

Bristol International Airport

Environmental Impact Assessment of the Expansion of Bristol International Airport

Scoping Report

September 2005



Entec

Creating the environment for business

Report for

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Executive summary

Introduction

The Government's Aviation White Paper ('The Future of Air Transport') sets out a strategic framework for the development of airport capacity in the United Kingdom. The White Paper supports the development of Bristol International Airport, subject to conditions, to meet a forecast demand for air travel rising to between 10 and 12 million passengers a year by 2030. Bristol International Airport's own forecasts demonstrate passenger usage will grow to around 8 million passengers per annum (mppa) by 2015. Bristol International Airport's preferred option for facilitating this predicted rise in demand is to undertake development based on an expansion of the existing terminal building facilities at the north side of the airport, together with an expansion of other airport infrastructure and facilities, catering for annual passenger movements at the 9 mppa level.

This scoping report has been prepared as part of an Environmental Impact Assessment (EIA) under *The Town and Country Planning (Environmental Impact Assessment) (England and Wales) Regulations 1999* - SI No. 293. The EIA Regulations require that, for certain types of development under *The Town and Country Planning Act 1990*, an EIA be undertaken before planning permission can be granted. For this development, the decision about the need for an EIA has been made by Bristol International Airport, which follows the principles set out in the Aviation White Paper.

A key output from the EIA process is the production of an Environmental Statement (ES), which describes and evaluates the likely significant environmental effects of the proposed development and evaluates the significance of these effects.

Approach to scoping

The main purpose of this scoping report is to identify both the likely significant effects of the development that need to be considered in depth as part of the EIA and the proposed scope of the assessment in relation to these effects. Potential environmental effects have been considered in relation to the following key stages of development:

- construction and permanent land use change; and
- new infrastructure and operation/occupation of the scheme.

For these stages¹, the scoping report considers direct effects and any indirect, secondary, cumulative, short/medium/long-term, permanent/temporary and positive/negative effects.

The scoping report has been sent for comment to numerous interested organisations (see Appendix B). The scope of the assessment will be revised in response not only to consultees' comments but also to new information that comes to light during the course of the EIA process. Given this ongoing refinement of the scope, this report will not be revised and reissued in

¹ In this report, new infrastructure and permanent land use change, and the operation of the scheme are considered together.

response to consultees' comments. Where appropriate, however, proposed changes to the scope will be the subject of targeted consultation with relevant organisations. Any changes that are made to the scope of the EIA as documented in this report will be summarised in the ES.

Use of environmental information in scheme design

A key purpose of the EIA process is to use the environmental information that is gathered to contribute to the evolution of the design of the development, with the objectives of reducing any adverse environmental effects that could be caused by the development and increasing its positive effects. To do this requires the EIA team to work closely with the project design team. Much of this collaboration will occur after the preparation of the scoping report, but some has already taken place.

Prior to the production of this Scoping Report, Bristol International Airport commissioned Entec to undertake an Environmental Assessment of a high level master plan of the proposed development (a 'Statement of Intent'). This study included the collation and review of all publicly available and relevant environmental information, including previous work commissioned by BIA, together with some consultation with key stakeholders and site visits. This information allowed the identification of potentially sensitive and valued environmental resources and receptors at an early stage in the design process. This information has been used to identify, to BIA and its advisors, likely effects from the development proposals and measures that could be adopted to avoid and minimise potential effects. The information has been used to take into account environmental issues in subsequent iterations of Bristol International Airport's draft airport master plan.

The Scoping Report builds on this initial work.

Scope of the Assessment

The proposed scope of the EIA is summarised in the table below. For each of the environmental topics that need to be considered in the EIA, this section identifies any effects that need to be considered further as part of the EIA. The next steps in the work required to take forward the assessment of each likely significant effect are summarised.

Under certain topics, there are predicted to be no likely significant effects during one or more stages of the development. This often reflects the nature of the development or the types of environmental changes that it would bring about. In some cases, significant effects have been avoided through the use of tried and tested measures that have already been incorporated into the design of the scheme, which will reduce effects to a level that will not be significant. These have not been included within the table.

Summary of the Scope of the Assessment

Topic	Potential effect	Next steps
Air	Increase in aircraft emissions to air.	Assessment using a dispersion model (ADMS).
	Increase in road traffic emissions to air.	Assessment through the use of the ADMS model.
	Dust nuisance.	A qualitative assessment based on the likely construction activities and meteorological conditions.
	Changes in pollutant concentrations and deposition rates at sensitive ecological sites.	Assessment using detailed dispersion modelling (ADMS) and comparison of predicted deposition rates against reported critical loads for similar habitats, and the Air Quality Objective for NO _x and SO ₂ for the protection of vegetation and ecosystems.
Archaeology and Cultural Heritage	Loss of sub-surface archaeological remains of prehistoric date.	Further desk study, site assessment and consultation.
	Loss of remains of early post Medieval lead extraction to SE of Cornerpool Farm, known as 'Gruffy Ground'.	Desk study and consultation.
	Loss of surviving features relating to the WWII airfield of RAF Lulsgate Bottom.	Further documentary research, combined with a site visit and further consultation with North Somerset Council.
Biodiversity	Demolition of structures that may support roosting bats (e.g. trees, World War 2 dispersal pens), disturbance/loss of foraging habitat and/or modification of commuting routes (including disturbance from security lighting), and severance of commuting routes.	Bat surveys (roost inspections, and activity surveys) will be undertaken based on guidance provided by English Nature and the Joint Nature Conservation Committee.
	Permanent land take causing death or injury, and disturbance, or loss of great crested newt resting or foraging-habitat and commuting routes.	Surveys will be undertaken in accordance with guidance from English Nature.
	Damage and/or disturbance to badger setts, and potential for sett destruction, loss of some foraging habitat, and/or access to some foraging habitat.	Surveys will be undertaken in accordance with guidance from English Nature.
	Damage or disturbance to individual reptiles and/or their resting places, and/or loss of foraging and resting habitat.	Surveys will be undertaken in accordance with guidance from English Nature and the Joint Nature Conservation Committee.
	Damage or disturbance to dormouse hedgerow habitat and potential for injury to dormouse.	Surveys will be undertaken in accordance with guidance from English Nature and the Mammal Society.
	An increase in aircraft emissions at a concentration that might cause dieback or mortality of notable flora or fungi within designated sites.	Review of the outputs from the air quality modelling and published information.
	Disturbance to roosting bats within the Somerset and Mendips SAC and constituent SSSIs as a result of an increase in air traffic movements and change to vegetation composition due to an increase in nitrogen deposition.	Review of the outputs from the air quality modelling and published information.
	Increase in risk of groundwater contamination, and consequential change in water quality within surface watercourses	Review of the risk of changes in surface water quality and effects on aquatic ecology.

Topic	Potential effect	Next step
Community	Employment during construction and operation of expanded site.	Will be considered as part of the Economic Impact Assessment and the ES will draw on this information.
	Effects from any changes in tourism	The Economic Impact Assessment will also assess this and the ES will draw on this information.
	Effects from increased inward investment or trade.	The EIA will use the results of the Economic Impact Assessment to consider the effects.
	Effects on health during operation of expanded airport.	This will draw on the result of air quality and noise chapters.
	Effects on recreation from changes in land take or disturbance.	Qualitative assessment on informal recreation and other facilities.
	Effects upon rural characteristic of the area and character and amenities of surrounding villages.	Provision of a character assessment survey.
Landscape	Loss of mature vegetation and changes in ground levels associated with the construction of additional car parking within Cornerpool Farm.	Assessment based on methods promoted by the Second Edition of the Guidelines for Landscape and Visual Impact Assessment produced by the Landscape Institute and Institute of Environmental Management and Assessment (2002).
	Changes to the wider landscape character as a result of construction activity.	Assessment based on methods promoted by the Second Edition of the Guidelines for Landscape and Visual Impact Assessment.
	Effects on retained landscape features in the vicinity of Cornerpool Farm during the operation of an extended silver zone car park.	Assessment based on methods promoted by the Second Edition of the Guidelines for Landscape and Visual Impact Assessment
	Long term changes to landscape character by reconfiguration of features and elements outside the existing site boundary.	Assessment based on methods promoted by the Second Edition of the Guidelines for Landscape and Visual Impact Assessment
Visual	Visibility of the construction activities and infrastructures from various receptors.	Assessment based on methods promoted by the Second Edition of the Guidelines for Landscape and Visual Impact Assessment.
	Visibility of the new terminal, fuel farm, new aircraft stands, short stay car park and airport hotel, and the proposed car park extension into the Cornerpool Farm area (various options), associated infrastructure and lighting.	Assessment based on methods promoted by the Second Edition of the Guidelines for Landscape and Visual Impact Assessment.
	Effects of increased lighting during construction and operation.	Assessment based on methods promoted by the Second Edition of the Guidelines for Landscape and Visual Impact Assessment.

Topic	Potential effect	Next steps
Noise	Construction noise (including construction traffic). Variation in ground operations noise. Variation in airborne noise.	Assessed using the methodology in BS 5228 <i>Noise from construction and open sites</i>. Calculated using the methodology in ISO 9613 <i>Acoustics – propagation of sound outdoors</i>. Measurements of existing ground noise sources will be made on and around the airfield. The measurements and topographical information will be used to generate a computer model of the existing ground noise (LiMA). Calculated, based on aircraft movements, using the United States Federal Aviation Authority's Integrated Noise Model v6.2 (INM). INM output files will then be imported into LiMA and noise contours produced for each scenario. INM will also be used to generate noise contours for the day, evening and night periods as defined by the European Directive 2002/49/EC (the Environmental Noise Directive [END]).
Transport	Changes in baseline traffic as a result of construction activity and effects on the general highway network operation in terms of traffic speeds and capacity of highway links and junctions. Road safety for vulnerable road users and increased potential risk of accidents during the operational phase. Change in general highway operation in terms of traffic speeds and capacity of highway links and junctions. Increases in future traffic flows associated with airport expansion on amenity status of local residents, community facilities, schools & businesses.	Assessment of information prepared as part of a transport assessment using 'Guidelines for the Environmental Assessment of Road Traffic', promoted by the Institute of Environmental Management and Assessment. Analysis of Personal Injury Accident Data Records for key highway links and junctions on the surrounding highway network. Assessment of information prepared as part of a transport assessment using methodologies and criteria promoted by the Institute of Environmental Management and Assessment. Identification of routing strategy and assessment of sensitive receptors along defined routes.
Water	Increased presence of aircraft and the provision of up to 12 additional aircraft stands will result in increased use of de-icing chemicals, increased re-fuelling operations. Relocation and expansion of fuel farm and fire station, and risk of accidental pollution. Provision of additional car-parking areas for passengers and staff could result in an increase in surface runoff potentially causing minor on-site flooding.	Review and development of existing pollution prevention, control and response measures to take into account expansion. Consultation with the Environment Agency regarding discharge consenting. Review and development of existing pollution prevention, control and response measures. Review of potential for localised on-site flooding, use of SuDS, and opportunities to reuse water.

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1. Introduction

1.1 Purpose of this report

In December 2003, the Government published 'The Future of Air Transport'², a White Paper setting out a strategic framework for the development of airport capacity in the United Kingdom. Within this document, the White Paper supports the development of Bristol International Airport Ltd (BIA³), subject to conditions, to meet a forecast demand for air travel rising to between 10 and 12 million passengers a year by 2030. BIA has prepared its own high level forecasts that demonstrate passenger useage will grow to around 8 million passengers per annum (mppa) by 2015, a growth of 78% compared with 2004. BIA's preferred option for development is based on an expansion of the existing terminal building facilities at the north side of the airport, together with an expansion of other airport infrastructure and facilities, catering for annual passenger movements at the 9 mppa level. A passenger throughput of 9 mppa is predicted by 2019.

As part of the strategic view of air travel, the White Paper requires airport operators to produce Master Plans to explain how they propose to take forward the Government's strategic framework in the form of airport-specific proposals.

The Government published guidance⁴ on the preparation of airport master plans in July 2004. BIA is now in the process of finalising its Master Plan outlining how the airport intends to grow, following this guidance. The Master Plan will set out the development that is expected at BIA in the next ten years and these proposals will be subject to an application(s) for planning permission.

This scoping report supports a request to North Somerset Council for a formal 'scoping opinion' on the information that should be supplied in an Environmental Statement (ES). This ES will be submitted under *The Town and Country Planning (Environmental Impact Assessment) (England and Wales) Regulations 1999* SI No. 293 (referred to in this report as the EIA Regulations), which require that, for certain types of development under *The Town and Country Planning Act 1990*, an Environmental Impact Assessment (EIA) be undertaken before planning permission can be granted.

For this development, the decision about the need for an EIA has been made by BIA, on the basis that the development exceeds the 1ha (hectare) threshold (Schedule 2, Regulation 2(1) 10 (Section 3(ii) of the 1999 Regulations) and that potential significant effects may arise,

² Department for Transport. 2003. The Future of Air Transport. A Government White Paper.

³ In this report the acronym BIA relates to both the airport and the airport operator.

⁴ Department for Transport. 2004. Guidance on the Preparation of Airport Master Plans.

Government opinion⁵, and BIA's approach to managing its development programmes in a responsible manner.

This report identifies the likely significant effects of the development that need to be considered in depth as part of the EIA⁶ and the proposed scope of the assessment in relation to these effects (insofar as the scope can be determined at this early stage in the EIA process). It is hoped that this information will help to engage stakeholders in the development process and assist North Somerset Council in reaching its scoping opinion. The organisations that have been sent a copy of the report are listed in Appendix B.

The ES is required to describe the likely significant environmental effects of the proposed development and evaluate their significance using clearly defined criteria. The findings are then available to assist decision-makers in determining whether or not the proposed development should be granted consent. However, before the ES is produced, the EIA must fulfil other important purposes, notably:

- from the outset, it should consider the need for the development and any alternative ways of meeting this need;
- for the development option that is taken forward after this review of need and alternatives, the EIA should identify opportunities to modify the design of the scheme to
 - avoid or reduce adverse effects, with a focus on those effects that are likely to be significant, and
 - increase the environmental benefits through environmental enhancements;
- where significant adverse effects are unavoidable, consideration should be given to the opportunities to implement measures that will, at least in part, compensate for the effects.

Such mitigation and enhancement opportunities (see Box 1.1) can be identified at any stage in the evolution of a scheme (although compensatory measures will normally be identified late on in the EIA process). In this sense, EIA is an iterative 'process' that is used to help refine a scheme, with the objectives of reducing any adverse environmental effects that could be caused by the development and increasing its positive effects.

⁵ The Future of Air Transport (DfT, 2003) states that airport expansion proposals, such as those proposed at BIA, will be subject to the EIA process. This statement simply mirrors the requirement of the EIA Regulations and eliminates any need to request a screening opinion (under Regulation 4).

⁶ Schedule 4 of the EIA Regulations states that the ES should include "*a description of the likely significant effects of the development on the environment...*". Circular 02/99 states, in Paragraph 82, that "*In many cases, only a few of the effects will be significant and will need to be discussed in the ES in any great depth. Other impacts may be of little or no significance ... and will need only very brief treatment to indicate that their possible relevance has been considered*".

Box 1.1 Definitions of mitigation and enhancement

Mitigation

In this report, mitigation is defined as covering the following.

- **Avoidance:** Measures taken to avoid adverse effects.
- **Reduction:** Measures taken to reduce adverse effects.
- **Compensation:** Measures taken to offset/compensate for significant adverse effects. These usually take the form of attempting to replace what will be lost.

Enhancement

The genuine enhancement of environmental interests, unrelated to any avoidance, reduction or compensation, is not considered to be mitigation. However, it will still be relevant to the ES if it is proposed as part of the development.

1.2 Approach to scoping

Potential environmental effects have been considered in relation to the following key stages of development.

- **Construction and permanent land use change:** Effects may arise from the construction activities themselves, associated changes (e.g. changes in road vehicle traffic), the temporary occupation of land or the change in land use. With the exception of the latter, many of the effects are temporary and of limited duration.
- **New infrastructure and operation:** The environmental effects resulting from this stage are typically permanent.

For these stages, the scoping report needs to consider “...*direct effects and any indirect, secondary, cumulative, short, medium and long-term, permanent and temporary, positive and negative effects*”, as required under Schedule 4 of the EIA Regulations.

For the purposes of this EIA:

- the baseline year is taken as 2004/2005;
- mid-construction effects will be assessed at 2009;
- effects occurring after construction is complete, but airport 'capacity' has not yet been reached will be assessed at 2015; and
- effects occurring when the airport is at 'capacity' (i.e. 9 mppa) will be assessed at 2019.

Schedule 4 also specifies that the ES should describe those “*aspects of the environment likely to be significantly affected by the development, including, in particular, population, fauna, flora, soil, water, air, climatic factors, material assets, including the architectural and archaeological heritage, landscape and the inter-relationship between the above factors.*” In this report, these topics are dealt with under the headings set out in Table 1.1.

Table 1.1 Environmental topics addressed in an EIA

Topics in the EIA Regulations (SI No. 293)	Topics in this report
Population	Community; Noise, Vortex and vibration
Fauna	Biodiversity
Flora	Biodiversity
Soil	Geology and land quality
Water	Water resources and water quality
Air	Air
Climatic factors	Air; Water resources and water quality
Material assets, including the architectural and archaeological heritage	Cultural heritage; Transport
Landscape	Landscape and visual
The inter-relationship between the above factors	No specific topic but the inter-relationship of the different subject areas will be assessed by analysis of the environmental changes arising from the development with the consequent effects being central to the approach used for scoping and assessment

The approach taken to the identification of effects is to consider:

- the **activities** involved in constructing and operating the proposed development;
- the **changes** that could result from these activities (e.g. changes in traffic flows during construction and operation or changes in land cover as a result of construction); and
- the **effects** of these changes on people and environmental resources (collectively referred to as 'receptors') that could be affected by the proposed development (e.g. how people might be affected by increased traffic or how wildlife might be affected by the changes in land cover resulting from the development).

Consideration of the scope of the EIA and subsequent work involves assessing effects in relation to the baseline environmental conditions that would be expected to occur in the absence of the development at the time that the development would be constructed and operated. Thus existing baseline conditions need to be extrapolated to reflect the planned development programme.

Under each of the topics in Table 1.1, effects are considered likely to be significant and therefore to require further assessment (i.e. they are 'scoped in') when:

- they are expected to be significant; or
- they could be significant - with further information and/or consultation being required to determine whether they are likely to be significant.

If, before the assessment of an effect is complete, it becomes clear that an effect is not likely to be significant, no further assessment will be carried out and the effect will be ‘scoped out’ (i.e. it will not be considered further in the EIA).

In this scoping report, consideration of which effects are likely to be significant has been made using information about:

- the receptors that could be affected by the proposed development;
- the expected magnitude and other characteristics of the environmental changes that could affect important receptors (incorporating consideration of the magnitude, duration etc. of the changes and their spatial extent, which may extend beyond the ‘footprint’ of the development);
- the susceptibility of important receptors to exposure to these changes; and
- the potential to avoid or reduce any possible effects such that they are not likely to be significant.

For effects that are likely to be significant, this report sets out the work that is needed to take forward the assessment. As much detail as possible is provided about the scope of work, to make it easier for consultees to comment on the proposals and thereby reduce the risk that they will identify new issues or alternative assessment methodologies later in the EIA process (e.g. after the ES is produced); such a situation can lead to additional expense, both for the developer and consultees, and significant delays.

It should, however, be recognised that this report has been prepared early in the EIA process, and there may be insufficient available information to define the full scope of the assessment.

Following the production of this scoping report, the scope of the EIA will be kept under review and modified if:

- there is a material change to the project (e.g. where refinements to the development proposals avoid effects or reduce them to the point that they are no longer likely to be significant);
- new information becomes available (e.g. from consultees or further survey) indicating that previously ‘scoped out’ effects are now likely to be significant or that previously ‘scoped in’ effects are not; or
- new effects are identified that are likely to be significant.

The process of refining the scope will continue, if necessary, up to the point that the ES is being finalised. It is therefore inappropriate for this report to be revised and reissued in response to consultees’ comments. Where appropriate, however, proposed changes to the scope will be the subject of targeted consultation with relevant organisations. Comments from the consultees will be taken into account and reported on in the ES. Any changes that are made to the content of this report about the proposed scope of the EIA will be summarised in the ES.

1.3 Promoter and project team

BIA is the promoter for this project. The project team (appointed to date) is listed below:

- BIA – responsible for managing the Master Planning process, involvement in the planning and community consultation process, and providing airport engineering expertise;
- Entec UK Ltd (Entec) – responsible for the EIA, planning strategy and planning application, Sustainability Appraisal, and community consultation;
- Ove Arup Ltd (Ove Arup) – responsible for technical issues relating to road transportation, including the transport assessment;
- Reid Architecture – responsible for the design process;
- Jacobs Engineering - responsible for airfield development studies;
- Roger Tym & Partners responsible for the economic impact study; and
- Avia Solutions - responsible for the forecasting work and strategic advice.

1.4 Structure of this report

Chapter 2 of this report provides a description of the background to, and need for, the development and the alternatives that have been considered (together with any proposals to undertake further investigation into need and alternatives), and a description of the scheme design.

Chapter 3 considers other projects, which are under construction or are planned, that could influence the baseline conditions against which the project is assessed. For each environmental topic (see Table 1.1), this chapter also describes the policies relevant to the topic, and presents a summary of the available baseline information. Brief consideration is also given to the predicted changes to the existing baseline conditions without the development. This is followed by an outline of the requirement for further assessment of potential effects. If some potential effects do not require any further assessment (i.e. they are scoped out), the reasons for this are briefly stated. Chapter 3 also summarises the proposed content of the ES.

Chapter 4 lists the consents that are required to enable the proposed development to proceed (over and above planning permission).

Appendix A sets out a glossary of terms and abbreviations that are used in this report.

Appendix B provides a list of consultees who have been sent a copy of this scoping report.

Appendix C identifies policies relevant to this development.

Appendix D presents photographs of biodiversity habitat features.

Appendix E provides a geology and land quality qualitative risk assessment.

Appendix F presents landscape and visual assessment photographs.

2. Scheme description

2.1 Outline description of the proposed development site

BIA is located approximately seven miles to the south west of the main conurbation of Bristol, within North Somerset, in a rural part of the city region dominated by the city of Bristol. The airport's main road access is by the A38. Bus connections from the city centre are provided at Temple Meads Station and the Marlborough Street Bus Station. There is no rail link at the airport. The terminal is situated at approximately National Grid Reference (NGR) ST 506654. The location of BIA is illustrated in Figure 2.1.

The area of land within the current operational boundary at BIA covers 176 hectares (ha). The airport company has an option to acquire a further 10ha of land immediately to the south of the airport. The runway is aligned in an east/west direction and is 2011 metres (m) long. The majority of the airport facilities are located on the north side of the runway, with car parks and general aviation facilities located to the south. The airport facilities comprise:

- passenger terminal building;
- runway and taxiway system;
- main passenger aircraft parking apron;
- short and long term car parks (the main long term car park is located with the north side passenger facilities; the Silver Zone car park for pre-book customers is located to the south of the runway);
- air traffic control tower;
- administration and operational offices in the old terminal building; and
- ancillary facilities such as the fuel farm, flight catering, general aviation facilities, aircraft hangars and car hire.

The current layout of airport facilities is illustrated in Figure 2.2.

2.2 Background to the development

2.2.1 Overview

BIA is the United Kingdom's tenth largest airport and the sixth largest airport outside the South East. Currently the airport serves a network of 47 non-stop international and domestic scheduled destinations with a further 50 routes operated by charter airlines. In 2004 4.57 million passengers passed through the airport, of which 15% were carried on 'full service' scheduled carriers, 28% on charter (primarily leisure) services and 57% on low cost 'no frills' carriers (e.g. easyJet and Ryanair).

BIA has a higher proportion of passengers flying for business purposes than many other airports in the United Kingdom, including Gatwick, Stansted, East Midlands and Cardiff. This underlines the importance of the airport to the regional economy. A survey of passengers undertaken by the Civil Aviation Authority (CAA) in 2003 showed that around 20% of passengers using BIA were travelling for business purposes; 80% of passengers were travelling for leisure purposes. Approximately 6% were foreign leisure passengers, 2.6% were foreign business passengers, and around 22% of passengers on scheduled international flights are foreign inbound passengers.

The airport has enjoyed significant growth over the last ten years (averaging 13.3%⁷ passenger growth per annum). This compares with an UK average growth rate of 5.9%⁸ over the same period. Passenger operations transferred to a new terminal building, of a striking modern design, in March 2000. The new facilities have served to stimulate interest in the airport. Between 2000 and 2003 passenger growth has been particularly strong, primarily as a result of the development by GO (later taken over by easyJet) of a base at the airport. In this period the number of passengers using the airport has more than doubled from just under 2 million passengers per annum in 2000 to just under 4.6 million passengers in 2004.

2.2.2 Forecasts

In its White Paper on the Future of Air Transport the Government anticipated that the demand for air travel could rise nationally, from 200 million passengers in 2003 to between 400 million and 600 million by 2030. At the same time the Department for Transport⁹ issued long term traffic forecasts for all airports in the United Kingdom. The 'central scenario' assumes a new runway at both Stansted and Heathrow (in that order) and predicts that BIA would reach 7.2m passengers at 2015 and 11.6m passengers at 2030. This represents an average annual growth rate of 4.1% from 2003. This growth rate compares with the average annual growth rate of 13.3% at BIA over the past ten years.

Bristol International Airport has prepared its own high level forecasts as part of the master planning process. These have been prepared by assessing the growth in underlying traffic demand from the airport's catchment area and estimating the market share that BIA is likely to capture of the traffic from this catchment area. For domestic traffic the issue of traffic substitution from surface modes has also been considered. The market share has then been forecast taking into account the following factors:

- type of service available at Bristol Airport;
- type of service available at competitor airports;
- level of underlying traffic demand by district; and
- journey time to BIA from each district relative to competitor airports.

⁷ Source CAA Airport statistics.

⁸ Source CAA Airport statistics.

⁹ Dft Air Passenger Forecasting Model (described in the Aviation White Paper).

The forecasts assume that increasing capacity constraints at the London Airports, in particular Heathrow, reduce the attractiveness of using these airports. It has also been assumed that there will be some narrowing of the fare differential between low cost carriers and full service carriers from current levels.

The following geographical areas are considered as a potential source of traffic for BIA:

- South West region – near South West, Far South West and Dorset; and
- parts of Wales and the Midlands.

The results forecast that Bristol will grow to around 8 million passengers per annum (mppa) by 2015, growth of 78% compared with 2004. By 2020 the forecasts indicate demand for just over 9 mppa rising to around 12 mppa at 2030.

The following points emerge from BIA's own forecasting exercise.

- Average traffic growth for the airport is forecast at 6.3% per annum for the period to 2015. From 2015 to 2030 average traffic growth is predicted to drop to 2.9% per annum. This growth, while strong, is much lower than recent growth experienced by the airport.
- The route network is forecast to continue to be dominated by European short haul destinations.
- A market for long haul destinations is forecast but in the period to 2030 the number of destinations that can be supported remains limited.
- The aircraft type that is forecast to operate remains almost exclusively twin engined jets and turbo props, the aircraft that currently operate from BIA. The average aircraft size is forecast to increase as the smaller jets and turbo props are upgraded to larger aircraft. Load factors will also increase. Therefore the increase in aircraft movements is somewhat less than the increase in passenger numbers. A 53% increase in air traffic movements¹⁰ (ATM) is forecast to 2015 from a base of 2004, compared with the forecast 78% increase in passenger numbers over the same period.
- BIA estimates that the increase in air traffic equates to an average of between five and six additional movements per hour over the main operating hours of the airport (06:00 to 23:00) at 9mppa, compared to summer 2004.
- The majority of growth is forecast to take place in the low cost carrier sector, with modest growth by full service carriers.

The BIA forecasts are relatively consistent with the national forecasts. However they predict slightly higher growth, reaching 8.1m at 2015 and 12.5m at 2030. The differences result from assumptions regarding the share of the South West catchment area, market growth and the attractiveness of Bristol in comparison with the South East Airports.

¹⁰ ATM is a term used to describe the movements of aircraft into

2.2.3 Current Expansion

A number of enhancements to the terminal building are currently being put in train under BIA's permitted development rights. It is estimated that with these enhancements and a number of management initiatives the short-term capacity could increase to between 5 and 6 mppa. Within the existing terminal building BIA has undertaken two significant developments; extensions to the check-in hall and baggage reclaim. The check in hall extension opened in mid-April 2005 and the extended reclaim area was finished in May 2005. On the airfield BIA has extended the aircraft-parking apron with an extension to the western apron. A number of car park works are also underway. The pick up car park adjacent to the terminal building has been reconfigured, extended and improved, while the Silver Zone car park is also being extended (this will be finished in June 2005).

2.3 Reasons for the scheme and alternatives considered

2.3.1 Reasons

Forecasts (carried out by both the Government and BIA) and historic trends identify that future passenger growth at BIA is such that expansion and modification of the existing infrastructure and facilities and an increase in air traffic movements is required. This expansion is supported through the Government's national policy on aviation, as set out in the 'The Future of Air Transport' DfT (2003).

The Government's approach to airport expansion is to follow a balanced approach which:

- recognises the importance of air travel to national and regional economic prosperity, and that not providing additional capacity where it is needed would significantly damage the economy and national prosperity;
- reflects people's desire to travel further and more often by air, and to take advantage of the affordability of air travel and the opportunities this brings;
- seeks to reduce and minimise the impacts of airports on those who live nearby, and on the natural environment;
- ensures that, over time, aviation pays the external costs its activities impose on society at large;
- minimises the need for airport development in new locations by making best use of existing capacity where possible;
- respects the rights and interests of those affected by airport development; and
- provides greater certainty for all concerned in the planning of future airport capacity, but at the same time is sufficiently flexible to recognise and adapt to the uncertainties in long-term planning.

In respect of regional airports the White Paper encourages growth to serve local and regional demand, subject to environmental constraints, with the following potential benefits:

- support for the growth of the regional economies;

-
- relief for congestion at more overcrowded airports, particularly in the South East, and therefore making better use of existing capacity;
 - reducing the need for long-distance travel to and from airports; and
 - giving passengers greater choice.

Specific issues identified by the White Paper for the South West of England are:

- there is potential for beneficial growth at airports in the South West;
- many passengers from the South West (currently around 70%) use airports in adjacent regions, mainly in the South East. This is one of the highest leakages of any English region and stemming this leakage is consistent with the key principle of reducing surface traffic by making better use of regional airports and BIA in particular;
- the Government's forecasts suggest that BIA will remain the region's largest airport and expansion of BIA, including a runway extension and new terminal is supported, subject to certain conditions; and
- the option of a new airport to the north of Bristol is not supported.

North Somerset Council is the local planning authority for Bristol International Airport. Planning decisions should be made in accordance with the development plan, unless material decisions indicate otherwise. This is known as the plan-led approach.

The development plan includes the Regional Spatial Strategy (RPG10 – covering the period to 2016) and the North Somerset Local Plan which was adopted in 2000. In addition North Somerset Council is in the process of preparing a Replacement Local Plan which is currently at the subject of a Public Local Inquiry. This emerging document is a material consideration in the assessment of any application but it carries less formal weight than an adopted plan. A further material consideration is the Joint Replacement Structure Plan, which was adopted in 2001.

Both the adopted Local Plan and the draft Replacement Plan include policies that permit limited development at Bristol International Airport subject to conditions relating to environmental impact. The BIA site lies within the Green Belt and therefore the effect on the functions of the Green Belt is a key consideration in the assessment of any major proposals for airport development. The Local Plan identifies a part of the site in the vicinity of the Terminal Building as a Major Developed Site, within which a restricted level of redevelopment and infilling may be permitted. Outside these limitations any proposals for development in the rest of the airport operational land would be categorised as 'inappropriate development', which would only be permitted in very special circumstances. The Aviation White Paper noted that the development options would not fundamentally affect the integrity of the Green Belt within the area and would, on balance, be justified by the importance of the airport's growth to the region's economy.

2.3.2 Alternatives

Some assessment of alternatives has been addressed by the Aviation White Paper. These include the following.

New Airport

Consideration has been given to possibility of a new airport located to the north of Bristol. The White Paper states the following: *"The option of building a new airport north of Bristol was set out in the South West consultation document if development of the existing Bristol (Lulsgate) Airport needed to be constrained, or in the event that new capacity was not provided at South East airports. Based on the decisions set out above, and our conclusions on capacity in the South East, neither of these circumstances arise. The appraisal set out in the consultation document indicates that a new airport north of Bristol would therefore be neither economically beneficial nor commercially viable. In addition, respondents to the consultation identified a number of problems with the new airport proposal, including the proximity of major industrial complexes and settlements nearby, flood risk, and congestion on key motorway links. These concerns, combined with the cost of building a new airport and the negative impact from closing the existing airport on the economy of south Bristol, resulted in strong opposition to a new airport north of Bristol from a number of important stakeholders in the region. Taking all of these factors into account, we have concluded that there is no case for supporting a new airport to the north of Bristol in the period of this White Paper."*

Second Runway and Southern Terminal

The provision of a new terminal to the south of the airport, and the need for a runway extension has been previously assessed by BIA¹¹. The Master Plan Statement of Intent (BIA, 2005) has concluded that for the predicted passenger growth up to 2015, these developments are not required. At this stage BIA has no plans to bring forward firm proposals for these developments and these are technically complex projects with potentially significant effects. BIA concludes that there is some uncertainty about their need and realistic deliverability.

Other alternatives.

The proposals for the expansion of the airport will be set out in BIAs finalised Airport Master Plan. This document would be developed through a process of community consultation, a sustainability appraisal (that will also take into account the principles of Strategic Environmental Assessment [SEA]) and this EIA. These three processes would provide an opportunity to influence actively some elements of the Master Plan to achieve a more optimum design, which would minimise environmental effects and maximise environmental benefits. However, it is also important to recognise that there are technical constraints on some potential alternatives that are associated with the safe and successful operation of the airport. Box 2.1 provides an outline of how potential need and alternatives can be explored further.

Box 2.1 Scope of further investigation into need and alternatives

- Appraisal of need, alternatives and options to be carried out as part of a sustainability appraisal to be undertaken by Entec.
- Revision of draft Master Plan based on outputs of from early environmental investigations (e.g. Entec, 2005) and constraints workshop;
- Identification by the project team of the most favoured option (taking into account the environment, operational requirements, building design, and cost) as part of the EIA; and
- Response to community consultation on the draft Master Plan (autumn 2005).

¹¹ BIA (2005) Proposed Master Plan for Bristol International Airport. Statement of Intent.

2.4 Description of the proposed development

2.4.1 Description of the development

Proposed development

The key elements of the proposed development are described below.

- Expansion of the passenger terminal

BIA is currently investigating a number of options for expanding the passenger terminal. It is estimated that the terminal building (including current enhancements) would need to be at least 60% to 80% larger to handle a 9 mppa throughput. Concentrating the terminal development on the north side of the airport will be efficient in terms of capital and operating cost. It also concentrates the development in a single area which may be an advantage in terms of potential effects on landscape and visual amenity. The alternative proposal of developing a new (south side) terminal to handle the extra passenger growth is likely to have a greater requirement for land, increase operational cost and decrease efficiency, and require a greater initial commitment to construction with greater financial risk. Land restrictions dictate that a second terminal can only be accommodated on the south side of the airfield, through displacement of existing car parks.

- Insertion of new mezzanine floor and aircraft access piers in existing terminal building

It is proposed to create additional floor space within the existing terminal building through the insertion of a new mezzanine floor and to improve access to the aircraft by the insertion of new access piers. These improvement works are required to be carried out in the short term as part of continuing proposals to improve the existing terminal building.

- Apron extensions

It is anticipated that up to 30 aircraft stands may be required to accommodate 9mppa, which represents an increase of 12 additional stands. These additional stands can be accommodated by expanding the existing aircraft apron to west of the control tower and to the east.

To the west, expansion will require the relocation of the existing fuel farm, whilst expansion to the east will require the demolition of the former terminal building and the existing fire station. It is likely that westward expansion will be implemented first.

- Provision of new multi storey car parking facilities

Additional car parking will be needed and BIA aims to ensure that sufficient car park spaces are available at the airport to meet the demand for airport related car parking. The airport master plan and supporting studies are investigating various options for achieving this. Current proposals are for a single multi storey car park, 4 storeys in height, with 1000 spaces, to cater for short term parking requirements. Land will be safeguarded for a second, similar car park, in the future if required.

The nature of short stay car parking means that it must be located close to the terminal building.

- Long stay car park to south of Airport

There is also an increased demand for the provision of long stay car parking, which is currently provided immediately to the north of the terminal and in the Silver Zone, to the south. It is proposed that land around the silver zone will be developed for long stay car parking as an extension to the existing silver zone. However, the matter of airport car parking is currently the subject of a challenge in the High Court to an appeal decision in respect of unauthorised off airport car parking. The result of this challenge may have an effect on the master plan proposals and any changes will be reviewed.

- Demolition of former terminal building and existing fire station

The old terminal building provides offices for airport administrative staff, storage and airline crew report facilities. Its demolition is required to accommodate the easterly expansion of the aircraft apron. Replacement office facilities are proposed as part of the master plan.

The existing fire station is located adjacent to a busy part of the aircraft apron, and affords difficult access to the runway being across the apron. There is a need for urgent repair works and improvements to accommodate staff offices and accommodation. The demolition would also provide additional space for the easterly apron extension. A replacement facility is proposed on the southern side of the runway.

- Hotel accommodation

It is proposed that in the first instance a hotel of about 100-120 bed size will be required, with the potential to expand to 200 beds. The hotel will be of 3* grade, with business/conference facilities and limited leisure facilities.

- New fuel farm

The provision of a new fuel farm to facilitate the growth is anticipated. There are a number of options for the fuel farm currently being prepared, with the preferred solution being underground storage, in the north western corner of the north side long stay car park. The existing fuel farm will be removed to make way for westerly expansion of the aircraft apron.

- Fire station relocation

To make provision for the expanded aircraft apron, the fire station will need to be relocated, with the current preferred position being on the south side of the runway, close to the existing fire test area.

- Provision of new office accommodation

Two new office buildings are required for administrative and operational staff. The master plan will allocate land for these facilities within the airport operational

boundary and will also identify the location for future additional office space, if required.

- New road infrastructure

Modifications to the existing airport road network to effectively serve new areas of car parking, buildings and support facilities are planned. These will be designed in a manner that optimises traffic flow through and safety. There is the potential for highway improvements at the entrance to BIA to ensure the satisfactory operation of this part of the highway network.

- Runway and taxiway

The existing runway has sufficient capacity for the number of aircraft movements anticipated. The Master Plan will, however, need to make provision for some adjustments to the taxiway system at the eastern end of the runway in order to prevent aircraft waiting to get onto the runway restricting access to the aircraft stands in this area. One option under consideration is the provision of an additional taxiway hold area at the runway threshold.

- General aviation

New general aviation facilities have been recently developed. These facilities will be retained but no significant further expansion of general aviation is anticipated during the Master Plan period.

- Freight

No freight facilities are anticipated in the Master Plan period. BIA intends to continue to support the Royal Mail Skynet service and provide facilities for the existing cargo handling company, Ward Aviation.

Figure 2.3 provides a draft land use plan at the 9 mppa level.

2.4.2 Enabling works

Demolition of buildings

The former terminal (currently the administration building) will be demolished to provide space for additional aircraft stands. A number of defunct hangers located to the South of BIA would be demolished. There is the potential for the demolition and removal of up to three World War II aircraft dispersal pens, depending on the findings of the cultural heritage assessment and associated mitigation strategy. The current fuel farm will be demolished and relocated elsewhere on the airport. A small concrete Emergency Water Reservoir (EWS) could be drained, demolished and removed from the north west margin of the airport.

Remediation of contaminated land

Initial assessments, together with site investigation may confirm the presence of contaminated land. If present, appropriate measures will be put in place to either isolate and remediate this material *in situ*, or to remove it from site. In the latter case, contaminated material will be disposed of in an appropriately licenced landfill site.

Provision of new/enhanced ecological receptor habitats

The development would result in a loss of some areas of habitat (e.g. grassland). The ecological assessments carried out as part of this EIA (including this scoping report) are likely to identify potential enhancements that could/should be made to existing habitats within or adjacent to BIA that:

- may be used to either provide alternative habitats for displaced/translocated species;
- provide more favourable conditions on-site or within adjacent habitats for valued ecological resources;
- provide new habitats/habitat features;

Much of this work would be carried out in advance of the loss of existing habitats to minimise potential effects (e.g. strengthening of existing hedgerows to provide more optimum commuting/foraging habitats for some species of bat), and may also form part of the mitigation adopted for other components of the EIA (e.g. hedgerow strengthening could also be associated with the landscape and visual mitigation).

Capture and translocation of legally protected species

Where necessary, legally protected species (e.g. bats and reptiles) will need to be captured from habitats that would be disturbed/lost by the development and translocated to adjacent off-site locations. These activities would occur in advance of the construction work commencing, in accordance with standard methodologies and timing for such work. Where necessary the work would be licensed by Defra (in respect of species afforded legal protection under the *Conservation (Natural Habitats &c.) Regulations 1994*. In other cases (e.g. for reptiles), a mitigation strategy and method statement will be agreed in advance with English Nature.

Works required to relocated existing services

Before the start of the construction works, a number of service routes could require modification and/or diversion to accommodate the proposals.

2.4.3 Construction method**Construction programme and phasing**

As part of the engineering design work, a detailed programme for the development will be determined. Broadly this consists of phased but inter-related construction activities over a number of years (anticipated to be between 2006 and 2015). Subject to planning permission, work to expand the terminal building would be planned to start in 2007. Proposals for an airport hotel will be developed in conjunction with a hotel operator (work is anticipated to commence in 2007). The associated developments would be phased in line with demand. A provisional development timetable for the core elements of expansion is provided in Table 2.1.

Table 2.1 Provisional development timetable for core elements

Element	2006	2007	2008	2009	2010	2011	2012	2013	2014
Terminal extension									
Airport hotel									
Stand and apron extension									
Fuel farm relocation									
New office accommodation and demolition of current accommodation									
South side long stay car park extension									
Multi-storey car park									
Fire station relocation									

It should be noted that the scale of development of terminal building, aircraft stands, ancillary facilities and car parking anticipated above, cannot be delivered within the restricted constraints of the major developed site in the Green Belt identified in the North Somerset Replacement Local Plan.

General construction methodology

Standard construction techniques as previously used for buildings, car parks, roads and pavements, lighting, utility services and telecommunications, and airport infrastructure will be adopted. There are no substantive earthworks associated with the development.

Sustainable Construction

At this stage work on the potential effects of the development are not sufficiently advanced to permit development options to be appraised on the basis of sustainability criteria. Nevertheless BIA has commissioned the preparation of a Sustainability Appraisal as part of the production of the airport Master Plan.

Where operational requirements permit, BIA will investigate the use of sustainable construction methods in terms of building materials, building orientation and building design to reduce energy costs.

Access and transport

It is likely that the majority of material and equipment necessary for the construction works will be delivered to BIA by road (via the A38). A construction transport management plan will be developed by BIA to minimise the number of vehicle movements (e.g. by ensuring that where possible both inward and outward movements are being utilised for transporting materials/waste etc, agree routings for construction traffic, and hours of activity).

Standard best practice, agreed in advance with the relevant highways authority, will be adopted to manage potential effects on the entrance to the airport for non-construction traffic. It is unlikely that construction traffic will access the area in front of the terminal. However, all traffic movements will be subject to the normal requirements of airport security.

2.4.4 Site environmental management plan

A site environmental management plan (SEMP) will be prepared by BIA in order to manage and minimise the potential environmental impacts of construction activities. This will cover areas such as pollution, visual effects, noise, dust, ground conditions, traffic, sensitive ecological and archaeological areas, protected species, the water environment and any necessary supervision by an ecological or archaeological clerk of works. It will incorporate construction practice with reference to appropriate British Standards (e.g. *BS 5228: Noise and vibration control on construction and open sites*). Best working practices will be stipulated in the SEMP and will be a contractual requirement for the chosen civil engineering contractor(s). The SEMP will be audited and enforced by BIA during the works.

Waste disposal

Waste material, other than that which can be recycled and re-used on site, will be disposed of to licensed landfill facilities. Excavated material that cannot be reused as backfill in the works will be disposed of off-site. The aim will be for re-use on site in order to minimise traffic movements, but surplus quantities are inevitable. The volume of material and likely impacts on the working method will be assessed during the EIA.

Waste management will comply with *Waste Management Regulations 1994* and *Duty of Care Regulations 1991*, and will be finalised in consultation with the Environment Agency (EA).

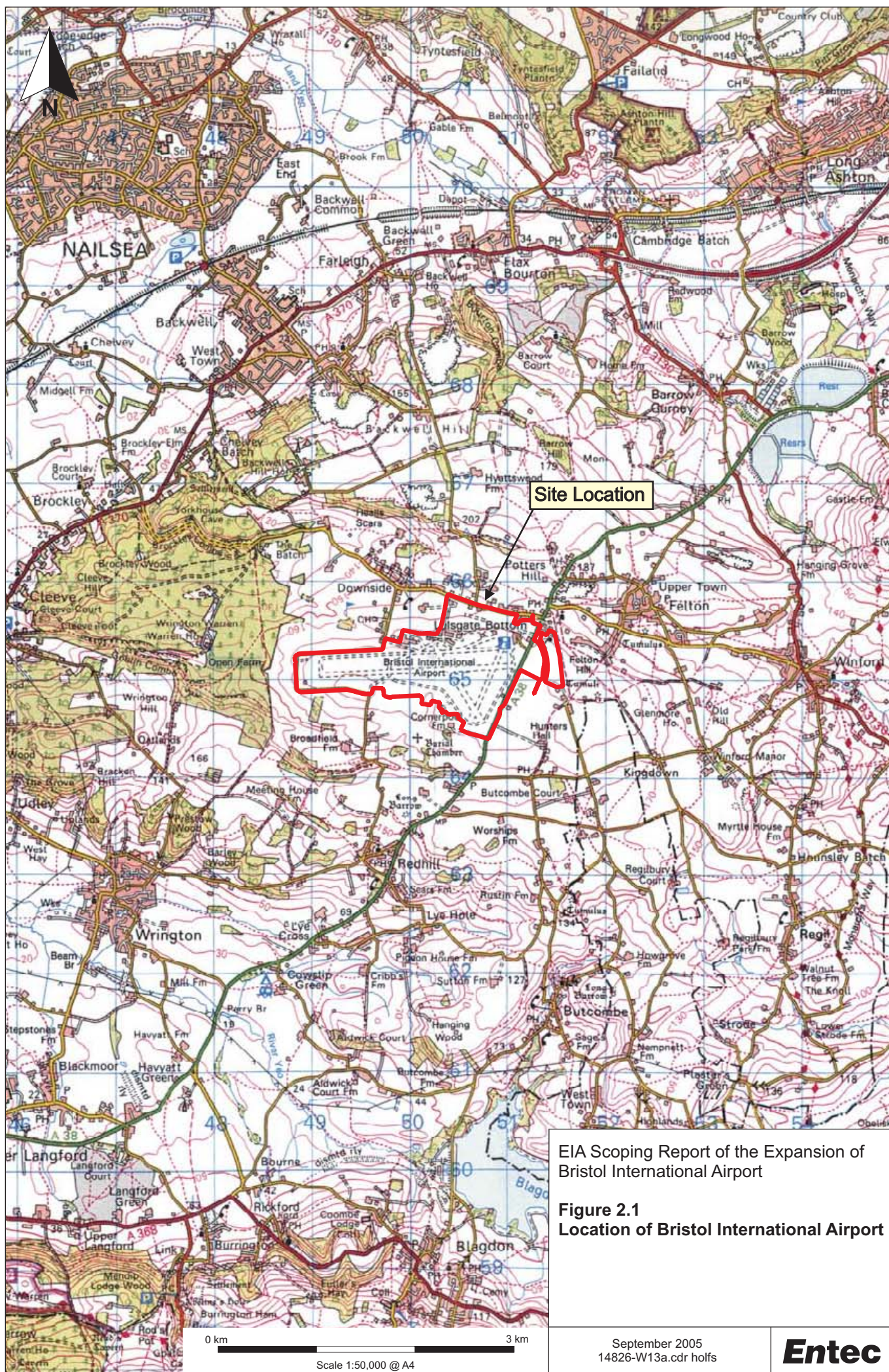
2.4.5 Operational period

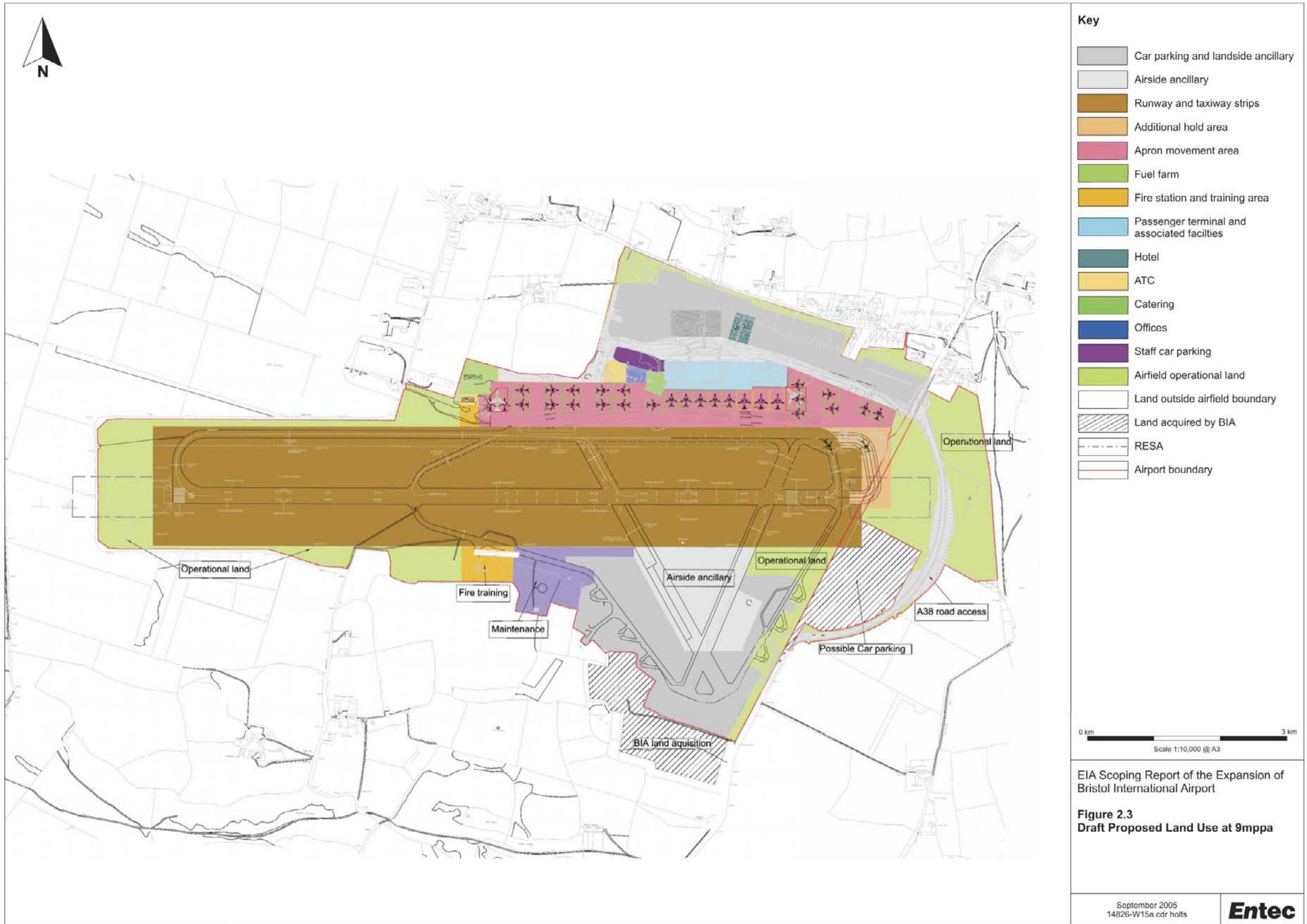
BIA is an existing operational commercial airport. Recent enhancements have provided the opportunity for the airport to handle up to 6mppa (estimated to be from 2005). Further expansion as a result of the developments outlined in the previous sections and considered by this EIA would provide for up to 9mppa (estimated to be by 2019). The operation of the airport will be continuous throughout the expansion programme, with passenger, staff and contractor movements increasing in proportion to passenger demand, creation of new jobs, and the availability of new services and infrastructure.

Road traffic movements, generation of waste, and use of natural resources would grow accordingly. Measures to promote the further use of public transport, and maximise the efficient operation of BIA and use of resources would be enhanced or introduced where necessary.

2.4.6 Decommissioning

This stage is not relevant to the development and, therefore, will not be considered by the EIA.





3. Scope of the assessment

3.1 Predicted changes affecting baseline conditions

Other developments that could influence the baseline conditions against which the BIA proposals will be assessed will be discussed further with North Somerset Council. (i.e. recognising that the current baseline may not be the future baseline). .

3.2 Air

3.2.1 Relevant policies and their implications for scoping

Table 3.1 lists the planning policy guidance and policies that are relevant to air, and sets out the implications of the guidance and policies for the scope of the EIA. The full names of the plans and guidance cited are given in Appendix C, which details all policies and guidance that are relevant to the development.

Table 3.1 Relevant policies and their implications -air

Policy reference	Implications
Policy 1 – JRSP 2002	Requires planning and transport policies to be based on the principles of sustainable development, and seeks to reconcile, balance and integrate the protection and enhancement of the environment, the maintenance and enhancement of economic prosperity and meeting the social needs and aspirations of the people of the area through the provision of opportunities for commercial and industrial development, housing and related services and activities. One of the aims of the policy is to seek the reduction of all forms of pollution and emissions.
Policy 61 – JRSP 2002	Bristol International Airport will be encouraged to improve and maintain its role in services, provided environmental impacts such as emissions are minimised, and noise is not an unacceptable problem for local residents.
Policy ENV/1 – NSLP 2000	Identifies that any development or use of land likely to cause air pollution or damage, and proposals for development near and sensitive to such sources of pollution or nuisance will not be permitted unless mitigation measures are included or can be imposed by condition to limit the adverse effects to an acceptable level.
Policy GDP/2 – NSRLP SDD 2004	Development that would result in air pollution will only be permitted if the potential adverse effects are limited to an acceptable level by other control regimes or by measures included within the proposals.

3.2.2 Approach to identifying likely significant effects

For each of the identified receptors that could be significantly affected by the proposed development, the likelihood of there being significant effects will be reviewed in the context of the magnitude and other characteristics of the environmental changes that are expected to be caused by the scheme. At this stage in the EIA process, these characteristics have not been

quantified. However, in some cases, even without such quantified information, it is reasonable to assume that the changes will not result in a significant effect. This is sometimes the result of tried and trusted mitigation measures that might reasonably be expected to be effective, which have already been incorporated into the scheme proposals¹².

The Air Quality Strategy for England, Scotland, Wales and Northern Ireland (AQS)¹³ was published in January 2000. It supersedes the earlier National Air Quality Strategy (NAQS) published in March 1997, and provides a revised framework for reducing air pollution at national and local levels from a wide range of emission sources. In addition, the Air Quality Regulations published in 2000 make statutory the objectives set out in the AQS.

Central to the AQS are health-based standards for eight air pollutants. These standards are based on recommendations made by the Government's Expert Panel on Air Quality Standards (EPAQS), European Union (EU) limit values and World Health Organisation (WHO) guidelines. From these standards, Air Quality Objectives (AQOs) have been derived, which take account of the costs and benefits, as well as of the feasibility and practicality of moving towards the standards. The relevant dates for achieving each of the objectives range from 2003 to 2010.

Part IV of the *Environment Act 1995* requires local authorities to periodically review air quality within their areas. This process of Local Air Quality Management (LAQM) is an integral part of delivering the Government's air quality objectives (AQOs) detailed in the Regulations.

To carry out an air quality 'Review and Assessment' the Government recommended a three-stage approach. This phased review process uses initial simple screening methods and progresses through to more detailed assessment methods of modelling and monitoring in areas identified to be at potential risk of exceeding the objectives in the Regulations.

The review and assessment of local air quality aimed to identify areas where national policies to reduce vehicle and industrial emissions were unlikely to result in air quality meeting the Government's AQOs at locations of relevant¹⁴ public exposure. Where the review and assessment work indicated that some or all of the objectives might potentially be exceeded, the local authority has a duty to declare an Air Quality Management Area (AQMA). The declaration of an AQMA requires the local authority to undertake what has been referred to as a

¹² In *R vs Dorset County Council and Viridor Waste Management Ltd.* (2003), the judgement stated (in Paragraph 52[4]) that "*The extent to which remedial measures can be taken into account when making a screening decision will depend upon their nature. If they are "modest in scope, or plainly and easily achievable"....or "plainly established and plainly uncontroversial"....or "of limited impact or well established to be easily achievable with ... the development".... then the decision maker can properly take them into account in forming a decision that the project would not be likely to have significant adverse effects on the environment*". Although this judgement relates to screening, it seems reasonable to adopt the same principles with regard to mitigation and the likely significance of effects at the scoping stage. We have summarised our understanding of the thrust of this aspect of the judgement in the phrase "reasonably be expected to be effective".

¹³ DEFRA, 2000 (as amended 2003) *The Air Quality Strategy for England, Scotland, Wales and Northern Ireland*.

¹⁴ In this context 'relevant' is taken to mean locations where members of the public are exposed to a concentration over the averaging period specified in the Objectives.

Stage 4 assessment and implement an Air Quality Action Plan (AQAP) to reduce air pollution levels so that the required AQOs are met.

The first phase of the review and assessment process was due to be completed by December 2000, although this was not a statutory deadline, with local authorities declaring an AQMA for those areas that were likely to exceed the AQOs. A second phase of review and assessment commenced in 2003, building on the data and techniques used within the first phase assessments. The stages of the second phase of Review & Assessment are the Updating & Screening Assessment (USA) which is similar to a combined Stage 1 and 2 Assessment, and the Detailed Assessment which is similar to the Stage 3 Review & Assessment.

For the purposes of LAQM, local authorities are required to assess air quality against the statutory objectives set in the Regulations. However, consideration should also be given to the supplementary objectives (which are non-statutory) and EU limit values that may be adopted in the future.

Provisional objectives have been set for ozone. However, due to the transboundary nature of this pollutant, a European strategy for reducing ozone concentrations is considered necessary. Therefore, ozone is not considered within local air quality management.

In August 2002, new objectives for particulate matter (PM₁₀), benzene, carbon monoxide and polycyclic aromatic hydrocarbons were released as amendments to the Regulations. The 2010 objectives for PM₁₀ are currently not set in the Regulations for the purposes of Local Air Quality Management.

Table 3.2 sets out the air quality objectives for transport related pollutants and the dates by which they are to be achieved.

Table 3.2 Summary of relevant air quality objectives

Substance	Statutory or Non-statutory	Averaging Period	Value ($\mu\text{g m}^{-3}$)	Date to be achieved
Benzene (C ₆ H ₆)	S	Running annual mean (All UK)	16.25	31 Dec 2003
	S	Annual mean (England and Wales)	5	31 Dec 2010
1,3-Butadiene (C ₄ H ₆)	S	Running annual mean	2.25	31 Dec 2003
Carbon Monoxide (CO)	S	Maximum daily running 8-hour mean (equivalent of 100 Percentile)	10 mg m ⁻³	31 Dec 2003
Nitrogen Dioxide (NO ₂)	S	Annual mean	40	31 Dec 2005
	N	Annual mean For the protection of vegetation and ecosystems	30	31 Dec 2000
	S	1-hour mean, not more than 18 exceedences a year (equivalent of 99.79 Percentile)	200	31 Dec 2005

Substance	Statutory or Non-statutory	Averaging Period	Value ($\mu\text{g m}^{-3}$)	Date to be achieved
Particulate Matter (PM_{10})	S	Annual mean	40	31 Dec 2004
	N ¹	Annual mean (England and Wales, not London)	20	31 Dec 2010
	S	24-hour mean, not more than 35 exceedences a year (equivalent of 90.41 Percentile)	50	31 Dec 2004
	N ¹	24-hour mean, not more than 7 exceedences a year (England and Wales, not London) (equivalent of 98.08 Percentile)	50	31 Dec 2010

$\mu\text{g m}^{-3}$ = micrograms per cubic metre.

¹ Particulate matter objectives amended in 2002 (currently not set in the Regulations).

The annual mean nitrogen dioxide (NO_2) objective is generally considered to be more stringent than the one hourly mean objective. Hence, if the annual mean objective is achieved it is unlikely that the hourly objective is exceeded. For PM_{10} , the 24-hour mean is more stringent than the annual mean.

Potential changes in pollutant concentrations following the proposed expansion of BIA and the incremental change in ambient concentration will be assessed against the above AQOs.

Determination of significant effects for NO_2 and PM_{10} will be assessed in accordance with Local Air Quality Management guidance¹⁵. Local Authorities are required to undertake detailed assessment of emissions of NO_2 from airports where sensitive receptors are located within 1 km of the airport boundary and where the passenger throughput exceeds 5 mppa and/or the 2005 NO_x background concentration exceeds $25 \mu\text{g m}^{-3}$. With regard to PM_{10} , assessment is required where there is relevant exposure within 500 m of the airport boundary and where the airport passenger throughput exceeds 10 mppa in 2004 or 5 mppa in 2010.

During the construction phase of a development, dust arising from construction activities has the potential to cause a nuisance by being deposited onto clean surfaces such as cars, windows or laundry. This potential nuisance can be experienced either as short-term events (over period of hours or days) or long term accumulation (over a period of months). The nuisance aspect of dust is generally quantified in terms of deposition.

The level and distribution of construction dust emissions will vary according to factors such as the type, duration and location of the activity, weather conditions and the effectiveness of mitigation measures. The nature of the dust and short duration of exposure are unlikely to represent a health risk. As a general rule, effects from airborne particles and nuisance dust would not be expected at a distance beyond approximately 250 m beyond a work activity area

¹⁵ DEFRA *et al.* 2003 Local Air Quality Management Technical Guidance, LAQM.TG(03)

(assuming no mitigation measures) and then only when sensitive receptors are downwind of the dust source¹⁶.

Although there is no statutory definition in the United Kingdom of what constitutes dust nuisance, a commonly used guideline, based on experience, suggests that deposition rates in excess of $200 \text{ mg m}^{-2} \text{ day}^{-1}$ (as a monthly average) may cause nuisance¹⁷. The deposition rate of $200 \text{ mg m}^{-2} \text{ day}^{-1}$ (as a monthly average) would be used in this assessment as a guideline for potential nuisance.

3.2.3 Baseline conditions

Data sources

The baseline conditions described below have been derived through a desktop review of the following information:

- the national Automatic Urban and Rural Network (AURN¹⁸) of monitoring stations;
- estimated background pollution concentration maps¹⁹ (compiled by the National Environment Technology Centre [NETCEN] for the Department for Environment Food and Rural Affairs [DEFRA];
- passive monitoring data (provided by BIA);
- North Somerset Council's Review and Assessment Reports; and
- maps of the local area including Ordnance Survey 1:25,000 maps.

Summary of available baseline information

Activities associated with the operation of airports are a potential source of air pollution.

Potential sources include:

- aircraft operations (including take-off, landing, taxiing, engine testing, running of auxiliary power units (APUs) and ground power units (GPUs) on aprons, and engine testing);
- airside and landside vehicle emissions;
- energy consumption (heating and power);
- aircraft fuel storage;

¹⁶ Department of the Environment, 1995, The Effects of Dust from Surface Mineral Workings Volume 2: Technical Report.

¹⁷ Department of the Environment, 1996, Urban Air Quality: The Third Report of the Quality of Urban Air Group.

¹⁸ www.airquality.co.uk

¹⁹ www.airquality.co.uk

- refuelling of aircraft and storage tanks (e.g. fugitive releases of hydrocarbons, volatile organic compounds); and
- maintenance and building operations.

The dominant pollutant emissions to air associated with airports include:

- nitrogen oxides (including nitric oxide and nitrogen dioxide);
- volatile organic compounds;
- carbon monoxide;
- carbon dioxide;
- sulphur dioxide; and
- particulates.

An initial review of available data sources has identified that monitoring of pollutant concentrations is undertaken by North Somerset Council and BIA.

North Somerset Council monitors monthly mean NO₂ and benzene concentrations at a number of sites in North Somerset using passive diffusion tubes. Monitoring has been undertaken at both roadside and background locations; monitored concentrations near to BIA are summarised in Table 3.3 and 3.4.

Table 3.3 North Somerset Council NO₂ diffusion tube monitoring results

Location	Grid Ref.	Annual Mean Concentration (µg m ⁻³)					
		1999	2000	2001	2002	2003	2005 Predicted from 2003 ²
Bristol Airport A38	512653	nt	nt	nt	17.5	24	19.6
Felton, Primary School	513655	30	33.1	23.6	21.7	22.9	18.7
Downside Road (Airport)	510656	nt	nt	28.7	25.3	30.5	24.9
Backwell A370	Not Known	nt	nt	nt	nt	26.2	21.4
Flax Bourton A370	Not Known	nt	nt	nt	nt	34.9	28.5
Note 1	nt = Not Tested						
Note 2	Calculated based on methodology in LAQM.TG(03), Defra (2003)						
Reference	North Somerset Council, 2004, Air Quality in North Somerset: Progress Report 2004.						

Annual mean NO₂ concentrations monitored between 1999 and 2003 and the concentrations predicted for 2005 achieve the annual mean AQO of 40 µg m⁻³.

Table 3.4 North Somerset Council benzene diffusion tube monitoring results

Location	Grid Ref.	Annual Mean Concentration (µg m ⁻³)					2005 Predicted from 2003
		1999	2000	2001	2002	2003	
Bristol Airport A38	512653	nt	nt	nt	1.0	1.2	0.9
Felton, Primary School	513655	nt	1.4	1.2	1.3	1.2	0.9
Downside Road (Airport)	510656	nt	nt	1.2	1.2	1.7	1.3
Backwell A370	Not Known	nt	nt	nt	nt	1.2	0.9
Flax Bourton A370	Not Known	nt	nt	nt	nt	1.8	1.3

Note nt = Not Tested

Reference North Somerset Council, 2004, Air Quality in North Somerset: Progress Report 2004.

Observed and forecast benzene concentrations are predicted to be significantly below the 2005 AQO for annual mean concentrations at sensitive receptors near to Bristol International Airport.

The obligations of the LAQM regime require North Somerset Council to assess existing and future concentrations of the air pollutants within the Borough. The 2004 Progress Report has been reviewed as part of this study.

Monitoring and modelling has been undertaken as part of the Authority's obligations under LAQM. The Review and Assessment process concluded that the Air Quality Objectives for NO₂ was of greatest concern, but that no pollutants were predicted to breach the relevant AQOs by the dates specified. As a result, no Air Quality Management Areas were declared.

BIA has undertaken an NO₂ diffusion tube monitoring survey since 2000 at five locations around the airport. Table 3.5 presents the annual average NO₂ concentrations monitored as part of BIA's diffusion tube survey.

Table 3.5 Bristol International Airport NO₂ diffusion tube monitoring

Monitoring Location	NO ₂ Concentration (µg m ⁻³)			
	2000	2001	2002	2003
Airside – behind step park	26	32	25	33
Airside – on fuel farm fence	23	28	34	36
Airside – 09 camera tower	16	20	15	17
Landside – new terminal central light	27	33	26	37
Landside – mph sign access road	32	35	33	40
Reference	Bristol International Airport, 2003, Air Quality Monitoring Report.			

Monitoring of NO₂ undertaken at BIA does not indicate any breaches of the annual mean NO₂ AQO in 2000 to 2003. A roadside concentration in 2003 is at the level of the AQO, but would not constitute a breach of the AQO as there would be no relevant exposure at this location. Observed levels at BIA are generally similar to those observed at locations monitored by North Somerset Council.

The NETCEN²⁰ has made estimates of background pollution concentrations on a 1 km² grid for the UK for seven of the main pollutants.

The background mapped concentrations for the 1 km² covering the site are given in Table 3.6.

Table 3.6 Estimated mapped background concentrations of pollutants from NETCEN

Year	1,3-Butadiene Annual Mean µg m ⁻³	Benzene Annual Mean µg m ⁻³	CO Annual Mean mg m ⁻³	NO _x Annual Mean µg m ⁻³	NO ₂ Annual Mean µg m ⁻³	PM ₁₀ Annual Mean (gravimetric) µg m ⁻³
2001	0.147	0.341	0.251	31.8	20.9	19.7
2003	0.127	0.301	-	-	-	-
2004	-	-	-	-	-	18.7
2005	-	-	-	27.3	18.8	17.0
2010	-	0.235	-	21.2	15.8	-
Reference	www.airquality.co.uk					

²⁰ www.airquality.co.uk

From a review of the existing monitoring data, estimated concentrations and conclusions of North Somerset Council’s 2004 Progress Report, ambient concentrations of NO₂ and other less critical pollutants are unlikely to exceed the AQO at locations where sensitive individuals would be exposed over the relevant averaging period.

Data gaps

No monitoring data has been identified near to BIA for (PM₁₀), carbon monoxide or 1,3-butadiene. It is proposed that data from the estimated background mapped data is used as the basis of any assessment in the absence of more suitable data.

Predicted trends

Due to more stringent regulation and technological advancements, ambient air quality concentrations have been observed to decrease over recent years. Through regimes such as LAQM and Integrated Pollution Prevention and Control (IPPC) it is expected that this improvement in local air quality will continue, although at a slower rate.

The increase in passenger numbers through BIA will affect not only emissions from aircraft, but also the emissions from road traffic in the area. Pollutant concentrations, predominately in terms of NO₂ and PM₁₀, are likely to increase at receptors in close proximity to routes serving BIA as a result of the increased traffic flows.

3.2.4 Identification of the next steps in the assessment process

Table 3.7 identifies receptors, likely environmental changes and potential effects, and the supporting text sets out the scope of the assessment for air quality, insofar as it can be defined at this stage of the EIA process.

Table 3.7 Receptors, likely changes and potential effects - air

Receptor	Changes and potential effects
<i>Construction and permanent land use change</i>	
Occupants of residential properties, schools, and other sensitive locations	- Dust generation due to site preparation and construction activities. - Increase in pollutant concentrations due to movement and operation of construction related vehicles.
Designated ecological receptors (e.g. local SSSIs and County Wildlife Sites)	Dust generation due to site preparation and construction activities.

Receptor	Changes and potential effects
<i>New infrastructure and operation</i>	
Occupants of residential properties, schools and hospitals	- An increase in road transport numbers and flow (i.e. due to a modification of the airside and landside, road network, an increase in passenger numbers and road transport movements and extent of parking) resulting in an increase in vehicle emissions. - An increase in aircraft movements and variation in type of aircraft as a result of the growth in passenger numbers and opening of new routes/schedules resulting in an increase in aircraft emissions. - Increase in pollutant concentrations due to the presence of aircraft upon stands and areas of apron, and new power units in the vicinity of a school and residential dwellings at Felton. - Change to pollutant concentration as a result of improvements to the taxiway system. - Change in pollutant concentrations due to the relocation of the fuel farm and fire station.
Internationally designated ecological receptors (North Somerset and Mendips SAC)	Changes in pollutant deposition rates due to an increase in emissions from aircraft sources, changes in airside and landside road traffic and the use of power units.
Nationally and locally designated ecological receptors (SSSIs and County Wildlife Sites)	Changes in pollutant deposition rates due to an increase in emissions from aircraft sources, changes in airside and landside road traffic and the use of power units.

Potential effects requiring further consideration

The potential effects that need to be investigated further are listed below together with an outline of the work that is required.

- Aircraft emissions to air:* Existing background (from all sources) NO_x concentrations and the passenger throughput at BIA already exceed thresholds set for airports by Defra *et al* (2003) under Local Air Quality Management. The emissions from the predicted increase in ATMs (particularly during the take-off phase) would contribute further to this concentration. Due to the background threshold exceedences, the local authority will be required to undertake a detailed assessment of NO_x and PM₁₀ as part of its Local Air Quality Management Requirements. Further assessment using a dispersion model (ADMS) will be undertaken to establish whether any potential effects arising from the additional ATMs will be significant.
- Road traffic emissions to air:* An assessment of the potential effects of road traffic emissions on local concentrations of these pollutants will be undertaken through the use of the ADMS model. It is proposed to consider the principal road traffic network in the immediate vicinity of the airport. The selected model will be used to predict air quality effects of NO₂ and PM₁₀ from moving and idling motor vehicles at, or alongside roadways and junctions. Concentrations will be predicted at specific receptors, including the façades of residential properties and sensitive ecological sites. Contouring of pollutant concentrations (usually on a 10m x 10m

grid basis) may be required to determine the extent of any exceedance predicted in relation to the Air Quality Objectives (AQOs in the *Air Quality (England) Regulations 2000*²¹ and the *Air Quality (England) (Amendment) Regulations 2002*²².

To enable local verification of detailed dispersion modelling, a statistical comparison will be made between the modelled concentrations and any relevant local continuous monitoring data and diffusion tubes sited in suitable locations. The aim of this process is to assess the performance of the model and any tendency it might have to over or under estimated concentrations.

- *Dust nuisance*: A qualitative assessment of potential dust nuisance will be undertaken based on the construction activities and meteorological conditions. Consideration will be given to the need to establish baseline monitoring for potential dust nuisance.
- *Deposition of airborne pollutants on designated sites*: Changes in pollutant deposition rates may occur due to an increase in emissions from aircraft sources, changes in airside and landside road traffic and the use of power units on the North Somerset and Mendips Special Area of Conservation (SAC) and its constituent (and other local) Sites of Special Scientific Interest (SSSI), and local non statutorily designated Wildlife Sites (WS). Local SACs have been designated on the basis of their bat population and vegetation. Bats are not considered to be vulnerable to nitrogen deposition except where this leads to habitat changes (which might reduce the availability of prey organisms). An increase in nitrogen deposition may, however, result in a change in vegetation composition. Changes in pollutant concentrations and deposition rates at sensitive ecological sites, in particular, the North Somerset and Mendips SAC and component SSSI, will be predicted using detailed dispersion modelling techniques. Predicted deposition rates will be compared against reported critical loads for similar habitat, and the AQO for NO_x and SO₂ for the protection of vegetation and ecosystems.

Potential effects not requiring further consideration

The following potential effects will not be considered by the EIA.

- *Emissions of CO₂ from aircraft*: The emission of CO₂ from aviation is a matter of concern but the Aviation White Paper²³ recognises that this issue can only be addressed at the International level.
- *Emissions to air from construction vehicles*: The likely change in airborne pollutant concentrations at residential properties, schools, and other sensitive locations due to the movement and operation of construction related vehicles is considered to be minimal and would not be permanent.

²¹ The Air Quality (England) Regulations (2000), Statutory Instrument N^o 928.

²² The Air Quality (England) (Amendment) Regulations 2002, Statutory Instrument 2002 N^o 3043

²³ DfT (2003); *The Future Development of Air Transport*, December Cm604

- *Dust deposition on designated sites of nature conservation interest during site preparation and construction:* Designated ecological receptors (e.g. local SSSIs and Wildlife Sites) are generally not located within 250 m of the airport, therefore the likelihood of these locations being adversely affected by dust is minimal. Felton Common WS is located within 250 m. However, the proposed dust control strategy should minimise potential effects on Felton Common WS.

3.2.5 Mitigation of effects not expected to be significant

In order to minimise emissions of CO and hydrocarbons from aircraft, the modifications to the airfield layout/scheduling/operating protocols should be designed and operated in such a way as to minimise idling and taxiing times.

The effects of road traffic on air quality can be minimised by measures including,

- locating junctions and intersections away from sensitive receptors;
- traffic management schemes resulting in free flowing traffic, including priority schemes, speed limits and road design, will minimise emissions (free flow conditions where vehicle speeds are 60-80 kph are optimum);
- using dense vegetation screens or barriers (there is some evidence that pollutant concentrations are slightly reduced in a small area to the lee side of a large screen or barrier); and
- improvements to public transport connections and use, to reduce private vehicle use, and the configuration of roads and car parks to minimise congestion will have a beneficial effect on road traffic emission levels.

3.3 Archaeology and cultural heritage

3.3.1 Relevant policies and their implications for scoping

Table 3.8 lists the planning policy guidance and policies that are relevant to archaeology and cultural heritage, and sets out the implications of the guidance and policies for the scope of the EIA. The full names of the plans and guidance cited are given in Appendix C, which details all policies and guidance that are relevant to the development.

Table 3.8 Relevant policies and their implications - archaeology and cultural heritage

Policy reference	Implications
Policy 1 – JRSP 2002	Requires planning and transport policies to be based on the principles of sustainable development, and seeks to reconcile, balance and integrate the protection and enhancement of the environment, the maintenance and enhancement of economic prosperity and meeting the social needs and aspirations of the people of the area through the provision of opportunities for commercial and industrial development, housing and related services and activities. One of the aims of the policy is to improve the built environment by making positive use of cultural heritage.
Policy 19 – JRSP 2002	Local Plans should protect that part of the cultural heritage that consists of the built and historic environment of the area and manage development and land use change in a manner that respects local character and distinctiveness, ensuring that new development and other land use changes respect and enhance local character through good design and conform with any local character statement /guidance produced locally; protect Scheduled Monuments (SM) and other nationally important archaeological remains, which should be preserved in situ and their settings maintained and enhanced; and require development proposals affecting archaeological sites of local importance to demonstrate an overriding need for the development, to provide for a mitigation strategy where necessary, and to provide for appropriate prior investigation and recording of the site.
Policy ARCH/2 – NSLP 2000	Where there is good reason to believe that development could affect locally important archaeological remains, the Council will seek a field evaluation and assessment, or the submission of further information, to establish the extent and importance of remains before a planning application is determined. Where an assessment indicates development would affect remains and the Council consider preservation 'in-situ' is not justified, a full archaeological evaluation will be required.
Policy ECH/6 – NSRLP 2004	Development will not be permitted where it would result in significant alteration or damage to nationally-important archaeological remains, or would have a significant impact upon the setting of such remains. Where such features exist, the Council would expect a field evaluation and assessment prior to the grant of planning permission. Where it is considered that the conservation of remains in situ is not justified, the Council will seek an agreement that the remains are fully excavated and recorded.

3.3.2 Approach to identifying likely significant effects

Introduction

For each of the identified receptors that could be significantly affected by the proposed development, the likelihood of there being significant effects will be reviewed in the context of the magnitude and other characteristics of the environmental changes that are expected to be caused by the scheme. At this stage in the EIA process, these characteristics have not been quantified. However, in some cases, even without such quantified information, it is reasonable to assume that the changes will not result in a significant effect. This is sometimes the result of tried and trusted mitigation measures that might reasonably be expected to be effective, which have already been incorporated into the scheme proposals (refer to Footnote 12).

Cultural heritage is represented by a wide range of features, both visible and buried, that result from past human use of the landscape. These include standing buildings, many still in use, sub-surface archaeological remains and artefact scatters. It also includes earthwork monuments as well as landscape features such as field boundaries and industrial remains.

The presence of cultural heritage features is a consideration in determining planning applications, and early consultation with the local authority is encouraged in planning guidance. Where there is a reason to believe that cultural heritage features may be affected by a development proposal then the first step is often the preparation of a desk-based assessment. Desk-based assessment involves the collection of existing information that can assist in the assessment of the likely or potential impact of the development.

In completing a desk-based assessment of the effects of any development on cultural heritage it is important to identify the known and potential nature of features that may be involved. This requires consideration of a number of factors.

- Development can affect features of cultural heritage interest not only through direct impacts (e.g. land take) but also indirect impacts, such as the setting of monuments.
- Desk-based assessment involves a review of current information only and there may be further features within the application area that are not yet known. The potential for this may be assessed from the current and historic land use within the proposed development site, features within the wider area and a history of land use within the area of proposed development.
- Not all cultural heritage features are considered of equal “importance” and it is important to identify the significance of the features. This is done through reference to legislation, policy guidance and professional judgement.

Policy and Guidance

The importance of cultural heritage remains is recognised in both legislation as well as national and local policy. Certain features that are deemed to be of particular importance are given legal protection through legislation. The *Ancient Monuments and Archaeological Areas Act 1979* provides for a schedule of monuments which are protected. Under this act, local planning authorities are required to take into account the impact of proposals upon scheduled ancient monuments (SM) and their setting when they consider planning applications.

Similarly, the *Planning (Listed Buildings and Conservation Areas) Act 1990* provides for the definition and protection of a list of buildings or areas of architectural and historical interest.

Policy guidance on how cultural heritage should be treated is given in Planning Policy Guidance Notes (PPG) 15 and 16.

PPG 15 deals with the historic environment, and sets out policy for the protection of Listed Buildings and Conservation Areas and their setting under the Planning (Listed Buildings and Conservation Areas) Act 1990 (paragraph 2.16). PPG 15 also gives guidance on other aspects of the historic environment for which there are no specific statutory controls; namely World Heritage Sites (WHS), historic parks and gardens and historic battlefields.

PPG 16 sets out policy on archaeological remains, their importance and the handling of archaeological matters in the planning process. It describes archaeological remains as a ‘*finite and non-renewable resource* that should not be *thoughtlessly or needlessly destroyed*’. PPG 16 also states that there is a presumption in favour of preserving *in situ* archaeological sites of national importance and their settings (paragraph 8).

There will be times when the physical preservation of a monument will not be justified in the light of a proposed development, which would result in the loss of the monument. In such cases it is important that relevant information on the archaeological resource will have been provided and that appropriate excavation and recording should take place prior to development.

3.3.3 Baseline conditions

Data sources

The baseline conditions described below have been derived through an appraisal of the following sources.

- Nationally-based registers of designated sites - English Heritage.
- The National Monuments Record (NMR) - English Heritage.
- The Sites and Monuments Record (SMR) - North Somerset Council.
- Aerial photographs at the NMR.
- Defence of Britain Project Database.
- Cartographic sources from Somerset Archive and Record Service.
- Published sources, including:
 - Environmental Appraisal (Chapter 9) in Gibb Airports (2000) *Bristol International Airport Master Plan*;
 - Avon County Planning Department (ACPD) (1992) *Bristol Airport Terminal, Site Specific Archaeological Evaluation*;
 - James, I (1989) *The Story of RAF Lulsgate Bottom*.

A site visit was also undertaken on 7 January 2005 by one of Entec's archaeologists. The purpose of the site visit was to view features identified by the desk-based appraisal and any other visible features of cultural heritage interest, in addition to noting the general ground conditions.

Over 600 records were returned from the SMR search, which was received shortly before the issue of this report. A brief appraisal of these has been undertaken in an attempt to identify the main issues, but these have not been accurately plotted (as no grid references have been received at this time) and therefore effective interpretation of these dates has not been possible.

Summary of available baseline information

Features identified within the airport site and vicinity are recorded in Table 3.9 and shown on Figure 3.1.

Data received from North Somerset SMR (formerly part of Avon SMR) has not been fully reviewed and therefore Table 3.9 does not represent all recorded features. SMR entries within the site consist of features and events relating to the former RAF Lulsgate Bottom and include an inventory of all contemporary buildings within the site, the vast majority of which have no standing remains. There are also many records relating to prehistoric features and artefact finds

in the area surrounding the airport. The vast majority of SMR entries therefore relate either to features for which no remains are known to survive, or to those which lie outside the site and will not in any case be affected by the proposed development.

A brief appraisal of the data received has not identified any surviving features or areas of interest which fall within the development area, further to those identified from other sources. It is possible that some further structural remains relating to the WWII airfield may survive which are not detailed in Table 3.9 and would be of local historical importance.

Table 3.9 Features of cultural heritage interest recorded within the airport and vicinity

Reference	Source	NGR	Description	Location
A	Site visit	ST 50351 64423	Airmen's latrine and drying room with adjacent air raid shelter, identified as 'Stanton' type in James (1989).	S of Cornerpool Farm
B	Site visit	ST 50357 64437	Circular earthwork consisting of a stony ring bank. May be similar function to a gruffy, or agricultural or military in origin. Appears relatively recent.	S of Cornerpool Farm
C	Site visit	ST 506 643 (nominal central point)	Gruffy Ground: The remains of lead extraction, likely to be of early post Medieval or later date.	SE of Cornerpool Farm
D/ SMR 41634	Site visit	ST 5025 6476	Recorded on SMR as the remains of a machine gun and cannon range.	Airport S perimeter fence
E/ SMR 41527	Site visit	ST 5029 6471	Aircraft Hangar with sliding steel doors. Recorded on the SMR as WWII blister hanger.	Within S of Airport
F	Site visit	ST 5030 6464	Brick structure identified in James (1989) as a WWII cannon test butt.	Outside airport S perimeter fence
G1-6	Site visit	ST 5033 6480 ST 5043 6470 ST 5050 6462 ST 5094 6484 ST 5090 6475 ST 5085 6465	Aircraft dispersal pens, contemporary with the WWII airfield. Varying states of survival.	Adjacent to S taxiway in airfield
-	DoB	ST 5055 6524	Lulsgate WWII Airfield.	Location of present airfield
NMR 7015	NMR	ST 513 655	Mesolithic settlement and Neolithic worked flint scatter.	NE of airport on A38
NMR 7033	NMR	ST 5130 6530	Archaeological Evaluation by BRAS: Prehistoric artefact scatter.	E of A38
NMR 7210	NMR	ST 5130 6480	Archaeological Watching Brief by BRAS: Prehistoric lithic implement.	E of A38

Reference	Source	NGR	Description	Location
NMR 1049219 (ASMR 8270, 8271)	NMR Excavation Index	ST 50 65 (ST 5060 6540)	Archaeological Evaluation in advance of construction of new passenger terminal: Prehistoric features found.	New passenger terminal
NMR 1235221	NMR Excavation Index	ST 51 65	Environmental Assessment for A38 Diversion, Lulsgate Bottom.	General NGR
NMR ST46NE20/ SMR 416, NMR ST46NE21/ 22/ 23	NMR	ST 4893 6471 ST 4920 6507 ST 4940 6501 ST 4943 6500	Possible Bronze Age barrows, although recorded on NMR as possible tree disturbance.	3 within airport
NMR ST56SW31	NMR	ST 512 649	Scatter of worked flint suggesting Mesolithic occupation site.	E of A38
NMR ST56NW18	NMR	ST 513 653	Neolithic leaf-shaped flint arrowhead and scraper.	NE of airport on A38
NMR ST56NW19	NMR	ST 51 65	Bronze Age socketed axe found at Lulsgate.	General NGR
NMR ST56SW6/ SMR 664	NMR	ST 5020 6485	Original record of a Bronze Age bowl barrow, discredited on NMR.	Just outside airport boundary to S
NMR ST56SW21/ SMR 2186	NMR	ST 5070 6445	Prehistoric flint working site.	S of airport

(A)SMR (former Avon) Sites and Monuments Record; BRAS: Bristol and Region Archaeological Services; DoB: Defence of Britain Project Database; NMR: National Monuments Record. Compass points given as N, E, S, W, etc.

Prehistoric features

The airport lies within an area known for prehistoric activity in particular, with artefact finds dating from the Mesolithic period onwards recorded in the vicinity on the NMR and SMR. Some of these sites have been proven during investigative fieldwork. To the south of the airport is a Neolithic chambered long barrow, which is scheduled (Long barrow 350 m south-west of Cornerpool Farm -official schedule entry, SM 22819). Other similar features, some of which are also scheduled, are known in the area surrounding the airport. Within the airport site there has been some archaeological investigation. Archaeological trial trench evaluation in advance of the construction of the new passenger terminal (ACPD, 1992) identified some archaeological features including postholes and ditches for which a prehistoric date was postulated (NMR 1049219, former Avon SMR 8270/8271). No artefacts were recovered from these features, but some unstratified worked flint, some of which was dated to the Neolithic or early Bronze Age period, was recorded during the evaluation. Three possible Bronze Age round barrows are also recorded within the airport in the vicinity of the western end of the runway at North Hill (NMR ST46NE21/ 22/ 23). These were identified as cropmarks of unspecified date on aerial photographs, although the NMR also suggests that they may relate to the former locations of trees. These features are also not recorded on the SMR and were not identified on the aerial photographs viewed as part of this scoping report. They should therefore be regarded as highly tentative features. In addition, the runway represents made ground, thus in order for such cropmarks to have been correctly identified the aerial photographs must pre-date the runway extension. A prehistoric flint-working site is also recorded to the south of the airport (NMR ST56SW21).

Lead extraction

To the south of the airport, south east of Cornerpool Farm, is an area of former lead extraction, manifested by small depressions surrounded by irregular earthworks, locally referred to as 'Gruffy Ground' (identified at C²⁴ on Figure 3.1). Such remains of surface lead extraction are known in the Mendips from the Roman period onwards, although the industry reached its peak between AD 1628 and 1659. It is most likely that the remains to the south of the airport date from this early post Medieval period (V Russett, N Somerset Council, pers comm.). After this period, the lead industry in the area declined rapidly, probably due to the exhaustion of ore in the lodes near the surface. In the area of this gruffy ground there are also three north west to south east aligned banks, which divide the field. These appear to be contemporary to the remains of lead extraction.

Lulsgate Airfield

The modern airport and runway occupy the site of the former Lulsgate Airfield, which was in use during WWII and abandoned in 1946. Little of the infrastructure of the original airfield survives, although some features survive which are of historical interest. Perhaps the most important of these are the remains of six aircraft dispersal pens, also known as fighter pens, which are arranged in two groups of three to the south west and south east of the airfield. These essentially comprise a rounded 'E'-shaped earthwork enclosure on a brick frame, forming two bays, into which fighter aircraft were reversed. The examples at BIA also contain reinforced store rooms and/or air raid shelters for the aircraft and ground crew. Entrances to these are from each of the two bays and in some cases also to the rear of the fighter pen. The purpose of the aircraft dispersal pens was to shelter and disguise fighter aircraft from enemy reconnaissance and attack.

Other features noted within and to the south of the airfield, which are contemporary with its WWII use and therefore of historical interest, are brick built butts of a firing range (D) and the brick remains of a cannon test butt (F). To the south of Cornerpool Farm there is also a small brick building (marked on current Ordnance Survey [OS map editions}), identified in James (1989) as an airmen's latrine and drying room, with an adjacent air raid shelter (A). An aircraft hanger within the south of the airfield (E) also dates from WWII and is of local historical interest.

Data gaps

Data requested from the SMR maintained by North Somerset Council were received shortly before the preparation of this scoping report. The data comprised some 600 individual records, many of which relate to WWII built features and events for which there are no known remains. It has not been possible to assess all of these at the scoping stage, although it is anticipated that there are no records contained therein which would alter the conclusions of this scoping report.

²⁴ The capital letters referred to in brackets in the following paragraphs relate to features shown in Figure 3.1.

Predicted trends

Although there is no current direct threat to features identified within the airfield and the area of Cornerpool Farm, remains of the WWII airfield are in varying states of survival and their condition is likely to deteriorate.

3.3.4 Identification of the next steps in the assessment process

Table 3.10 identifies receptors, likely environmental changes and potential effects, and the supporting text set out the high level assessment for cultural heritage, insofar as it can be defined at this stage of the EIA process.

Table 3.10 Receptors, likely changes and potential effects - cultural heritage

Receptor	Changes and potential effects
<i>Construction and permanent land use change</i>	
Potential sub-surface archaeological remains of prehistoric date.	Loss of archaeological remains to development.
Remains of early post Medieval lead extraction to SE of Cornerpool Farm - 'Gruffy Ground'.	Loss of archaeological features to development.
Surviving features relating to the WWII airfield.	Loss of some or all of the archaeological features to development and a change to their setting if retained.
<i>New infrastructure and operation</i>	
Designated cultural heritage receptors, i.e. Scheduled Monuments.	Indirect effects on the setting of Scheduled Monuments.

Potential effects requiring further consideration

The potential effects that need to be investigated further are listed below together with an outline of the work that is required:

- *Loss of sub-surface archaeological remains of prehistoric date:* Data will be obtained from the SMR in a form that can be input on to a GIS (Geographic Information System) to enable an assessment of any entries within the site, those within the surrounding area and the potential for further unrecorded remains to survive within the site. Analysis of past land use from cartographic sources and any available geotechnical data will assist in this assessment. This desk-based work will allow the determination of any investigative fieldwork required and at what point this should be undertaken. There is no current evidence that any remains exist which would be sufficiently important to warrant their preservation *in situ*.
- *Loss of remains of early post Medieval lead extraction to SE of Cornerpool Farm, known as 'Gruffy Ground':* These remains are of local importance and it is anticipated that their loss to development will be sufficiently compensated by their preservation by record as part of the development programme, in accordance with

PPG 16. Further consultation of documentary sources will be undertaken as part of the EIA and the exact nature of mitigation or compensation required will be established in conjunction with North Somerset Council.

- *Loss of surviving features relating to the WWII airfield of RAF Lulsgate Bottom:* Features identified are of historic interest and may be directly affected by development. The importance of features similar to the aircraft dispersal bays at other WWII airfields has been recognised by their protection as Scheduled Monuments, although the examples at BIA have not identified as being of schedulable importance. Assessment of the surviving features will include further documentary research, combined with a site visit and further consultation with North Somerset Council. Re-appraisal of emerging development details will allow any direct effects to be determined and a scheme for mitigation and/ or compensation of identified effects to be established. Consideration of potential biodiversity issues (e.g. whether they support roosting bats) will be required.

Potential effects not requiring further consideration

The following potential effects will not be considered further.

- *Change in the setting of designated cultural heritage features:* There may be some indirect effects on the setting of designated cultural heritage receptors such as Scheduled Monuments identified within the vicinity of the site. These are not currently expected to be significant in the context of the existing airport unless the design changes substantially, although potential effects will be re-appraised in light of the emerging development scheme.

3.3.5 Mitigation of effects not expected to be significant

No measures have been identified at this stage.

3.3.6 Environmental enhancement measures

No measures have currently been identified, although there is some potential for the enhancement of the current setting of some WWII built features within the site, should it be possible to retain these within the proposed development.

3.4 Biodiversity

3.4.1 Relevant policies and their implications for scoping

Table 3.11 lists the planning policy guidance and policies that are relevant to biodiversity, and sets out the implications of the guidance and policies for the scope of the EIA. The full names of the plans and guidance cited are given in Appendix C, which details all policies and guidance that are relevant to the development.

Table 3.11 Relevant policies and their implications - biodiversity

Policy reference	Implications
Policy 1 – JRSP 2002	Requires planning and transport policies to be based on the principles of sustainable development, and seeks to reconcile, balance and integrate the protection and enhancement of the environment, the maintenance and enhancement of economic prosperity and meeting the social needs and aspirations of the people of the area through the provision of opportunities for commercial and industrial development, housing and related services and activities. One of the aims of the policy is to secure effective stewardship of the area's environmental assets by protecting the diversity of wildlife and habitats and where possible enhancing their value and viability.
Policy 18 – JRSP 2002	Requires local plan policies to ensure that that new development assists in the retention of existing habitats, important species, buffer areas and landscape features of major importance for wildlife. Priority should be given to enhancing the overall ecological quality, extent, capacity, structure and functioning of locations and the surrounding ecological network by creating new habitats, buffer areas and landscape features. Such effort should be concentrated in those locations where habitats and/or species have been identified as being particularly vulnerable.
Policy 21 – JRSP 2002	The creation of the Forest of Avon will be supported and assisted. Where development is permitted within the Forest of Avon, conditions or planning obligations may be used to ensure that the development respects and contributes to the woodland setting.
Policy NE/1 – NSLP 2000	The Council will support and assist the creation of the Forest of Avon and will require the design and materials of any buildings, and any landscaping and planting to reflect the woodland setting and assist in establishing the Forest of Avon.
Policy NE/4 – NSLP 2000	In considering any development in or near Local Nature Reserves or Sites of Nature Conservation Importance, the Council will seek to ensure that the nature conservation or geological value of the designated area is not lost or unacceptably harmed.
Policy NE/5 – NSLP 2000	When considering development that would be likely to harm those plants and animals protected by law, including their habitats, the Council will take into account the extent to which that particular harm could be avoided or mitigated by the use of planning conditions or legal agreements.
Policy NE/6 – NSLP 2000	Development will be expected to fully consider nature conservation. Important woodland, trees, hedgerows, watercourses, ponds, wetland habitats, geological features and other natural features, habitats or wildlife corridors should be retained and protected during construction work. Compensatory provision should be made where the loss of habitats to wild flora and fauna is unavoidable. Any habitat features attractive to wildlife, should be incorporated into the development. Provision should be made for the future management of retained and newly created features of importance to wildlife.
Policy NE/7 – NSLP 2000	Where necessary and opportune the Council will seek arrangements for or undertake the management and enhancement of landscape features that are of major importance to wild flora and fauna.
Policy GDP/3 – NSRLP SDD 2004	A high standard of planning and design is expected in all development. In determining planning applications account will be taken of a number of design objectives, including safeguarding and integration of important ecological features within the development where appropriate.
Policy ECH/10 – NSRLP SDD2004	Where development is permitted within the Forest of Avon, conditions may be imposed or planning obligations sought requiring the design and materials of any buildings, landscaping and planting, to reflect the developing woodland setting and assist in establishing the Forest.
Policy ECH/11 – NSRLP SDD 2004	This requires all development proposals to fully consider the implications for biodiversity, and in particular should ensure no net loss of biodiversity, and that species and habitats set out in the UK and local biodiversity action plans will be protected and where possible, enhanced. The Policy seeks to ensure that ecological features are retained and protected during construction work; that compensatory provision of at least equivalent value is made for any habitat that is unavoidably lost; that new habitat features which compliment existing ecology are incorporated into the development, and provision is made for the management and enhancement of ecological features.

Policy ECH/12 – NSRLP SDD 2004	Development which could harm, directly or indirectly, nationally or internationally protected species of flora or fauna or the habitats used by such species will not be permitted unless that particular harm could be avoided or mitigated and the species protected by the use of planning conditions or planning obligations.
Policy ECH/14 – NSRLP SDD 2004	Sites of Special Scientific Interest (SSSI) and National Nature Reserves; Development within or near a SSSI or National Nature Reserve that is likely to have a direct or indirect adverse effect on its biodiversity will not be permitted unless other material considerations outweigh its loss.
Policy ECH/15 – NSRLP SDD 2004	In considering proposals in or near to Wildlife and Geological Sites and Local Nature Reserves and likely to have a direct or indirect on these features, the council will seek to ensure that biodiversity on these sites is not lost or unacceptably harmed.

3.4.2 Approach to identifying likely significant effects

For each of the identified receptors that could be significantly affected by the proposed development, the likelihood of there being significant effects will be reviewed in the context of the magnitude and other characteristics of the environmental changes that are expected to be caused by the scheme. At this stage in the EIA process, these characteristics have not been quantified. However, in some cases, even without such quantified information, it is reasonable to assume that the changes will not result in a significant effect. This is sometimes the result of tried and trusted mitigation measures that might reasonably be expected to be effective, which have already been incorporated into the scheme proposals (refer to Footnote 12).

The assessment will be based on the emerging guidelines for Ecological Impact Assessment developed by the Institute of Ecology and Environmental Management (IEEM).

It is impractical for an ecological assessment to consider every individual species and habitat that may potentially be affected by a development. Rather it should focus on ‘valued ecological receptors’ and legally protected species. These two criteria are explained in more detail by the following text.

Valued ecological receptors

Valued ecological receptors are species and habitats that are valued in some way, are indicative of the ecological quality of the site, and which could be affected by any proposed development. The value of species populations and habitats is assessed with reference to:

- their importance in terms of ‘biodiversity conservation’ value (which relates to the need to conserve representative areas of different habitats and the genetic diversity of species populations);
- any social benefits that species and habitats deliver (e.g. relating to enjoyment of flora and fauna by the public); and
- any economic benefits that they provide.

Species populations and habitats have been valued for their biodiversity conservation value within the context described, using the following scale:

- international;
- national;

- regional;
- county;
- district;
- local; and
- negligible.

The presence of a recorded species population or habitat will be considered within its national or international context (e.g. distribution and rarity). However, as the purpose of this report is to evaluate the potential ecological effects of the proposed development activity, the key element for assigning biodiversity conservation value is through considering the habitats and species within their local context (taking into account criteria such as extent, diversity, rarity, and typicality).

Designated sites (e.g. SSSIs) will obviously have met the criteria set out for international, national or local designations and should be assigned this level of value. Other sites (e.g. those that are privately owned, and/or have not been surveyed) may also meet these criteria, and can also be assigned a high value.

Although this approach is subjective, and to a large extent is based on professional judgement, it needs to stand up to scrutiny, therefore a comparison against criteria used to designate statutory and non-statutory sites is typically used as the bench-mark for assigning a level of value for habitats above district level.

The approach that is taken in this report is that a species population or habitat is considered as a valued ecological receptor if it is of more than district importance in biodiversity conservation terms, taking into account its social or economic value.

Legal protection of species and habitats

There is also a need to identify all legally protected species that could be affected by the proposed development and to devise mitigation strategies that will avoid contravention of the relevant legislation. The mitigation must be acceptable to English Nature (EN) and, for European protected species²⁵, the Department DEFRA. By implication, therefore, it is inappropriate to assess the significance of effects within the context of species' legal protection - effects on such species have to avoid contravention of the law (i.e. to be 'non-significant'), otherwise the development cannot be taken forward.

In certain situations, however, measures that are proposed to ensure that the law is not contravened can result in an effect that might be significant for reasons related to the species' biodiversity conservation, social or economic value. For example, it may be possible to avoid contravening the law regarding a reptile species by translocating the population from the development site. However, if the reptile species is sufficiently rare in the locality, it may be concluded that the loss of the population from the site could be a significant effect in biodiversity conservation terms.

²⁵ As set out in Schedules 2 and 4 of *The Conservation (Natural Habitats, &c.) Regulations 1994* (SI 1994 No. 2716) (as amended).

3.4.3 Baseline conditions

Data sources

This section of the report drew on the following sources of information:

- Cresswell Associates (1999) Bristol International Airport Nature Conservation Management Plan;
- Bristol Regional Environmental Records Centre (BRERC) (2005). Data provided on statutory and non statutory designated sites of nature conservation interest and records of legally protected species and other local notable and or BAP species within 2km of the airport;
- Billington, G. (2002) Radio Tracking Study of Greater Horseshoe bats at Brockley Hall Stables SSSI, May – August 2001. English Nature Research Report No.442 2001. English Nature. Peterborough;
- an Extended Phase 1 survey carried out by Entec during January 2005, and updated during May 2005;
- correspondence from English Nature (in a letter dated 13th January 2005); and
- correspondence from North Somerset Council's biodiversity team (in a letter dated 5th January 2005).

Summary of available baseline information

Site context

BIA is located on a flat plateau and is dominated by buildings, car parks areas of hardstanding (e.g. runway, taxiway, apron and stands), other airport infrastructure, areas of grassland and small areas of scrub. The surrounding landscape is more complex and varied, being characterised by alternating ridges and broad valleys with some steep wooded slopes and open rolling farmland. To the north and south of the airport these valleys run east to west and support a high concentration of designated sites of nature conservation value. A large woodland complex is located west of the airport and this also includes a number of designated sites of nature conservation value. Carboniferous and Jurassic Limestone underlie the area and the geology has been exploited through mineral extraction. Quarry exposures, together with areas of screes, scrub, pockets of grassland and adjacent woodland, support an exceptional number of nationally rare and scarce plant species. Elsewhere the generally thin soils support woodlands, a number of parklands of conservation value, and limited areas of calcareous grasslands that are characteristically species-rich.

Designated sites of nature conservation interest

A large number of statutorily and non-statutorily designated sites of nature conservation importance are located within 2km of BIA. These are shown on Figure 3.2.

Five Sites of Special Scientific Interest (SSSI) are located within 2km of the airport and are detailed in Table 3.12 and illustrated on Figure 3.2. Two sites, Kings Wood/Urchin Wood SSSI and Brockley Hall Stables SSSI are also a component of the North Somerset and Mendip Bats

Special Area of Conservation²⁶ (referred to here as SAC) due to the populations of greater horseshoe bat (*Rhinolophus ferrumequinum*) and lesser horseshoe bat (*Rhinolophus hipposideros*) that they support.

Table 3.12 identifies statutorily designated sites of nature conservation interest within 2km of BIA.

Table 3.12 Statutorily designated sites of nature conservation importance

Name	Location (NGR/distance meters (m))	Summary Description	On-site/off-site
North Somerset and Mendips SAC	ST454645, 998m at nearest point to the west.	Designated features of interest are: semi-natural dry grasslands and scrubland facies: on calcareous substrates (<i>Festuco-Brometalia</i>); <i>Tilio-Acerion</i> forests of slopes, scree and ravines, caves not open to the public, greater horseshoe bat and lesser horseshoe bat.	Off-site
Lulsgate Quarry SSSI	ST516659, 799m at nearest point to the north.	Selected for its geological interest.	Off-site
King's Wood and Urchin Wood SSSI Also a component of the North Somerset and Mendip Bats SAC	ST454645, 998m at nearest point to the west.	One of the largest blocks of ancient woodland in the local area. Supports a diverse woodland flora as well as populations of dormouse (<i>Muscardinus avellanarius</i>) and greater horseshoe bats which utilise disused mine workings to the north east of the site for both hibernation and nursery roosts.	Off-site
Goblin Combe SSSI	ST473652, 2035 m at nearest point to the west.	A steep sided dry valley supporting unimproved calcareous grassland, ancient woodland and limestone heath. Supports a population of dormice and foraging habitat for greater horseshoe bats.	Off-site

²⁶ Formerly known as a candidate Special Area of Conservation (cSAC), these sites have now been listed by the European Commission and will be classified as an SAC in due course.

Name	Location (NGR/distance meters (m))	Summary Description	On-site/off-site
Hartcliff Rocks Quarry SSSI	ST534662, 2211m at nearest point to the north east	Selected for its geological interest.	Off-site
Brockley Hall Stables SSSI	ST471662570m at nearest point to the north.	Former stable block supporting a summer breeding roost of greater horseshoe bats.	Off-site
Also a component of the North Somerset and Mendip Bats SAC			

Nineteen non-statutorily designated sites (known locally as Wildlife Sites [WS]) are located within 2km of the airport and these are listed in Table 3.13. The majority of the sites are associated with the steep sides valleys running east-west to the north and south of the airport, and a concentration of woodland to the west. A single site, Felton Common Wildlife Site, which is also a Local Nature Reserve (LNR) is located to the east of the airport the other side of the A38.

Table 3.13 Non-statutorily designated sites of nature conservation importance

Code	Name	Location(NGR/ distance meters (m))	Summary Description	On-site/off-site
56/21	Felton Hill and Common	ST516652, 703m to the east	Semi-improved and unimproved acidic grassland, with unimproved calcareous grassland and scrub.	Off site
46/11	Brockley Combe, Cleeve Hill and Goblin Combe	ST489644, 532m to the south west.	Ancient semi-natural broad-leaved woodland, with mixed woodland plantation, scrub, heath and limestone outcrops.	Off site
46 + 56/04	High Wood, Lulsgate	ST501640, 644m to the south west	Ancient semi-natural broad-leaved woodland.	Off site
46 + 56/03	Garleys Wood	ST500663, 680m to the north west.	Ancient semi-natural broad-leaved woodland.	Off site
56/20	Oatfield Wood	ST508663, 782m to the north	Ancient semi-natural broad-leaf woodland, and semi-improved neutral grasslands.	Off site
56/27	May's Grove Coppice and adjacent field	ST508632, 1252m to the south and ST504631, 1360m to the south	Semi-natural broad- leaved woodland.	Off site
56/18	Oatfield Pool	ST509660, 1279m to the north	Semi-natural broad- leaved woodland (carr), and swamp, with standing water and	Off site

Code	Name	Location(NGR/ distance meters (m))	Summary Description	On-site/off-site
			scrub.	
46 + 56/02	Heall's Scars	ST496667, 1423m to the north.	Semi-natural broad- leaved woodland with semi-improved neutral to calcareous grassland.	Off site
56/19	Hyatt's Wood	ST503671, 1501m to the north	Ancient semi-natural broad-leaf woodland.	Off site
46/22	Woodland south of Broadfield Farm	ST490640, 1544m to the south west	Semi-natural broad- leaved woodland and coniferous plantation.	Off site
56/29	Scars Wood and adjacent field	ST505629, 1588m to the south	Ancient semi-natural broad-leaved woodland with unimproved and semi-improved neutral grassland.	Off site
46/18	Littler Plantation	ST473635, 1915m to the south west	Semi-natural mixed woodland.	Off site
46/23	Horts Wood	ST491631, 2073m to the south west	Ancient semi-natural broad-leaved woodland with coniferous plantation.	Off site
46/21	Little Horts Wood	ST487634, 2209m to the south west	Ancient semi-natural broad-leaved woodland.	Off site
46 + 56/01	Cheston Combe and Backwell Hill	ST496675, 2307m to the north.	Semi-natural broad- leaved woodland with semi-improved neutral grassland.	Off site
56/15	Rock Lane Fields	ST531663, 2453m to the north east	Calcareous grassland to north. Semi-improved neutral grassland/scrub to south.	Off site
46/20	Tucker's Grove and Whitley Coppice	ST483631, 2609m to the south west	Ancient semi-natural broad-leaved woodland.	Off site
56/46	Steven's Farm Fields	ST524671, 2621m to the north east	Unimproved neutral grassland.	Off site
46/19	Prestow Wood and Shippenhays Wood	ST477634, 2851m to the south west	Ancient semi-natural broad-leaved woodland and mixed woodland.	Off site

Habitats

The habitats present within the airside boundary and those within 2km of BIA are illustrated by Figure 3.3. Photographs illustrating some of these habitats are reproduced in Appendix C.

The bulk of the airport land comprises runways, taxiways, car parking, and buildings. The land between the runways consists of species poor semi improved grassland, managed according to a

standard ‘long grass policy’²⁷. There are also areas of landscape planting, mature trees and hedgerows associated with the entrance to BIA, the car parks and northern perimeter of BIA.

On the northern edge of BIA, in the vicinity of the Bryman Hanger, there are two short sections of hedgerow and a small (10m x 4m) square water tank set into the grassland on the edge of the main runway.

The southern edge of the airport in the vicinity of the Bristol Flying Centre has an area of semi improved species rich calcareous grassland dominated by upright brome (*Bromus erectus*) but also supporting forb species such as ladies bedstraw (*Galium verum*) and salad burnet (*Sanguisorba minor*). Three short sections of species rich hedge, truncated during the construction of the runways were noted. The hedge sections have expanded laterally to form small patches of scrub including hazel (*Corylus avellana*), holly (*Ilex aquifolium*) and hawthorn (*Crataegus monogyna*).

Adjacent to the southern boundary of the airport is Cornerpool Farm, which includes a complex of small fields bounded by hedges and a small broadleaved copse that is approximately 0.5ha in extent. The copse consists of mature cherry (*Prunus sp.*) ash, (*Fraxinus excelsior*) and the occasional oak (*Quercus robur*), with an understorey of occasional hawthorn. The woodland was heavily sheep grazed and rabbit burrows were much in evidence. Consequentially, no notable ground flora was recorded; large quantities of woody debris littered the ground. The adjacent fields comprise improved grassland dominated by perennial rye grass (*Lolium perenne*) with few forb species noted. In one field, approximately 5ha in extent, a feature known as “gruffy land” was noted. This consists of small rock-strewn mining depressions on which patches of scrub such as holly, ash and hazel have become established.

Flora and Fauna

Records of legally protected species within a 2km radius are listed in Table 3.14 and an overview of the spatial distribution of the records is illustrated in Figure 3.4.

In particular this figure highlights:

- records of great crested newt (*Triturus cristatus*) within 500m of the west of the runway;
- concentrations of greater and lesser horseshoe bats associated with the North Somerset and Mendips SAC roosting to the west but also using a cave system 500m to the north for hibernation;
- foraging activity of these and other species of bats being recorded within Cornerpool Farm, other fields adjacent to the south of the airside boundary, and within the airport itself;
- badger (*Meles meles*) setts located along the current southern boundary of the airport; and

²⁷ For safety reasons, to minimise the risk of bird strike, the grass is cut for silage once a year, and then is regularly mown to maintain a height of 15-20cm during the summer.

- slow worm (*Anguis fragilis*) recorded in the vicinity of the southern boundary of the airfield.

Table 3.14 Records of legally protected species within 2km of BIA

Species	Location(NGR/distance meters (m))	Date	Status ²⁸	On-site/off-site
Common dormouse	ST484662, Warren Plantation, 2000m to the west.	1995-1998	Sch 5 W&CA 1981	Off site
	ST498669, Spinning's Drove, Backwell Hill 2000m to the north west.	2001		Off site
	ST505663, Downside, Backwell, 1500m to the north.	2000		Off site
	ST508663, Oatfield Wood, Backwell, 1500m to the north.	1995 - 1999		Off site
Adder (<i>Vipera berus</i>)	ST480661, Brockley Combe, 2000m to the west.	1994		Off site
Great crested newt (<i>Triturus cristatus</i>)	ST485651, Abspit Pond, 500m to the west.	1980-1983	Sch 5 W&CA 1981 EC Annex11a, IVa	Off site
	ST518667, Freeman's Quarry .Barrow Gurney, 2000m to the north east.	Numerous records during 1999		Off site
High Brown Fritillary (<i>Argynnis adippe vulgoadippe</i>)	ST485663, Goblin Combe and Cleeve Toot 2km to the west.	Last recorded 1992, thought extinct	Sch 5 W&CA 1981	Off site
	ST492641, Woodland south of Broadfield Farm, 1km to the south.	Last recorded 1992, thought extinct		Off site
	ST506678, Bourton Combe, 3km to the north.	1983, thought extinct		Off site
Badger (<i>Meles meles</i>)	ST507646, Luisgate, inside the southern boundary of the airport.	1999 - 2003	Sch 6 W&CA Badgers Act 1992	On site
Noctule bat (<i>Nyctalus noctula</i>)	ST485663, The Batch Brockley, 2km to the west.	2002	Sch 5 W&CA 1981 EC Annex11a, IVa	Off site

²⁸ Sch 5 W&CA 1981 = Schedule 5 of the wildlife and Countryside Act (1981) 1981 (as amended) and The Conservation (Natural Habitats, &c.) Regulations 1994. EC Annex II a, IV a = annexes 2 and 4 of *The Conservation (Natural Habitats, &c.) Regulations 1994 (SI 1994 No. 2716)* Badgers Act 1992 = the Protection of Badgers act (1992).

Species	Location(NGR/distance meters (m))	Date	Status ²⁸	On-site/off-site
Pipistrelle bat(<i>Pipistrelle sp.</i>)	ST485663, The Batch Brockley, 2km to the west.	2002	Sch 5 W&CA 1981 EC Annex11a, IVa	Off site
Greater horseshoe bat	ST495664, Brockley, Combe Cave, 2km to the west.	1990 - 92	Sch 5 W&CA 1981 EC Annex11a, IVa	Off site
	ST496661, Downside Cave, 500m north.	2000		Off site
Lesser horseshoe bat	ST495664, Brockley, Combe Cave, 2km to the west.	1980 - 1993	Sch 5 W&CA 1981 EC Annex11a, IVa	Off site
	ST496661, Downside Cave, 500m to the north.	2000		Off site
Brown Long-eared Bat (<i>Plecotus auritus</i>)	ST496655, North Hill House, Cooks Bridle Path, Backwell, 20m west on northwest boundary of site.	1998	Sch 5 W&CA 1981 EC Annex11a, IVa	Off site
Natterer's Bat (<i>Myotis nattereri</i>)	ST496661, Downside Cave, Brockley Combe, 500m to the north.	1996	Sch 5 W&CA 1981 EC Annex11a, IVa	Off site

The current nature conservation management plan for the airport (Cresswell, 1999) highlighted the following:

- two badger setts on the southern boundary of the airport and a further sett just to the south of the southern boundary;
- a single slow worm near the southern boundary of the airport;
- foraging pipistrelle (*Pipistrelle sp.*) bats located around the southern boundary of the site and the terminal buildings during summer activity surveys; and
- six earth mounds²⁹ with a brick structure on the southern boundary that could potentially be utilised by roosting bats.

The site visits (Entec, January and May 2005) identified four badger setts:

- a large main sett on the southern boundary of the site in the landscape bund of the silver zone parking consisting of over 20 entrances (some of which were partially used or disused), and small annex sett in close proximity;
- a small outlying sett consisting of two entrances in the broad-leaved copse at Cornerpool Farm;

²⁹ The WWII aircraft dispersal pens described in Section 3.3.

- a further sett in the southern boundary of the site near the fire training area; and
- the presence of birds (e.g. skylark [*Alauda arvensis*]) that may utilise areas of longer grassland, scrub and trees for foraging and nesting.

The English Nature Research Report highlighted:

- that greater horseshoe bats regularly foraged up to 7km from the roost at Brockley Hall Stables; and
- that the southern boundary of the airport at Cornerpool Farm was used (at the time of the survey) by foraging bats or bats commuting to foraging areas elsewhere.

A large number of records within 2km of BIA are held for other notable species including locally scarce species and UK Biodiversity Action Plan (UK BAP) and Local Biodiversity Action Plan (LBAP) Priority Species. The majority of these are associated with the woodland and limestone combes located just to the west of the airport, including Kings Wood and Goblin Combe SSSI. Another set of records is associated with Felton Common Local Nature Reserve and Wildlife Site located 700m to the east of the airport boundary.

Further survey at the appropriate time of the year will provide a more robust record of the biodiversity present at and in the immediate vicinity of BIA.

Data gaps

Contemporary site specific surveys, carried out at the appropriate time of the year, are being carried out. The findings of these surveys will be presented within the ES.

Predicted trends

In the absence of management for its nature conservation interest, the quality of habitat supported immediately to the south of the airport may reduce through continuation of current agricultural practices.

3.4.4 Identification of the next steps in the assessment process

Table 3.15 identifies receptors, likely environmental changes and potential effects, and the supporting text set out the scope of the assessment for biodiversity, insofar as it can be defined at this stage of the EIA process.

Table 3.15 Receptors, likely changes and potential effects - biodiversity

Receptor	Changes and potential effects
<i>Construction and permanent land use change</i>	
Vegetation in Felton Common County Wildlife Site	Increased dust deposition from construction activity affecting growth/survival of plants.
Bats (all species)	- Demolition or disturbance of structures that may support roosting bats (e.g. trees, World War 2 dispersal pens, hangers, and other buildings). - Disturbance/loss of foraging habitat and/or modification of commuting routes (including disturbance from lighting).
Great crested newt (if present)	Permanent land take causing death/injury/ disturbance/loss of resting places.
Badger	Damage and/or disturbance to setts, loss of some foraging habitat, and/or access to some foraging habitat.
Slow worm and other reptiles	Damage or disturbance to individual reptiles or resting places, and/or loss of foraging habitat.
Dormouse	Damage or disturbance to individual dormouse or resting places, and/or loss/disturbance of foraging habitat.
Nesting birds	Damage or disturbance to nesting birds, nests, or their young by construction activities.
Semi-improved calcareous grassland	Loss of areas of the grassland through construction activities.
Groundwater fed watercourses	Increase in pollution transmitted through groundwater to watercourses resulting in a change in biodiversity.
<i>New infrastructure and operation</i>	
North Somerset and Mendips SAC and constituent SSSI	Disturbance to roosting bats from an increase in air traffic movements and change to vegetation composition due to an increase in nitrogen deposition.
Bats	Disturbance to key commuting routes and foraging areas from proximity to car parks and lighting
Badger	Potential risk of injury of mortality through access to new roads and car park.
Dormouse	Disturbance to hedgerow habitats from proximity to car parks and lighting.
Flora and fungi sensitive to an increase in air pollution	Increase in aircraft emissions at a concentration that might cause dieback or mortality of notable flora or fungi.
Birds	Increase in risk of mortality through bird strike.
Groundwater fed watercourses	Increase in pollution transmitted through groundwater to watercourses resulting in a change in biodiversity

Potential effects requiring further consideration

The potential effects that need to be investigated further are listed below together with an outline of the work that is required.

- Demolition of structures that may support roosting bats (e.g. trees, World War 2 dispersal pens), disturbance/loss of foraging habitat and/or modification of*

commuting routes (including disturbance from lighting), and severance of commuting routes: Surveys to confirm the presence and status of potential roost structures, bat species utilising the development site, activity, habitat type and identifiable commuting routes will be carried out, based on guidance provided by English Nature (2004³⁰). This information will be taken into account as the design evolves and will be used to avoid, or reduce potential effects, and/or as the basis of appropriate mitigation.

- *Permanent land take causing death or injury, and disturbance, or loss of great crested newt resting or foraging-habitat and commuting routes:* Survey work, based on guidance provided by English Nature (2001³¹) will be undertaken to confirm the presence or absence of the species within 500m³² of potential breeding habitat, to confirm habitat type, and availability of potential receptor sites. This information will be taken into account as the design evolves and will be used to avoid, or reduce potential effects, and/or as the basis of appropriate mitigation.
- *Damage and/or disturbance to badger setts, and potential for sett destruction, loss of some foraging habitat, and/or access to some foraging habitat:* Survey work to confirm the presence of badgers and setts, and the status of setts, will be undertaken. Where there is the potential for these setts to become isolated from foraging habitat, or at risk from damage or disturbance further survey to assess the extent of the territory of the resident badger population (e.g. a bait marking exercise), and to determine the specification for potential replacement sett creation will be carried out. This information will be taken into account as the design evolves and will be used to avoid, or reduce potential effects, and/or as the basis of appropriate mitigation.
- *Damage or disturbance to individual reptiles and/or their resting places, and/or loss of foraging and resting habitat:* Survey work to identify the diversity and distribution of reptiles and their habitats on the development site will be undertaken. This information will be taken into account as the design evolves and will be used to avoid, or reduce potential effects, and/or as the basis of appropriate mitigation.
- *Damage or disturbance to dormouse hedgerow habitat and potential for injury to dormouse:* A survey to confirm the presence of dormouse within hedgerows and scrub/wooded copses using nest tubes and nest boxes will be undertaken. This information will be taken into account as the design evolves and will be used to avoid, or reduce potential effects, and/or as the basis of appropriate mitigation.
- *An increase in aircraft emissions at a concentration that might cause dieback or mortality of notable flora or fungi within designated sites:* The results of the air

³⁰ English Nature. 2004. Bat mitigation guidelines. English Nature. Peterborough.

³¹ English Nature. 2001. Great crested newt mitigation guidelines. English Nature. Peterborough.

³² That includes components of the BIA

quality modelling work will be reviewed to determine likely levels of air pollution and effect, and be compared to standards for the protection of ecosystems.

- *Disturbance to roosting bats within the Somerset and Mendips SAC and constituent SSSIs as a result of an increase in air traffic movements and change to vegetation composition due to an increase in nitrogen deposition.* It is considered that due to the likely altitude of aircraft as they over-fly the SAC and SSSI noise levels, vortex effects and vibration would not affect roosting bats. However the effect of an increase in nitrogen deposition may alter the vegetation composition within the SAC or one of its constituent SSSI. The results of the air quality and noise modelling work will be reviewed to determine likely levels of air pollution and effect. An assessment may be required to demonstrate to English Nature that an Appropriate Assessment (under the *Conservation (Natural Habitat &c.) Regulations 1994* is not required (in respect of the SAC).
- *Increase in contaminants transmitted through groundwater to groundwater fed watercourses resulting in a change in biodiversity:* No pollution of groundwater-fed watercourses has been recorded to date. Risks of contamination and potential effects on aquatic ecology will be considered as part of the EIA.

Potential effects not requiring further assessment

The following potential effects will not be considered by the EIA.

- *Dust deposition on vegetation in Felton Common County Wildlife Site:* Dust deposition from future construction activities is not thought to affect growth/survival of plants within Felton Common CWS because of a high level of dust control incorporated into the construction methodology and SEMP, and distance (more than 250m) of areas of significant botanical interest from the development site.
- *Damage or disturbance to nesting birds, nests, or their young by construction activities:* All works that have the potential to affect nesting birds will be undertaken outside of the breeding season (mid-February to mid August), taking into account the requirements of other legally protected species. Therefore no significant effects are likely.
- *Loss of semi-improved calcareous grassland through construction activities.* The loss of a small portion of this grassland is not considered to be significant due to its presence elsewhere on the site, and its limited diversity as a result of existing management procedures.
- *Potential risk of injury of mortality to badger through access to new roads and car park.* Badgers will be excluded from these areas through the installation of badger-proof fencing and underpasses (if necessary).
- *Increase in risk of bird mortality through aircraft strike.* BIA will increase proportionately the intensity of its bird scaring activities and maintain its management of grassland to minimise the risk of bird strike.

3.4.5 Mitigation of effects not expected to be significant

Where appropriate mature trees and hedgerows will be retained. New areas of landscape planting will use native species of a local provenance where appropriate, particularly where this planting is in proximity to natural stands of vegetation or existing hedgerows/trees/scrub.

3.4.6 Environmental enhancement measures

As part of the airport development, new habitats will be created and/or existing habitats will be enhanced. This may include parts of Cornerpool Farm, and/or other discrete parcels of land to the east of the A38. Such habitat creation/enhancement would be aligned with providing additional opportunities for known local ecological resources (e.g. bats, badgers, and reptiles), and where possible, seek to contribute to LBAP targets.

3.5 Community

3.5.1 Relevant policies and their implications for scoping

Table 3.16 lists the planning policy guidance and policies that are relevant to community, and sets out the implications of the guidance and policies for the scope of the EIA. The full names of the plans and guidance cited are given in Appendix C, which details all policies and guidance that are relevant to the development.

Table 3.16 Relevant policies and their implications - community

Policy reference	Implications
Policy 1 – JRSP 2002	Requires planning and transport policies to be based on the principles of sustainable development, and seeks to reconcile, balance and integrate the protection and enhancement of the environment, the maintenance and enhancement of economic prosperity and meeting the social needs and aspirations of the people of the area through the provision of opportunities for commercial and industrial development, housing and related services and activities.
Policy 4 – JRSP 2002	Seeks an integrated, corridor based approach to transport improvements which maximises opportunities to secure travel by alternatives to the car. One on the identified transport corridors is the A38 between BIA and Bristol.
Policy 16 – JRSP 2002	Establishes the boundary of the Green Belt and the type of development that would be acceptable within the boundary.
Policy 50 – JRSP 2002	Requires local plans to provide for the development and upgrading of passenger transport interchanges between different public transport services to further the development of a fully integrated transport network.
Policy 52 – JRSP 2002	Local Plans and Local Transport Plans should secure the provision of facilities to help people with impaired mobility.
Policy NE/1 – NSLP 2000	The Council will support and assist the creation of the Forest of Avon and will require the design and materials of any buildings and any landscaping and planting to reflect the woodland setting and assist in establishing the Forest of Avon.
Policy CON/1 – NSLP 2000	Development will not be permitted unless it is compatible with its surroundings

	or general locality in terms of height scale, density, massing, landscaping, layout and materials used.
Policy GRB/1 – NSLP 2000	The boundary of the Green Belt is defined on the Proposal Map.
Policy GRB/3 – NSLP 2000	Within the Green Belt, planning permission will not be granted except for new buildings for the purposes of agriculture and forestry, new building of essential facilities which are appropriate on the Green Belt, infilling within identified settlements, re-use of buildings provided development has no greater impact upon the openness of the Green Belt, and the carrying out of engineering or other operations or for changes in the use of land which maintain openness and do not conflict with the purposes of including land in the Green Belt.
Policy GRB/5 – NSLP 2000	Infilling or redevelopment within the defined boundary of Bristol International Airport will be permitted provided that it has no greater impact on the purposes of including the land in the greenbelt, development does not exceed the height of existing buildings and does not cause a major increase in the developed proportion of the site. Any new buildings and uses should be compatible with the location, be well integrated with their surroundings, cause no insurmountable amenity or traffic objection and no unacceptable travel implications.
Policy GDP/3 – NSRLP SDD 2004	A high standard of planning and design is expected in all development. In determining planning applications account will be taken of a number of design objectives, including the retention of important ecological, amenity or heritage value, views of public importance, development to have regard to characteristics of site and surroundings, and a requirement that hard or soft landscaping is of an appropriate standard that contributes positively to the character of the site.
Policy GDP/5 – NSRLP SDD 2004	Development will only be permitted where adequate provision has been made for, infrastructure necessary in planning terms for the development to proceed; and other services and facilities, the need for which arises directly from the development.
Policy GDP/6 – NSRLP SDD 2004	Where appropriate, planning obligations will be phased or conditions used to regulate how development is carried out and subsequently managed.
Policy ECH/2 – NSRLP SDD 2004	In respect of major development proposals, the Council will seek the inclusion and maintenance of public art as a contribution from developers where such works would enhance or improve the quality of the development and/or its surroundings.
Policy RD/4 – NSRLP SDD 2004	The boundary of the Green Belt is defined on the Proposal Map.
Policy RD/5 – NSRLP SDD 2004	Development within the Green Belt is inappropriate unless it is for agricultural or forestry purposes, is essential for outdoor sport, recreation, cemeteries or other uses that preserve the openness of the green belt the re-use or sub-division of existing buildings or the construction of new dwellings within identified settlement boundaries or the infilling or redevelopment of identified developed sites. New buildings for any other purpose will not be approved unless there are very special circumstances.
Policy RD/6 – NSRLP SDD 2004	This policy allows the infilling or redevelopment within the defined boundary of Bristol Airport provided the infilling has no greater impact on the purpose of including the land within the Green Belt, does not exceed the height of existing buildings or cause a major increase in the developed proportion of the site. In terms of redevelopment, proposals should not impact on the openness of the Green Belt, should not exceed the height of existing buildings, or occupy a larger footprint than the existing building. Any new buildings should be compatible with the location and character of the site, be well integrated with their surroundings, and cause no insurmountable amenity or traffic objections.

3.5.2 Approach to identifying likely significant effects

Consideration of a number of key potential effects on local communities (i.e. arising from changes in air quality, landscape and visual environments, noise, vibration and vortex strikes, and transport) have been dealt with in other sections of the report. This section deals with

further potential socio-economic effects, including effects on employment, tourism, trade and investment, health, and recreation.

For each of the identified receptors that could be significantly affected by the proposed development, the likelihood of there being significant effects will be reviewed in the context of the magnitude and other characteristics of the environmental changes that are expected to be caused by the scheme. At this stage in the EIA process, these characteristics have not been quantified, although the EIA will include a further review of baseline conditions to contribute to the assessment of impacts. The significant effects will be identified against the baseline conditions and other anticipated trends using professional judgement and consideration of the impacts of other relevant schemes elsewhere.

3.5.3 Baseline conditions

Data sources

This section of the report has been based on the following sources of information:

Gibb Airports (2000) Bristol International Airport Master Plan;
Ordnance Survey 1:25,000 maps; and
a site visit.

Summary of available baseline information

BIA is situated on a plateau surrounded by agricultural land adjacent to the A38 and lies between the residential settlements of Lulsgate Bottom and Redhill. To the north of the airport boundary and on either side of Downside Road near its junction with the A38, there are houses which form part of Lulsgate Bottom. These properties are on land of a lower level than the airport site, while the remaining areas of Lulsgate Bottom, include a primary school, are located on a dip in the land north of the airport and to the east of the A38.

Other nearby residential settlements include Downside, Downside Caravan Park and Potters Hill to the north, whilst Felton, the nearest village, which has a small conservation area, lies some two miles to the north-east of the airport. Felton Common LNR contains public footpaths and a small car park. BIA is surrounded by agricultural land, which includes a number of farms and individual dwellings. Other businesses are also located in the local area, including a golf course to the west of the airport site.

The SoI (BIA, 2004) identifies that approximately 2500 workers were employed at BIA during the summer of 2004. A recent survey of 900 staff indicated that 42% of these lived in North Somerset. A further 1350 jobs are currently estimated to be generated by the airport through companies supplying the airport or through the spending of wages by employees. In addition, BIA makes a contribution to the regional economy through attracting inward investment, supporting productivity and growth of indigenous industries.

No Public Rights of Way (PRoW) occur within or immediately adjacent to the airport boundary.

Figure 2.1 provides an overview of the area in the local vicinity to BIA.

Data gaps

An economic impact assessment is being undertaken as a separate piece of work; this study will review and quantify the potential impacts on employment, tourism, and investment and trade. The community chapter of the ES will draw on this information to assess the potential effects in these areas. Effects on health are being considered as part of a sustainability appraisal/SEA of the project. Information on potential health effects identified from that work will be incorporated into the ES.

Predicted trends

No trends have been identified.

3.5.4 Identification of the next steps in the assessment process

The evaluation of other many community effects (i.e. arising from changes in air quality, landscape and visual environments, noise, vibration and vortex strikes, and transport) are set out elsewhere in this report. Table 3.17 identifies receptors, likely environmental changes and potential effects, and the supporting text sets out the scope of the assessment for community, insofar as it can be defined at this stage of the EIA process.

Table 3.17 Receptors, likely changes and potential effects - community

Receptor	Changes and potential effects
<i>Construction and permanent land use change</i>	
Labour force	Direct, indirect and induced employment from construction activity.
Local communities	- Changes in air quality as a result of construction activity affecting the health of those living near the site. - Noise and vibration during construction may have negative effects on local communities. - Increased traffic in the area during construction could have negative impacts on local communities. - The overall effect on the rural characteristics and amenities of the area local to BIA
<i>New infrastructure and operation</i>	
Labour force	Direct, indirect and induced employment from increased airport activity.
Local businesses	- Increased accessibility to the area could increase the number of tourists and tourism spending. - Increased accessibility of the area could help to encourage investment and trade benefiting the local economy.
Local communities	- Changes in air quality and noise could affect the physical and mental health of those living near to the airport site. - Changes in provision of open land could affect the availability of areas for informal recreation. Increases in visual or noise disturbance may affect the appeal of nearby open space. This may also be true of more formal recreation at the nearby golf course. - The overall effect from the growth of the airport and its increased patronage on the rural characteristics and amenities of the area local to BIA

Potential effects requiring further consideration

The potential effects that need to be considered further are listed below.

- *Construction disturbance to local communities through changes to air quality, noise or traffic:* Assessment of these effects will draw on the work undertaken in other relevant sections of the ES, providing commentary on how these changes may affect the health and wellbeing of the community.
- *Employment during construction and operation of the expanded site:* Employment will be considered by a separate Economic Impact Assessment, and the ES will draw on this information to assess the significance for the affected communities of the effects identified in the economic report. The significance will be assessed in comparison to the existing employment levels in the areas affected.
- *Effects of tourism on local communities:* It is understood that the Economic Impact Assessment will assess the expected impact of the expansion on tourist numbers, and therefore the EIA will assess these results to consider the significance of potential effects on affected communities.
- *Effects from increased inward investment or trade:* As for employment and tourism, the EIA will use results from the Economic Impact Assessment to consider the effects of changes in trade or investment for affected communities.
- *Effects on health during operation of the expanded airport:* Drawing on the results of the air quality and noise chapters, this section will consider the implications of any identified changes in air quality or noise for the mental and physical health of the local community. It will include a review of guidance documents and research to identify thresholds or levels for potential health impacts.
- *Effects on recreation from changes in land take or disturbance:* The potential effects on informal recreation and other facilities (specifically the nearby golf course and Felton Common LNR) as a result of expansion will be considered by looking at potential effects on these areas. This is expected to be a qualitative assessment to highlight if there may be potential changes.
- *Effects upon rural characteristics of the area and character and amenity of surrounding villages:* The effect of increased patronage upon the rural area and character of surrounding villages will be considered through a character assessment survey that will assess existing characteristics and then examine the impact of increased traffic numbers and travel patterns upon these characteristics and identified receptors.

Potential effects not requiring further consideration

No further potential effects (other than those identified above) have been identified.

3.5.5 Mitigation of effects not expected to be significant

No additional mitigation has been confirmed to be necessary at the time of writing.

3.5.6 Environmental enhancement measures

No additional enhancement measures have been confirmed to be necessary at the time of writing.

3.6 Geology and land quality

3.6.1 Relevant policies and their implications for scoping

Table 3.18 lists the planning policy guidance and policies that are relevant to geology and land quality, and sets out the implications of the guidance and policies for the scope of the EIA. The full names of the plans and guidance cited are given in Appendix C, which details all policies and guidance that are relevant to the development.

Table 3.18 Relevant policies and their implications - geology and land quality

Policy reference	Implications
Policy 1 – JRSP 2002	Requires planning and transport policies to be based on the principles of sustainable development, and seeks to reconcile, balance and integrate the protection and enhancement of the environment, the maintenance and enhancement of economic prosperity and meeting the social needs and aspirations of the people of the area through the provision of opportunities for commercial and industrial development, housing and related services and activities.
Policy ENV/1 – NSLP 2000	Identifies that any development or use of land likely to cause pollution or damage, and proposals for development near and sensitive to such sources of pollution or nuisance will not be permitted unless mitigation measures are included or can be imposed by condition to limit the adverse effects to an acceptable level.
Policy ENV/5 NSLP 2000	On land which is unsuitable by reason of contamination, planning permission will not be granted unless remedial works are included or can be secured, or development restricted, sufficient to reduce the risk to an unacceptable level.
Policy GDP/2 – NSRLP SDD 2004	Development that could result in air, water or other environmental pollution or damage, loss of amenity, or increased risk to health or safety, as a consequence of any such problem (including the cumulative impact of different sources of the same or different kinds of problem) will only be permitted if the potential adverse effects can be limited to an acceptable level by other control regimes or by measures included in the proposal or imposed by condition or planning obligation.

3.6.2 Approach to identifying likely significant effects

For each of the identified receptors that could be significantly affected by the proposed development, the likelihood of there being significant effects will be reviewed in the context of the magnitude and other characteristics of the environmental changes that are expected to be caused by the scheme. At this stage in the EIA process, these characteristics have not been quantified. However, in some cases, even without such quantified information, it is reasonable to assume that the changes will not result in a significant effect. This is sometimes the result of

tried and trusted mitigation measures that might reasonably be expected to be effective, which have already been incorporated into the scheme proposals (refer to Footnote 12).

The identification of likely significant effects that relate to geology and land quality are determined through the use of a qualitative risk assessment based on ‘source-pathway-receptor’ methodology, which can be defined as follows.

- **Source:** a contaminant that has potential to cause harm to human and environmental receptors. In a wider context this could include particular ground conditions, for example the presence of redundant footings, which have the potential to impact on re-development proposals.
- **Pathway:** the route by which the ‘source’ could come into contact with the ‘receptor’. This can include the transport of contamination via physical contact, groundwater, wind-blown dust, vapour migration, excavation and deposition etc.
- **Receptor:** human beings, other living organisms, physical systems and built structures that could be affected by the ‘source’. A ‘receptor’ can only be affected if a viable pathway from the ‘source’ to the ‘receptor’ is present. Groundwater and surface water systems can be considered as receptors in their own right as their quality is regulated by the statutory bodies, as well as being pathways for contaminant migration to other receptors.

The ‘source-pathway-receptor’ relationship allows an assessment of potential human health and environmental risks to be made, based on the nature of the source, the degree of exposure of a receptor to a source and the sensitivity of the receptor. On this basis an assessment can then be made of the liabilities associated with the identified ‘source-pathway-receptor’ linkage. These can be expressed, for example, in terms of additional costs associated with site redevelopment and remedial measures, the potential for costs, fines or penalties imposed for breaches of environmental legislation or third party claims, and loss of land value.

A site walkover by Entec land quality specialists, accompanied by BIA staff, was undertaken on the 7th January 2005 to identify potential sources, pathways and receptors that are currently present at BIA, including land to the south at Cornerpool Farm. Potential contaminative land uses and/or potential sources of contamination in the vicinity of the airport and development areas are identified in Figure 3.5. The potential linkages identified from the site walkover and desk based information are presented in E, where the associated environmental risks are assessed for a given source. This assessment takes account of specific contaminants of concern or groups of similar contaminants of concern. It is implicit that where a potential source has been identified during the site walkover, it has been included within the list.

Potentially significant effects to receptors are considered to only occur where a project-level risk assessment (presented in Appendix E) has identified as “medium” risk or above.

3.6.3 Baseline conditions

Data sources

The section of the report is based on the following sources of information:

- meetings and conversation with staff at Bristol International Airport;

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- information provided by the Environment Agency in response to a request for relevant information (in a letter dated 08 February 2005, ref. NWX/CSC/20673);
 - conversation with staff at Fuel Farm (operated by AirBP);
 - AEA Technology (January 2000) Hydrogeology of Bristol international Airport: Desk Study. Ref. AEAT/ENV/R/0447;
 - Serco (August 2002) Borehole Installation and Monitoring at Bristol International Airport. Ref. SERCO/ERRA-0482;
 - Serco (September 2004) Installation of Two Boreholes at Bristol International Airport. Ref. SA/ENV-0690;
 - Serco (June 2004) Bristol International Airport Chemical and Oil Storage Review. Ref. SA/ENV-0682;
 - Churngold Remediation Limited (2000) Site Investigations, Fire Fighting Training Area, Bristol Airport;
 - City and County of Bristol (October 1968) Bristol (Lulsgate) Airport, An Investigation and Report on Ground Conditions in the Vicinity of the Airfield with Particular Reference to the 10 (Western) End of the Main Runway;
 - Geotechnical Engineering Limited (March 1998) Geophysical Survey, Bristol International Airport, Proposed Terminal Building. Ref. 8919;
 - Geotechnical Engineering Limited (December 1990) Ground Investigation, Bristol Airport, Airport Development. Ref. SM/P/5409;
 - C. Robson Limited (October 2004) *Review of Fuel System Delivery Options*. Ref. BRS 01/1;
 - Waterman Environmental (June 1997) *Pre-Acquisition Environmental Audit Report*. Ref. R.EN742.JH01.1.5;
 - Waterman Environmental (December 2003) *Phase I Environmental Due Diligence Report*. Report Ref. EN3921/R/1.1.5/JEH;
 - Environment Agency South West Region (July 2001) *Notice of Modification to Consent*. Consent No. 101449; and
 - Ove Arup & Partners International Ltd (December 2001) 11kV Audit. Ref. 231/01.
 - Findlay, D.C., Colborne, G.J.W., Cope, D.W., Harrod, T.R., Hogan, D.V., Staines, S.J. (1984) Soils and Their Use in South West England. Soil Survey of England and Wales Bulletin No. 14.

Soil

The soil in the vicinity of BIA is dominated by the Crwbin Association, and Findlay *et al* (1984) describe that this consists mainly of loamy brown rankers of the Crwbin Series associated with typical brown earths over limestone belonging to the Malham and Waltham series. The fine

earth of almost all constituent profiles is decalcified although there are some areas of some humic rendzinas. Bare rock in the form of limestone pavements and small crags is common and many soils are stony. Little of the silt-sized soil material is weathered from the underlying limestone and much is Aeolian in origin. Most of the land is used for rough grazing. Droughtiness is a serious limitation but where soil depth, stoniness and gradient permit, there is some improved pasture and arable cultivation. Scattered woodland is a feature of the association, particularly on steeper slopes. The base-rich nature of the soils and shallowness to limestone mean that calcicole species dominate the semi-natural unmanaged deciduous woodlands.

Geology

A review of the local geology of BIA described by the hydrogeological desk study, undertaken by AEA Technology (2000), indicates that the majority of BIA is located on the carboniferous black rock limestone, which dips NNW at approximately 12°. The Blue and White Lias formations (limestone) are noted to underlie the southeastern edge of the site. A geophysical survey undertaken by Terradat (1998) indicates that bedrock to the north of the Apron is generally present between 2.5 – 5.5m below ground level.

Fault zones are not noted to pass through the site, but are present to the north and south. However, it is noted that evidence of lead mining exists in the vicinity of the western part of the site and suggests that a minor linear feature may be present beneath the area of the 1963 runway extension. This is supported by the Terradat geophysical study that identified linear features towards this area.

Limestone swallow holes are evident in the vicinity of the airport and anecdotal evidence suggests depressions periodically appear in the car parking area following heavy storms. An Envirocheck database search commissioned by Waterman Environmental (2003) identified 15 natural sinkholes at BIA. Intrusive investigations undertaken by Geotechnical Engineering (1990) identified solution features along bedding plains and discontinuities within the limestone bedrock in a number of locations to the north and east of the Old Terminal.

Site history

A review of historical ordnance survey maps commissioned by AEA Technology (2000), indicates that in 1888 the site and surrounding area is mainly open fields. An “*Old Limekiln*” is noted at two locations, both of which are within the vicinity of the current runway. Cooks Farm is present to the north of the site and Cornerpool Farm is present to the south. Quarries are located in the vicinity of the current Fuel Farm and approximately 250m to the west of the proposed Fuel Farm. Both quarries are noted as “*Old Quarry*” by 1904.

Historical limestone quarrying is evident in the vicinity of the site and lead and calamine (zinc oxide) workings are thought to be present in the area. The Phase I Environmental Due Diligence Report prepared by Waterman Environmental Ltd (2003), identifies mineshafts underlying the site that are associated with mineralisation along the North Hill Fault, which runs to the south of the site. One such mineshaft is understood to be located beneath the present runway.

It is understood that the site was first developed as an airfield in 1941 for use during WWII as a pilot training facility and Fighter Command. The Waterman Environmental report (2003) indicates that Bristol City Council acquired the site from WWII Fighter Command in 1956, and

1960/61 mapping shows “*Bristol (Lulsgate Bottom) Aerodrome*”, prior to the runway being extended in 1963 and the “*Old Terminal*” developed in 1965.

Further expansion and development of the runway, terminal and associated buildings has been undertaken since the 1960s. Anecdotal evidence from BIA staff indicates that this included the relocation of the Fuel Farm from adjacent to the old terminal to its present location, the construction of the current terminal building, and the further extension of the runway. It is understood that the raising of ground levels occurred during both the runway extension and the construction of the current terminal building.

Sources (contaminants of concern)

Potential sources of contamination that may be of concern to geology and land quality are contaminated soil and or shallow groundwater arising from contaminative activities taking place either recently or historically, on or in the vicinity of the site. Potential sources relating to past or present activities on the site, together with the contaminants of concern and/or potential effects likely to be associated with each discrete source are:

- areas of potential infilling include the historical quarry in the vicinity of the current fuel farm, level raising fill material under the extended area of the runway and in the vicinity of the current terminal building, land at the former Cornerpool Farm and land below current and historical structures – metals, inorganic and organic contaminants, asbestos, ground gases and organic vapours;
- fuel tanks and filling areas – fuel/oil hydrocarbons including total petroleum hydrocarbons, polycyclic aromatic hydrocarbons, benzene, toluene, ethylbenzene, xylene;
- maintenance, servicing and storage hangars – metals, solvents, surfactants, fuel/oil hydrocarbons;
- fire fighting and training – metals, solvents, halogens, surfactants, fuel/oil hydrocarbons;
- airport operations – de-icing chemicals, metals, fuel/oil hydrocarbons, surfactants, solvents, herbicides, organic and inorganic contaminants;
- electricity substations – fuel/oil hydrocarbons, polychlorinated biphenyls;
- potential contamination associated with former WWII RAF operations at the site – metals, inorganic contaminants, polycyclic aromatic hydrocarbons;
- car valeting and maintenance – metals, solvents, surfactants, fuel/oil hydrocarbons;
- car parking and roadways – metals, fuel/oil hydrocarbons;
- underlying geology, including solution features – subsidence, radon gas;
- historical mining and quarrying – subsidence, metals;
- asbestos associated within historical site activities – asbestos fibres; and a
- landfill site approximately 225m to the northeast – biogenic gases.

Historical contamination of the site may have also arisen from nearby commercial/industrial land uses. Consultations between Waterman Environmental Ltd and the Contaminated Land Officer of North Somerset Council (2003) indicates that there are five disused landfill sites in the vicinity of the site, six limestone quarries, a gravel pit and two lime kilns. It is also noted that lead & calamine (zinc oxide) mining is known to have occurred in the surrounding area. The Waterman Environmental Ltd report (2003) also indicates a substantiated minor pollution incident relating to the release of diesel near to the site (September 2002), but does not indicate the proximity of the incident to the site or whether the site was affected.

Discussions with BIA also indicate an accidental release of kerosene to drainage from the fire fighting training ground in October 2003, which is highlighted in borehole monitoring records. It is also noted that drainage interceptors at Hertz car valeting and maintenance are currently believed to be inadequate, and have been highlighted by BIA to be upgraded as part of the proposed development works. The Environment Agency has no record of any pollution incidents occurring at BIA.

Pathways

The potential pathways from the identified sources are indicated below for each of the receptors:

- site visitors– dermal contact, ingestion, inhalation of dust and/or vapours;
- construction workers during redevelopment – dermal contact, ingestion, inhalation of dust and/or vapours;
- site workers (other than construction workers) during/after any development – dermal contact, ingestion, inhalation of dust and/or vapours;
- adjacent site users before/during/after development – surface water runoff, inhalation of dust and/or vapours;
- land quality before/during/after development – leaching of contaminants, direct contact, subsidence, surface water runoff, groundwater;
- buildings, buried services and infrastructure (existing and proposed) – chemical attack, vapour migration, subsidence, surface water runoff, groundwater;
- surface water – direct effects, runoff, leaching of contaminants;
- groundwater – direct effects, runoff, leaching of contaminants;
- biodiversity – direct contact, ingestion/uptake, inhalation of dust and/or vapours, surface water, groundwater.

Receptors

Potential receptors relating to geology and land quality that are associated with the proposed development are:

- people (human health) – workers within the site, site visitors, public who use the site, future development workers who will be involved in below ground excavations and adjacent site occupants in residential and commercial properties;

-
- buildings and buried services – current and proposed;
 - land quality – current and future;
 - surface water;
 - groundwater; and
 - flora and fauna.

A qualitative risk assessment has been completed and is located in Appendix E.

Potential effects from the proposed development associated with the presence of contaminants, and/or transfer to biodiversity, surface water and groundwater, are discussed in Sections 3.4 and 3.11.

Data gaps

As very little ground investigation has been undertaken at the site, the risk estimation and evaluation of potential significant effects are purely qualitative. There is an inherent uncertainty in the risk classifications which is based on suspected or potential contamination only, rather than quantitative test results.

Those scenarios for which a moderate or higher risk has been identified may require some form of remedial action or control measure (as part of the SEMP). This may require ground investigations to obtain site specific data, allow quantitative risk assessment in order to reduce the uncertainty, and refine the risk classification.

Predicted trends

Discussion with BIA indicates that the use of kerosene in the Fire Fighting Training Area is due to be phased out by the end of 2005. This will eliminate future spillage or leakage of kerosene within this area and will limit any potential cumulative effects.

In the absence of the development, the expected increase in air travel from BIA would increase towards the maximum capacity of the current infrastructure, including associated increases in fuel use, placing additional demands on the current fuel farm and fuel delivery. This may increase the potential of contamination associated with fuel spillage.

3.6.4 Identification of the next steps in the assessment process

Table 3.19 identifies receptors, likely environmental changes and potential effects, and the supporting text sets out the scope of the assessment for geology and land quality, insofar as it can be defined at this stage of the EIA process.

Table 3.19 Receptors, likely changes and potential effects - geology and land quality

Receptor	Changes and potential effects
<i>Construction and permanent land use change</i>	
Site visitors	Creation of pathways through excavations within ground and/or groundwater containing potential contamination. Transportation off-site of contaminated materials during remediation works or when changing ground levels.
Construction workers	Exposure to potential historical contamination, and ground gas through excavation during development works creating pathways.
General site workers	Creation of pathways through excavations within ground and/or groundwater containing potential contamination.
Adjacent land users	Introduction of contaminant pathways through excavation and construction works during development.
Land quality	Introduction of potentially contaminative materials and land uses from development works. Remediation of land prior to construction should areas of contamination be encountered.
Buildings and buried services	Location of buildings and services may create pathways and may be impacted by existing and introduced contaminant sources.
Biodiversity	See Section 3.4.
Groundwater	See Section 3.11.
Surface Water	See Section 3.11.
<i>New infrastructure and operation</i>	
Site visitors and workers	Exposure to potentially contaminative materials from land use changes and from alterations to pathways from new land uses and operations.
Adjacent land users	Introduction of new contaminant sources and pathways from changes in land use and operations.
Land quality	Use of potentially contaminative materials and land use changes may introduce contamination sources and pathways.
Buildings and buried services	Location of buildings and services may create pathways and may be impacted by existing and introduced contaminant sources.
Biodiversity	See Section 3.4.
Groundwater	See Section 3.11.
Surface Water	See Section 3.11.

3.6.5 Potential effects requiring further consideration

With regards to geology and land quality, there are no potential effects that require further consideration.

3.6.6 Potential effects not requiring further consideration

Measures that will be set out in the SEMP, which forms part of the scheme, will be designed to protect soil structure during stripping and storage of soils, reinstate drainage to its previous condition, and prevent contamination of soils, biodiversity, groundwater, groundwater fed surface watercourses, and people by construction activities and/or mobilisation of historical contamination. These measures will ensure that the integrity of any restored and adjacent *in situ* soils is maintained and that the risk of pollution of nearby areas/groundwater/watercourses is minimised. The potential effects on geology and land quality will not therefore need to be assessed further.

3.6.7 Mitigation of effects not expected to be significant

The presence of ‘gruffy’ areas, attributed to historical lead and calamine mining, may indicate the potential for elevated concentrations of metals in the vicinity of the proposed car parking area to the south. The car parking area is proposed to include land previously occupied by Cornerpool Farm, which may include potential land contamination associated with waste/rubble and where there is evidence of building foundations.

Suitable personal protective equipment and working practices employed during development works within these areas would minimise potential risks to construction workers. The hardstanding associated with the proposed car parking would act to remove the main pathway between future site users and contamination associated with the mining activities and farm waste/rubble identified above.

It should be noted that the risk to receptors is not exhaustive and Table 3.19 indicates potential effects considered most likely, hence the proposed development has the potential to introduce potential effects that have not been highlighted, and in such cases further work may be required.

3.6.8 Environmental enhancement measures

Environmental enhancement measures associated with the proposed development include an improvement of drainage, including an upgrade to the site's interceptors. This will help reduce the risk of potential contaminants impacting land quality.

Contamination may have occurred within the proposed development areas from historical activities. Such contamination may be defined during the development and redevelopment works, which would otherwise not be detected and potentially continue to pose a risk to sensitive receptors.

3.7 Landscape and visual

3.7.1 Relevant policies and their implications for scoping

Table 3.20 lists the planning policy guidance and policies that are relevant to landscape and visual, and sets out the implications of the guidance and policies for the scope of the EIA. The full names of the plans and guidance cited are given in Appendix C, which details all policies and guidance that are relevant to the development.

Table 3.20 Relevant policies and their implications - landscape and visual

Policy reference	Implications
Policy 1 – JRSP 2002	Requires planning and transport policies to be based on the principles of sustainable development, and seeks to reconcile, balance and integrate the protection and enhancement of the environment, the maintenance and enhancement of economic prosperity and meeting the social needs and aspirations of the people of the area through the provision of opportunities for commercial and industrial development, housing and related services and activities. One of the aims of the policy is to secure effective stewardship of the area's environmental assets by respecting and, where appropriate, enhancing landscape character and protecting the countryside from inappropriate development.
Policy 16 – JRSP 2002	A Green Belt shall continue to surround and separate Bristol and Bath, and will be kept open in order to: check the unrestricted sprawl of the Bristol conurbation and Bath; assist in safeguarding the surrounding countryside from encroachment; prevent neighbouring towns from merging into one another. Within the Green Belt, the positive use of land will be promoted by: allowing appropriate opportunities for improved access to the open countryside; allowing appropriate opportunities for outdoor sport and recreation near urban areas; safeguarding attractive landscapes, enhancing landscapes, and improving damaged and derelict land around towns; securing nature conservation interest; and retaining land in agricultural, forestry and related uses; provided that the openness of the Green Belt is maintained.
Policy 17 – JRSP 2002	In terms of assessing landscape impact, emphasis will be placed on ensuring the continued conservation and enhancement of the character and distinctiveness of the landscape, and where necessary the restoration or regeneration of degraded landscapes. Where development or land use change occurs and significant landscape impact cannot be avoided or mitigated, the creation of new landscape features or elements which contribute to the character of the locality may be considered.
Policy 21 – JRSP 2002	The creation of the Forest of Avon will be supported and assisted. Where development is permitted within the Forest boundary, conditions or planning obligations may be used to ensure that the development respects and contributes to the woodland setting. Any development proposal within the Forest in the Green Belt will be subject to the normal policies controlling development in Green Belts.
Policy ENV/1 – NSLP 2000	Identifies that any development or use of land likely to cause light pollution or damage, and proposals for development near and sensitive to such sources of pollution or nuisance will not be permitted unless mitigation measures are included or can be imposed by condition to limit the adverse effects to an acceptable level.
Policy ENV/2 – NSLP 2000	Planning permission for artificial lighting will be permitted provided that the proposal by itself or in conjunction with other similar proposals would not harm the appearance and character of the area, the amenities of neighbouring properties, or create a safety hazard on adjoining roads.
Policy NE/1 – NSLP 2000	The Council will support and assist the creation of the Forest of Avon and will require the design and materials of any buildings and any landscaping and planting to reflect the woodland setting and assist in establishing the Forest of Avon.
Policy LCS/1 – NSLP 2000	Where granting planning permission for development having a substantial impact on its surroundings, the Council will require the submission of and approval of a landscaping scheme, and for the scheme to be implemented before the development is fully occupied or in accordance with an agreed programme of work.
Policy GRB/1 – NSLP 2000	The boundary of the Green Belt is defined on the Proposal Map.
Policy GRB/3 – NSLP 2000	Within the Green Belt, planning permission will not be granted except for new

	buildings for the purposes of agriculture and forestry, new building of essential facilities which are appropriate on the Green Belt, infilling within identified settlements, re-use of buildings provided development has no greater impact upon the openness of the Green Belt, and the carrying out of engineering or other operations or for changes in the use of land which maintain openness and do not conflict with the purposes of including land in the Green Belt.
Policy GRB/5 – NSRLP 2000	Infilling or redevelopment within the defined boundary of Bristol International Airport will be permitted provided that it has no greater impact on the purposes of including the land in the greenbelt, development does not exceed the height of existing buildings and does not cause a major increase in the developed proportion of the site. Any new buildings and uses should be compatible with the location, be well integrated with their surroundings, cause no insurmountable amenity or traffic objection and have no unacceptable travel implications.
Policy GDP/2 – NSRLP SDD 2004	Development that could result in air, water or other environmental pollution or damage, loss of amenity, or increased risk to health or safety, as a consequence of any such problem (including the cumulative impact of different sources of the same or different kinds of problem) will only be permitted if the potential adverse effects can be limited to an acceptable level by other control regimes or by measures included in the proposal or imposed by condition or planning obligation.
Policy GDP/3 – NSRLP SDD 2004	A high standard of planning and design is expected in all development. In determining planning applications account will be taken of a number of design objectives, including a requirement that hard or soft landscaping is of an appropriate standard that contributes positively to the character of the site.
Policy ECH/8 – NSRLP SDD 2004	Within the Landscape Character Areas, development will be permitted if it will not adversely affect significantly the particular character of the landscape.
Policy ECH/10 – NSRLP SDD 2004	Where development is permitted within the Forest of Avon, conditions may be imposed or planning obligations sought requiring the design and materials of any buildings, landscaping and planting, to reflect the developing woodland setting and assist in establishing the Forest.
Policy RD/5 – NSRLP SDD 2004	Development within the Green Belt is inappropriate unless it is for agricultural or forestry purposes, is essential for outdoor sport, recreation, cemeteries or other uses that preserve the openness of the green belt the re-use or sub-division of existing buildings or the construction of new dwellings within identified settlement boundaries or the infilling or redevelopment of identified developed sites. New buildings for any other purpose will not be approved unless there are very special circumstances.
Policy RD/6 – NSRLP SDD 2004	This policy allows the infilling or redevelopment within the defined boundary of Bristol Airport provided the infilling has no greater impact on the purpose of including the land within the Green Belt, does not exceed the height of existing buildings or cause a major increase in the developed proportion of the site. In terms of redevelopment, proposals should not impact on the openness of the Green Belt, should not exceed the height of existing buildings, or occupy a larger footprint than existing the building. Any new buildings should be compatible with the location and character of the site, be well integrated with their surroundings, and cause no insurmountable amenity or traffic objections.
Policy E/8 – NSRLP SDD 2004	States that outside of Weston super Mare, new hotel accommodation will only be permitted in existing settlements, or in areas outside of the Green Belt.

3.7.2 Approach to identifying likely significant effects

For each of the identified receptors that could be significantly affected by the proposed development, the likelihood of there being significant effects will be reviewed in the context of the magnitude and other characteristics of the environmental changes that are expected to be caused by the scheme. At this stage in the EIA process, these characteristics have not been quantified. However, in some cases, even without such quantified information, it is reasonable to assume that the changes will not result in a significant effect. This is sometimes the result of

tried and trusted mitigation measures that might reasonably be expected to be effective, which have already been incorporated into the scheme proposals (refer to Footnote 12).

It is usual to consider potential landscape effects and visual effects separately. Landscape effects are those that are predicted to result from changes to landscape features, elements or patterns. They include direct effects such as removal or disruption but also include effects upon landscape character. Landscape character is a product of the complex relationship between physical elements, the natural environment, land use and human activity (past and present).

Visual effects result from changes in the visual environment and the receptors are always human. Visual effects include loss of views, imposition of new elements into views or the removal of existing elements from views.

In all cases the determination of significance is carried out by considering the magnitude of a predicted change and the sensitivity of the receptor/s to that change. Rather than use a rigid scale to determine sensitivity, it is normal practice to define the scale in response to a particular site or area. The methods adopted for this EIA will be based on the Second Edition of the Guidelines for Landscape and Visual Impact Assessment produced by the Landscape Institute and Institute of Environmental Management and Assessment (2002).

3.7.3 Baseline conditions

Data sources

This section of the report is based on the following sources of information:

- Countryside Agency (1999) Countryside Character Volume 8; South West;;
- Land Use Consultants (2004) North Somerset Landscape Character Assessment;;
- the Forest of Avon Plan (January 2002) Forest of Avon;
- a site inspection carried out by an Entec landscape and visual specialist on January 13th 2005, during which discussions were held with BIA representatives and a photographic record was produced; and
- a preliminary discussion on 26 January 2005 with the North Somerset Land Design and Conservation Team with particular regard to visual sensitivity around the airport and the landscape sensitivity of “gruffies”.

Summary of available baseline information

According to the Countryside Agency’s Character Map of England, BIA falls within an area called Bristol, Avon Valleys and Ridges (Character Area 118). It is a large and varied area stretching from the Mendips in the south to the Cotswolds in the north. The sheer size and diversity of the area limits the extent to which the associated text is directly relevant to the study area. Indeed there is no mention of the existing airport at Lulsgate. It does however state that one of the key characteristics of the area is that it supports wooded scarps with ancient woodland and high, open, downland ridges; BIA sits on such a ridge.

Of more interest in the context of this study is the work carried out in 2004 by Land Use Consultants on behalf of North Somerset Council. The North Somerset Landscape Character Assessment (October 2004) provides an extremely useful and up to date summary of landscapes

within the administrative boundary of North Somerset. In that study, BIA falls within a group of landscape types termed “*Settled Limestone Plateau (sic)*”. Specifically, within this group the site falls within The Broadfield Down Settled Limestone Plateau. The report identifies the key characteristics of the area as follows:

- flat to undulating elevated broad plateau extending from the summits of the limestone escarpments;
- open and exposed landscape with distant views to lowland and wooded ridges;
- mixed and coniferous plantation woodland belts and clumps (some of ancient woodland), the most substantial of which are to the north of the area;
- remnant areas of grasslands of ecological value such as unimproved calcareous and acid grassland at Felton Common;
- large rectilinear fields enclosed by hedges;
- BIA and the associated modern terminal buildings and infrastructure, particularly prominent along the A38, dominate the central section of this area;
- settlement is limited to isolated farmsteads, nucleated villages and along the A38, development of a more urban character;
- fairly inaccessible away from the A38, with few rural roads crossing the area. Near to the airport increased signage and road markings give the roads a more urban feel;
- increased lighting at the airport impact (sic) on rural character and night skies;
- several working quarries.

The report suggests that the Broadfield Down Settled Limestone Plateau Character Area has a moderate strength of character. The presence of the airport is cited as a disruptive presence, however it is noted that whilst the area as a whole exhibits a number of characteristic features of the Settled Limestone Plateau landscape type, there is a lack of any unity or distinct pattern of features.

The report also suggests that the condition of the area is declining. Evidence put forward for this is poor management of field boundaries and “*the effects of the pressure on the area from airport infrastructure.*”

The North Somerset Landscape Character Assessment suggests a strategy of conserving existing positive features (such as blocks of woodland) and enhancing the rural and pastoral nature of the area by improving hedgerows and careful design and management of airport infrastructure. In particular, the report suggests the following Landscape Guidelines for the area:

- strengthen the rural nature of the wooded and pastoral landscape;
- promote sensitive, cyclical / rotational management of hedgerows;
- maintain key local landscape features such as ancient woodland blocks;

- promote opportunities for creating new and linking existing areas of unimproved grassland;
- minimise the impact of visually intrusive land uses such as quarrying and the airport, associated development and infrastructure through design guidance and appropriate land management; and
- promote the preparation of Village Design Statements within the context of the landscape character assessment.

BIA falls within the boundary of the Forest of Avon, which includes some 57,000 ha in four unitary areas. The aspirations of the Forest of Avon are reflected in a number of landscape policies and supported by Supplementary Planning Guidance. Of particular relevance to development proposals at Bristol International Airport is the fact that the Lulsgate Plateau is one of two “strategy areas” within The Forest of Avon Plan. Priorities for the Lulsgate Plateau include:

- the management of the existing woodland;
- improve the boundaries of the airport visually;
- improve the wildlife corridors, particularly by extending woodland cover towards Bristol and improving the management of Brook corridors; and
- improving management of existing hedgerows with new tree planting and pollarding in the Ashton Vale.

Physical baseline

When describing the existing landscape and visual baseline there is a clear distinction between that associated with proposals within the exiting site boundary and that beyond. The possible expansion of the southern car park falls outside the boundary whilst proposed development within the boundary includes:

- multi-storey car park;
- expanded aircraft stands;
- new office accommodation;
- new fuel farm;
- new fire station; and
- an airport hotel.

For the purposes of this assessment, there are no sensitive landscape receptors within the existing airport boundary likely to be affected by the proposed development. For the most part development is proposed on previously developed land in areas already characterised by airport facilities, functions and infrastructure.

Cornerpool Farm to the south of the airport contains a number of landscape features that will have a degree of sensitivity to proposals to expand the southern car park. All existing field boundaries have a degree of sensitivity as well as existing groups of trees and scrub. The latter

are concentrated to the south of the existing car park. The sensitivity of these features is heightened by the recommendations of the North Somerset Landscape Character Assessment, the aspirations of the Forest of Avon Plan and the Structure Plan Policy C.6 (Priority Landscape Improvement Area.). All of these documents encourage the protection of existing woodland cover, the introduction of additional planting and improved management to existing field boundaries. The field immediately to the south of the existing car park contains some remnant earthworks associated with mining activity (gruffies). Whilst these features are locally common, they are of some significance in terms of heritage value. There is also a linear landform suggesting evidence of a former enclosure running north - south.

The landscape character of Cornerpool Farm is predominantly rural, low grade grazing with occasional open views across lowlands to the Mendips. It is influenced to an extent by the A38 and infrastructure associated with the airport although this is mostly well screened. The lower slopes are characterised by tree groups and scrub, which in turn are associated with the gruffies. The area contains a number of World War II structures including an air raid shelter adjacent to the airport boundary fence and evidence of former barracks in the woodland.

Visual baseline

A preliminary photographic record is provided in Appendix F, together with a plan showing photograph locations. The proposed development is illustrated in Figure 2.3. This section will describe the existing visual context of the proposed development sites and identify the key visual receptors associated with each of them.

Passenger terminal, fuel farm, fire station, office accommodation

This group of facilities would be constructed within an existing band of operational development which occupies a ridge top position between the car park area to the north and the airside to the south. The area is currently characterised by the modern architecture of the existing terminal building, control tower and the maturing formal landscape as well as infrastructure associated with vehicular and pedestrian movements. From the north, the skyline is already broken by existing development. The proposed development, like the existing, would be visible from beyond the airport boundary in particular from the south facing slopes to the north. Views of the proposed development would be visible from the settlement of Downside as well as from residential properties along Backwell Hill Road. Photograph 1 represents a view north from the existing terminal building and illustrates the extent to which the new development would be visible from the north.

Aircraft stands

New aircraft stands are proposed along the entire “frontage” to the north of the runway and taxiway. For the most part, this area is screened from views beyond the airport boundary by topography and existing development. To the east however, the stands would extend across the site of the old terminal building and the staff car park. The area is currently visible from the A38 as illustrated in Photograph 2. The nature of existing views across this site is determined to a large extent by the maturing landscape at the gateway to the airport. As this landscape matures views will become more contained within the road corridor. Views from Felton Primary School would be influenced by development of the Old Terminal and the car park for aircraft stands.

Airport hotel, short stay car park and possible catering facilities

This group of proposed developments would be constructed on low-lying land currently occupied by the long stay car park. The area is illustrated in Photograph 3. Whilst this area is clearly visible from elevated land to the south occupied by the main airport facilities, visual receptors in this area are not considered to be sensitive. Some filtered views are available of this area from Downside Road, however landscape planting and earth bunds will be increasingly effective in screening these views. This screening is less effective along the western boundary of the car park area. The area is also exposed in elevated views from north of Downside Road including residential properties along Backwell Hill Road.

Cornerpool Farm

Consideration is being given to a number of potential options for the expansion of the silver zone car park onto Cornerpool Farm. For the purposes of this visual assessment, the area in question has been split into four distinct areas (as illustrated in Figure 3.6). The extent to which each of these areas is visible at present is determined to a large extent by topography and existing vegetation.

Area 1 occupies the lower, steeper, south facing slopes of Cornerpool Farm. The area is currently exposed to views from the south including from various points along the A38 (as illustrated in Photographs 4 and 5). It supports a number of tree/scrub groups and is enclosed to the south by a gappy, low hedge (Photograph 6). The area is potentially visible from distant vantages on the Mendip Hills.

Area 2 occupies the upper slopes immediately to the south of the existing silver zone car park (Photograph 7). In contrast to Area 1, it has gentler gradients, less uneven gruffy ground and less tree and scrub cover. The tree and scrub cover in Area 1 coalesces to form an effective screen to views from the south. The mature hedgerow along the A38 effectively screens all but glimpsed views from passing vehicles.

Area 3 is a relatively level, open field (Photograph 8) which once contained the main farm buildings. Views into this area from the A38 and from the south are effectively screened by landform, existing woodland and the screen planting around the existing silver zone car park.

Area 4 is a large, open field with gentle gradients falling to the south west. Views into the upper parts of this field adjacent to the existing airport boundary are restricted by topography and existing vegetation. Any potential development (not confirmed at this stage) would need to be sympathetic to the outlook from Highfield and Goblin Coombe Farm, both on Winters Lane and to views from Winters Lane itself. Photograph 9 represents a view into this area from Winters Lane to the south.

Data gaps

No field studies have been undertaken at night nor have potential views from the Mendip Hills been investigated.

Due to bright and low winter sun during the site inspection in January, no photographs are available of the site from the north. This includes views from Downside Road and Backwell Hill Road.

The digital base plan used during this study has no geo-reference data. Consequently the 3D topographic data obtained separately needed to be superimposed manually. There will be a degree of inaccuracy (say +/- 5 m horizontal).

At the time of the site visit only Cornerpool Farm was accessible (Areas 1, 2 and 3). The field further to the west (Area 4) was not.

Predicted trends

The North Somerset Landscape Character Assessment suggests that landscape condition in the vicinity of the airport is declining. This decline is in part attributed to past development associated with the airport itself but also to the management of field boundaries.

3.7.4 Identification of the next steps in the assessment process

Table 3.21 and 3.22 identifies receptors, likely environmental changes and potential effects, and the supporting text sets out the scope of the assessment for landscape and visual (including a number of car parking options), insofar as it can be defined at this stage of the EIA process.

Table 3.21 Receptors, likely changes and potential effects - landscape

Receptor	Changes and potential effects
<i>Construction and permanent land use change</i>	
Landscape features and elements within the existing airport boundary	Construction activity to reconfigure existing landscape features and buildings to accommodate new development.
Landscape features and elements within Cornerpool Farm	Loss of mature vegetation, hedgerows, changes in ground levels associated with the construction of additional car parking.
Landscape Character within the airport boundary	Changes to landscape character within the airport site as a result of construction activity.
Landscape Character of the wider area	Changes to the wider landscape character as a result of construction activity.
<i>New infrastructure and operation</i>	
Landscape features and elements within the existing airport boundary.	Care and management of landscape features within the site.
Landscape features and elements within Cornerpool Farm	Care and management of retained landscape features in the vicinity of Cornerpool Farm during the operation of an extended silver zone car park.
Landscape Character within the airport boundary	Long term changes to landscape character by reconfiguration of features and elements within the existing site boundary.
Landscape Character of the wider area	Long term changes to landscape character by reconfiguration of features and elements outside the existing site boundary.

Table 3.22 Receptors, likely changes and potential effects - visual

Receptor	Changes and potential effects
<i>Construction and permanent land use change</i>	
Residential properties in Downside, along Backwell Hill Road, Core Hill, Cook's Farm, Old Farm / Downside Farm, Cooks Bridlepath/ Winters Lane	Construction activity associated with the new, fuel farm, fire station and new office accommodation. Views of construction activity, plant and materials.
Residential properties in Downside, along Backwell Hill Road, Old Farm, Downside Farm, and Coombe Dale	Construction activity associated with the new terminal building / terminal extension. Views of construction activity, plant and materials.
Felton Primary School, A38	Construction activity associated with the new aircraft stands. Views of construction activity, plant and materials.
Residential properties in Downside, along Backwell Hill Road, Old Farm, Downside Farm and Coombe Dale	Construction activity associated with the short stay car park and airport hotel. Views of construction activity, plant and materials.
Local area	Effects from construction lighting.
<i>New infrastructure and operation</i>	
Residential properties in Downside, along Backwell Hill Road, Core Hill (residential property), Cook's Farm (Residential Property), Old Farm / Downside Farm, Cooks Bridlepath/ Winters Lane, Downside Road	Visibility of the new, fuel farm, fire station and new office accommodation.
Residential properties in Downside, Backwell Hill Road, Old Farm, Downside Farm, and Coombe Dale	Visibility of the new terminal building / terminal extension.
Felton Primary School, and the A38	Visibility of the new aircraft stands.
Residential properties in Downside, Backwell Hill Road, Old Farm, Downside Farm, and Coombe Dale	Visibility of the short stay car park and airport hotel.
Distant viewpoints including the Mendip AONB and the A38	Visibility of the car park extension into Cornerpool Farm, associated infrastructure and lighting (Area 1 -Optional). Visibility of the car park extension into Cornerpool Farm associated infrastructure and lighting (Area 2 -Optional). Visibility of the car park extension into Cornerpool Farm associated infrastructure and lighting (Area 3 -Optional).
Distant viewpoints including the Mendip AONB, and the A38, Highfield, Goblin Coombe Farm, and Winters Lane	Visibility of the car park extension into Cornerpool Farm associated infrastructure and lighting (Area 4 -Optional).
Local area	Increased lighting at the airport.

Potential effects requiring further consideration (landscape)

The potential effects that will be considered further are listed below.

- *Loss of mature vegetation, hedgerows, changes in ground levels associated with the construction of additional car parking within Cornerpool Farm:* The planning framework and the Forest of Avon place some sensitivity on existing hedgerows and woodland blocks. Gruffy ground has some cultural heritage sensitivity.
- *Changes to the wider landscape character as a result of construction activity:* There is the possibility in the short term of the perception of “urbanisation” during construction activity before mitigation measures such as landscape proposals have been implemented.
- *Effects on retained landscape features in the vicinity of Cornerpool Farm during the operation of an extended silver zone car park:* There is an opportunity to improve the management of retained landscape features such as woodland blocks, retained vegetation and field boundaries including hedgerows. This can be achieved by additional planting to augment the existing (in accordance with CAA guidelines) and implementation of a management plan.
- *Long term changes to landscape character outside the existing site boundary by reconfiguration of features and elements:* The landscape condition of the area as a whole is identified as being “in decline” and the character is recognised as lacking unity. Proposals should be designed so that they have at least little or no detrimental effects upon landscape character and condition.

Potential effects requiring further consideration (visual)

The potential effects that will be considered further are listed below.

- *Views of construction activity, plant and materials associated with the new, fuel farm, fire station and new office accommodation:* Limited construction activity will be visible above the existing tree line.
- *Views of construction activity, plant and materials associated with the terminal extension:* Views from low-lying properties and Downside Road are partially screened by boundary planting and earth bunds. Views of construction activity will be available from properties higher up the opposite hillside.
- *Views of construction activity, plant and materials associated with the new aircraft stands (from Felton Primary School):* For the most part construction activity associated with new aircraft stands will be screened from view by topography and existing development. To the east however, on the site of the old terminal building and the staff car park, activity will be apparent from the A38 and Felton Primary School.
- *Views of construction activity, plant and materials associated with the short stay car park and airport hotel:* Filtered views will be available from Downside Road and some residential properties on the opposite, south facing slopes.
- *Visibility of the new terminal building/terminal extension:* The proposed redevelopment of the terminal building will take place on the site of the existing

facility. Whilst the architecture may change, assuming the roof height remains constant, the nature and quality of views towards the development will not be materially changed. Careful consideration will be given to building design, choice of materials and lighting.

- *Visibility of the new fuel farm:* Whilst this development may take place on a ridgeline which currently supports the main airport infrastructure including the terminal building and control tower, the proposed new fuel farm is separate from the main concentration of development. The structures are likely to be up to 10m high and would be visible above the existing tree line. The development would represent a perceived westward extension to the built development on the ridge (as perceived from residential properties to the north.).
- *Visibility of the new aircraft stands (Felton Primary School and from the A38):* Where the new aircraft stands are to be constructed on the site of the old terminal building and staff car park (which may include an acoustic screen if necessary), they will have a strong influence upon the appearance of the airport from the main entrance from the A38.
- *Visibility of the short stay car park and airport hotel:* Screen planting and earth bunds along Downside Road effectively preclude views of the existing parking within this low lying area. Views are, however, available from residential properties higher on the rising land to the north. New buildings within the parking area would increase the extent to which this area (or at least development in it) is visible. Any change in these views will be seen in the context of existing airport development on the higher ground to the south. The actual effect will depend upon the height and architectural style of the proposed structures
- *Visibility of the proposed car park extension into the Cornerpool Farm area (various options), associated infrastructure and lighting (distant viewpoints including the Mendip AONB):* Construction of a new area of parking and associated lighting on the lower, south facing slopes of Cornerpool Farm would be difficult (if not impossible) to effectively screen from the A38 and from distant views such as from the Blackdown Hills.
- *Increase in night-time lighting:* Careful consideration will be given to the location and design of any additional lighting.

Potential effects requiring no further consideration (landscape)

The following landscape effects will not be considered by the EIA.

- *Construction activity to reconfigure existing landscape features and buildings to accommodate new development within the existing airport boundary:* For the most part landscape features and elements within the airport boundary are not sensitive to change. The SEMP, which forms part of the design will include detailed designs that respect mature vegetation. The design will include proposals for further and by effective landscaping.
- *Changes to landscape character within the airport site as a result of construction activity:* The effects will be temporary and the sensitivity of this essentially

functional landscape is low. The airport is effectively a dynamic site, which responds to the functional demands placed upon it. Care needs to be taken to protect mature and valued vegetation during the construction period as well as the implementation of a high quality, effective landscape scheme. However, the SEMP will detail appropriate care and management of landscape features within the site. During the operational period the landscape will be managed to mature and improve with age.

- *Long term changes to landscape character elements within the existing site boundary by reconfiguration of features:* The proposals will not materially alter the character within the site boundary which is essentially that of a busy international airport.

Potential effects requiring no further consideration (visual)

All potential visual effects are considered by the EIA.

3.7.5 Mitigation of effects not expected to be significant

No mitigation has been identified.

3.7.6 Environmental enhancement measures

No measures have been identified at the time of writing. Opportunities for enhancement will be kept under review.

3.8 Noise

3.8.1 Relevant policies and their implications for scoping

Table 3.23 lists the planning policy guidance and policies that are relevant to noise, and sets out the implications of the guidance and policies for the scope of the EIA. The full names of the plans and guidance cited are given in Appendix C, which details all policies and guidance that are relevant to the development.

Table 3.23 Relevant policies and their implications - noise

Policy reference	Implications
Policy 1 – JRSP 2002	Requires planning and transport policies to be based on the principles of sustainable development, and seeks to reconcile, balance and integrate the protection and enhancement of the environment, the maintenance and enhancement of economic prosperity and meeting the social needs and aspirations of the people of the area through the provision of opportunities for commercial and industrial development, housing and related services and activities. One of the aims of the policy is to reduce all forms of pollution and emissions including noise.
Policy 61 – JRSP 2002	Bristol International Airport will be encouraged to improve and maintain its role in services, provided environmental impacts such as emissions are minimised, and noise is not an unacceptable problem for local residents.

Policy ENV/1 – NSLP 2000	Identifies that any development or use of land likely to cause noise pollution or damage, and proposals for development near and sensitive to such sources of pollution or nuisance will not be permitted unless mitigation measures are included or can be imposed by condition to limit the adverse effects to an acceptable level.
Policy GDP/2 – NSRLP SDD 2004	Development that could result in air, water or other environmental pollution or damage, loss of amenity, or increased risk to health or safety, as a consequence of any such problem (including the cumulative impact of different sources of the same or different kinds of problem) will only be permitted if the potential adverse effects can be limited to an acceptable level by other control regimes or by measures included in the proposal or imposed by condition or planning obligation.

3.8.2 Approach to identifying likely significant effects

For each of the identified receptors that could be significantly affected by the proposed development, the likelihood of there being significant effects will be reviewed in the context of the magnitude and other characteristics of the environmental changes that are expected to be caused by the scheme. At this stage in the EIA process, these characteristics have not been quantified. However, in some cases, even without such quantified information, it is reasonable to assume that the changes will not result in a significant effect. This is sometimes the result of tried and trusted mitigation measures that might reasonably be expected to be effective, which have already been incorporated into the scheme proposals (refer to Footnote 12). The noise from the airport can be considered as four different categories comprising:

- construction noise;
- airborne noise;
- ground operations noise; and
- road traffic noise.

These are discussed further below.

Construction noise

Construction noise has the potential to affect the students and staff at Felton Primary School (although the school is believed to be in the process of being relocated) and residential properties close to the existing terminal and the redevelopment of the taxiways and holding area at the western end of the runway.

Airborne noise

Detailed modelling using the most recently available data and techniques has not been completed at this stage, but the predicted future number of ATM and existing model outputs has been used to estimate whether the area that experiences noise levels in excess of 57 dB(A)³³ (the onset of community annoyance) will expand into sensitive areas. The future ATMs have also

³³ This noise level has been defined by the Department for Transport (1985) as the ‘onset of community annoyance level’.

been examined to estimate whether those areas that already experience noise from the airport in excess of 57 dB(A) will be exposed to significant increases in aircraft noise.

Night time airbourne noise is currently controlled by a noise quota, and mitigation against night time noise was provided by a Noise Insulation Grant Scheme in 1997. Noise insulation grants were provided to properties that regularly experienced noise levels of above 82 dB(A) (measured as Sound Exposure Level [SEL]). BIA are not proposing to increase the night-time quota before 2010. BIA is committed to retaining the current night quota until this time by a Planning Condition relating to the new terminal building. There is a shift to more early morning flights, that fall into the 'night' period, by operators such as Easyjet. These additional flights are being off-set by a reduction in the number of mail flights using the airport at night.

The modelling of future noise levels will be undertaken using the US Federal Aviation Authority's Integrated Noise Model (INM) v6.2, with reference to an indicative summer weekly schedule representing 6 an 9 mppa per annum.

Ground operations noise

Changes in ground operations have the potential to change the noise in the area around the airport. Ground operations noise consists of taxiing aircraft, engine testing, aircraft auxiliary power units and ground vehicles used at the airport. The redevelopment of the airport includes plans to increase the number of aircraft stands or relocate stands to areas where there is potential for ground noise to increase at the sensitive receptors close to the airport terminal. There are also plans to modify the taxiway and holding areas at the western end of the runway. This could lead to increased noise levels at properties close to this location.

Road traffic noise

The proposals in the master plan include provision for an increased passenger throughput at Bristol Airport. Passengers starting or ending their journeys at BIA will mostly arrive at the airport by road so will generate increased road traffic. The proposals also include plans to realign some road links. The changes in traffic noise levels and the realignment of roads will change the road traffic noise levels experienced at sensitive receptors (properties). This change in traffic noise will be calculated and assessed using the methodology detailed in the *Calculation of Road Traffic Noise* (CRTN) publication issued by the DoT (1988).

There are also proposals to increase the number of car parking spaces at the airport. This could lead to changes in traffic noise at receptors close to the new car parking areas.

3.8.3 Baseline conditions

Data sources

This section of the report is based on the following information:

- Alan Saunders Associates (2002): The impact of aircraft noise on the area around BIA currently; in the past; and in the future;
- Alan Saunders Associates (2004a): Bristol International Airport. Daytime noise contours with 6MPAX and 9MPAX;

- Alan Saunders Associates (2004b): Bristol International Airport. 2002 Daytime noise contours;
- Alan Saunders Associates (2004c): Bristol International Airport. 2003 Daytime noise contours;
- BIA (2002) Night noise quota consultation- review of responses;
- Entec UK Ltd (2005 in publication) *Ambient noise monitoring around BIA*;
- written responses from North Somerset Council, Bristol City Council, and Bath and North East Somerset Council;
- a site visit; and
- a meeting between Entec, BIA, and the Environmental Health Officer from North Somerset Council (on 20 December 2004).

Summary of available baseline information

The baseline airborne noise environment is well defined as part of the existing noise management procedures at the airport. Baseline noise monitoring is undertaken continuously by two monitoring stations, one located under the approach path of each end of the main runway. Entec has also undertaken a background noise-monitoring programme at other locations in 2005.

Airport noise contours for both daytime and night-time noise were produced for 1992, 2000, 2003 and 2006, and for 6mppa and 9mppa by Alan Saunders Associates. The contours show airborne noise levels around the airport calculated using the INM. Figure 3.7 presents the daytime noise contours for 2003 (Alan Saunders Associates, 2004c).

Ground operations noise levels are not regularly monitored although the airport seeks opportunities to minimise noise where possible. For example, the airport is currently investigating how ground operations procedures could be modified to reduce noise generated by the APU while the aircraft remain on the stands.

Complaints relating to noise originating from BIA or overflying aircraft have been received by North Somerset Council ('from time to time'), Bath and North East Somerset Council (eight complaints since 2001), and Bristol City Council, (7 complaints since 2001).

Data gaps

Future traffic data is not available at the time of writing. This will be provided as a result of the Transport Assessment for the development, being completed by Ove Arups.

Predicted trends

If no development occurs, it is likely that the flight movements and therefore road traffic will increase until the airport facilities reach capacity. Thus airborne noise, noise from ground operations and road traffic noise associated with the airport is likely to increase in the near future.

The noise insulation grant area is unlikely to change significantly as a result of an increased number of flights, as it is based on maximum noise levels, which are related to individual

aircraft. Noisier aircraft are gradually being phased out as they reach the end of their lives, so it is likely that the 82 dB(A) SEL contour will reduce as the changeover to newer, quieter aircraft progresses.

3.8.4 Identification of the next steps in the assessment process

Table 3.24 identifies receptors, likely environmental changes and potential effects, and the supporting text sets out the scope of the assessment for noise, insofar as it can be defined at this stage of the EIA process.

Table 3.24 Receptors, likely changes and potential effects - noise

Receptor	Changes and potential effects
<i>Construction and permanent land use change</i>	
Residential receptors at north-western end of runway	Construction noise (including construction traffic) from development of the taxiway and new fire station may result in temporary disturbance of local residents.
Residential receptors, pupils and staff at Felton Primary School (if this has not relocated) and local workforce close to terminal building and main apron	Construction noise from development (including construction traffic) may cause a level of temporary disturbance.
<i>New infrastructure and operation</i>	
Residential receptors currently outside 57 dB(A) contour	Increased airborne noise during the day as a result of an increase in air traffic movements.
Residential receptors currently within 57 dB(A) contour	Increased airborne noise during the day as a result of an increase in air traffic movements.
Residential receptors (general)	Increased airborne noise during the night. Changes in road traffic noise generated by surrounding roads.
Residential receptors at western end of runway	Changes in ground operations noise from development of taxiway may increase disturbance to residents.
Residential receptors close to terminal building and main apron	Changes in ground operation noise from increasing number of aircraft movements and stands in new locations. Changes in noise levels generated by car parks that may disturb local residents.
Felton Primary School (if this has not relocated)	Increased airborne noise during the day as a result of an increase in air traffic movements causing increased disturbance. Changes in ground operation noise from increasing number of aircraft movements resulting in increased disturbance.

3.8.5 Potential effects requiring further consideration

The following effects will be considered by the EIA.

- *Construction noise (including construction traffic)*: The effect of construction noise on the residential receptors close to the airport and the school will be assessed using the methodology in BS 5228 *Noise from construction and open*

sites. Assumptions on the likely construction programme and equipment to be used will be made in consultation with the project engineers and used to calculate construction noise levels at each receptor.

- *Ground Operations Noise:* The impact of changes in ground noise as a result of the assessment will be calculated using the methodology in ISO 9613 *Acoustics – propagation of sound outdoors*. Measurements of existing ground noise sources, such as taxiing aircraft, aircraft on stands and auxiliary vehicles servicing the aircraft will be made on and around the airfield. The measurements will then be used, together with topographical information, to generate a computer model of the existing ground noise. The model used will be LiMA v4.29 (or a successive version) which will use the methodology in ISO 9613 to calculate noise levels around the airfield. The modelled results will be validated through comparison with measured results. The model will then be adapted to reflect the changes in ground operations as a result of the proposed development, for example increased numbers of aircraft, changes in the locations of operational areas or changes in the layout of airport buildings. Ground noise levels will then be recalculated.
- *Airborne noise:* Noise from aircraft in the air will be calculated, based on aircraft movements, using the United States Federal Aviation Authority's Integrated Noise Model v6.2 (INM). The INM model will be run to show 2004/5 (baseline at 6mppa) and 2019 (9mppa) summer day noise levels with and without the proposed development. INM output files will then be imported into LiMA v4.29 and L_{eq} noise contours produced for each scenario. LiMA will then be used to calculate the number of properties exposed to noise within different 3 dB(A) bands for each scenario.
 - INM will also be used to generate noise contours for the day, evening and night periods for 2004 as defined by the European Directive 2002/49/EC relating to the assessment and management of environmental noise, commonly referred to as the Environmental Noise Directive (END). The noise levels during these periods are combined, together with penalties for the more sensitive periods, to produce the L_{den} . The airport will be required to produce L_{den} noise contours in the future, so it is considered that the ES should also include L_{den} as well as L_{eq} for 2004.³⁴ The END specifies that L_{den} should be calculated over an entire year, and this will be the case for the work carried out for the ES.
- *Road traffic noise:* Information on road traffic levels (taken from the TA) and road layout for each scenario will be input into LiMA v4.29 and noise levels calculated for each scenario using the methodology specified in Assessment of the Change in Road Traffic Noise Levels using methodology detailed in the DoTs (1998) *Calculation of Road Traffic Noise (CRTN)*.

³⁴ The production of L_{den} for future years is not currently possible as data relating to actual ATMs and aircrafts is not sufficiently robust, particularly winter. Future annual L_{den} will be produced as data becomes available, in accordance with the END.

- *Cumulative noise level change:* Noise levels from each source will be added within LiMA to calculate the overall change in noise levels at each receptor due to changes in ground operations noise, airborne noise and road traffic noise. The overall change will be used to predict the change in noise levels using the guidance detailed in the draft IEMA/IOA guidelines for noise impact assessment (or the final version due to be published during 2005). An assessment of the effects in change of noise levels at the local school will be carried out with regard to Building Bulletin 93 *Acoustics in Schools*.

3.8.6 Potential effects requiring not further consideration

The following effects will not be considered by the EIA.

- *Changes in night-time noise:* The effects of night time noise levels has not been included within this assessment, because night time aircraft movements, and the noise associated with them, would not change as a result of the proposed development.

3.8.7 Mitigation of effects not expected to be significant

No additional mitigation is thought to be necessary, as other receptors are not anticipated to experience noise levels above the onset of community annoyance threshold.

3.8.8 Environmental enhancement measures

Over time, new and quieter aircraft will gradually replace some of the current and more noisy aircraft operating from BIA.

3.9 Transport

3.9.1 Relevant policies and their implications for scoping

Table 3.25 lists the planning policy guidance and policies that are relevant to transport, and sets out the implications of the guidance and policies for the scope of the EIA. The full names of the plans and guidance cited are given in Appendix C, which details all policies and guidance that are relevant to the development.

Table 3.25 Relevant policies and their implications - transport

Policy reference	Implications
Policy 1 – JRSP 2002	Requires planning and transport policies to be based on the principles of sustainable development, and seeks to reconcile, balance and integrate the protection and enhancement of the environment, the maintenance and enhancement of economic prosperity and meeting the social needs and aspirations of the people of the area through the provision of opportunities for commercial and industrial development, housing and related services and activities. One of the aims of the policy is to promote more sustainable modes of transport by co-ordinating measure to reduce dependency on private cars, encourage use of public transport and walking and cycling
Policy 4 – JRSP 2002	This policy makes provision for an integrated, corridor approach to transport improvements which maximises opportunities to secure travel by alternatives to the private car. One of the identified transport corridors for improvement is the

Bristol - Bristol Airport - Bridgwater corridor

Policy 48 – JRSP 2002	Local Transport Plans will provide whole corridor improvements to bus transport to offer bus travel a decisive advantage and achieve a key role for buses in meeting transport needs.
Policy 50 – JRSP 2002	Requires local plans to provide for the development and upgrading of passenger transport interchanges between different public transport services to further the development of a fully integrated transport network.
Policy 52 – JRSP 2002	Local Plans and Local Transport Plans should secure the provision of facilities to help people with impaired mobility.
Policy 61 – JRSP 2002	Bristol International Airport will be encouraged to improve and maintain its role in services, provided that appropriate transport measures, including improvements to access by public transport, are secured with a reduction in the proportion of trips to the airport by car and recurring congestion is not caused on the road network.
Policy T/11 – NSLP 2000	Planning permission will not be granted for development when the proposal will be detrimental to highway safety, will lead to an unacceptable level of congestion. Proposals should ensure that the traffic generated can be accommodated without seriously affecting the character of the surrounding area and can be integrated with public transport, cycleways and footways. Proposals for major developments that have a significant impact on travel patterns will need to be accompanied by a statement addressing these issues.
Policy T/15 – NSLP 2000	Development at Bristol Airport will be permitted provided that the it is required in connection with the movement or maintenance of aircraft, or with the embarking, disembarking, loading, discharge or transport of passengers, livestock or goods; it will not harm the environmental conditions for local residents; is suitably sited, designed and landscaped so as not to harm the surrounding landscape; and appropriate provision is made for surface access to the airport, particularly having regard to opportunities for public transport.
Policy T/17 – NSLP 2000	Development will not be permitted that affects the outside environment of buildings open to the public where inadequate provision has been made for people with a mobility impairment.
Policy T/6 – NSRLP SDD 2004	Sets out the car parking standards for new development across the district and requires appropriate provision to be made for the parking of vehicles to load and unload.
Policy T/10 – NSRLP SDD 2004	States that development will only be permitted where it would not prejudice highway safety. Development that gives rise to a significant number of traffic movements will only be permitted where it would not lead to an unacceptable level of traffic congestion or generate traffic that cannot be accommodated without seriously affecting the character of the surrounding area. Development should be readily integrated with public transport, cycleways, footpath links and bridleways where appropriate.
Policy T/11 – NSRLP SDD 2004	Requires travel plans to be prepared for new developments which are likely to have significant transport implications. Travel plans will have the role of reducing car use to and from a development site.
Policy T/12 – NSRLP SDD 2004	Development at Bristol International Airport will be permitted provided that: i) it is required in connection with the movement or maintenance of aircraft, or with the embarking, disembarking, loading, discharge or transport of passengers, livestock or goods; ii) environmental impacts such as emissions are minimised, and noise is not an unacceptable problem for local residents and communities; iii) it is suitably sited, designed and landscaped so as not to harm the surrounding landscape; and iv) appropriate provision is made for surface access to the airport, including highway improvements and/or traffic management schemes to mitigate the adverse impact of airport traffic on local communities, together with improvements to public transport services.

Car parking for the airport will be limited to on-site provision; airport-related parking in other locations will be resisted.

Other relevant policies include the Greater Bristol Joint Local Transport Plan (GBJLTP), and the Greater Bristol Strategic Transport Study (GBSTS). An overview of these two plans is provided in Appendix C.

3.9.2 Approach to identifying likely significant effects

For each of the identified receptors that could be significantly affected by the proposed development, the likelihood of there being significant effects will be reviewed in the context of the magnitude and other characteristics of the environmental changes that are expected to be caused by the scheme. At this stage in the EIA process, these characteristics have not been quantified. However, in some cases, even without such quantified information, it is reasonable to assume that the changes will not result in a significant effect. This is sometimes the result of tried and trusted mitigation measures that might reasonably be expected to be effective, which have already been incorporated into the scheme proposals (refer to Footnote 12).

Data on which any assessment could be based is not currently available. A separate Transport Assessment will be undertaken by Ove Arups and the findings of this study will be used by this EIA.

The methodology to that would be used in the EIA will adhere to that set out in the Institute of Environmental Assessment's³⁵ (IEA's) '*Guidelines for the Environmental Assessment of Road Traffic*', published in 1993. The assessment will therefore focus on potential effects on:

- local roads and the users of those roads; and
- land uses and environmental resources fronting those roads, including the relevant occupiers and users.

It is likely that transport impacts during construction will be associated with the movements of commercial Heavy Goods Vehicles³⁶ (HGV) travelling to and from the site during the construction phase of the development. Once the site is operational, transport effects will mostly be associated with the movement of private cars to and from the site.

A comparison will be made between existing and future traffic conditions on highway links in the vicinity of the site that will be directly affected by the development proposals. Criteria will then be applied to establish whether significant environmental effects are likely. These criteria take into account the following:

- The sensitivity of the receptors or the resources likely to be affected;
- Any changes in the composition of traffic, specifically where a higher proportion of HGV's is anticipated.

³⁵ Now the Institute of Environmental Management and Assessment (IEMA)

³⁶ Heavy Goods Vehicles (HGV) are defined as goods vehicles exceeding a gross vehicle weight of 7.5T

The methodology based on guidance given in the document '*Guidelines for the Environmental Assessment of Road Traffic*', published by the Institute of Environmental Management and Assessment (IEMA), formerly the Institute of Environmental Assessment includes two criteria whereby assessment is only undertaken on:

- i) Highway links where traffic flows will increase by more than 30% (or the number of HGV's will increase by more than 30%);
- ii) Any specifically sensitive areas where traffic flows have increased by 10% or more.

The extent of the surrounding highway network (for which consideration will be given within this assessment to both base and future traffic conditions as a result of the development proposals) will include those highway links that the majority of traffic accessing the existing uses and any future additional uses will be expected to be routed. These will be considered in detail within the Transport Assessment being prepared by Ove Arup consultants on behalf of BIA.

Baseline traffic movements along these highway links will be established and predictions will be made of future background traffic flows by applying appropriate growth factors to agreed years of assessment both in terms of construction and operational considerations.

3.9.3 Baseline conditions

Data sources

This section of the report has been based on the following information:

- BIA Surface Access Strategy (ASAS);
- North Somerset Council Local Transport Plan - 4th Annual Progress Report April 2003 - March 2004 [Appendix H: Bristol International Airport Surface Access Strategy Progress Report];
- GBSTS Interim Report on Existing Problems & Issues (August 2004);
- North Somerset Council / JMP Consultants - options for an A38/A370 Link Road;
- Ordnance Survey maps;
- a site visit; and
- discussions with BIA staff.

Summary of available baseline information

Existing highway network

The principal vehicular access to the airport is by the A38 Bridgewater Road that extends south-westwards through the built-up area of Bristol, past the eastern boundary of the airport and continuing to link up with the M5 motorway at Junction 22.

In the vicinity of BIA, the A38 is a two-way single carriageway width road of varying width between 6.5 and 7.5m. To the north of the main airport access roundabout, the A38 Bridgewater Road is subject to a 40 mile per hour (mph) speed limit. To the south of the roundabout, the speed limit changes to 50mph.

Some 380m north of the main airport access roundabout, the A38 widens to around 11m to facilitate a ghosted right-turn lane priority controlled staggered 'T' junction with West Lane and Downside Road. Both junctions incorporate central refuge islands to assist pedestrian and cyclists in crossing the A38 and prevent overtaking. In addition there is a pedestrian footbridge over the A38 Bridgewater Road located immediately north of the Downside Road junction.

The section of the A38 Bridgewater Road provides direct access frontage to a number of residential and commercial properties as well as the Airport Tavern public house and pedestrian access to the Felton Primary School. Footways and street lighting are provided on both sides of the carriageway between the main airport access roundabout and West Lane. On and off carriageway cycle lane facilities are also provided on both sides of the carriageway between the main airport access roundabout and Downside Road and on the eastern side of the carriageway between Downside Road and West Lane.

West Lane itself is a rural single carriageway two-way road that extends eastwards from the A38 Bridgewater Road towards the village of Winford and onwards towards Chew Magna. It is between 5.5 and 6.5 m in width and is subject to the national speed limit (60mph). There is no footway provision along West Lane in the vicinity of the A38 Bridgewater Road.

Downside Road is also a rural single carriageway two-way road that extends westwards from the A38 Bridgewater Road, through Lulsgate Bottom village towards Downside and onwards to the village of Brockley. Downside Road also provides access for freight and delivery traffic as to the airport as well as an alternative access for emergency vehicles.

It is provided with a carriageway width of between 5.5 and 6.5 m in width with limited footway provision on at least one side of the road through Lulsgate bottom village. Downside Road is subject to a 40mph speed limit as it passes through Lulsgate Bottom village and is provided with direct frontage access to a number of residential properties.

The access to the airport off Downside Road is a give-way controlled priority 'T' junction that is located approximately 900m west of the A38 Bridgewater Road.

The main access roundabout to the airport is located some 190m south of the A38 Bridgewater Road / Downside Road junction and is provided with a 36m Inscribed Circle Diameter (ICD). It comprises four approach arms including the airport access itself, north and southbound approaches on the A38 as well as vehicular access to Felton Primary School.

The circulatory carriageway is provided with two lanes. In addition, the airport access road and each of the A38 arms are provided with flared two-lane approaches incorporating directional signage and road markings. The roundabout incorporates pedestrian and cycle crossing facilities on the A38 (north) approach to the junction.

From the main airport access roundabout, the A38 Bridgewater Road extends southwards for a distance of approximately 1 km, around the eastern boundary of the airport to a further roundabout junction that serves the airport. This section of the A38 incorporates modern design standards and is provided with a standard single carriageway 7.3 m road width with 1 m

margins on either side. Access along this stretch of the A38 is limited to emergency access to the airfield and gated access to agricultural land.

The roundabout is provided with a 34m ICD and incorporates three approach arms and primarily serves the airport's south side long-stay car park area (known as the Silver Zone). As with the main access roundabout, the roundabout incorporates a two-lane circulatory carriageway and both A38 arms of the junction are provided with flared two lane approaches. The airport access arm of the junction incorporates a single lane approach. Street lighting is provided on the approaches to the roundabout.

South of this roundabout, the A38 continues to be provided as a single carriageway road of standard width (approximately 7.3m) with margins provided on both sides of the road.

The main airport access road leads westwards from the A38 roundabout at the north-eastern corner of the airport complex and is provided with a carriageway width of 7.3 m with footways provided on both sides of the carriageway up to the first internal roundabout located some 130 metres into the site. All of the main access roads within the airport complex are subject to a 30mph speed limit and are provided with street lighting.

The first internal roundabout is provided with a 24m ICD incorporating four approach arms. As well as the main access road, this roundabout provides access to the Old Terminal Building area and the main long-stay car park.

A further 275m west of the first internal roundabout, the main airport access road forms a restricted movement left-in/left-out give-way controlled priority junction with an access road leading to the main short-stay car park, the Business (Navigator) car park and the short and long-stay disabled parking areas. This section of the main access road is provided with a footway on the southern side of the road that eventually links into the main concourse area outside the main Terminal building.

A further 50m to the west of this junction is another roundabout junction of approximately 27m ICD. This roundabout provides access to the restricted access set down/pick-up route that passes directly in front of the main terminal building. Access to this section is limited to buses, coaches, Silver Zone set-down/pick-up courtesy buses and limited general set-down facilities. The main access road extends from the roundabout to the north of the set-down/pick-up road to link up with a further internal roundabout to the west of the Terminal Building. This roundabout is also provided with a 27m ICD and provides access to the passenger pick-up car park and airside facilities.

From this point the main access road follows a route around the western end of the main car park area, eventually linking up with the restricted access from Downside Road. This section of the access road provides connections to the delivery and freight areas, staff car parking area and the car hire parking area.

Car parking

Bristol International Airport currently provides a comprehensive range of parking services for passengers that includes for approximately 7,727 car parking spaces. The parking spaces currently available include:

- passenger pick up;

- short stay;
- long stay;
- business parking;
- special assistance parking;
- motorcycle parking; and
- pre-book parking.

For all of the car parking areas, BIA provide facilities for payment at the exit barrier by credit / debit card or payments by cash at pay-on-foot terminals within each car park area and inside the Terminal building. An additional charge is levied for pre-book car park payments made on-line or through the call centre or for credit card payments at the pay-on-foot terminals.

Illegal off-site parking facilities also operate in the local area.

Long-stay parking

BIA provides approximately 6,821 long-stay car parking spaces. For trips of five days or less, long-stay car parking is located to the north of the main airport approach road, accessed by way of the first internal roundabout. For trips over six days, BIA provides a “Silver Zone” long-stay car parking area that is located to the south of the airport, accessed directly from a dedicated roundabout off the A38. Specific road signage is provided to direct passengers to the Silver Zone car park area.

BIA operates a frequent courtesy coach service between both of the long stay car parks and the main entrance terminal building.

Passenger pick-up

Passenger pick-up provides 50 car parking spaces located approximately 100 metres west of the main terminal building, provided with level access.

Short stay parking

There are 523 short-stay car parking spaces currently provided to the north of the main airport approach road that are access by way of a give-way controlled priority “T” junction some 400 metres west of the main A38 roundabout. The short-stay car park is accessible by foot to the main terminal building and in addition BIA operate a frequent courtesy coach service between the car parking area and the main entrance of the terminal.

Special assistance car parking

BIA provides 101 special assistance car parking spaces within both the long and short-stay car parking areas, the facilities being well signed and located in the areas closest to the main terminal building within the designated parking areas. Special tariffs are applicable to the special assistance car parking facilities, the details of which are provided within the long and short-term car parking areas.

Motorcycle parking

BIA provides free motorcycle parking that is located within a designated area to the east of the main terminal building accessed from the main airport approach road some 400 metres west of the A38 roundabout. At present provision is made for 10 motorcycle spaces for passengers' use within the airport complex.

Business car park (Navigator)

This is a premium car park that is located closest to the main terminal building off the main airport approach road. The facility provides some 222 car parking spaces and Navigator members receive preferential tariff rates without the need to pre-book access to the car park. There are however facilities in place for non-members to pre-book space within the car park on-line.

Public Transport Access

Bristol International Flyer

First (Badgerline) operate an express coach link between Bristol International Airport and Bristol City Centre that makes limited stops at Bridgewater Road (Kings Head), Parson Street / Chessel Street / West Street, Bedminster Parade (Asda), Temple Meads railway station and the central Bus Station.

The Bristol International Flyer operates on a daily basis (except Christmas Day and Boxing Day) with a journey time of approximately 30 minutes between the Airport and the Bus Station. Early mornings and evenings the service operates on a half-hourly frequency, however during daytime hours the frequency increases to one bus every 20 minutes.

Connections with the wider bus network in the Bristol and Bath and North East Somerset area as well as National Express coaches are provided at the central Bus Station. Temple Meads station provides connections with local and inter-regional rail services and is also provided with a dedicated "Flyer" lounge within the station premises.

Other Bus services

Bristol International Airport is also served by a local bus service, route 121/821, that is operated between Weston-Super-Mare railway station and Bristol City Centre (Rupert Street) by First (Badgerline). Route 121/821 provides an approximate hourly service in each direction, 0724 - 1732 hours (towards Bristol) and 0925 - 1848 hours (towards Weston-Super-Mare), Monday to Friday. Similar operating hours are provided on a Saturday and there is one bus every two hours, 1008 - 1808 hours (towards Bristol) and 1003 - 1803 (towards Weston-Super-Mare) on a Sunday.

Route 121/821 provides numerous intermediate stops en route including the villages of Locking, Winscombe, Churchill, Wrington, Felton, Winford and Bedminster Down as well as Temple Meads railway station. Approximate journey times are 40 minutes to Bristol City Centre (Rupert Street) and 62 minutes to Weston-Super-Mare railway station.

Rail

Bristol Airport has no direct access to the national rail network. The nearest railway station is at Nailsea & Backwell some 4 miles north-west of the airport. Nailsea & Backwell is served by Wessex Trains and First Great Western. Wessex Trains operate approximately two trains per hour in both directions (Monday to Saturday daytime hours) serving Weston-Super-Mare and Taunton to the south-west, Bristol, Newport, Cardiff, Gloucester and Cheltenham Spa to the north and west. First Great Western provide a limited service between Weston-Super-Mare and London Paddington that also serve Bristol and Reading on a daily basis. There is currently no public transport link between the airport and Nailsea & Backwell station however the station is provided with car and cycle parking facilities.

The principle connection with the national rail network is by way of Bristol Temple Meads station that is linked directly with the airport by the Bristol International Flyer coach link. Bristol Temple Meads is served by First Great Western, Virgin Trains, Wessex Trains and Arriva Trains Wales and provides regular services to a significant range of destinations within the south-west region, Wales, the Midlands and the Thames Valley.

Taxis

Bristol International Cars (or *airportcarZ*) operate the airport taxi concession. Their operation is supplemented by a considerable number of non-airport taxis.

Traffic Flows/Counts

Total traffic flows into and out of BIA during the 2004 morning peak time were 1132 vehicle movements, which can be compared to the 2004 evening peak of 1383 movements.

Data gaps

No detailed traffic flow data is currently available; this is currently being gathered by Ove Arups for the Transport Assessment.

Predicted trends

Background traffic flows are predicted to increase, even if the development does not go ahead, and these increases need to be established in order to make a robust assessment of effects. Any existing traffic counts therefore require a growth factor to be applied, from the date of count, to adjust the data to the expected values in the year of assessment.

3.9.4 Identification of the next steps in the assessment process

Table 3.26 identifies receptors, likely environmental changes and potential effects, and the supporting text sets out the scope of the assessment for transport, insofar as it can be defined at this stage of the EIA process

Detailed traffic data is not currently available and therefore no evaluation of potential environmental effects has been possible within the context of this report. It is considered, however, that the effects of the airport expansion on traffic flows could be significant and mitigation in the form of promotion of the usage of public transport as a key method of reducing reliance on private vehicles, together with other measures (e.g. careful highway and car parking design, and use of traffic control systems) will also be required.

Table 3.26 Receptors, likely changes and potential effects - transport

Receptor	Changes and potential effects
<i>Construction and permanent land use change</i>	
Road users	Increased vehicular activity would have consequences in terms of road safety on vulnerable road users and increase potential risk of accidents. Changes in baseline traffic as a result of construction activity, particularly HGV's may affect general highway network operation in terms of traffic speeds and capacity of highway links and junctions.
Local residents / community uses / schools & businesses	Large HGV's may cause disturbance to local receptors.
<i>New infrastructure and operation</i>	
Road users	Increased vehicular activity would have consequences in terms of road safety on vulnerable road users and increase potential risk of accidents. Changes in baseline traffic as a result of increased passenger numbers and staff associated with expansion of airport that is likely to affect general highway operation in terms of traffic speeds and capacity of highway links and junctions.
Local residents / community uses / schools & businesses	Increases in future traffic flows associated with airport expansion could affect amenity of local residents and community uses.

Potential effects requiring further consideration

The following effects will be considered by the EIA.

- *Changes in baseline traffic as a result of construction activity (particularly an increase in HGV's) and effects on the affect general highway network operation in terms of traffic speeds and capacity of highway links and junctions:* Peak periods of construction activity could lead to a concentration of construction vehicle movements in addition to the existing traffic generation associated with Airport activity. The assessment will include the identification of a routing strategy and assessment of sensitive receptors along defined routes, identification of baseline daily (12-hour) traffic flows expressed as total volumes and number of HGV's on key highway links and junctions that are to be affected by construction activity (data provided by the Transport Assessment being prepared by Ove Arup), prediction of number and type of vehicles associated with each construction activity, occurrence and time period within overall programme, and assessment of effects against thresholds outlined in IEMA Guidelines.
- *Road safety for vulnerable road users and increased potential risk of accidents during the operational phase:* Additional traffic associated with airport expansion may have an effect on road safety. The assessment will include an analysis of Personal Injury Accident Data Records for key highway links and junctions on the surrounding highway network.

- *General highway operation in terms of traffic speeds and capacity of highway links and junctions:* The airport expansion will have a significant effect on highway link and junction capacity, with likely effects reducing as traffic disperses onto wider network. The assessment would include the identification of routing strategy and assessment of sensitive receptors along defined routes: identification of baseline daily (12-hour) traffic flows expressed as total volumes and number of HGV's on key highway links and junctions that are to be affected by additional operational activity (Source: Transport Assessment being prepared by Ove Arup). It would also identify the capacities of public transport networks and opportunities for further enhancement, prediction of number and type of trip generations, especially vehicles associated with the future expansion of the airport, occurrence and time periods of peak activity, and an assessment of potential effects by using thresholds outlined in IEMA Guidelines.
- *Increases in future traffic flows associated with airport expansion on amenity status of local residents, community facilities, schools & businesses:* There are a number of receptors with direct frontage onto A38 and other key highway links in the vicinity of the airport. The assessment will focus on the identification of routing strategy and assessment of sensitive receptors along defined routes.

Potential effects requiring not further consideration

The following effects will not be considered by the EIA.

- *Changes in road safety for vulnerable road users and increased potential risk of accidents:* Measures can be implemented to protect or divert pedestrian and cycle routes during the temporary construction period.
- *Disturbance to local receptors from large HGV movements during the construction phase:* The number of vehicle movements will be low and effects will only occur for a short period. Effects can be mitigated through the implementation of a Traffic Management Plan and avoidance of increased activity during network peak hourly periods. This would include the identification of a routing strategy and assessment of sensitive receptors along defined routes, and prediction of likely abnormal load activity, occurrence and time periods within overall programme.

3.9.5 Mitigation of effects not expected to be significant

The effects of construction traffic will be minimised and managed through the production and implementation of a construction traffic management strategy by BIA. This strategy will be developed with and agreed by the local highways authority.

3.9.6 Environmental enhancement measures

No enhancement measures have been proposed at this time.

3.10 Vortex and vibration

3.10.1 Relevant policies and their implications for scoping

Table 3.27 lists the planning policy guidance and policies that are relevant to vortex and vibration, and sets out the implications of the guidance and policies for the scope of the EIA. The full names of the plans and guidance cited are given in Appendix C, which details all policies and guidance that are relevant to the development.

Table 3.27 Relevant policies and their implications - vortex and vibration

Policy reference	Implications
Policy 61 - JRSP 2000	Bristol International Airport will be encouraged to improve and maintain its role in services, provided environmental impacts such as emissions are minimised, and noise is not an unacceptable problem for local residents.
Policy T/13 - NSRLP SDD 2004	Within the identified Public Safety Zones, planning permission will only be granted for development that would not prejudice the safe operation of Bristol International Airport.

3.10.2 Approach to identifying likely significant effects

For each of the identified receptors that could be significantly affected by the proposed development, the likelihood of there being significant effects will be reviewed in the context of the magnitude and other characteristics of the environmental changes that are expected to be caused by the scheme. At this stage in the EIA process, these characteristics have not been quantified. However, in some cases, even without such quantified information, it is reasonable to assume that the changes will not result in a significant effect. This is sometimes the result of tried and trusted mitigation measures that might reasonably be expected to be effective, which have already been incorporated into the scheme proposals (refer to Footnote 12).

Consideration of potentially significant effects from vortex strikes and vibration is based on consideration of previous qualitative evaluations of these issues and discussion with BIA staff.

3.10.3 Baseline conditions

Data sources

This section of the report has been based on the following sources of information:

- Gibb Airports (2000) Bristol International Airport Master Plan; and
- Discussions with BIA staff.

Summary of available baseline information

The Gibb Airports report provides the following information: *“Potential sources of vibration can be divided into those that are airborne and those that are transmitted through the ground. Airborne vibration would potentially only cause problems (e.g. rattling of windows) for the*

relatively small numbers of properties directly under the flight-path in close proximity to the airport (mainly located near Felton Common). Traffic on the A38 is the most likely source of ground-transmitted vibration, but only the relatively small numbers of properties located within 40m of the road are likely to be affected (the level of vibration experienced declines rapidly with distance from the source)."

There are a small number of properties that experience damage to roofs as a result of ‘vortex-strikes’ where eddies produced by aircraft moving through the air migrate downwards and encounter buildings. The effects are more likely to occur in calm conditions, and can be influenced by:

- aircraft type (some aircraft are more likely to produce potentially damaging vortices);
- height of aircraft above buildings (the likelihood of vortices migrating to the ground is greater for landing aircraft);
- aircraft speed (the slower the aircraft the stronger/larger the vortex); and
- the nature of the buildings that could potentially be affected (tile roofs may be more easily damaged).

BIA has a policy of offering to fund any re-roofing/roof repairs required as a result of a confirmed vortex-strike.

Data gaps

No detailed evaluation of current vibration and vortex effects has been undertaken.

Predicted trends

No trends have been identified.

3.10.4 Identification of the next steps in the assessment process

Table 3.28 identifies receptors, likely environmental changes and potential effects, and the supporting text sets out the scope of the assessment for vortex and vibration, insofar as it can be defined at this stage of the EIA process.

Table 3.28 Receptors, likely changes and potential effects - vortex and vibration

Receptor	Changes and potential effects
<i>Construction and permanent land use change</i>	
Residential receptors and pupils and staff at Felton Primary School (if this has not relocated)	Construction-generated vibration (including construction traffic) from development activities. Construction vibration will only be temporary and restricted to short periods of disturbance. The receptors are located beyond 40m from any areas where vibrations may be generated.

Receptor	Changes and potential effects
<i>New infrastructure and operation</i>	
Residential receptors and pupils and staff at Felton Primary School (if this has not relocated)	Ground-transmitted vibration originating from traffic along the A38 and ground-equipment at the airport. Vibration will only be temporary and restricted to short periods of disturbance. Most receptors are located beyond 40m from any areas where vibrations may be generated (e.g. the A38, airport aprons, stands, holding points and taxiways).
Residential receptors under the landing path (e.g. those at Felton Common)	An increase in the risk of vortex-strike as a result of an increase in air traffic movements. Only a limited number of properties have currently been affected by vortex-strike and the likely increase in those affected is not expected to increase dramatically. BIA will repair any damage to properties that is confirmed to have originated through vortex-strike.

Potential effects requiring further consideration

With regards to vortex and vibration, there are no potential effects that require further consideration for the reasons described above.

3.10.5 Mitigation of effects not expected to be significant

No additional mitigation has been identified to be necessary.

3.10.6 Environmental enhancement measures

No additional enhancement measures have been identified to be necessary.

3.11 Water resources and quality

3.11.1 Relevant policies and their implications for scoping

Table 3.29 lists the planning policy guidance and policies that are relevant to water resources and quality, and sets out the implications of the guidance and policies for the scope of the EIA. The full names of the plans and guidance cited are given in Appendix C, which details all policies and guidance that are relevant to the development.

Table 3.29 Relevant policies and their implications

Policy reference	Implications
Policy 1 – JRSP 2002	Requires planning and transport policies to be based on the principles of sustainable development, and seeks to reconcile, balance and integrate the protection and enhancement of the environment, the maintenance and enhancement of economic prosperity and meeting the social needs and aspirations of the people of the area through the provision of opportunities for commercial and industrial development, housing and related services and activities. One of the aims of the policy is to conserve, and where possible reduce the consumption of non-renewable resources including water and protecting such resources for the future.

Policy 23 – JRSP 2002	Provision will be made for development only where adequate water resources exist or can be made available, and where it can be demonstrated that the development will not cause a deterioration in the quality or quantity of underground.
Policy ENV/1 – NSLP 2000	Identifies that any development or use of land likely to cause water pollution or damage, and proposals for development near and sensitive to such sources of pollution or nuisance will not be permitted unless mitigation measures are included or can be imposed by condition to limit the adverse effects to an acceptable level.
Policy ENV/6 – NSLP 2000	Planning permission will not be granted for development that would pollute any water supply source, wetland, watercourse, pond, stream, or other water area.
Policy GDP/2 – NSRLP SDD 2004	Development that could result in air, water or other environmental pollution or damage, loss of amenity, or increased risk to health or safety, as a consequence of any such problem (including the cumulative impact of different sources of the same or different kinds of problem) will only be permitted if the potential adverse effects can be limited to an acceptable level by other control regimes or by measures included in the proposal or imposed by condition or planning obligation.
Policy GDP/4 – NSRLP SDD 2004	Development that would affect the continuing availability of local water resources; create a demand for water that cannot be met from existing or planned resources without serious environmental harm; alter the water table; cause silt deposition; prevent maintenance of a water body or watercourse; or preclude the solution to existing flooding problems will only be permitted if adequate, environmentally-acceptable measures are incorporated which provide suitable protection or mitigation. Development proposals will normally be required to incorporate sustainable drainage systems for the disposal of surface waters. Where this is not practicable, it must be demonstrated that an acceptable alternative means of surface water disposal is incorporated.

3.11.2 Approach to identifying likely significant effects

For each of the identified receptors that could be significantly affected by the proposed development, the likelihood of there being significant effects will be reviewed in the context of the magnitude and other characteristics of the environmental changes that are expected to be caused by the scheme. At this stage in the EIA process, these characteristics have not been quantified. However, in some cases, even without such quantified information, it is reasonable to assume that the changes will not result in a significant effect. This is sometimes the result of tried and trusted mitigation measures that might reasonably be expected to be effective, which have already been incorporated into the scheme proposals (refer to Footnote 12).

The identification of likely significant effects on surface and groundwater features are determined using an approach based on a ‘source-pathway-receptor’ methodology that has already been described in some detail in Section 3.6.

Consented discharges

Under the *Water Resources Act 1991* and *Groundwater Regulations 1998*, it is an offence for anyone to cause, or knowingly permit the entry into surface, or groundwater polluting substances, in particular substances included on List 1 and 2 of the 1998 Regulations.

Almost any solid, liquid or gaseous substance entering surface waters could be classified as a pollutant. This includes chemicals, salt, wash waters, waste products, trade effluents, and fuels.

Rainwater that runs across a site can also be classed as a pollutant if substances from the site contaminate it.

BIA has been granted a consent to discharge under the *Water Resources Act 1991*. Predicted exceedences of the limits set for the discharge consent has been taken as an indicator of a potentially significant effect.

Environmental quality standards

Much of the water quality regulatory regime in the UK derives from a raft of EU Directives which tackle specific issues relating to water quality. These have been implemented into national legislation via appropriate regulations. The main requirements for water quality in surface waters are defined by standard values attached to the *Dangerous Substances Directive 76/647/EC* (and Daughter Directives). The *Dangerous Substance Directive* (and associated daughter Directives) aims to improve water quality through the elimination and/or reduction of dangerous substances discharged to the aquatic environment. Two levels of standard exist:

- List 1 substances that have the potential to cause the most harm to aquatic life due to their persistence, toxicity or bioaccumulation; and
- List 2 substances that are thought to be harmful, but not to the same degree as List 1 substances.

The above Directives and subsequent UK Regulations have set a range of Environmental Quality Standards (EQS) that are devised to protect both the fresh and marine aquatic environment. EQSs must not be exceeded in any controlled water in England and Wales. The dangerous substance is not believed to be detrimental to aquatic life at any concentration below its EQS limit. The EQS is set for the receiving water and not the discharge itself. The list is extensive and is not reproduced here.

Likely exceedence of any EQS in surface waters has been taken as an indicator of a significant effect.

General Quality Assessment and River Ecosystem criteria

Seven indicative parameters are currently used by the Environment Agency as indicators of the health of rivers. These indicators have been used to form the River Ecosystem (RE) classification system. The RE classification ranges from RE1 (highest quality) to RE5 (poorest quality). Each river stretch is assigned one of these classes as a target taking into account current uses and what could realistically be achieved through improvement. In addition to these targets, the actual water quality of the watercourses are monitored using the Environment Agency's General Quality Assessment (GQA) scheme. Under the assessment scheme for river chemistry, a river is assigned a grade from A (Very Good) to F (Bad). Table 3.30 shows the likely uses and characteristics of each GQA class.

Table 3.30 – General Quality Assessment (Chemistry) classification scheme

Classification	Likely uses and characteristics*
A (Very Good)	All abstractions; very good salmonid fisheries; cyprinid fisheries; natural ecosystems.
B (Good)	All abstractions; salmonid fisheries; cyprinid fisheries; ecosystems at or close to natural.
C (Fairly Good)	Potable supply after advanced treatment; other abstractions; good cyprinid fisheries; natural ecosystems, or those corresponding to good cyprinid fisheries.
D (Fair)	Potable supply after advanced treatment; other abstractions; fair cyprinid fisheries; impacted ecosystems.
E (Poor)	Low grade abstraction for industry; fish absent or sporadically present; vulnerable to pollution **; impoverished ecosystems **
F (Bad)	Very polluted rivers which may cause nuisance; severely restricted ecosystems.

* Provided other standards are met; ** Where the grade is caused by discharges of organic pollution

Pollution of watercourses to a level that is likely to result in the change of one RE or GQA class has been taken as an indicator of a potentially significant effect. The focus of the evaluation is restricted to groundwater-fed watercourses, as there are no watercourses present on or adjacent to BIA.

Groundwater quality standards

The *Groundwater Regulations 1998* set out standards that are required to meet groundwater quality, primarily from the perspective of the quality of potable water supply. These are an environmental protection measure which complete transposition of the *Groundwater Directive (80/68/EEC)* and provide enhanced protection of the groundwater. The Regulations include a list of substances (known as List 1 and List 2 substances), for which there are associated quality standards. The list is extensive and is not reproduced here.

Likely exceedence of any of these standards has been taken as an indicator of a significant effect.

3.11.3 Baseline conditions

Data sources

Surface and groundwater-related information in respect of the BIA and its immediate surrounds has been obtained from a variety of sources.

A number of reports and maps on the site were consulted to establish local baseline surface and groundwater conditions. The majority have already been listed in Section 3.6.3 of this report; however, sources considered particularly pertinent to surface and groundwater are listed below:

- AEA Technology (January 2000) Hydrogeology of Bristol international Airport: Desk Study. Ref. AEAT/ENV/R/0447;
- Serco (August 2002) Borehole Installation and Monitoring at Bristol International Airport. Ref. SERCO/ERRA-0482;

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- Serco (September 2004) Installation of Two Boreholes at Bristol International Airport. Ref. SA/ENV-0690;
 - Waterman Environmental (December 2003) Phase I Environmental Due Diligence Report. Report Ref. EN3921/R/1.1.5/JEH;
 - Bristol International Engineering Department (2004) Bristol International Interceptor Report, version 1; and
 - Environment Agency flood maps (<http://maps.environment-agency.gov.uk>);

This information has been supplemented with data provided by the Environment Agency in response to a request for information (in a letter dated 08 February 2005 ref. NWXCSC 20673), including:

- identification of watercourses receiving drainage from BIA;
- records of any pollution incidents associated with BIA;
- confirmation of the chemical and biological GQA water quality for all water course within 2 km of BIA;
- confirmation of the River Quality Objectives and River Ecosystem classes for these watercourses;
- confirmation of the designated status and quality of any locally designated bathing waters, shell fisheries, and freshwater fisheries;
- the status and vulnerability of groundwaters beneath BIA
- discharge consents and abstraction licences within 2 km of BIA; and
- compliance of sites with the Surface Water Abstraction Directive.

A site walkover to visually evaluate surface and groundwater related features was undertaken on 7th January 2005, at which time discussions were also held with engineering staff working at BIA

Hydrogeology

BIA is located on Broadfield Down, which is a dome-shaped periclinal structure, the core of which is composed of Black Rock Limestone (BRL) of Carboniferous age.

The topography of BIA is fairly gentle and covered by large tracts of hard-standing (including the run way, service roads, car-parking facilities and buildings associated with the terminal) and areas of vegetation (dominated by grass, but also including trees and scrub).

Run-off from covered portions of the site collect in interceptor drains that discharge directly to underground soakaways. The grass covered areas appeared (during the site visit) free of standing water, which suggests that the thin veneer of soil (borehole logs indicate that it is less than 0.4m thick) and the underlying limestone do not present a significant barrier to water flow. This characteristic is also borne out by the presence of small dry valley-like depressions, such as one located on the north western side of the airport (Grid Ref.: 4985 6518).

According to the Environment Agency's Groundwater Vulnerability Maps (sheets 36 and 37), the overlying soil also has a high leaching potential. Hence, the lack of a significant physical barrier, coupled with the poor chemical attenuating properties of the soil, would suggest that there may be relatively little to impede the passage of potentially contaminated recharge waters down to the underlying water table.

The Groundwater Vulnerability Maps also indicates that the BRL is classified as a major aquifer (as defined by the Environment Agency's Policy and Practice for the Protection of Groundwater³⁷). The AEA Technology Report on local hydrogeology indicates that this aquifer is unconfined and may be up to 1000m thick.

Although there are no important water supply wells on, or immediately adjacent to BIA (the EA has stated that there are no licensed abstractions within 2 km of the site), the presence of springs like the Chelvey source on the north western fringe of the plateau are testament to the importance of this aquifer as a source of potable water. The Environment Agency has designated the portion of the aquifer under BIA as a Source Protection Zone (SPZ) class because of its proximity to the Chelvey spring.

Private water supplies are located in the vicinity of BIA; active supplies are located at Langford, Winford, Blagdon and Yatton.

As in many limestone settings, these water sources are closely allied to major structural discontinuities that, due to solution weathering, have become important pathways for groundwater flow. The site is crossed by a series of east-south-east to west-north-west trending faults, including the Lulsgate and North Hill Faults. These discontinuities are frequently associated with collapse features and swallets, indicating that the underlying limestone is locally karstified.

Groundwater monitoring of boreholes recently installed at BIA indicate that the water table resides between 20 and 50m below ground level and that the principle direction of flow is towards the northwest. According to the AEA report, this pattern of flow is strongly focussed towards a limited number of important sources. Indeed, AEA report on calculations undertaken in a separate study that suggest that approximately 38% of total recharge available to the carboniferous limestone on Broadfield Down actually discharges at the Chelvey source.

Surface water features

The Environment Agency is not aware of any surface water features that receive drainage from Bristol International Airport.

Information on surface water features on and in the vicinity of the site, and the potential for surface runoff / recharge from the airport site contributing to the flow of these surface water features was obtained from the report *Hydrogeology of Bristol International Airport* (AEA Technology, 2000), the OS 1:25,000 map for the local area and a site visit.

There are no surface watercourses above the 150m contour of Broadfield Down, including within the airside boundary of BIA. A pond is shown by the Ordnance Survey 1:25,000 map to be present within the immediate vicinity of Cornerpool Farm. The only airside surface water

³⁷ Environment Agency. 1999. Policy and practice for the protection of groundwater. The Stationary Office. London.

feature is a small concrete Emergency Water Supply reservoir (EWS) located along the northern perimeter of the taxi way.

A walkover survey by an Entec hydrologist has confirmed that the EWS is the only surface water feature present airside.

A number of springs arise from the limestone aquifer of Broadfield Down and a number of surface watercourses in the vicinity of the site either arise from groundwater springs, or are fed by groundwater from the Broadfield Down aquifer. The locations of these surface water features are summarised in Table 3.31.

Table 3.31 Surface water features fed by the aquifer underneath BIA

Surface Watercourse	Groundwater Component of flow
River Kenn	Headwaters fed by spring at Chelvey Well to northwest of Broadfield Down. Discharge from Chelvey Well springs thought to comprise 38% of recharge from Broadfield Down. Airport located within SPZ II (Outer Protection Zone) for this abstraction point, therefore recharge from airport site has potential to contribute significantly to this flow.
Little River	Groundwater flow considered to be predominantly ESE - WNW therefore recharge from airport site likely to contribute to baseflow component of this river.
Land Yeo	Arises from Cold Bath Spring and Dundry Hill Spring to north of Broadfield Down. Discharge from Cold Bath Spring estimated to be comprised of only 6% of Broadfield Down recharge. Therefore unlikely that recharge from airport site contributes significantly to this flow.
River Chew	Tributaries of River Chew drain eastern flank of Broadfield Down. Groundwater flow considered to be ESE-WNW therefore unlikely that recharge from airport site contributes significantly to this flow.
Winford Brook	Winford Brook arises in Winford approximately 4km to east of site. Groundwater flow considered to be predominantly ESE - WNW therefore unlikely that recharge from airport site contributes significantly to this flow.
Congresbury Yeo	Congresbury Yeo located approximately 5km to south of site. Groundwater flow considered to be predominantly ESE - WNW therefore unlikely that recharge from airport site contributes significantly to this flow.

Water quality

BIA has been granted a consent to discharge under the *Water Resources Act 1991*. This consent allows the discharge of site drainage comprising of surface water containing trade effluent, from the Western Apron to a soakaway that is located in the Congresbury Yeo catchment. The conditions of the consent stipulate that:

- the discharge shall not contain a significant trace of visible oil or grease;
- the discharge shall be passed through a class one by-pass interceptor with a cut off valve manufactured in accordance with BS 8301:1985; and
- the use of de-icing chemicals at Bristol International Airport will be in accordance with the specified code of practice.

In addition, the Airport Fire Service is also permitted to discharge fire training foam to ground 12 times a year.

Groundwater quality has been monitored, in the past, at public supply abstractions, in particular, at Bristol Water's Chelvey Well and Cold Bath Spring. Research by AEA Technology (January 2000) indicated that the Chelvey source, which draws from the BIA catchment, has shown no indication of being affected by airport activities. It was postulated that elevated winter levels of potassium, ammonium and pH could point to de-icer use, though this was not conclusive.

A further six boreholes on the BIA site have been monitored in more detail for organic contaminants since their installation in late 2002 (BH1-3) and early 2003 (BH4-6). The most recent Serco report on these boreholes (September 2004) concluded that groundwater quality beneath the BIA site is 'generally good and does not indicate that the airport is a significant source of groundwater contaminants'.

The nearest sampling point for the Water Framework Directive and Surface Water Supply Directive is Blagdon Lake. This is located over 5km away from BIA.

Potential sources of contamination

For potential sources of contamination to surface and groundwater at the site relating to current and future activities are set out in Section 3.6 of this report.

Pathways

The principal pathways are likely to be either through the thin soil cover, or more rapidly via the soakaways in to the unsaturated zone and down to the water table. The transit time for water and potentially contaminating substances is likely to be substantially reduced if infiltration occurs via solution enlarged fractures and near-surface collapse structures. In this context, it has been noted that geophysical surveys undertaken by Geotechnical Engineering Limited in 1998 showed that such structures may exist below portions of the proposed development.

The current water quality of the surface water features that have the potential to receive a contribution of their flow from groundwater recharge from the airport site are summarised in Table 3.32.

Table 3.32 Water quality of watercourses fed from the aquifer under BIA

Surface Watercourse	Sample Point NGR	RE Classification (2001)	GQA Chemistry (2002)
River Kenn (source to sea)	(338325, 168525)	Grade 4 (Pass)	Grade D (Fair)
Little River	Not monitored	Grade 3 (Pass)	-
Land Yeo at Nailsea	(346895, 171575)	Grade 2 (Pass)	Grade B (Good)
River Chew	(357100, 162100)	Grade 3 (Pass)	Grade B (Good)
Winford Brook	(355800, 163800)	Grade 2 (Pass)	Grade B (Good)
Congresbury Yeo	(346300, 162400)	Grade 2 (Pass)	Grade B (Good)

These data show that in general, the current water quality of the rivers which have the potential to receive a contribution of their flow from groundwater recharge from the airport site is

classified as Grade B (Good). This indicates that these rivers will support ecosystems at a state close to natural, salmonid and cyprinid fisheries as well as being suitable for abstractions for drinking water. These rivers will therefore be sensitive to pollution.

Flooding

BIA is not considered to be at risk from extreme flooding, by sea or river, according to the Environment Agency³⁸. The Environment Agency has, however, highlighted that the expansion of the airport has the potential to create flooding problems if discharges were to be made to local watercourses. Historic flooding problems are known from locations downslope of BIA (e.g. Felton/Winford brook) and the small catchments draining to the west towards Brockley and Cleeve. As a result the EA would object to any direct discharge and require that all additional surface runoff is returned through infiltration drainage systems, infiltration areas, filter drains and soakaways etc. This will continue the natural drainage patterns and hydrology of the area. The Agency also suggest that interception, recycling and reuse of surface water runoff should be promoted.

Data gaps

The recent programme of site investigation, monitoring well installation (Reported on by Serco) and subsequent water level and quality monitoring has gone some way towards making up the shortage of site specific information. However, recent inspection of the water level monitoring data has revealed that it has been collected only occasionally and that it therefore provides little indication of seasonal variability. Regular monitoring of water levels is considered important by the EA; the generation of borehole hydrographs provides important information on, for example, the significance of fractures and the likely storage properties of the host rock.

Predicted trends

BIA will continue to expand up to its existing capacity. An increase in the usage of potentially contaminating materials (e.g. de-icers and fuel) is likely, however, the current environmental management and pollution prevention/response protocols should be adequate to mitigate against any likely effects.

A new area of car parking is currently being constructed to provide for the short-term increase in passenger numbers. This site will adopt a Sustainable Drainage System (SuDS) linked to the existing drainage system, which will include a sand and geotextile layer under a permeable surface. Consequentially, this area should be able to mimic the natural drainage processes found in undeveloped parts of BIA, as well as reducing the presence of contaminants transmitted to groundwater.

Climatic variables are likely to alter as a result of climate change. Key features of this may include an increase in rainfall intensity and variability during winter months, as well as drier summers. The change in rainfall pattern may result in increased surface runoff and potential for localised flooding. An overall decline in groundwater recharge has been predicted, which will result in the lowering of groundwater levels and associated effects in groundwater supported watercourses.

³⁸ According to the flood risk map accessible at www.environment-agency.gov.uk

3.11.4 Identification of the next steps in the assessment process

Table 3.33 identifies receptors, likely environmental changes and potential effects, and the supporting text sets out the scope of the assessment for water resources and quality, insofar as it can be defined at this stage of the EIA process.

Table 3.33 Receptors, likely changes and potential effects - water resources and quality

Receptor	Changes and potential effects
<i>Construction and permanent land use change</i>	
Groundwater and Groundwater-fed surface water features, and local ditches	Potential contaminants associated with construction activities include suspended solids, oils and hydrocarbons, concrete and cement products, heavy metals and other chemicals stored on site, for use in construction, or present within the soil. Surface water discharge may become contaminated with these pollutants as a result of construction activities or accidental spillage.
	Provision of additional car-parking areas for passengers and staff is likely to result in an increase in surface runoff potentially contaminated with hydrocarbons and suspended solids. Discharge of this surface runoff to soakaway has the potential to result in contamination of groundwater.
<i>New infrastructure and operation</i>	
Groundwater and Groundwater-fed surface water features, and local ditches	Increased presence of aircraft and the provision of up to 12 additional aircraft stands will result in increased use of de-icing chemicals. This has the potential to cause increased volumes of contaminated surface runoff from the additional aircraft and new stands and apron. Discharge of this surface runoff to soakaway has the potential to result in contamination of groundwater with de-icing chemicals. Increased air traffic will result in increased re-fuelling operations. This has the potential to result in increased fuel spillage and hydrocarbon –contaminated surface runoff. Discharge of this surface runoff to soakaway has the potential to result in contamination of groundwater. Relocation and expansion of fuel farm. Storage of additional fuels results in increased risk of accidental spillage / leakage of fuels. Significant volumes of fuel may bypass site drainage system and interceptors and have the potential to result in contamination of groundwaters. Relocation of the fire station. Contaminants associated with the fire station include storage of fire fighting foams and hydrocarbons. Surface runoff contaminated by these pollutants has the potential to result in contamination of groundwater.
Passengers staff and site operations.	Provision of additional car-parking areas for passengers and staff could result in an increase in surface runoff potentially causing minor on-site flooding

3.11.5 Potential effects requiring further consideration

The following effects will be considered by the EIA.

- *Contamination of groundwater and groundwater-fed surface water features, and local ditches by construction activities:* Potential contaminants associated with construction activities include suspended solids, oils and hydrocarbons, concrete and cement products, heavy metals and other chemicals stored on site, for use in construction, or present within the soil. Surface water discharge may become contaminated with these pollutants as a result of construction activities or accidental spillage. The ES will consider the appropriate design and use of best practice measures for the prevention of pollution during construction (e.g. EA Pollution Prevention Guidance). The potential requirement for a (revised) discharge consent will be discussed with the Environment Agency for the discharge of site drainage associated with construction activities to soakaway. This would set thresholds for the discharge of a range of substances/determinants.
- *Contamination of groundwater and groundwater-fed surface water features through the provision of additional car-parking areas for passengers and staff:* This may result in an increase in surface runoff potentially contaminated with hydrocarbons and suspended solids. Discharge of this surface runoff to soakaway has the potential to result in contamination of groundwater. The ES will set out details of an appropriate SuDS, including the use of hydrocarbon interceptors, that would be installed to further comply with conditions set out in the discharge consent and should further prevent contamination of underlying groundwaters and groundwater-fed surface waters.
- *Contamination of groundwater and groundwater-fed surface water features through the increased presence of aircraft and the provision of up to 12 additional aircraft stands:* This would result in increased use of de-icing chemicals and fuels. This has the potential to cause increased volumes of contaminated surface runoff from the additional aircraft and new stands and apron. Discharge of this surface runoff to soakaway has the potential to result in contamination of groundwater with de-icing chemicals and hydrocarbons. The ES would include details of an appropriate drainage system, including the use of interceptors, and compliance with conditions set out in discharge consent that would limit the contamination of underlying groundwater and groundwater-fed surface waters. The use of de-icers would adhere to the protocol currently set out by the Environment Agency.
- *Contamination of groundwater and groundwater-fed surface water features through the relocation and expansion of fuel farm:* Storage of additional fuels results in increased risk of accidental spillage / leakage of fuels. Significant volumes of fuel may bypass site drainage system and interceptors and have the potential to result in contamination of groundwaters. However, fuels are currently stored in bunded area to prevent escape of fuels in the event of an accident. The ES will include consideration of options for fuels storage to minimise risk of leakage/catastrophic failure, taking into account the increase in fuel volumes.
- *On-site flooding:* Passengers, staff and on-site operations are potentially vulnerable to localised flooding from the presence of additional car-parking areas, and other

impermeable surfaces (e.g. apron, stands, building surfaces) likely to result in an increase in surface runoff potentially causing minor on-site flooding. The ES would consider on site flood risk, and include consideration of an appropriately designed SuD, to prevent any significant localised flooding from surface runoff production.

3.11.6 Potential effects not requiring further consideration

None.

3.11.7 Mitigation of effects not expected to be significant

The SEMP will include all measures necessary to safeguard the water resources and quality. This will include the following:

- a detailed pollution prevention and management plan for the construction phase needs developing, based on best practice;
- Review and update of current drainage system to minimise transfer of pollutants to groundwater, and further monitoring to determine the efficacy of the system;
- design of pollution containment system for the new fire station and fuel farm; and
- use of SuDS in the areas of new and current car parking to maximise percolation of runoff through the soil to groundwater, in accordance to the discharge consent and EA guidance for the site.

3.11.8 Environmental enhancement measures

The re-use and conservation of water would be promoted throughout the new development. This could include rainwater harvesting, use of grey water, and other water management practices. These issues will be considered by the sustainability appraisal/SEA of the development.

3.12 Cumulative effects

The construction and operation of the expanded BIA may not be the only activity that could exert an effect on the environment. The ES for the proposed development at BIA will take into account other activities that may promulgate environmental changes, which could result in cumulative effects on the environment.

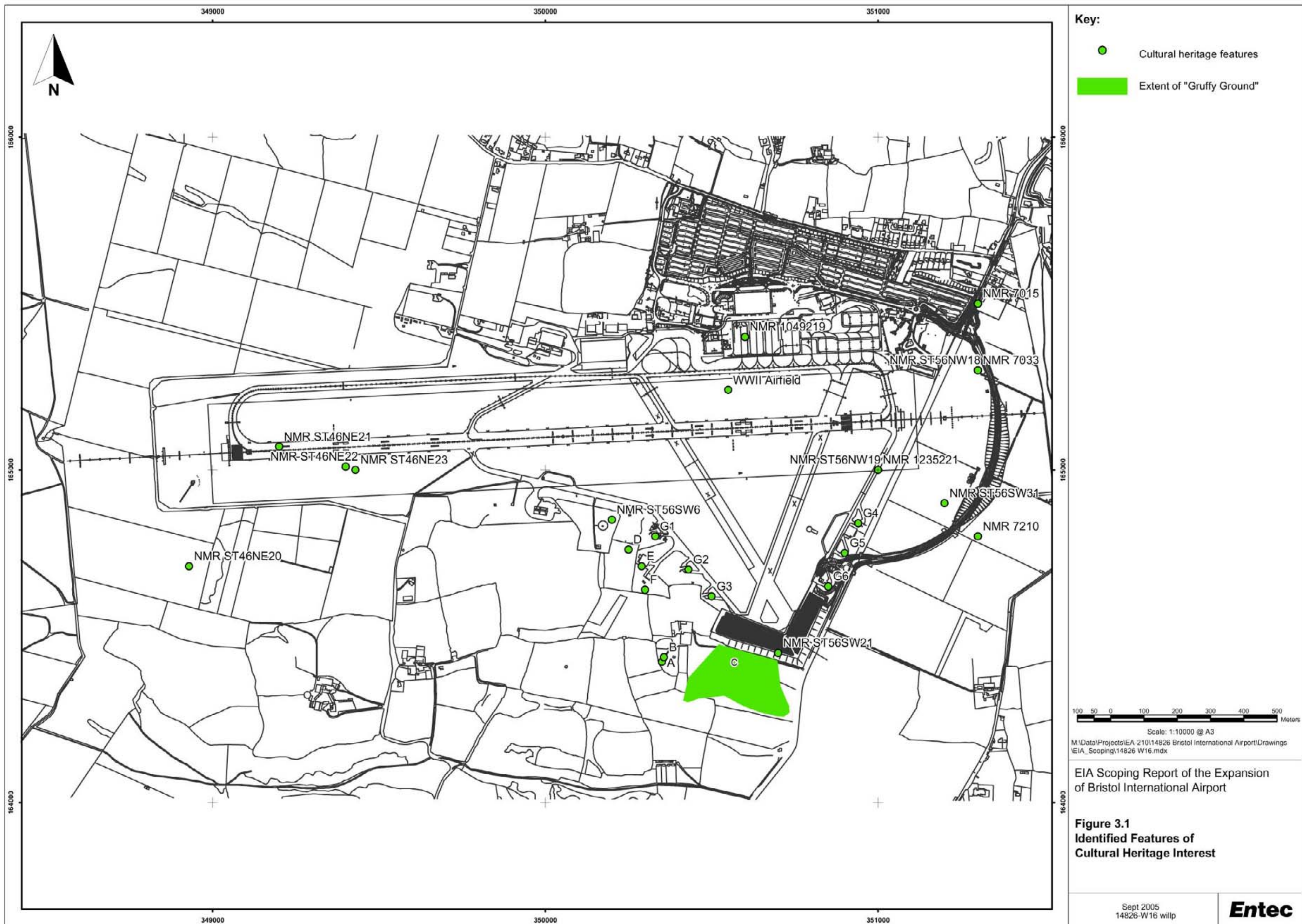
In this context, cumulative effects should be taken to mean the combined effects of two or more development activities, for example noise, air quality or landscape and visual aspects.

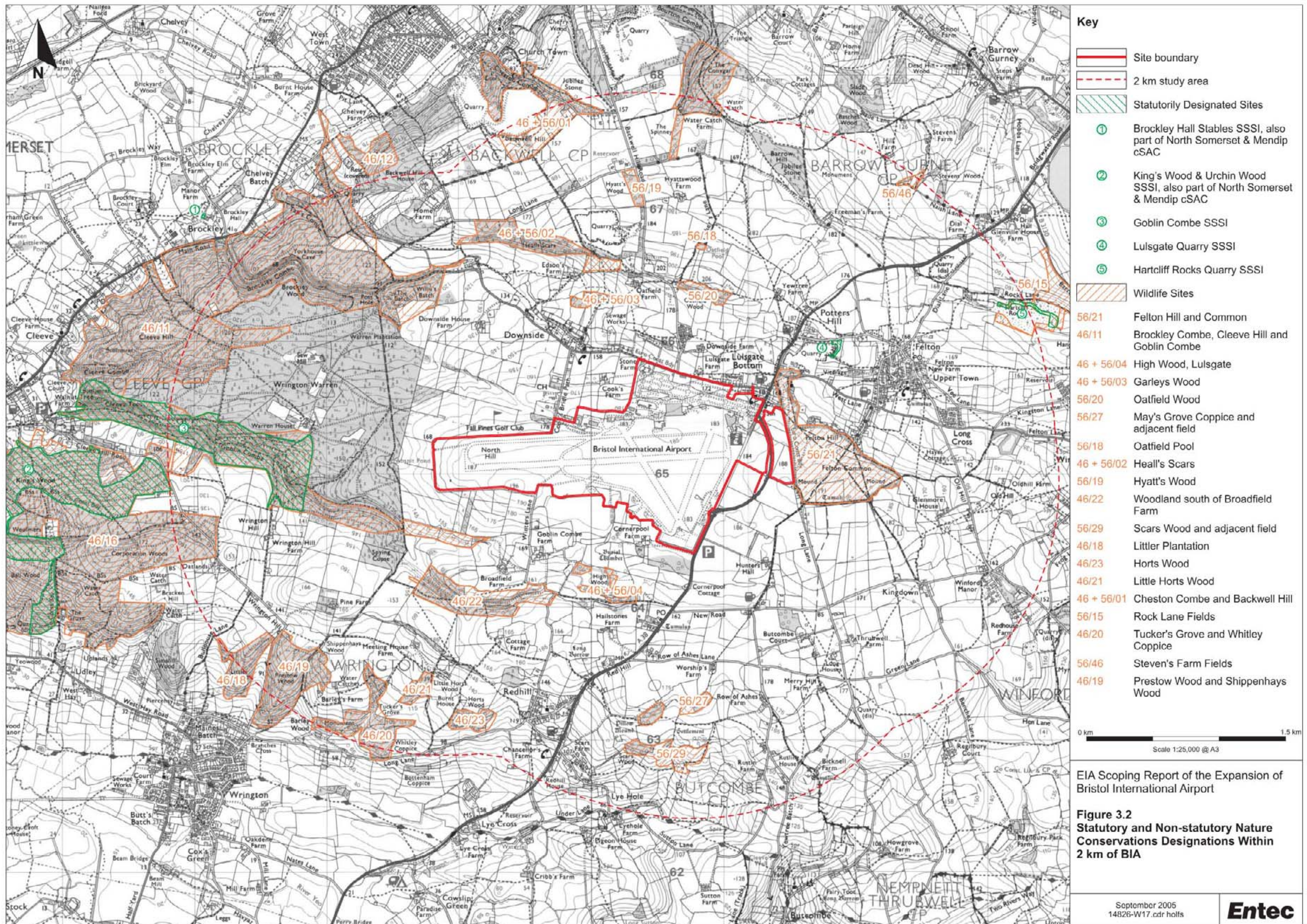
Other developments that will be considered in this context by the EIA will be agreed with North Somerset Council.

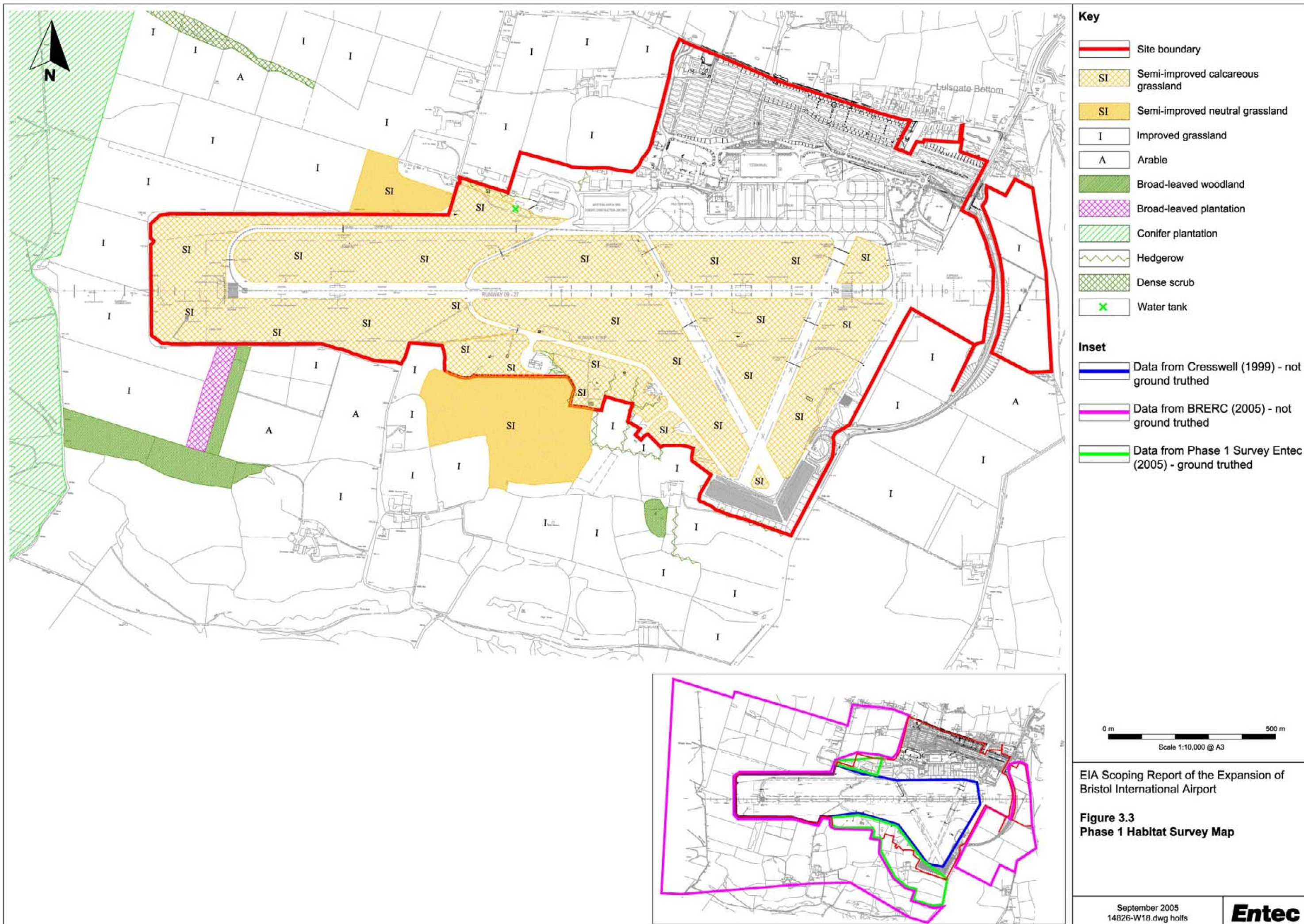
3.13 Content of the ES

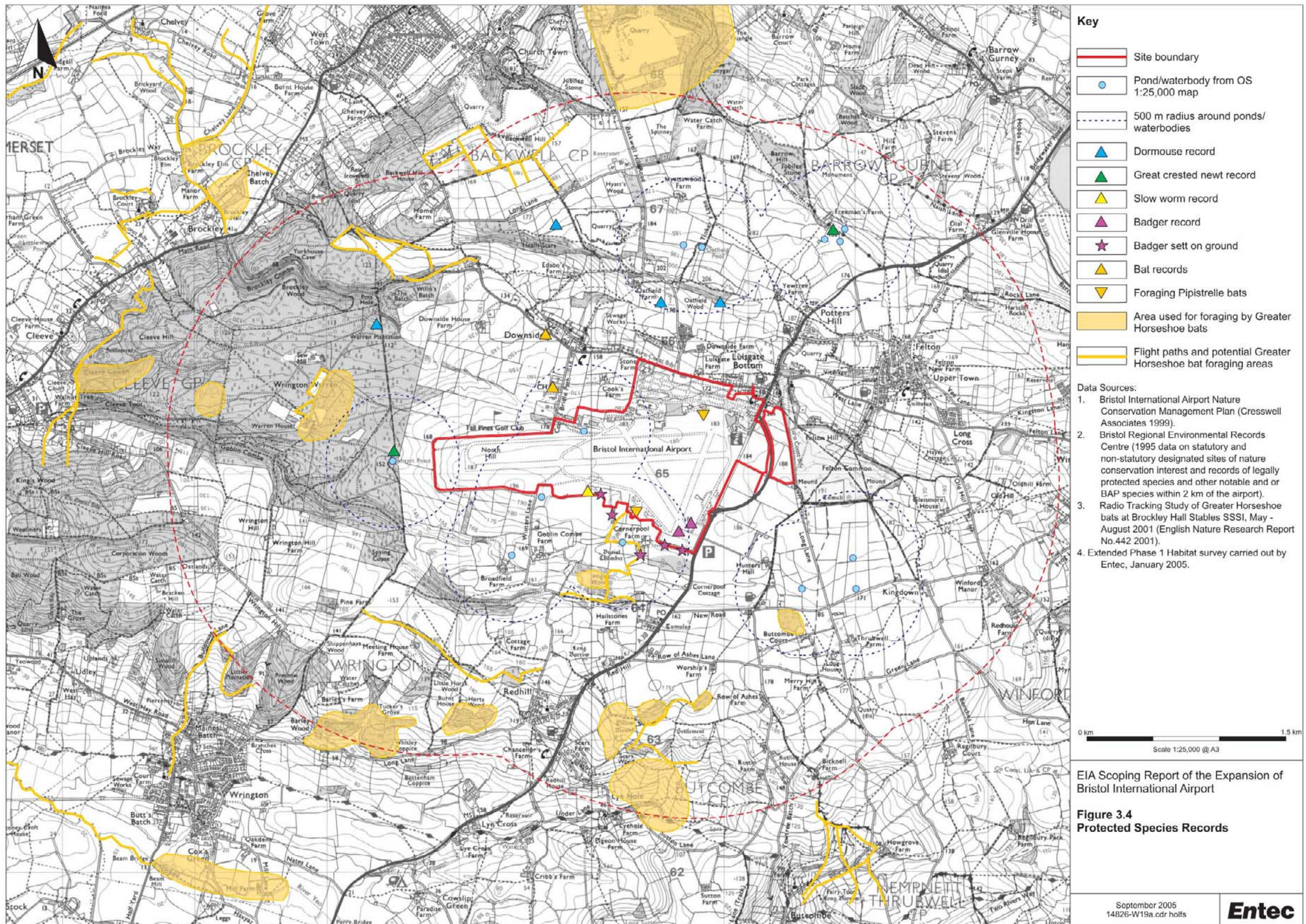
In accordance with the EIA Regulations and good practice, the ES will contain:

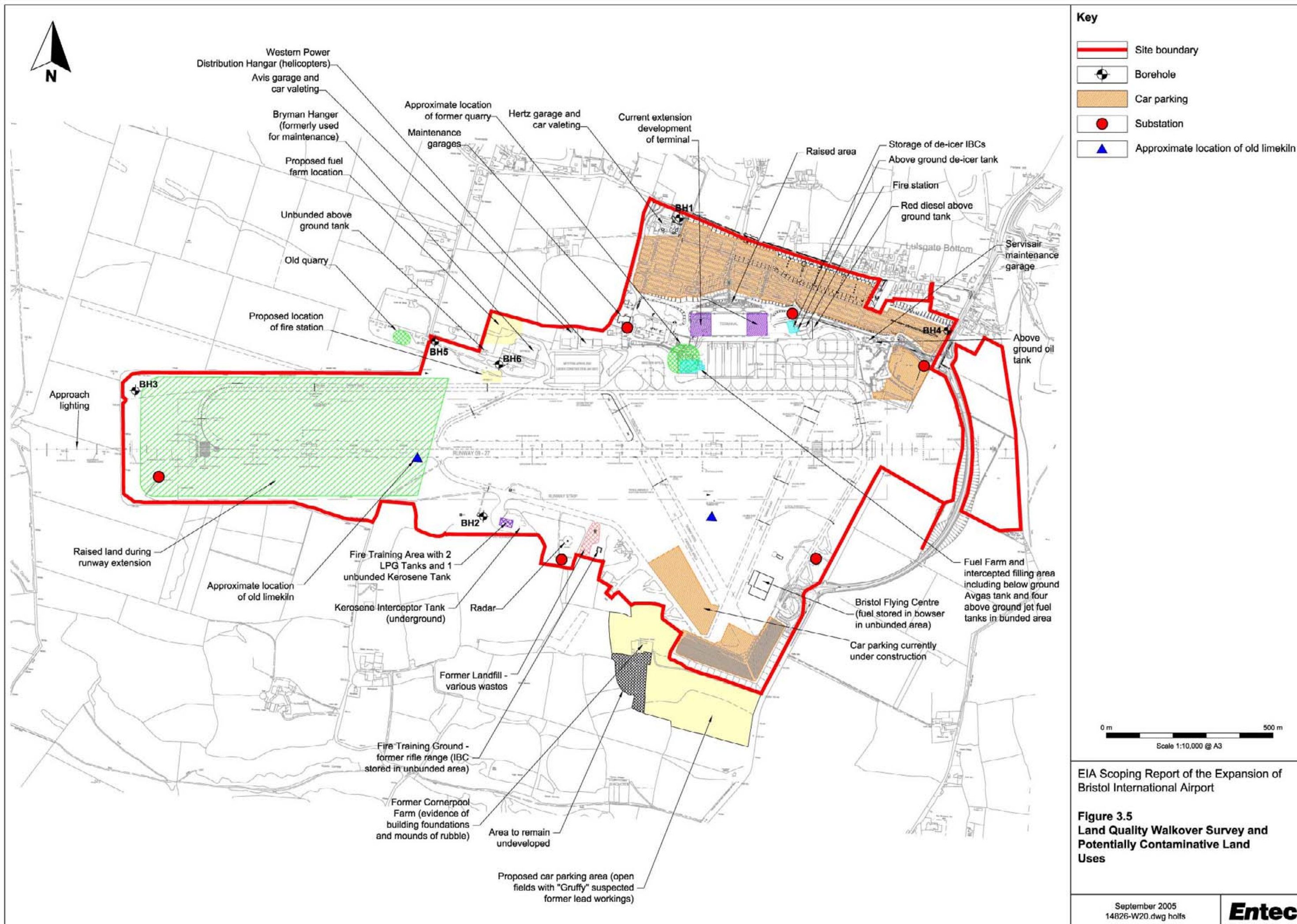
- a non-technical summary (which will be available as a standalone document);
- a description of the proposed development comprising information on the need for the development, alternatives that have been considered and a description of the development;
- information about the consents required if the development is to proceed and the policy context to the development;
- a definition of the EIA process, including the various steps in the EIA process, terminology, and the assessment methodology;
- separate chapters setting out the assessment relating to each environmental topic, including
 - a description of baseline conditions, including information about how these might change during the course of the development
 - a description of any measures that have been incorporated into the proposed development with a view to delivering environmental benefits
 - the scope of the assessment and the methodologies adopted
 - assessments and evaluations of significance of predicted effects - dealing, in turn, with each receptor/resource that has been assessed in detail
 - a summary of the evaluations of significance
 - proposals for implementing environmental and mitigation measures;
- an assessment of cumulative effects; and
- an appraisal of the effects of the scheme against relevant planning and environmental policies.

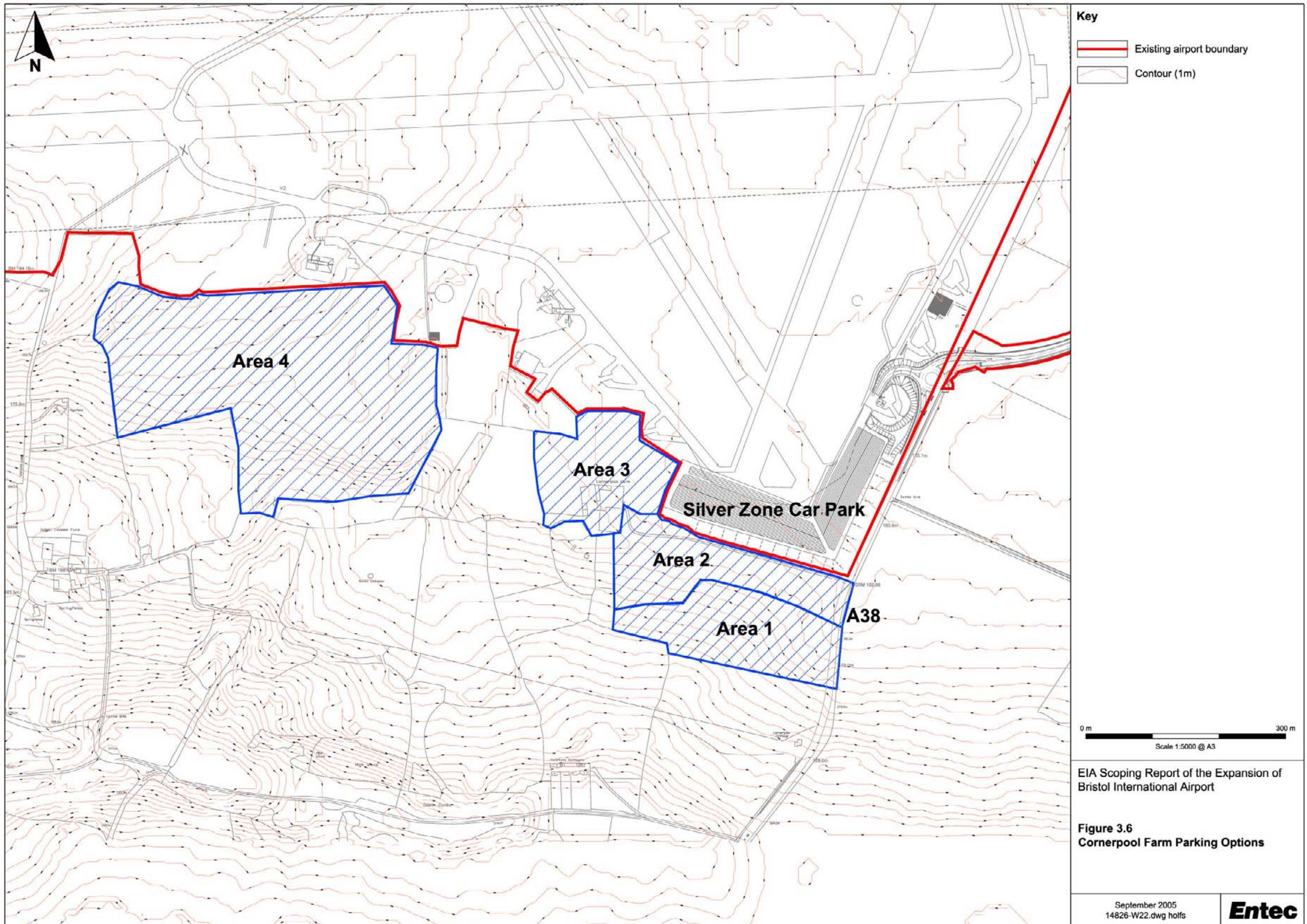






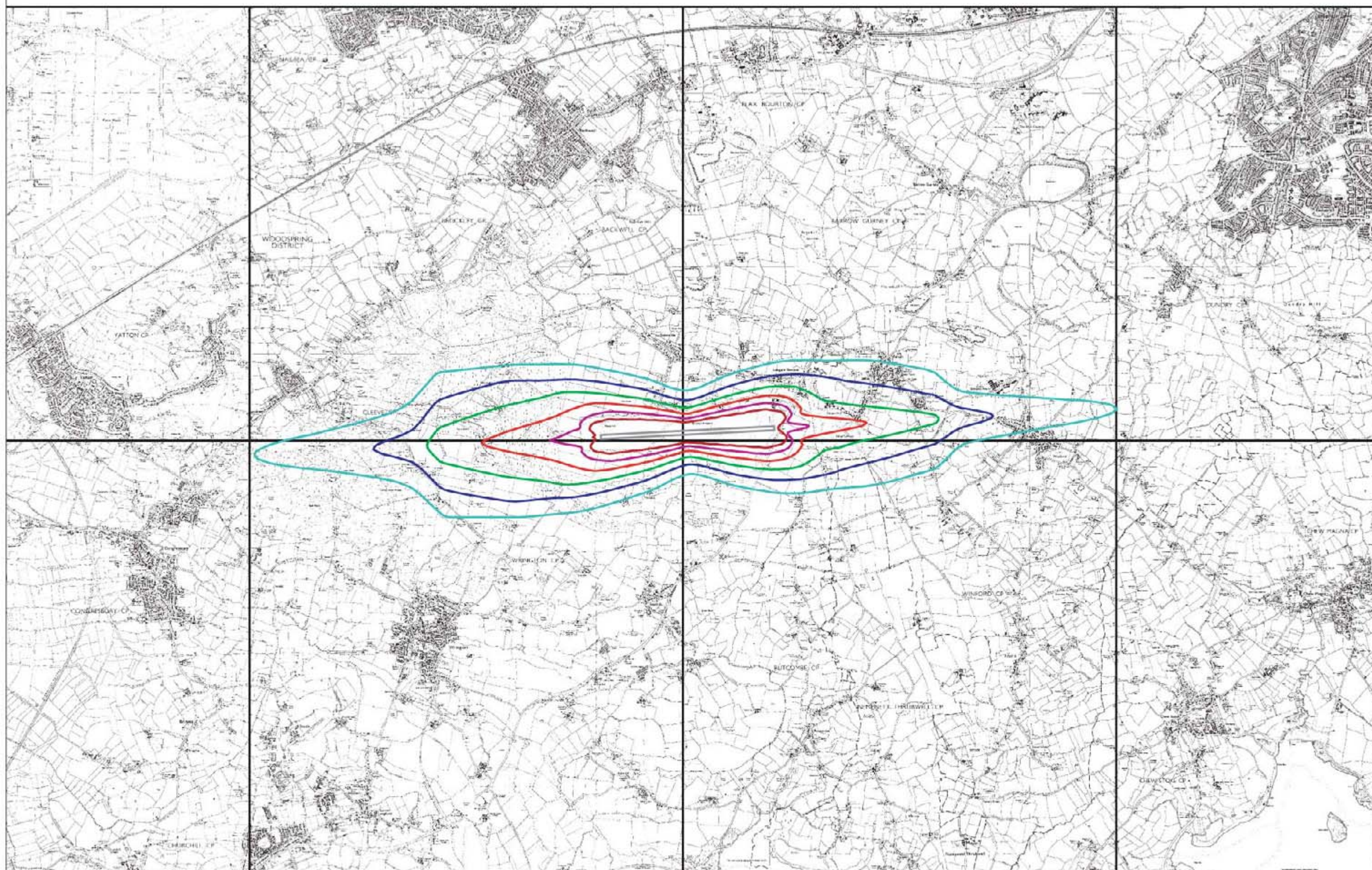








Key



0 km 3 km
Scale 1:50,000 @ A3

EIA Scoping Report of the Expansion of
Bristol International Airport

Figure 3.7
2003 Daytime Noise Contours

September 2005
14826-W21.cdr holls

Entec

4. Consents required

In addition to planning permission under the *Town and Country Planning Act 1990*, which drives the requirement for EIA (see section 1.1), other consents are required to enable the proposed development to proceed (see Table 4.1). The environmental information needed to apply for these consents has either been collected as part of the EIA process or through separate work carried out at the same time. Table 4.1 indicates whether the ES provides all of the required environmental information to support the application for the various consents.

Table 4.1 Consents that are relevant to the proposed development

Interest feature/activity	Summary of legislative context	Source of supporting environmental information
Discharge consents	A revision to the discharge consent under Section 88 and Schedule 10 of the <i>Water Resources Act 1991</i> may be required for any increase or variation in quality of the discharge to groundwater.	Separate supporting information.
Works involving waste materials	A Waste Management Licence is required for any site to be used for the deposition of Controlled Waste. Controlled Waste includes wastes arising from construction/demolition, or other sources (e.g. surplus excavation spoil) as well as all contaminated, polluted, or discarded material. Registration of a Waste Management Licence Exemption will be required if it is proposed to re-use such waste materials on site (for example if a structure is demolished and the resulting material, which is termed a Controlled Waste, is re-used, for example, as infill). Similarly, surplus excavation spoil may be classed as Controlled Waste, in which case registration of a Waste Management Licence Exemption is required to permit its retention on any site other than a registered waste management facility. A Waste Management Licence Exemption registration must be submitted to the land owner and the EA well in advance of works starting, and must normally be supported by representative chemical analyses of the material to be re-used together with an environmental risk assessment generated using the results of the analyses.	Separate supporting information.
Legally protected species	Many species of animal and plant are protected by law and works that could affect some of these species require special consent. For species protected under <i>The Conservation (Natural Habitats, &c.) Regulations 1994</i> (SI 1994 No. 2716 (as amended) - known as the Habitats Regulations) (e.g. bats, great crested newt or otter), licences are required from the Department for the Environment, Food and Rural Affairs (Defra) for any activities that will damage or disturb the habitats used by the species or the species themselves. Under <i>The Protection of Badgers Act 1992</i> , a licence is required from English Nature, for any activity that will disturb badgers or their setts. Works that affect species that are protected solely under the <i>Wildlife & Countryside Act 1981</i> , as amended (including by the <i>Countryside and Rights of Way Act 2000</i>), may require a license from English Nature.	Separate supporting information.
Listed Buildings	Control over listed buildings is governed by the <i>Planning (Listed Buildings and Conservation Areas) Act 1990</i> , which makes provision for the maintenance of a list of buildings of particular architectural or historical interest. Listed building consent is required from the local planning	No consent required (subject to review of full SMR).

Interest feature/activity	Summary of legislative context	Source of supporting environmental information
Scheduled Monuments	authority for any works that would involve the demolition or alteration of the character of a listed building. The setting of a listed building will also be a consideration in the determination of planning applications. Scheduled Monuments (SMs) are designated under the <i>Ancient Monuments and Archaeological Areas Act 1979</i> by the Secretary of State, acting in England on the advice of English Heritage. Only monuments that are considered to be of national importance are designated in this way. Scheduled Monument Consent is required for almost any work affecting a SAM. In particular this includes any work involving damage, demolition, removal, repair or alteration of all or part of a SM, or flooding or tipping on land in or under which there is a SM.	No consent required (subject to review of full SMR).

Appendix A

Glossary and abbreviations

3 Pages

Term/abbreviation	Description
APU	Auxiliary power units
AQO	Air Quality Objectives
AQS	Air Quality Strategy
ASAS	Bristol International Airport Surface Access Strategy
ATM	Air transport movement
AURN	Automatic Urban and Rural Network
BIA	Bristol International Airport
BRERC	Bristol Regional Environmental Records Centre
BRL	Black rock limestone
CAA	Civil Aviation Authority
CWS	County Wildlife Site
Defra	Department for Environment, Food and Rural Affairs
DoB	Defence of Britain Project Database
DoE	Department of the Environment
DfT	Department for Transport
EA	Environment Agency
EIA	Environmental Impact Assessment
EIP	Examination in public
EPAQS	Expert Panel of Air Quality Standards
EQS	Environmental Quality Standards
EN	English Nature
ES	Environmental Statement
EU	European Union
EWS	Emergency Water Supply
GBJLTP	Greater Bristol Joint Local Transport Plan
GBSTS	Greater Bristol Strategic Transport Strategy
GIS	Geographic information system
GLVIA	Guidelines for landscape and visual assessment
GPU	Ground power units
GQA	General Quality Assessment
HA	Highways Agency
HGV	Heavy Goods Vehicle
ICD	Inscribed circle diameter

Term/abbreviation	Description
IEA	Institute of Environmental Assessment
IEEM	Institute of Ecology and Environmental Management
IEMA	Institute of Environmental Management and Assessment
INM	Integrated Noise Model
IPPC	Integrated Pollution Prevention and Control
LAQM	Local Air Quality Management
LBAP	Local Biodiversity Action Plan
LNR	Local Nature Reserve
LTP	Local Transport Plan
mppa	Million passengers per annum
NAQS	National Air Quality Strategy
NETCEN	National Environment Technology Centre
NGR	National Grid Reference
NO ₂	Nitrogen dioxide
NO _x	Nitrogen oxides
NMR	National Monuments Record
NSLP	North Somerset Local Plan
NSRLP	North Somerset replacement Local Plan
ODPM	Office of the Deputy Prime Minister
OS	Ordnance Survey
PM	Particulate matter
PPG	Planning Policy Guidance
PRoW	Public right of way
RAF	Royal Air Force
RE	River Ecosystem
RPG	Regional planning guidance
SAC	Special Area of Conservation
SM	Scheduled Monument
SEA	Strategic Environmental Assessment
SEL	Sound exposure level
SEMP	Site environmental management plan
SDD	Second Draft Deposit
SI	Statutory Instrument
SM	Scheduled Monument
SMR	Sites and Monuments Record

Term/abbreviation	Description
SP	Structure plan
SPA	Special Protection Area
SPZ	Source Protection Zone
SSSI	Site of Special Scientific Interest
SUDS	Sustainable drainage system
TPO	Tree Preservation Order
WHO	World Health Organisation
WHS	World Heritage Site
WW II	World War Two
UKBAP	United Kingdom Biodiversity Action Plan

Appendix B

List of consultees

2 Pages

Organisations' status	Organisations
County Council	North Somerset Council Bristol City Council Bath and North East Somerset Council South Gloucestershire Council Somerset County Council
District Council	Mendip District Council Sedgemoor District Council
Others	Joint Strategic Planning Unit Countryside Agency English Nature Environment Agency English Heritage Government Office for the South West South West Regional Development Agency Bristol Water

Appendix C

Relevant policies

8 Pages

The following policy guidance and plans are relevant to the proposed development.

National planning guidance

Government White Paper - Future of Air Transport (2003)

The White Paper acknowledges that the expansion of the Airport would result in the loss of some greenbelt land. However this is not considered to affect the overall integrity of the Green Belt in the area and would on balance be justified by its importance to the regional economy.

The need for improved surface access to the airport is also recognised and this will be addressed in the Greater Bristol Strategic Transport Study.

Planning Policy Guidance Notes and Statements

Planning Policy Guidance Notes (PPG's) and Planning Policy Statements (PPS's) set out the Government's policies on different aspects of planning. Local planning authorities must take their content into account in preparing development plans. A number of PPG's are relevant to the preparation of the ES.

- PPG2: Green Belts, 2001;
- PPG9: Nature Conservation, 1994;
- PPG13: Transport, 2001;
- PPG15: Planning and the Historic Environment, 1994;
- PPG16: Archaeology and Planning, 1990; and
- PPG24: Planning and Noise, 2001.

Relevant Planning Policy Statements (depending on the final design of the scheme) include:

- PPS 1: Delivering Sustainable Development 2005
- PPS7: Sustainable Development in Rural Areas 2004;
- PPS9: Biodiversity and Geological Conservation (Consultation Draft, 2004);
- PPS10: Planning for Sustainable Waste Management (Consultation Draft, 2004);
- PPS12: Local Development Frameworks 2004;
- PPS 22: Renewable Energy 2004; and
- PPS 23 Planning and Pollution Control 2004.

Regional planning guidance

Regional Planning Guidance for the South West (RPG 10) was published by the Secretary of State in 2001. Under the provisions of the Planning and Compulsory Purchase Act 2004, this document became the Regional Spatial Strategy (RSS10) for the South West in September 2004. The primary purpose of the RSS is to set the framework for development plans in the Region. The RSS is underpinned by the following objectives:

- protection of the environment;
- prosperity for communities and the regional and national economy;
- progress in meeting society's needs and aspirations; and
- prudence in the use and management of resources.

Bristol lies within the northern sub region as set out in Policy SS3 and is an identified Principal Urban Area (PUA) as set out in Policy SS5. SS5 sets out the framework for developing Structure Plans including the extent of the Green Belt and provision for major transport proposals. Policy SS4 deals with Green Belts and the need to review critically green belt boundaries and remove land from the green belt if it represents the most sustainable option for accommodating development. Policy SS8 addresses the Bristol Area and the need to make the most effective use of Bristol Airport. Policy TRAN 9 deals specifically with airports and the need to encourage the sustainable development of airports and associated facilities.

In 2004 a consultation document on the Regional Spatial Strategy for South West 2006-2026, outlining possible development strategies for the region, was published. The strategy will deal with broad options for future development based around varying levels of development at the PUAs.

Local planning context

The following Local Planning Policy documents are considered relevant to Bristol Airport

- Joint Replacement Structure Plan October 2002 (SP 2002);
- North Somerset Local Plan 2000 (NSLP 2000);
- Second Deposit North Somerset Local Plan with Pre-Inquiry Changes March 2004 (NSRLP SDD 2004);
- North Somerset Waste Local Plan January 2002 (NSWLP 2002);
- Greater Bristol Strategic Transport Study (GBTS); and
- Greater Bristol Joint Local Transport Plan (GBJLTP).

The overall strategic framework for the local area is set out in the Joint Replacement Structure Plan. This provides a broad context for the future development of the Airport. The most relevant policies are set out in Table 3.2. Policy 61 is a policy specific to Bristol Airport and sets out that development there should emphasis access by public transport, minimise environmental impacts and respect the integrity of the Green Belt.

The key policy issue in relation to the BIA's Master Plan is in relation to the impact on Green Belt policies within the Structure and Local Plans. As the Aviation White Paper points out expansion of the Airport will require some loss of Green Belt land, although this is considered to be justified on balance as not affecting the integrity of the Green Belt. Structure Plan policy does allow for development at the Airport provided it does not affect the integrity of the surrounding Green Belt. Existing and emerging Local Plan policy does not however make any provision for the expansion of the Airport into the Green Belt. The local planning authority takes the view that this would be inappropriate development and therefore would need to be

considered in the context of an individual planning application. Any proposal involving incursion into the Green Belt would therefore be contrary to the Local Plan.

Given the national approach in respect of BIA it does seem that there is a considerable case which could be made for the relaxation of the Green Belt boundary in respect of the Airport expansion. A detailed assessment of the effects of the development on the integrity of the Green Belt would however be required. In particular this would need to look closely at the relationship between the different types of development proposed at the site.

Greater Bristol Strategic Transport Study

The Greater Bristol Strategic Transport Study (GBSTS) has been commissioned by the Department for Transport (DfT) and the Government Office for the south-west (GOSW) and is being conducted by a consortium of Atkins, MDS Intermodal and Roger Tym & Partners.

The principal objective of the GBSTS is to address the current and long-term future of the strategic transport needs within the Greater Bristol area up to the year 2031. The area covered by the study is supported by and includes four local authorities (Bristol, North Somerset, South Gloucestershire and Bath & North East Somerset) together with parts of Wiltshire, Somerset and Gloucestershire. In addition the study is supported by the South West Regional Development Agency and the Highways Agency.

The GBSTS began in January 2004 and has included a period of public consultation conducted during the summer of 2004 to establish the current problems and issues associated with the existing transport system within the Greater Bristol area. From the public consultation exercise, the key issues are delays associated with traffic congestion and the lack of convenient, affordable alternatives by public transport despite an overall willingness to change modes of travel if the opportunities arose.

With specific reference to Bristol International Airport, the GBSTS Interim Report on Existing Problems and Issues (August 2004) indicates that by the year 2031, the likely growth in passenger figures is likely to require a step change in the consideration of surface accessibility and possible improvements that may need to be considered could include:

- links to the M4 via an Avon Ring Road extension;
- A38 corridor improvements between Bristol and Junction 22 of the M5 or more direct links to the M5;
- new rail facilities;
- possible LRT(Light Rapid Transit) line from Bristol City Centre; and
- improved transport links to the airport from Bath.

In overall terms, the GBSTS team have built a computer-based transport model of the study area in order to predict likely transport conditions up to the year 2031. Based upon the model outputs that take account of changes in living, working and travel patterns, the GBSTS team predict that by 2031, the effects on the transport network without change could result in:

- 16% growth in the total number of journeys during the morning peak period;
- increased average distances of car journeys;

- a higher proportion of journeys by car, with a reduction in the proportion of journeys made by bus;
- higher rate of traffic growth on local roads as a result of constraints for extra traffic on the motorway network; and
- a reduction in average speeds on the road network and, due to congestion, some people deciding not to travel.

On this basis, the GBSTS team have considered how best to address strategic travel within the Greater Bristol area under three long-term transport themes, these being:

- Theme 1 - better public transport;
- Theme 2 - better public transport, controlling demand for car travel; and
- Theme 3 - better roads

In considering public transport up to the year 2031, the GBSTS includes significant improvement measures that could have an effect of encouraging car users to shift to public transport thereby assisting in reducing traffic levels, congestion and pollution. Those measures that are of particular relevance to the future travel patterns to and from the airport include:

- a network of “showcase” bus corridors that include physical bus priority measures to improve journey times and reliability, more frequent services, better interchange facilities and cheaper, more convenient ticketing initiatives; and
- new high-speed inter-urban coach services linking major centres and transport interchanges (the GBSTS illustrates a potential Weston-Super-Mare - Airport - Bath route).

The GBSTS recognises that improvements to public transport alone is unlikely to be sufficient to tackle congestion and other problems on the road network. For this reason the study consideration has been given to measures to control future demand for travel by car that include:

- increasing car parking charges in town centres;
- reducing the number of parking spaces in town centres;
- introducing charges for businesses that have car parking spaces for their employees; and
- different forms of road tolls.

Of these measures, area-wide tolls (or road user charging) is considered to offer the most effective deterrent for controlling future travel demand by car. The study suggests that road user charging would only be introduced if there were to be major improvements to the transport network, the revenue from which could be used to part fund public transport improvements. The extent of road user charging would more than likely vary by time of day, type of vehicle, type of road and level of congestion but typically could incur a cost of between 5p and 50p per mile.

The GBSTS also recognises that despite measures that could be put in place to improve public transport provision and discourage growth in travel demand by car, there will remain certain sections of the road network that will have insufficient capacity to cater for predicted traffic demands.

The study identifies a number of road corridors that fall into this category that, in the context of BIA include the A370 and A38 corridors to the south-west (towards the M5 and Weston Super Mare) and to the north-east (towards Bristol City Centre, the need for improved links to the M5 (in the direction of junction 20 - Clevedon & Nailsea) and the A4174 to the south of Bristol.

Whilst the proposals are illustrative at this stage, the GBSTS will seek to gain an understanding of how schemes could be introduced to improve strategic movements whilst recognising that it is not necessarily possible to resolve all local congestion issues.

The next stage of the GBSTS is to prepare a series of integrated transport packages that it is anticipated will draw upon the best elements of each of the themes considered. The intention is then to undertake a further consultation exercise on the specific integrated transport packages in Spring 2005 and the study to be concluded by the end of the summer 2005.

Greater Bristol Joint Local Transport Plan

At present, the four local authorities that make up the Greater Bristol area (i.e. Bristol, North Somerset, South Gloucestershire and Bath & North East Somerset) each have individual Local Transport Plan (LTP's) for the period 2000/01 - 2005/06. All local authorities within England & Wales are preparing LTP documents that outline the transport objectives and measures proposed to address transport issues for a 5-year period up to 2010/11. The decision has been taken by the four local authorities to prepare a joint LTP for the next five-year period that is currently being prepared and is due to be developed for public consultation in Spring 2005.

The shared priority relating to transport focuses on improving access to jobs and services, particularly for those most in need, in ways which are sustainable. On this basis the joint LTP will comprise four key elements to be tackled namely: congestion, road safety, air quality, and accessibility.

With regard to congestion, the aspirations of the joint LTP will be to improve public transport, widen transport choice and manage traffic flows to reduce its effects.

In terms of road safety, the key objective is to improve conditions for all road users through careful traffic management and enhance the environment for pedestrians and cyclists.

It is envisaged that a combination of area-wide measures such as reducing congestion and encouraging more environmentally sustainable forms of transport, along with more localised traffic management at pollution "hot-spots" will assist in improving air quality.

In terms of accessibility, the joint LTP will seek to identify problems that exist and work in partnership with service providers to develop a strategic framework for the preparation of local action plans to address these issues.

Summary of planning policies associated with environmental topics.

Planning policies associated with environmental topics

Topic and source document	Relevant policy/policy guidance
<i>General policies</i>	•
<i>Air Quality</i>	• SP 2002 Policy 1 • NSLP 2000 ENV/1 • NSRLP SDD 2004 GDP/2
<i>Biodiversity</i>	▪ SP 2002 Policies 1, 18, 19, 21 ▪ NSLP 2000 NE/1, NE/4, NE/5, NE/6, NE/7 ▪ NSRLP SDD 2004 GDP/3, ECH/10, ECH/11, ECH/12, ECH/14, ECH/15
<i>Geology and land quality</i>	▪ SP 2002 Policy 1 ▪ NSLP 2000 ENV/1 ▪ NSLP 2000 ENV/5 ▪ NSRLP SDD 2004 GDP/2
<i>Cultural Heritage</i>	▪ SP 2002 Policies 1, 19 ▪ NSLP 2000 ARCH/2 ▪ NSRLP SDD 2004 GDP/2, ECH/6
<i>Landscape and Visual</i>	▪ SP 2002 Policy 1, 16, 17, 21 ▪ NSLP 2000 NE/1, LCS/1, GRB/1, GRB/3, GRB/5 ▪ NSRLP SDD 2004 GDP/2, GDP/3, ECH/8, ECH/10, RD/4, RD/5, RD/6, E/8
<i>Lighting</i>	• SP 2002 Policy 1 ▪ NSLP 2000 ENV/1, ENV/2 ▪ NSRLP SDD 2004 GDP/2
<i>Noise</i>	▪ SP 2002 Policy 1 ▪ NSLP 2000 ENV/1 ▪ NSRLP SDD 2004 GDP/2
<i>Community</i>	▪ SP 2002 Policies 1, 2, 4, 16, 50, 52 ▪ NSLP 2000 NE/1, CON/1, GRB/1, GRB/3, GRB/5, E/1 ▪ NSRLP SDD 2004 Policies GDP/1, GDP/3, GDP/5, GDP/6, ECH/2, RD/4, RD/5, RD/6, E/5
<i>Transport</i>	▪ SP 2002 Policies 1, 4, 48, 50, 52, 56, 61 ▪ NSLP 2000 T/11, T/15, T/17 ▪ NSRLP SDD 2004 GDP/3, E/8, T/6, T/10, T/11, T/12, T/13 ▪ South-West Regional Assembly - Developing a Regional Transport Strategy for the South-West ▪ GBSTS ▪ GBJLTP
<i>Water resources</i>	▪ SP 2002 Policies 1, 23. ▪ NSLP 2000 ENV/1, ENV/6 ▪ NSRLP SDD 2004 GDP/2, GDP/4

Other environmental policies

BIAs Environmental Policy

BIAs environmental policy contains the following statement, and this will form the basis of how environmental issues associated with the proposed airport expansion will be approached.

“BIA is committed to controlling the adverse effects of its operations and minimising their impact on the environment and the local community, whilst seeking to maximise the positive benefits from continued growth of the airport. We will do this by:

- identifying, monitoring, managing and reviewing our environmental effects, we will prepare environmental management plans and include measurable environmental targets in our business plans;
- developing our employees to raise environmental standards by ensuring that they are well informed, well trained and committed to the environmental improvement process;
- working with our business partners to raise standards and encouraging them to adopt environment policies and management systems and BIA will take a central role in co-ordinating and driving forward performance improvement;
- striving to be a better neighbour by engaging the local community in a two way dialogue to understand their needs and playing an active part in meeting these needs;
- integrating sustainability principles into our business processes and decision making;
- transparent reporting of our performance and progress; and
- meeting or exceeding all legal requirements.

The key areas of action are:

- management of noise;
- traffic and surface access;
- air quality;
- reducing waste and conserving resources;
- water quality and management;
- wildlife and nature conservation; and
- community relations."

Pollution prevention

Best practice guidance for the prevention or reduction in probability of pollution is available from the Environment Agency and CIRIA ((amongst others). Two key sources are identified

below. This will form the basis for the development of relevant aspects of the site Health and Safety and Environmental Management Plan.

- EA Pollution Prevention Guidance Notes (PPG), particularly the following:
 - PPG 1: General guide to the prevention of water pollution;
 - PPG5: Works in, near or liable to affect watercourses;
 - PPG6: Working at construction and demolition sites;
 - PPG8: Storage and disposal of used oils;
 - PPG20: Dewatering underground ducts and chambers;
 - PPG21: Pollution Incidence Response Planning; and
 - PPG27: Installation, decommissioning and removal of underground storage tanks.
- CIRIA guidance notes, namely the following:
 - CIRIA R186: Hydraulic Measures for the Control and Treatment of Groundwater Pollution;
 - CIRIA C522: Sustainable urban drainage systems - design manual for England and Wales;
 - CIRIA C523: Sustainable urban drainage systems - best practice manual for England, Scotland, Wales and Northern Ireland;
 - CIRIA Report C532: Control of Water Pollution from Construction Sites (2001); and
 - CIRIA Report C502: Environmental Good Practice on Site.

Construction over abandoned mine workings

Best practice guidance for construction over abandoned mine workings are provided by CIRIA (amongst others). A key source is identified below. This will form the basis for the development of relevant aspects of the site Health and Safety and Environmental Management Plan and construction strategy.

- Healy PR and Head JM. 2004. Construction over abandoned mine workings (C700CD).

This publication deals with building on previously undermined areas, providing information and guidance for engineers and geologists who are engaged in the co-ordination of a mining investigation, in the design of foundations, or in remedial measures.

Appendix D

Photographs of Biodiversity Habitat Features

1 Page



Plate 1 Emergency Water Supply pond - which may support amphibians



Plate 2 Semi-improved neutral grassland - typical of land airside



Plate 3 WW2 structure that may support roosting bats.



Plate 4 Cattle-grazed grassland to the south of the airport that supports foraging greater horseshoe bats



Plate 5 Hedgerow to the south of the Airport that contains a large main badger sett



Plate 6 Gruffy features that provide potential refuge and basking opportunities for reptiles.

Appendix E Geology and Land Quality Qualitative Risk Assessment

8 Pages

Overview of the risk matrix

The column designated as ‘Potential Consequence of Source - Receptor Linkage’ gives an indication of the sensitivity of a given receptor to a particular source and/or contaminant of concern being considered. The classification assumes a “worst case” scenario and is based on full exposure via the particular linkage being examined. The derivation of the classes used in the table is shown below

Consequence classes

Classification	Human Health	Controlled Water	Ecological	Built Environment
Severe	Irreversible damage to human health	Substantial pollution of sensitive water resources	Significant change to the number of one or more species or ecosystems	Irreparable damage to buildings, structures or the environment
Moderate	Non-permanent health effects to humans	Pollution of non-sensitive water resources or small scale pollution of sensitive water resources	Change to population densities of non-sensitive species	Damage to sensitive buildings, structures or the environment
Mild	Slight short term health effects to humans	Slight pollution to non-sensitive water resources	Some change to population densities but with no negative effects on the function of the ecosystem	Easily repairable effects of damage to buildings or structures
Negligible	No measurable effects on humans	Insubstantial pollution to non-sensitive water resources	No significant changes to population densities in the environment or in any ecosystem	Very slight non-structural damage or cosmetic harm to buildings or structures

The column entitled ‘Likelihood of Source-Receptor Linkage’, gives an assessment of the probability of the selected source and receptor being linked by the identified pathway. This assessment is ranked based on site specific conditions as follows:

- Very unlikely 0 to 5%;
- Unlikely 5 to 45%;
- Possible 45 to 55%;
- Likely 55 to 95%;
- Almost Certain 95 to 100% (i.e. effect noted during the walkover survey).

The ‘Risk Classification’ column is an overall assessment of the risk, which considers the likely consequence of a give risk being realised and the likelihood of that risk being realised. The risk classifications are assigned using the following consequence/likelihood matrix.

Potential Consequence	Severe	Low	Low to moderate	Moderate to high	Very High	Very High
	Moderate	Negligible to low	Low	Moderate	Moderate to high	High
	Mild	Negligible	Low	Low	Low to moderate	Moderate
	Negligible	Negligible	Negligible	Negligible to low	Low	Low
		Very Unlikely	Unlikely	Possible	Likely	Almost Certain
		Likelihood				

The 'Risk Classification' descriptions used are as follows:

- **Negligible** The presence of the identified source does not give rise to the potential to cause significant harm.
- **Low** It is possible that harm could arise to a designated receptor from an identified source, however, this is likely to be mild.
- **Moderate** It is possible that harm could arise to a designated receptor from an identified source, but it is likely that such harm would be relatively localised or non-permanent. Remedial action may be necessary.
- **High** A designated receptor is likely to experience significant harm from an identified source without remedial action.
- **Very High** There is a high probability that severe harm could arise to a designated receptor from an identified source without appropriate remedial action.

Those combinations which are shaded are deemed to require some mitigation to reduce the risk. In cases of physical features, such as foundations and underground services, harm is defined as impact which would result in non-serviceability of the identified receptor or extra-over building costs associated with redevelopment.

Bristol International Airport – On-Site Principal Pollutant Linkages from Potential Contaminants

Source	Pollutant (Chemical of Concern) or Consequence	Critical Receptors and Scenarios	Pathway	Potential Effect	Potential Consequence of Source - Receptor Linkage	Likelihood of Source - Receptor Linkage	Risk Classification
Contaminated fill material	Metals, sulphate, sulphide, organic and inorganic contaminants	Current and future site users	Dermal contact, ingestion, inhalation of dust	Hazard to human health	Moderate	Unlikely	Low
		Construction workers	Dermal contact, ingestion, inhalation of dust	Hazard to human health	Moderate	Possible	Moderate
		Offsite public	Dermal contact, ingestion, inhalation of dust	Hazard to human health	Moderate	Unlikely	Low
		Land quality	Leaching of contaminants	Land contamination	Moderate	Unlikely	Low
		Buildings and Buried Services	Chemical attack	Hazard to buildings, services and human health	Moderate	Possible	Moderate
Contaminated fill material	Asbestos	Current and future site users	Inhalation	Hazard to human health	Severe	Unlikely	Low to Moderate
		Construction workers	Inhalation	Hazard to human health	Severe	Possible	Moderate to High
		Offsite public	Inhalation	Hazard to human health	Severe	Unlikely	Low to Moderate
Biogenic gases generated from potential fill material	Methane and carbon dioxide	Current and future site users	Inhalation via migration through unsaturated strata	Explosion, asphyxia	Severe	Possible	Moderate to High
		Construction workers	Inhalation via migration through	Explosion, asphyxia	Severe	Unlikely	Low to Moderate

Source	Pollutant (Chemical of Concern) or Consequence	Critical Receptors and Scenarios	Pathway	Potential Effect	Potential Consequence of Source - Receptor Linkage	Likelihood of Source - Receptor Linkage	Risk Classification
Airport Operations and Maintenance Works	Fuels, oils, de-icing chemicals, solvents, surfactants, herbicides, tritium	Offsite public	unsaturated strata				
			Inhalation via migration through unsaturated strata	Explosion, asphyxia	Severe	Unlikely	Low to Moderate
		Current and future site users	Dermal contact, ingestion, dust / vapour inhalation	Hazard to human health	Moderate	Possible	Moderate
		Construction workers	Dermal contact, ingestion, dust / vapour inhalation	Hazard to human health	Moderate	Possible	Moderate
		Offsite public	Dermal contact, ingestion, dust / vapour inhalation	Hazard to human health	Severe	Unlikely	Low to Moderate
		Land quality	Leaching of contaminants, direct contact	Land contamination	Moderate	Likely	Moderate to High
Electricity Sub Station	Transformer oils, PCB's, asbestos	Buildings and Buried Services	Chemical attack, vapour migration	Hazard to buildings, services and human health	Moderate	Likely	Moderate to High
		Current and future site users	Dermal contact, ingestion, inhalation of dust	Hazard to human health	Severe	Unlikely	Low to Moderate
		Construction workers	Dermal contact, ingestion, inhalation of dust	Hazard to human health	Severe	Unlikely	Low to Moderate

Source	Pollutant (Chemical of Concern) or Consequence	Critical Receptors and Scenarios	Pathway	Potential Effect	Potential Consequence of Source - Receptor Linkage	Likelihood of Source - Receptor Linkage	Risk Classification
		Offsite public	Dermal contact, ingestion, inhalation of dust	Hazard to human health	Severe	Very Unlikely	Low
		Land quality	Leaching of contaminants	Land contamination	Severe	Unlikely	Low to Moderate
		Buildings and Buried Services	Chemical attack, migration of contaminants	Hazard to buildings, services and human health	Moderate	Unlikely	Low
Hydrocarbon contamination from historical on-site spillage	Fuels and oils	Current and future site users	Dermal contact, ingestion, inhalation	Hazard to human health	Moderate	Unlikely	Low
		Construction workers	Dermal contact, ingestion, inhalation	Hazard to human health	Moderate	Possible	Moderate
		Offsite public	Dermal contact, ingestion, inhalation	Hazard to human health	Moderate	Unlikely	Low
		Land quality	Leaching of contaminants, direct contact	Land contamination	Moderate	Likely	Moderate to High
		Buildings and Buried Services	Chemical attack, migration of contaminants, vapour migration	Hazard to buildings, services and human health	Moderate	Possible	Moderate

Source	Pollutant (Chemical of Concern) or Consequence	Critical Receptors and Scenarios	Pathway	Potential Effect	Potential Consequence of Source - Receptor Linkage	Likelihood of Source - Receptor Linkage	Risk Classification
Car Parking and Roadways	Metals, fuels, oils	Current and future site users	Dermal contact, ingestion, inhalation of dust	Hazard to human health	Moderate	Unlikely	Low
		Construction workers	Dermal contact, ingestion, inhalation of dust	Hazard to human health	Moderate	Unlikely	Low
		Offsite public	Dermal contact, ingestion, inhalation of dust	Hazard to human health	Moderate	Unlikely	Low
		Land quality	Leaching of contaminants	Land contamination	Moderate	Unlikely	Low
		Buildings and Buried Services	Chemical attack, migration of contaminants	Hazard to buildings, services and human health	Moderate	Very Unlikely	Negligible to Low
Fire Fighting and Training	Metals, fuels, oils, solvents, halogens, surfactants	Current and future site users	Dermal contact, ingestion, inhalation of dust	Hazard to human health	Severe	Unlikely	Low to Moderate
		Construction workers	Dermal contact, ingestion, inhalation of dust	Hazard to human health	Severe	Possible	Moderate to High
		Offsite public	Dermal contact, ingestion, inhalation of dust	Hazard to human health	Severe	Very Unlikely	Low

Source	Pollutant (Chemical of Concern) or Consequence	Critical Receptors and Scenarios	Pathway	Potential Effect	Potential Consequence of Source - Receptor Linkage	Likelihood of Source - Receptor Linkage	Risk Classification
Car Valeting and Maintenance	Metals, fuels, oils, solvents, surfactants	Land quality	Leaching of contaminants	Land contamination	Severe	Possible	Moderate to High
		Buildings and Buried Services	Chemical attack, migration of contaminants	Hazard to buildings, services and human health	Moderate	Unlikely	Low
		Current and future site users	Dermal contact, ingestion, inhalation of dust	Hazard to human health	Severe	Unlikely	Low to Moderate
Natural Geology	Solution Features	Construction workers	Dermal contact, ingestion, inhalation of dust	Hazard to human health	Severe	Possible	Moderate to High
		Offsite public	Dermal contact, ingestion, inhalation of dust	Hazard to human health	Severe	Very Unlikely	Low
		Land quality	Leaching of contaminants	Land contamination	Severe	Possible	Moderate to High
		Buildings and Buried Services	Chemical attack, migration of contaminants	Hazard to buildings, services and human health	Moderate	Unlikely	Low
Natural Geology	Solution Features	Current and future site users	Subsidence	Hazard to human health	Negligible	Unlikely	Negligible
		Construction workers	Subsidence	Hazard to human health	Mild	Possible	Low
		Buildings and Buried Services	Subsidence	Hazard to buildings, services and human health	Moderate	Possible	Moderate

Source	Pollutant (Chemical of Concern) or Consequence	Critical Receptors and Scenarios	Pathway	Potential Effect	Potential Consequence of Source - Receptor Linkage	Likelihood of Source - Receptor Linkage	Risk Classification
Historical Quarrying and Mining (including former lime kilns)	Radon	Current and future site users	Inhalation via migration through unsaturated strata	Ionising radiation	Severe	Unlikely	Low to Moderate
		Construction workers	Inhalation via migration through unsaturated strata	Ionising radiation	Severe	Very Unlikely	Low
	Metals, sulphate, sulphide	Current and future site users	Dermal contact, ingestion	Hazard to human health	Moderate	Unlikely	Low
		Construction workers	Dermal contact, ingestion	Hazard to human health	Moderate	Unlikely	Low
		Offsite public	Dermal contact, ingestion	Hazard to human health	Moderate	Unlikely	Low
		Land quality	Leaching of contaminants and direct contact	Land contamination	Moderate	Unlikely	Low
		Buildings and Buried Services	Chemical attack	Hazard to buildings, services and human health	Severe	Unlikely	Low to Moderate
Ground Instability	Buildings and Buried Services	Subsidence	Hazard to buildings, services and human health	Severe	Possible	Moderate to High	

Bristol International Airport – Off-Site Principal Pollutant Linkages from Potential Contaminants

Source	Pollutant (Chemical of Concern) or Consequence	Critical Receptors and Scenarios	Pathway	Potential Effect	Potential Consequence of Source - Receptor Linkage	Likelihood of Source - Receptor Linkage	Risk Classification
Off site former quarrying and mining (including former lime kilns)	Metals, sulphate, sulphide	Current and future site users	Dermal contact, ingestion	Hazard to human health	Moderate	Very Unlikely	Negligible to Low
		Construction workers	Dermal contact, ingestion	Hazard to human health	Moderate	Unlikely	Low
		Land quality	Leaching of contaminants	Land contamination	Moderate	Unlikely	Low
		Buildings and Buried Services	Chemical attack, contaminant migration	Hazard to buildings, services and human health	Moderate	Unlikely	Low
		Buildings and Buried Services	Subsidence	Hazard to buildings, services and human health	Moderate	Possible	Moderate
Off site waste disposal and/or landfill sites	Various harmful substances	Current and future site users	Dermal contact, ingestion, inhalation	Hazard to human health	Severe	Unlikely	Low to Moderate
		Construction workers	Dermal contact, ingestion, inhalation	Hazard to human health	Severe	Unlikely	Low to Moderate
		Land quality	Leaching of contaminants	Land contamination	Severe	Unlikely	Low to Moderate
		Buildings and Buried Services	Chemical attack	Hazard to buildings, services and human health	Severe	Unlikely	Low to Moderate

Appendix F

Landscape and Visual Assessment

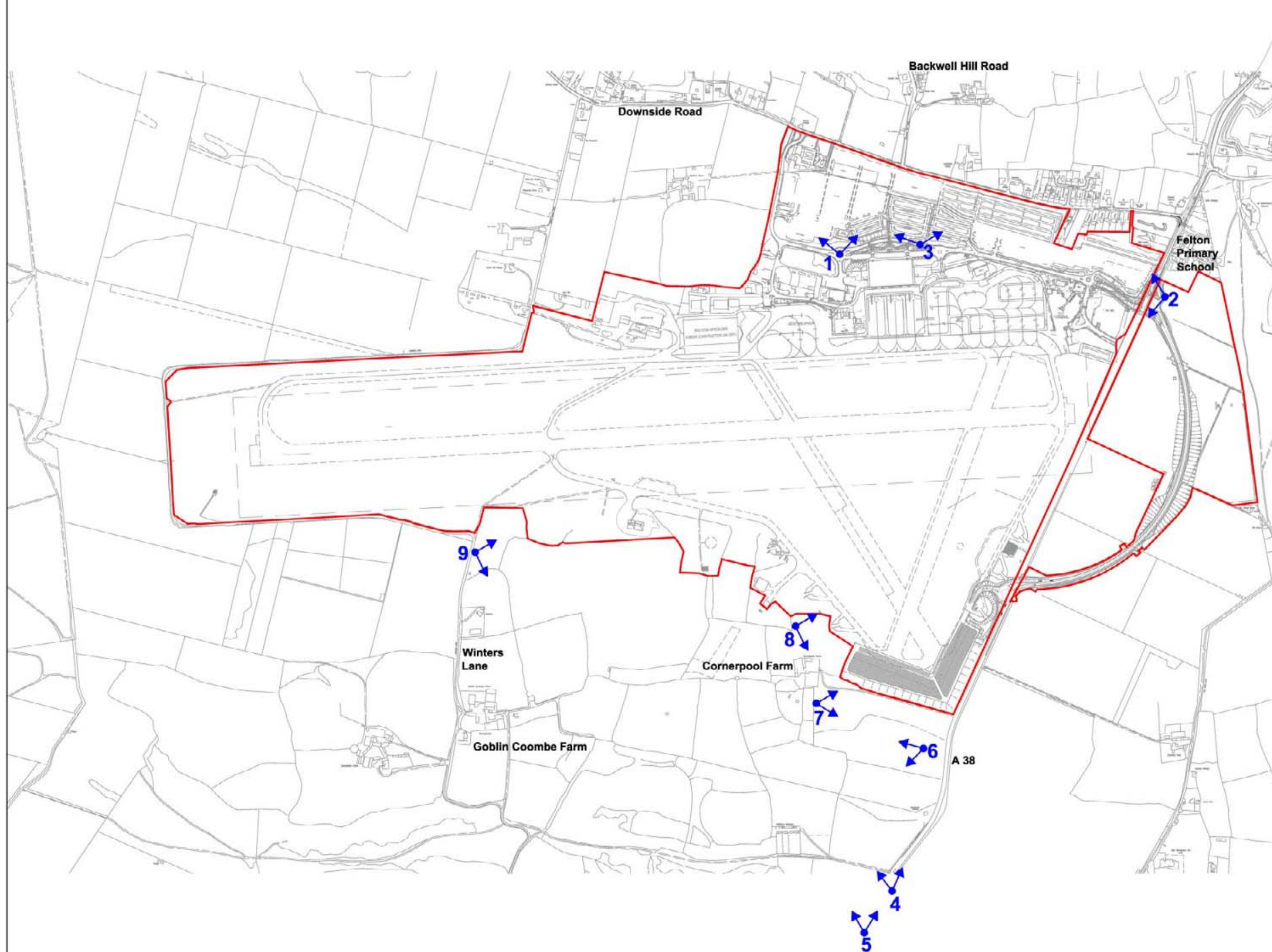
Photographs

4 Pages



Key

-  Existing airport boundary
-  Photograph location



0 m 500 m
Scale 1:10,000 @ A3

EIA Scoping Report of the Expansion of
Bristol International Airport

Photograph Location Plan

September 2005
14826-L04.dwg smitv

Entec



Photograph 1



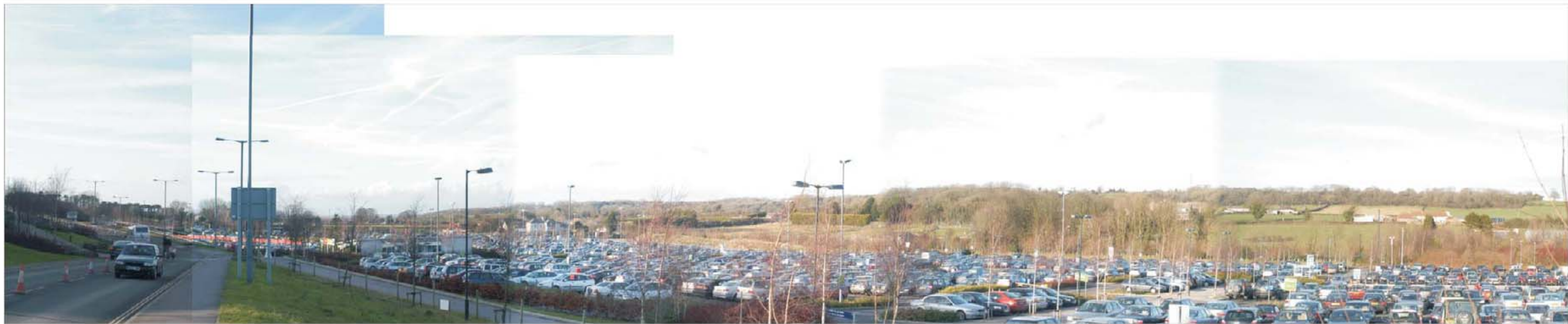
Photograph 2

EIA Scoping Report of the Expansion of
Bristol International Airport

Photographs 1 and 2

September 2005
14826-L02.cdr smitv

Entec



Photograph 3



Photograph 4



Photograph 5

EIA Scoping Report of the Expansion of
Bristol International Airport

Photographs 3, 4 and 5

September 2005
14826-L03.cdr smitv

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Photograph 6



Photograph 7



Photograph 8



Photograph 9