the invertebrate communities that inhabit the ditches on the site.

As shown in Figure 2.1, much of the site has been designated as an SPA and Ramsar site. In view of the international designation, maintenance of its integrity will be a key issue. It may be possible to compensate for such impacts through creation of new habitat through for example land acquisition and the creation of new ditches on the existing site. It should be noted that such measures will need to ensure that overall integrity and quality of the site is maintained and that the number of species that it can support is maintained. It is therefore possible that the area of land acquisition will be greater than that lost. In addition the creation of any new ditches on the existing site can only be undertaken providing the landtake required does not threaten other important resources on the site. Initial estimates indicate that approximately 4.5 ha of land will be lost from the SPA.

Habitat loss outside the area of international importance will also be of concern where there are occurrences of particularly rare or notable species, for example areas containing *carex divisa* near Queenborough roundabout.

In addition to the long term impacts identified above, short term effects will be experienced by bird communities as a result of visual disturbance and noise generation. It is understood that such effects are unlikely to have long term consequences but further work and review of appropriate studies will be undertaken to confirm this view.

4.5 Assessment Work Outstanding

The reviews of existing data and undertaking of additional surveys necessary to determine the baseline environmental conditions are nearing completion. The next stage of the study comprises identification and evaluation of impacts and effects and where appropriate proposal of mitigation measures.

5.0 ARCHAEOLOGICAL AND HISTORIC RESOURCES

5.1 Identification of Receptors

The cultural heritage resources to be assessed, that contribute to the overall character of the historic environment, can be grouped into three broad categories :

- Historic buildings;
- Historic landscapes and townscapes;
- Archaeological sites.

Historic buildings include statutory listed buildings (Grade I, II and II), locally listed buildings and other features identified by local authorities, interest groups and the Consultant as being of historical interest. This definition also encompasses structures of historic merit such as railway bridges, boundary stones, statues etc.

Historic landscapes comprise visible elements of the landscape fashioned by human occupation such as field patterns, walls and hedgerows, drainage systems, lime kilns, barns, historic woodlands, village greens etc. Historic townscape includes street patterns, squares, market places, walls and railings etc. They also include sites of historical events, namely battlefields and birthplaces of distinguished people.

Archaeological sites include a variety of features dating from palaeolithic to modern times and include ruins, stone circles, standing stones, burial chambers, crop and soil marks and finds scatters etc. They may be designated statutory sites such as Scheduled Ancient Monuments (SAMs) and local authority Archaeological Priority Areas. They also include palaeo-environmental geological features contained in gravels, drift, head material, alluvium and peat deposits.

5.2 Identification of Impacts and Effects

Impacts

Potential impacts have been identified through a consideration of the construction, operational and maintenance requirements of the scheme, eg extent of landtake, level of traffic movements etc. Many impacts that occur during the construction phase are temporary in nature, but others may be experienced throughout the operational phase in which case they are long term. The following list comprises a range of impacts which may occur as a result of the scheme and which could result in effects on ecological resources:

- temporary or permanent landtake;
- temporary or permanent severance;
- excavation and ground disturbance;
- visual disruption during both construction and operation;
- disruption to local hydrology, drainage patterns, flows and volumes of subsurface water;
- off-site spoil disposal.

Effects

These impacts could lead to a set of effects on the archaeological and historic resources. Such effects have been identified as:

- complete or partial loss of the archaeological or architectural feature, or topographical evidence due to landtake;

- loss in the physical and visual integrity within the site due to severance, such that key relationships are lost. This is most likely to occur where it is the first effect on the resource's integrity or setting.

- where the historic setting of an archaeological monument, historic building or historic landscape/townscape feature with important visual amenity and historic integrity is extensively altered and the new intrusive element dominates its setting

- damage to resources due to changes in waterlogging;

- damage due to excavation; and

- covering of buried resources.

5.3 Methodology

5.3.1 Establishment of Baseline Conditions

The baseline information for the ES will be based on :

- statutory lists and maps of listed buildings and plans of scheduled ancient monuments;
- aerial photography;
- local history records;
- local authority records;
- consultation with the county archaeological officer;
- review of existing reports including the Wessex Archaeology and Canterbury Archaeology Trust reports; and
- where appropriate additional field walkovers and other site surveys.

5.3.2 Evaluative Criteria

(i) For Assessing the Importance of Historical Resource

The importance of archaeological sites, historic buildings, and landscape features varies considerably. The starting point for evaluating the sensitivity of the cultural heritage features will be to consider their legal or quasi-legal status (such as scheduled ancient monuments, conservation areas, listed buildings). The importance of cultural heritage features can be further defined by use of the non-statutory criteria for scheduling ancient monuments and listed buildings, as set out by English Heritage :

The criteria include :

(i)	survival	(vi)	documentation
(ii)	period	(vii)	group value
(iii)	rarity	(viii)	potential
(iv)	fragility	(ix)	amenity
(v)	diversity	(x)	conservation value

(ii) For the Significance of Impacts and Effects

There is no standard scale of comparison against which the severity of impacts on cultural heritage may be judged, because of the great variety of resources and receptors. Severity of impacts can be judged taking the following into account:

- the proportion of the feature affected and whether key characteristics would be affected;

- consideration of the type, survival/condition, fragility/vulnerability, potential and amenity value of the feature affected.

The significance of effects will be determined by integrating the importance of the historic resources with the severity of impact judged to occur there. It is envisaged that the assessment will use a matrix technique combined with professional judgement on a case by case basis.

Major - Effects which breach national statutory designations and policy and affect sites of national importance. The effects are likely to be of particular importance to national statutory agencies, local authorities, national and local interest groups and the general public. Examples may include demolition or significant landtake within a SAM or Grade I listed building or significant intrusion in setting of a SAM or Grade I listed building.

Moderate - Effects which conflict with national designations and local authority policies. They also include effects which do not technically conflict with national or local policy but which are significant in having a major impact on features which are of particular importance at a county and local level with local authorities and special interest groups. Examples could include the demolition of a Grade II listed building, extensive landtake in a poorly preserved archaeological site (ie a site of degraded archaeological value), significant visual intrusion to a Grade II listed building.

Minor - Effects which, although not breaching national or local policies, may be raised by local authorities and be of concern to local interest groups and the local public. These effects could be removed by incorporation of additional mitigation in the detailed design process. Examples may include the demolition or extensive intrusion of setting of unlisted historic buildings and loss of non-critical components of an archaeological site of local or county importance.

5.3.4 Mitigation

When considering mitigation options for significant effects the study will draw upon general advice and mitigation good practice set out in national policy guidance on archaeology (DOE PPG Note 16 (PPG16)) and English Heritage policy statements and local authority local and structure plan policies.

Where significant effects are anticipated mitigation measures will be recommended; these could include:

(i) further surveys including geophysical and if necessary invasive surveys (this information can be fed into the detailed engineering design process);

(ii) minor amendments to horizontal road alignment and careful siting of construction sites/haul roads during detailed design to avoid or minimise disturbance, severance and landtake to a site of medium archaeological importance (eg the group of salterns identified in Section 5.4.2) and adjacent areas of archaeological potential;

(iii) where (ii) is unachievable and landtake/demolition required an archaeological survey of the site to record its value/contents/structure etc prior to its destruction. However, a full survey incorporating rescue archaeology would only be carried out for a site of national interest.

(iv) minimal disturbance of hydrological regime of the Study Area in the immediate vicinity of the new A249 so as to maintain the prevailing anaerobic conditions and preserving the archaeological remains in situ.

(v) archaeological watching brief during construction, especially areas of piling.

5.4 Work Undertaken to Date

5.4.1 Establishment of Baseline Condition

Initial archaeological and historical baseline information was collected and assessed for the purposes of the Ove Arup & Partners Stage 2 Environmental Appraisal Report that was produced in November 1993, to inform the Secretary of States' decision of a Preferred Option for the Scheme and the subsequent period of Public Consultation.

The information contained in the Arup Report (Chapters 2.6 and 5.6 - Cultural Heritage) was based on a detailed archaeological study undertaken by Wessex Archaeology :

- Archaeological Survey - Stage 1 : Desk Study (October 1992)

  The information in these reports was acquired by a comprehensive review of the existing historical data sources :

  - statutory lists and maps of listed buildings and plans of scheduled ancient monuments;
  - aerial photography;
  - Ordnance Survey Maps; and
  - local authority records.

- Archaeological Survey - Stage 2 : Preliminary Field Evaluation (November 1992)

  A site walkover survey based on the methods of rapid field scan and more detailed gridded fieldwalking was undertaken by Wessex Arachaeology to gain a visual understanding and site specific awareness of the Study Area.

Two additional archaeological reports were commissioned by Mott MacDonald Environmental Consultants in May 1995 and undertaken by the Canterbury Archaeological Trust:

- A249 - Kingsferry Bridge to Queenborough Roundabout Improvement Scheme - An Archaeological Note : Simon Pratt, (May 1995)

- The Preferred Scheme : Archaeological Desk Study (expected completion, April 1996)

The purpose of these reports, using local archaeologists with a specialised understanding of the area, were to supplement and update the historical baseline produced by Wessex Archaeology in 1992 and focus the analysis on the more limited geographical area of Study associated with the Preferred Option.

5.4.2 Initial Appraisal

The results of the Wessex Archaeology desk study were compiled into a project gazetteer which contained a documentation of all features of archaeological/historic value within the scope of the project and an estimate of the resource value based on three ranking categories:

A - Sites of 'high archaeological importance' or potential (known site of national or regional importance);

B - Sites of 'medium archaeological importance' or potential (site with the potential to be of local importance);

C - Sites of 'low archaeological importance or potential' (site of limited or, at best, local archaeological value).

In summary, the Wessex Report identified that for the Study Area (which comprised several route options) :

- no sites of high archaeological importance/potential were situated within the Study Area;
- three sites of medium archaeological importance were situated within the Study Area but only one of these sites was directly affected by the Option 12z5 (subsequently announced by the Secretary of State as the Preferred Option):

  Group of nine salt-working mounds (salterns) on the Neatscourt/Cheyney Marshes, 2 to 4 m spot heights.

The Ove Arup report concluded, on the basis of information contained within the Wessex Reports, that there would be no areas of High Archaeological Potential or Scheduled Ancient Monuments directly affected within the Study Area. Overall, however, the Arup report noted that the Study Area has considerable archaeological potential based on the record of human activity in and around the Study Area and the likelihood that any remains would likely to be preserved in situ because of the anaerobic conditions that prevail in the marshland. Any route option with an alignment close to the existing A249 would be preferred because this would cause least landtake and severance of known remains (ie, the saltern features) and least disturbance to adjacent areas of archaeological potential.

The Canterbury Archaeology Trust Report (May 1995) outlined a list of recommendations for future archaeological work, in the light of the work already undertaken and the current engineering design and project programme:

- fieldwalking and transects confined to those areas of the route where earth is exposed, ie ploughed fields rather than land under permanent rough pasture. Such an assessment could however only provide superficial information and archaeological deposits may be buried much deeper in silt sediments estimated to range from 2 to 9 m thick;
- advance trial trenches would be of limited use because of the high water table (flooding) and could have the disbenefit of causing disturbance in a designated ecological site (SPA/Ramsar/SSSI);
- inspection of borehole samples collected during geotechnical ground investigation (especially likely sheet piling locations for road piers) for evidence of archaeological remains; and

- archaeologist watching brief during construction and active supervision of excavation should any features (eg ancient boats) be discovered.

While the reports produced to date have identified that there are no known archaeological sites of national importance or designated status affected by the Scheme, importance must be attached to the *potential* for archaeological remains preserved in situ in the anaerobic peat and clay marshland and the possible disturbance of such features during construction activites such as piling.

Advice will be sought from the County Archaeological officer on these matters together with further on-site archaeological investigation using borehole/trial pit analysis during geotechnical investigations conducted for the detailed engineering design and archaeological watching/supervision during the piling drilling for the road/bridge piers.

5.5 Assessment Work Outstanding

The reviews of existing data and undertaking of additional surveys necessary to determine the baseline archaeological conditions will be continued and will include:

- examination of statutory lists and maps of listed buildings and scheduled ancient monuments;
- examination of aerial photography;
- examination of local history records; and
- consultation with local authority records/officers.

Following completion of these reviews, an evaluation of impacts and effects will be undertaken and, where appropriate, mitigation measures will be proposed.

6.0 AIR QUALITY

6.1 Identification of Impacts, Effects and Receptors

Road traffic produces a range of gaseous and particulate pollutants including carbon monoxide (CO), nitrogen dioxide (NO2) and hydrocarbons (HC) that at high concentrations pollutants can have potentially significant adverse effects on human health and the environment.

The following receptors could potentially be affected by the Scheme;

- residents on Queensborough Road;
- community facilities such as pubs (Lady Hamilton PH) and schools (Queenborough County Primary School); and
- ecological resources including Medway Estuary and Marsh SSSI and The Swale SSSI.

6.2 Assessment Methodology

Baseline and operational air pollutant levels will be assessed using the methodology set out in the Department of Transport Design Manual For Roads And Bridges (DMRB) (Volume 11, Environmental Assessment, 1993) using 1997 and 2015 traffic predictions for the Do Nothing scenario and 2015 Do Nothing and 2015 traffic predictions for the With Scheme scenario.

The significance of traffic emissions will be based on the standards for Carbon Monoxide (CO) and Nitrogen Dioxide (NO2).

The CO guideline recommended in DMRB is 9 ppm, expressed as an 8-hour average not to be exceeded more than once per year. The NO2 limit is that given in EC Directive 85/203/EEC. This is 105 ppb expressed as the 98th percentile of the mean of measurements made throughout the year.

Significant : where modelling predicts a concentration of CO or NO2 at a receptor in excess of the guidelines.

Not-Significant : where modelling predicts a concentration at levels that do not exceed the guidelines.

6.3 Work Undertaken to Date

6.3.1 Establishment of Baseline Conditions

Baseline air quality data for sensitive receptors (eg residential, community facilities) that could be affected by the Scheme were outlined in the Ove Arup & Partners Environmental Appraisal Report (November 1993). 1993 air pollution levels (based on 1993 traffic flow information) were generally considered to be low and no significant effects were predicted on sensitive receptors.

6.3.2 Initial Appraisal

The Do Nothing predictions for 2015 anticipate an improvement in air quality which is attributable to improvements in fuel mixes and technology. Due to the greater distance of

the new road from most receptors, the predicted 2015 pollutant levels are in general lower than the Do Nothing scenario. At certain locations (eg Queenborough roundabout) higher pollutant levels are anticipated, although at no location will these levels be in excess of currently accepted guideline values.

6.4 Work Outstanding

The baseline data for the Preferred Scheme will be updated and impacts assessed using the DMRB guidelines to cover the following situations:

1997	Do Nothing (Baseline)
2015	Do Nothing
2015	With Scheme

Impacts associated with exhaust emissions from construction plant and vehicles on construction sites will be addressed in the 'Disruption Due To Construction' chapter of the EA.

7.0 TRAFFIC NOISE AND VIBRATION

7.1 Identification of Impacts, Effects and Potential Receptors

Road traffic noise can be divided into two components. The first is generated by engine, exhaust and transmission systems and the second is a result of road noise. The first dominates under low flow conditions while the second dominates during free flow conditions.

Receptors for noise are largely people in their homes or workplaces. Particularly sensitive receivers will include hospitals, schools, places of worship, heritage buildings and outdoor areas commonly used by people and where ambient levels are currently below 50dB(A). Occupants of buildings on soft soils may also be subject to disturbance arising from ground vibration. Air vibration can also cause disturbance in building elements such as windows and doors.

7.2 Methodology

Baseline and operational noise levels will be assessed using the methodology set out in the DMRB using 1997 and 2015 traffic predictions for the Do Nothing, 2015 Do Nothing, and 2015 With Scheme scenarios. The assessment of noise effects will evaluate changes in noise levels, (relative to ambient levels) and predict levels of increase and the number or properties or sensitive locations subject to such an increase. Where appropriate increases in nuisance level will be undertaken based on the number of receptors subject to a change of 1dB(A) or more. Receptors subject to a decrease in noise levels will also be identified.

7.3 Work Undertaken to Date

7.3.1 Establishment of Baseline Conditions

A baseline noise survey was undertaken in May 1992 by Ove Arup & Partners to establish ambient noise levels at 14 key sites representative of residential properties, recreational areas and areas and typical bird habitats within the SPA/SSSI which could be affected by traffic noise associated with the Scheme.

Baseline noise figures were based on a range of acoustic parameters commonly applied in construction projects:

- $L_{Aeq,T}$: The Average Noise Over Time Period T;
- L_{A90T} :The noise level exceeded for 90% of the time period T (this is generally considered to be the background noise level);
- L_{A10T} :The noise level exceeded for 10% of the time period T (it is commonly associated with isolated, short-term, intrusive events);
- $L_{A10,18hour}$: The arithmetic average of the 18, one hourly values from 0600 to 2400.

Residential Areas

At the 8 residential receptor sites considered in the baseline noise survey, background noise levels of 34 to 53 dBL_{A90} were recorded. Corresponding values of 52 to 66dBL_{A10} were also identified.

Recreational Areas

Three key areas of recreational sensitivity were identified in the Study : Kingsferry Yacht Club, Long Reach Water Ski Club and the Shooting Club.

Noise levels in the vicinity of the Kingsferry Yacht Club and Long Reach Water Ski Club were 52dBL_{A90} and 59dBL_{A10}. Noise levels at the Shooting Club were 49dBL_{A90} and 57dBL_{A10}.

Bird Habitats

Representative areas on the SSSI were selected and a noise level of 43dBL_{A90} was recorded.

7.3.2 Initial Appraisal

No attempt was made to put baseline noise levels into the context of existing quantitative noise standards to give an impression of the current effects of road traffic and other noise sources on potentially sensitive receptors and resources.

No predictions were also made for ambient operational noise levels associated with the new scheme and so there could be no quantitative comparison in the report to identify the magnitude of positive or negative noise impacts at key receptor locations associated with the Scheme and whether these represented significant effects.

The appraisal was limited to qualitative observations indicating that noise levels would be likely to be reduced (and therefore effects reduced) where the new alignment of the A249 was situated at a greater distance to the receptor than the existing road.

Based on the limited appraisal the following conclusions were reached in the Ove Arup report:

- the ideal route option would strike a balance between noise impacts on receptors/resources and landtake effects/habitat loss within the SSSI/SPA. An alignment at a greater distance from the existing A249 would reduce noise impacts on properties along Queenborough road but would create greater landtake in the SSSI. Effects would be reversed for an alignment closer to the existing A249.
- For the Preferred Option (12z5) :
  - Residential: Increase in distance between road and properties at Neats Court implies a reduction in noise.
  - Recreation: Reconstruction and expansion of Queenborough Roundabout increases potential for increased noise at Queenborough County Primary School and King George V Playing Fields.
  - Habitat: Potential increased impact on birds, especially during

construction.

Noise mitigation that could be considered during detailed design includes :

- Construction Activities:

  (i) application of 'best practice techniques' (noise abatement for piling equipment);
  (ii) sensitive location of construction sites, haul roads and access routes;
  (iii) careful organisation of construction programme to limit impacts at specific, critical time periods, eg migration (winter) and breeding seasons.

- Modification to horizontal alignment where engineering constraints allow.

- Incorporation of mitigation bunds/walls at Queenborough Roundabout and landscaping/earthworks at Neats Court and other residential/recreational receptor locations, should noise levels be sufficiently high to justify such measures and provided they did not conflict with landscape design objective.

7.4 Assessment Work Outstanding

- Revised baseline at key locations for year of construction (1997);

- noise modelling to predict operational noise levels after the completion of the project for 1999 and 15 year design year (2015).

8.0 LANDSCAPE EFFECTS

8.1 Identification of Impacts, Effects and Receptors

Impacts on visual amenity and landscape character can arise from:

- views to and from areas of landscape or scenic importance;
- views to and from historic buildings or other built features of importance; and
- finishes and materials and their compatibility with surrounding features.

Effects will arise due to the change in the existing environment as a result of the scheme, both in general terms within the overall landscape character and in specific terms relating to visual intrusion on properties. Effects can be either beneficial or adverse in relation to the existing situation.

Potential receivers for landscape impacts are people in their homes or at work and community facility users.

8.2 Assessment Methodology

The first stage of the landscape impact evaluation comprises the determination of the baseline landscape character: topography, vegetation, designated areas or other areas considered to be of landscape value, historical features, level of open views and material finishes. This will be followed by a determination of the overall visibility of the scheme to identify parts of the study area from which there is likely to be a view of the proposed road and bridge. Using the baseline conditions as a control, the potential impacts of the proposals will be assessed from a representative number of viewpoints in terms of level of visibility of the scheme against the existing terrain. The assessment of landscape effects will follow the detailed methodology laid down in DMRB Vol 11.

8.3 Work Undertaken to Date

8.3.1 Establishment of Baseline Conditions

The major part of the Study Area is characterised by open, low-lying grazing marshes which are intersected and bounded by numerous ditches and fleets. Sea walls and other flood defences define zones within the marshland and restrict views across the Study Area. The Kingsferry Bridge is a dominant feature within the landscape.

The Swale separates the mainland from the Isle of Sheppey and is the dominant natural landscape feature of the Study Area. At high tide it cuts a swathe approximately 250 m wide across the Study Area from the north-west to the south-east. At low tide the water channel is approximately 150 m wide with exposed mudflats on either side.

To the south of the Swale, the village of Iwade is surrounded by areas planted with fruit trees. These orchards are bounded by hedgerows which act as windbreaks. To the north of the Swale industrial buildings, a sewage treatment works, and the Rushenden car depots all form prominent intrusive elements in the landscape. These downgrade the landscape character and visual quality of the area. To the south-east, Ridham Dock and the paper mill at Kemsley form similar prominent visual features.

The predominant topographical features are Barrows Hill and Furze Hill to the north and Rushenden Hill to the west. Barrows Hill and Furze Hill and rise to a height of 25 m AOD and 40 m AOD respectively. This part of the Study Area is characterised by arable farmland

and mature hedgerows defining field boundaries. Rushenden Hill rises to approximately 15 m AOD and overlooks the housing area at Rushenden to its immediate east.

Views across the flat open landscape are generally expansive. The Study Area is not visible from the majority of residential areas in Queenborough, although some properties at Rushenden do have views across the marshes. However, views from ground level are screened by the earth bunding associated with the sewage treatment works and car depots to the south and east. This bunding becomes less effective as a visual screen at properties on rising ground at the edge of Rushenden. Properties along the A249 Queenborough Road also have views towards the south, although some of these on the northern side of the A249 are screened by hedgerows alongside the road and around property boundaries.

8.3.2 Initial Appraisal

An initial landscape appraisal was undertaken as part of the stage 1 assessment by Ove Arup & Partners, which defined the baseline landscape character. In addition, a preliminary assessment of the bridge in terms of its landscape impact was carried out, including several photomontages. The conclusions were that the flat, open marshland had a particular semi-natural quality, but that the presence of manmade objects such as electricity pylons and industrial buildings detracted from this quality. The bridge provided an opportunity to link these discordant elements by providing a new horizontal horizon, particularly as the existing Kingsferry Bridge was already a dominant feature in the landscape. However, no detailed visual intrusion studies were carried out for the stage 1 assessment.

8.4 Work Outstanding

The original landscape assessment will be updated in terms of any new developments. A detailed visual intrusion survey will be carried out and schedules produced showing the change in visual amenity for properties overlooking the route. Once the overall bridge structure is confirmed, a detailed visual envelope map will be plotted.

9.0 LAND USE

9.1 Identification of Impact, Effects and Receptors

The Scheme could potentially have impacts and effects on a range of land uses including:

- agricultural land, through severance or loss of land;
- amenity resources and community facilities;
- residential areas and development land.

9.2 Assessment Methodology

DMRB will be used to assess the impacts and effects of the scheme on agricultural land, properties and utilities, and recreation and amenities.

An update of the area of agricultural land in grades 3b, 4 and 5, and the total land-take of the scheme will be calculated.

The agricultural assessment of land use, severance and boundary impacts for individual farms will be updated in greater detail, to include their future viability. Consideration will also be given to the effect on ESA features and land management practises.

The detailed alignment of the preferred route will be finalised and the assessment of impacts on businesses will be updated.

9.3 Work Undertaken to Date

9.3.1 Establishment of Baseline Conditions

Baseline data on soil type, agricultural classification and use, land ownership, agricultural designations, properties and utilities were included in the Ove Arup & Partners Environmental Appraisal Report (November 1993), giving areas of land and numbers of properties affected by the scheme.

The Soil Survey of England and Wales Map (Sheet 6, South-East England) indicates that the major soil type for the alignment of the preferred route is deep, stoneless, non-calcareous and clayey soils of the Wallasea Association. The MAFF Land Classification Map (ALC) indicates that the land is predominantly Grade 4, with small areas of Grade 3.

Very few properties are located within the area of the scheme. For the preferred route there are 25 residential, 1 commercial and 3 community properties within 100 m of the existing A249.

9.3.2 Initial Appraisal

The following agricultural, residential and amenity facilities which could be affected by the scheme were identified by the initial impact appraisal:

- Agricultural land within the North-West Kent Coast Environmentally Sensitive Area (ESA);
- 25 residential, 1 commercial and 3 community properties within 100 metres of the existing A249; and
- recreation and amenity facilities, including the Kingsferry Yacht Club, the Long Reach water Ski Club, Shooting club, public footpaths and informal truck stops.

The soil character of the area and the agricultural land classification are not considered as constraints on the preferred route. Issues relating to the maintenance of ESA management practises were recognised, such as prevention of fragmentation of the grazing marshes. The properties and utilities affected by the scheme were identified, and analysis showed that traffic will be moved further away from the existing housing, which is considered to be an environmental benefit, with anticipated lower levels of disturbance and higher road safety. The principal effect of the scheme on amenities and recreation relate to encroachment on activities at The Swale. The preferred route would result in the new bridge being close to the jetty and carpark of the Long Reach Water Ski Club. The Club may need to be relocated.

9.4 Assessment Work Outstanding

The baseline data for the scheme will be updated using the DMRB guidelines.

Identification of the impacts of temporary and permanent land take necessary for the bridge construction over the Swale, the enlargement of the Queenborough Roundabout and the demolition of Barrowgate Cottage (subject to detailed engineering design plans), will be undertaken.

10.0 WATER QUALITY AND DRAINAGE

10.1 Identification of Impact, Effects and Recaptors

The study area consists of a series of grazing marshes and low lying areas which are of special scientific and nature conservation interest as a result of the wildlife which is supported by the hydrogeological conditions. The scheme could potentially impact on water quality and drainage, including:

- water quality and the salinity gradient in drainage ditches;
- sub-surface/groundwater flows;
- sedimentation rates of ditches;
- culverts and drains which maintain water flows.

10.2 Assessment Methodology

The water quality and drainage will be assessed using the methodology set out in the DMRB. There should be a detailed assessment to ensure no significant pollution impacts from the drainage of surface water run-off from the road or from spillages of hazardous materials. The water related ecological effects will be assessed in the ecological assessment.

10.3 Work Undertaken to Date

10.3.1 Establishment of Baseline Conditions

Consultations were undertaken by Ove Arup with the National Rivers Authority, and the Lower Medway Internal Drainage Board (LMIDB) for the assessment of hydrological implications of the scheme. A detailed report was compiled by the Wetland Research Unit, University College London, entitled A249 Iwade to Queenborough Wetland Hydrology, Final Report. The main conclusion from these was that the hydrological conditions on the mainland are different from those on the Isle of Sheppey, with freshwater flow from groundwater sources being important on the mainland in determining the salinity, compared to the island where the hydrological conditions are controlled by regular influxes of sea water influencing the salinity, and rainfall and evaporation being more important than runoff. The salinity gradient is a large contributory factor in the wide range of microhabitats in the area. There has been little or no flooding of the wetlands, although there is ponding and filling of ditches after heavy rainfall events.

10.3.2 Initial Appraisal

The potential impacts which were identified by the Ove Arup Assessment Report included:

- change in underlying geology/groundwater which could have severe adverse effects on surface water hydrology and may cause long-term environmental change;
- interception of surface and groundwater movement patterns causing desiccation/ponding and/or disturbance of existing salinity gradients;
- run-off from the road; and long-term pollutant load from increased road surfaces;
- pollution risk from accidental spillages;

The interrelationship between the hydrological conditions and wildlife on the marshes makes water quality and drainage a key issue, and minimisation of the hydrological impacts should in turn help to minimise the effects on wildlife.

10.4 Assessment Work Outstanding

Detailed baseline data are available for the scheme, prepared by the Wetland Research Unit. This would be updated for the Preferred Scheme using the DMRB guidelines. Particular attention would be paid to reducing any changes in water flow patterns and mitigating the potential impacts.

11.0 DISRUPTION DUE TO CONSTRUCTION

11.1 Identification of Impacts, Effects and Receptors

Disruption due to construction is a term which covers the effects on people and the environment during the period of construction, up to the end of the contract maintenance period. The potential temporary construction effects may cover a wide range of receptors and extend well beyond the margins of the highway; they include:

- noise and vibration;
- visual/landscape intrusion;
- air quality;
- traffic and transport;
- ecology: watercourse/marshland contamination.

Effects are likely to be concentrated around construction sites, access roads and haul routes, and can potentially be reduced during detailed design and by the developer's code of construction practice. Site-Specific effects will also be determined by the location and nature of major and secondary construction sites which have still to be identified.

11.2 Assessment Methodology

The assessment of disruption due to construction will be based on the DMRB. This will include identification of the number of properties within 100m of the preferred route, drawing attention to any which will be particularly sensitive; a check on the presence of ecological or archaeological sites of value; note of any construction operations which could be of particular significance; and assessment of the extent of the impacts and mitigation.

11.3 Work Undertaken to Date

11.3.1 Establishment of Baseline Data

There is currently no specific baseline data which covers the disruption due to construction. The DMRB, volume 11, stages 1 to 3 will therefore be necessary.

11.3.2 Initial Impact Appraisal

Some potential effects of construction operations were identified in the Ove Arup report and include:

- temporary land take due to the construction of haul roads and storage compounds;
- risk of pollution of receiving water and grazing marsh areas during the period of construction;
- noise, dust and visual disturbance to properties and amenities;
- temporary degradation of the landscape.

11.4 Assessment Work Outstanding

The baseline data for disruption due to construction will be compiled from existing data in other sections of the assessment. The impacts and effects will be identified and evaluated, and where appropriate mitigation measures will be proposed, such as the covering or shielding of stockpiles wherever practicable, and the provision of wheel wash facilities at exits from sites to prevent mud being carried on to the highway.

12.0 VEHICLE TRAVELLERS

12.1 Identification of Impacts, Effects and Receptors

DMRB defines two topics under the heading which affect vehicle users view from the road and driver stress. Depending on the location of the route and the design standards adopted impact on the receptors (ie vehicle users) will vary accordingly.

12.2 Methodology

View from the road is a largely subjective assessment based on whether or not views are open or restricted, and whether or not the landscape htrough which the route passes is of high scenic quality. Assessment of driver stress is more objective, and is based on traffic speeds and movements. A three point scale is used based on the existing situation against that which would exist if the scheme were built.

12.3 Work Undertaken to Date

12.3.1 Establishment of Baseline Conditions

The existing A249 passes through a flat and open marsh-dominated landscape, with an absence of natural topographical features and trees. Man-made features in view include electricity transmission lines and the Kingsferry Bridge.

12.3.2 Initial Appraisal

A preliminary assessment of View from the Road has been carried out as part of the Stage 1 assessment which concluded that this was unlikely to be a significant issue.

12.4 Work Outstanding

The assessment of View from the Road will be updated once detailed landscape proposals have been produced. An assessment of driver stress will be prepared in accordance with DMRB volume 11.

13.0 PEDESTRIANS, CYCLISTS, EQUESTRIANS AND COMMUNITY EFFECTS

13.1 Identification of Impacts, Effects and Receptors

The following receptors have been identified in the Study Area which could potentially be affected by the Scheme :

- cyclists on existing A249 and Ferry Road;
- pedestrians/cyclists on footpaths ZS11 (Cowstead Roundabout), ZR88 (north of Iwade), ZR90 and ZS12 (Kingsferry Bridge) and Saxon Shore Way;
- pedestrians/cyclists on Queensborough Road.

13.2 Assessment Methodology

DMRB provides a methodology based on assessing usage of footpaths and community facilities in relation to the severence effects of the scheme. In addition, an assessment of the effects on local journey times to and from community facilities is to be provided. As part of this section, the wider implications of the scheme on employment and accessibility to the Isle of Sheppey will be covered.

13.3 Work Undertaken To Date

13.3.1 Establishment of Baseline Conditions

No baseline work has been undertaken to date to identify the level of traffic (pedestrians, cyclists, equestrians), or use of community facilities.

13.3.2 Initial Appraisal

It is likely that pedestrian and cyclist amenity on the A249 will be improved by the provision of facilities on a new road that would be constructed parallel and adjacent to the new A249. This road would be likely to experience less traffic movements and lighter vehicles than the new A249. Two footpaths (ZR88 and ZS11) will be bisected/severed by the Scheme, potentially causing disruption unless suitable diversions can be incorporated.

13.4 Outstanding Work

Construction Phase Impacts will be assessed to include the following:

- Identify roads and footpaths/bridleways affected by proposed construction sites and access routes;
- Identify amount of construction traffic associated with construction works in broad terms;
- Identify sensitivity of pedestrians, cyclists and equestrians to changes in traffic levels, diversions and closures.

Once the road is open the permanent effects on footpath users will be assessed, together with the wider effects on the community.

14.0 GEOLOGY AND SOILS

14.1 Identification of Impacts, Effects and Receptors

A scheme can have impacts on designated sites (such as geological SSSI's) as well as the soil resource in general. In addition, the results of previous activity in the form of contaiminated land can have services implications regarding scheme development.

14.2 Assessment Methodology

A detailed desk study will be carried out to determine the local soil structure and geology, together with any records of contaminated land.

14.3 Work Undertaken to Date

14.3.1 Baseline Conditions

Information on the soil and geological conditions of the Study Area was gathered from British Geological Survey national, regional and local maps :

- 1:50 000 British Geological Survey (BGS) Map Sheet 272, 1978;
- Geology of the Country around Chatham;
- 1:10560 BGS geological maps, Sheets SW(1937), NW (1937) & SW (1937) and;
- Soil Survey of England and Wales (Sheet 6, South East England).

A summary of the soils and drift and solid geology is given below :

The predominant soil type in the Study Area comprises a deep stoneless clayey soil of the Wallasea Association characterised by localised peaty horizons. In the vicinity of Neats Court and Cowstead Farm and Iwade where the geology changes to clay, the soil type also changes to seasonally waterlogged clayey soils of the Windsor Association. There is localised potential for landslips which should be considered during engineering design.

Alluvial deposits of blue-grey mud with beds of silt, sand and peat cover large areas of land either side of The Swale. In the Queenborough area borehole records from earlier studies indicate approximately 17 m depth of alluvium. The London Clay (Tertiary Period) underlies a great part of the alluvium of the Swale and outcrops to the north of Iwade, and north of the Swale around Rushenden and the higher ground of Barrows Hill, Furze Hill and Cowstead Farm. Studies indicate that the clay deposit varies from a depth of approximately 44 m to 88 m.

14.3.2 Initial Appraisal

Because of the relatively uniform soil and geological conditions across the Study Area this environmental topic was not considered to be an important direct factor in the determination of a Preferred Route option. None of the characteristics of the ground were considered to pose a significant constraint to the location or design of the Scheme.

The soil/geology supports low-quality (Grade 3 and 4) rough pastoral agricultural land but of national and international ecological significance. During the construction phase, the existing surface and groundwater drainage patterns within the soil and drift should not be significantly altered which could potentially damage the ecological marshland habitat.

14.4 Work Outstanding

Previous work will be updated in the light of the engineering design, particularly with regard to constaints on earthworks.

15.0 POLICIES AND PLANS

15.1 Identification of Impacts, Effects and Receptors

The scheme will either accord or conflict with various policies and plans. For instance, it will facilitate economic development but this must not be to the detriment of the local natural environment. Assessment of the scheme must therefore be within the context of the overall planning framework.

15.2 Assessment Methodology

The scheme will be reviewed against national policy guidelines (PP6's) and local plans (County and District plans), in accordance with DMRB.

15.3 Work Undertaken to Date

15.3.1 Baseline Conditions

Land use planning is the responsibility of Kent County Council and Swale Borough Council. Baseline information for the Study was gained from a number of planning documents from the County and Borough Councils and meetings with relevant council members.

The Ove Arup report identified a range of planning consents, applications and development proposals appropriate to the Study Area in December 1992.

The Study Area is also of high ecological importance and is subsequently afforded number of statutory designations :

- The Swale Special Protection Area (SPA) : EC Directive 79/409/EEC;
- The Swale Special Area of Conservation (SAC) : EC Directive 92/43/EEC;
- The Swale Site of Special Scientific Interest (SSSI);
- The Medway Estuary and Marshes SSSI;
- North Kent Marshes Environmentally Sensitive Area;
- Special Landscape Area and Area of High Nature Conservation Value (Kent Structure Plan.

Planning Policy Guidance Notes (PPGs) of particular relevance to the scheme include :

- PPG7 'Countryside and the Rural Economy';
- PPG13 'Highway Considerations in Development Control';
- PPG16 'Archaeology and Planning'.

15.3.2 Initial appraisal

The Isle of Sheppey has been identified in the Kent County Structure Plan as requiring urgent measures to assist in reducing the problems of high unemployment experienced in the area. New development and improvement of infrastructure links to the Isle of Sheppey have been highlighted as being necessary and the proposed improvements to the A249 endorsed. However, such a scheme must be designed and built with the minimal disturbance to the environment with particular reference to the sites of international ecological importance and the archaeological remains in the marshland area.

15.4 Work Outstanding

A review of baseline conditions is required to note the current status of international and national designations within the Study Area and interpret the updated Kent Structure Plan and Local Plans.

The assessment will identify where the Scheme contravenes and complies with policies, plans and proposals set out at an international, national and regional level, and propose mitigation options to remove or lessen the level of conflict where reasonably practicable.

A249 IWADE BYPASS TO QUEENBOROUGH ROAD IMPROVEMENT – SCOPING STUDY FOR ENVIRONMENTAL STATEMENT – CONSULTATION DRAFT06/96