

Strategic Environmental Assessment for Transport Plans and Programmes

TAG Unit 2.11

December 2004

Department for Transport

Transport Analysis Guidance (TAG)

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1 Introduction

1.1 Purpose of the guidance

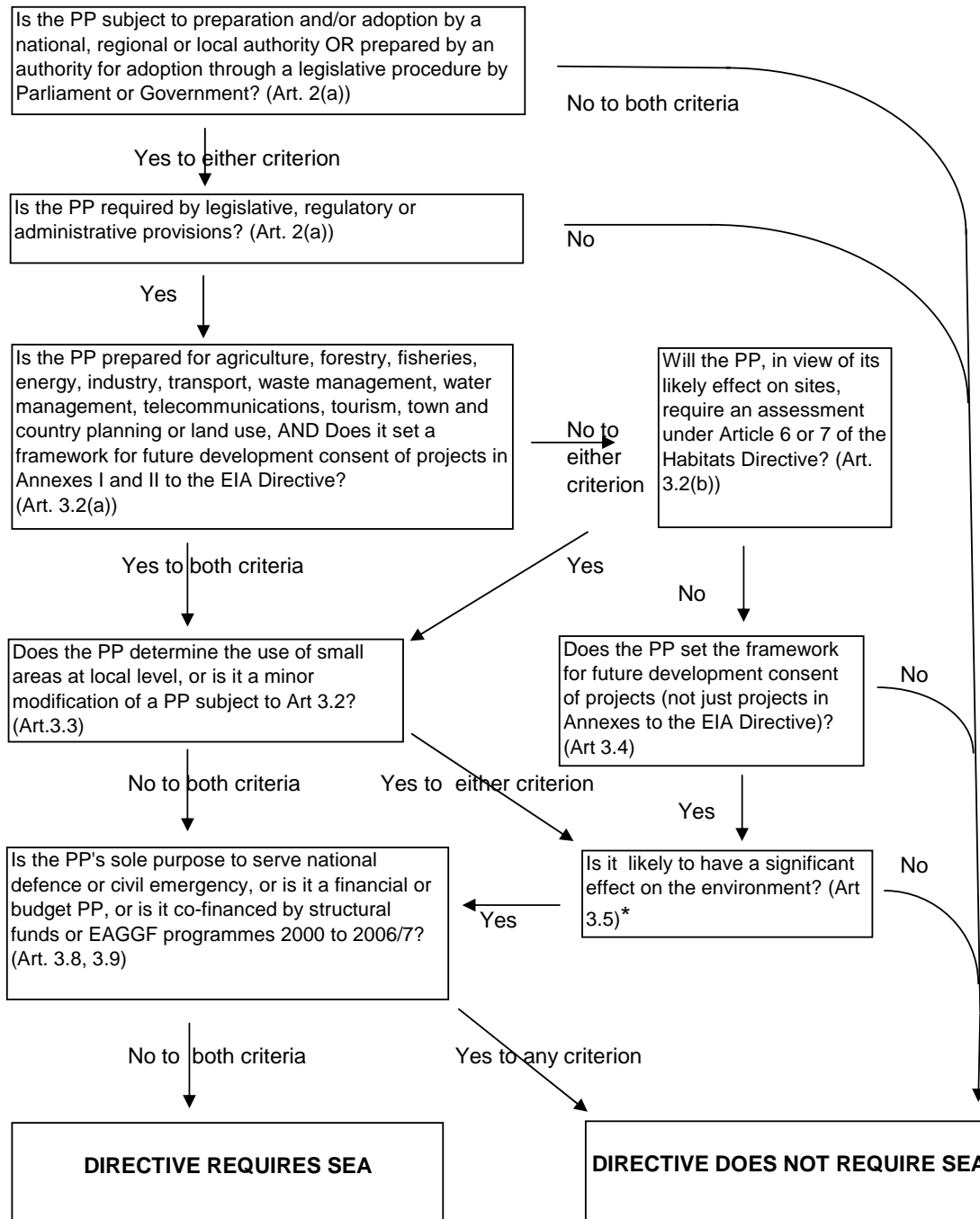
- 1.1.1 This document presents guidance on how to carry out strategic environmental assessment (SEA) for transport plans and programmes in England in accordance with the requirements of European Directive 2001/42/EC *on the assessment of the effects of certain plans and programmes on the environment*, also known as the SEA Directive¹. The Directive was transposed in England through *The Environmental Assessment of Plans and Programmes Regulations 2004 (Statutory Instrument 2004, no. 1633)*. It integrates the Directive's requirements with existing transport appraisal processes – the New Approach to Appraisal (NATA).
- 1.1.2 The objective of the SEA Directive is 'to provide for a high level of protection of the environment and to contribute to the integration of environmental considerations into the preparation and adoption of plans ... with a view to promoting sustainable development' (Article 1). This environmental commitment is broadly consistent with Government policies and is reflected in other transport planning and appraisal guidance.
- 1.1.3 The SEA Directive applies to plans and programmes, and modifications to them, whose formal preparation began after 21 July 2004. It also applies to plans and programmes whose formal preparation began before that date, if they have not been adopted (or submitted to a legislative procedure leading to adoption) by 21 July 2006. This guidance refers only to 'plans', but this should be taken to include all relevant plans or programmes regardless of their formal titles.
- 1.1.4 SEA will normally be required for new transport plans including Local Transport Plans and Local (Transport) Implementation Plans. Extensions or amendments to those plans and other new transport plans may, in certain circumstances, require SEA. Figure 1.1 provides guidance on the criteria for the application of the SEA Directive to plans and programmes.
- 1.1.5 This guidance is not intended as an interpretation of the law. It provides a basis for undertaking SEA, but is no substitute for giving careful thought to developing the approach to the SEA of the particular plan. It should be read in conjunction with the Directive and transposing legislation. The full text of the Directive can be found online at:
http://europa.eu.int/eur-lex/pri/en/oj/dat/2001/l_197/l_19720010721en00300037.pdf.
That of the Regulations can be found at:
<http://www.legislation.hmso.gov.uk/si/si2004/20041633.htm>.
- 1.1.6 This guidance should also be read alongside other TAG Units (see Chapter 8). Other sources of guidance on SEA may also be relevant, such as:
- The ODPM's *Draft Practical Guide to the SEA Directive* (2004a);
 - The ODPM's *Sustainability Appraisal (SA) of Regional Spatial Strategies and Local Development Frameworks, Consultation Paper* (2004b). That document covers SEA/SA for a form of transport plan, the Regional Transport Strategy;

¹ This guidance uses the term 'SEA' to mean an environmental assessment which complies with the Directive

1.2 Structure of the guidance

- 1.2.1 This guidance discusses the SEA process in a step-by-step fashion. Chapter 2 contains background information on the SEA Directive and details of how SEA fits into transport planning and appraisal processes. Chapters 3-7 then describe guidance on five stages that comprise an SEA. Chapters 8-10, provide further information, references and document provenance.
- 1.2.2 A glossary is provided in Appendix 1. The specific application of the guidance to local transport plans is discussed in Appendix 2 and advice on tiering issues in SEA between plans is outlined in Appendix 3.
- 1.2.3 Information on specific aspects of SEA is provided in a series of supporting appendices 4-8 covering the environmental baseline, cumulative and indirect effects, uncertainty, quality assurance, and monitoring.

This diagram is intended as a guide to the criteria for application of the Directive to plans and programmes (PPs). It has no legal status.



*The Directive requires Member States to determine whether plans or programmes in this category are likely to have significant environmental effects. These determinations may be made on a case by case basis and/or by specifying types of plan or programme.

PP = Plan or Programme; EIA = Environmental Impact Assessment; EAGGF = European Agricultural Guidance and Guarantee Fund.

Figure 1.1: Criteria for Application of the SEA Directive to Plans and Programmes (source: ODPM, 2004a)

2 SEA in transport planning

2.1 Introduction

2.1.1 This chapter explains how SEA should be integrated into the transport planning process generally and the New Approach to Appraisal (NATA) in particular.

2.2 SEA requirements

2.2.1 Before substantive work is undertaken on the plan, the Responsible Authority² must consider whether an SEA is required under the Directive. Figure 1.1 summarises the Directive/Regulations 'screening' requirements. In some cases, the Responsible Authority must consult the Consultation Bodies, make a screening determination and publicise the reasons for this decision.

2.2.2 The SEA Directive defines 'environmental assessment' as a procedure comprising:

- preparing an Environmental Report on the likely significant effects of the draft plan on the environment;
- carrying out consultation on the draft plan and the accompanying Environmental Report;
- taking into account the Environmental Report and the results of consultation in decision-making; and
- providing information when the plan is adopted and showing how the results of the SEA have been taken into account.

Table 2.1 shows the main requirements of the SEA Directive. SEA should be a tool for improving the plan, not a 'snapshot' of the plan once it has been finalised.

2.2.3 The Directive's definition of "environment" includes not only the natural environment and the historic environment, but also some human effects such as health and material assets. It also requires a thorough analysis of a plan's effects including secondary, cumulative and synergistic effects³ (see Glossary for an explanation of these terms).

2.2.4 NATA guidance partially addresses many aspects of the SEA Directive. Box 2.1 summarises NATA's requirements. Figure 2.1 shows the principal steps of the NATA process as shown in TAG Unit 2.1, grouped into the five key stages of SEA.

2.2.5 Table 2.2 outlines, in more detail, the main stages of transport appraisal and how the key SEA tasks and outputs at each stage. In the early stages of the NATA process, the requirements of the SEA Directive will focus on the environment as well as on transport (baseline, problems, solutions etc.). Enhancing the NATA to fulfil the requirements of the SEA Directive requires additional work on:

- collecting baseline environmental information and identifying environmental problems;
- predicting the significant environmental effects of the plan;
- identifying mitigation;
- identifying alternatives and their effects;
- consulting the public and authorities with environmental responsibilities;
- reporting how the results of the SEA and consultation responses have been taken into account;
- providing a non-technical summary of the SEA; and
- monitoring the actual environmental effects of the plan during its implementation.

² i.e. the transport authority responsible for preparing the plan or programme.

³ The Directive refers to "effects" rather than "impacts", since plans can have beneficial effects as well as negative effects. "Impacts" are sometimes incorrectly seen as only been adverse. NATA and SEA have slightly different definitions of "environment". see Section 3.3.

Table 2.1: Main requirements of the SEA Directive

<p>Requirements.</p> <p>■ = already generally carried out as part of good practice transport appraisal</p>
<p>Preparing an Environmental Report in which the likely significant effects on the environment of implementing the plan are identified, described and assessed. Reasonable alternatives taking into account the objectives and geographical scope of the plan should also be described. The information to be given is set out in (Article 5 and Annex I):</p> <ol style="list-style-type: none"> a) An outline of the contents, main objectives of the plan, and the relationship with other relevant plans and programmes; b) The relevant aspects of the current state of the environment and the likely evolution thereof without implementation of the plan; c) The environmental characteristics of areas likely to be significantly affected; d) Any existing environmental problems which are relevant to the plan including, in particular, those relating to any areas of a particular environmental importance, such as areas designated pursuant to Directives 79/409/EEC and 92/43/EEC; e) The environmental protection objectives, established at international, Community or national level, which are relevant to the plan and the way those objectives and any environmental considerations have been taken into account during its preparation; f) The likely significant effects on the environment, including on issues such as biodiversity, population, human health, fauna, flora, soil, water, air, climatic factors, material assets, cultural heritage including architectural and archaeological heritage, landscape and the interrelationship between the above factors. (These effects should include secondary, cumulative, synergistic, short, medium and long-term permanent and temporary, positive and negative effects); g) The measures envisaged to prevent, reduce and as fully as possible offset any significant adverse effects on the environment of implementing the plan; h) An outline of the reasons for selecting the alternatives dealt with, and a description of how the assessment was undertaken including any difficulties (such as technical deficiencies or lack of know-how) encountered in compiling the required information; i) A description of measures envisaged concerning monitoring in accordance with Article 10; j) A non-technical summary of the information provided under the above headings. <p>The report must include information that may reasonably be required taking into account current knowledge and methods of assessment, the contents and level of detail in the plan, its stage in the decision-making process and the extent to which certain matters are more appropriately assessed at different levels in that process to avoid duplication of the assessment (Article 5.2)</p>
<p>Consulting:</p> <ul style="list-style-type: none"> • authorities with environmental responsibilities, when deciding on the scope and level of detail of the information which must be included in the Environmental Report (Article 5.4); • authorities with environmental responsibilities and the public, to give them an early and effective opportunity within appropriate time frames to express their opinion on the draft plan and the accompanying Environmental Report before the adoption of the plan (Article 6.1, 6.2); • other EU Member States, where the implementation of the plan is likely to have significant effects on the environment in these countries (Article 7).
<p>Taking the Environmental Report and the results of the consultations into account in decision-making (Article 8)</p>
<p>Providing information on the decision:</p> <p>When the plan is adopted, the public and any countries consulted under Article 7 must be informed and the following made available to those so informed:</p> <ul style="list-style-type: none"> • the plan as adopted; • a statement summarising how environmental considerations have been integrated into the plan and how the Environmental Report of Article 5, the opinions expressed pursuant to Article 6 and the results of consultations entered into pursuant to Article 7 have been taken into account in accordance with Article 8, and the reasons for choosing the plan as adopted, in the light of the other reasonable alternatives dealt with; and • the measures decided concerning monitoring (Article 9).
<p>Monitoring the significant environmental effects of the plan's implementation (Article 10).</p>

Box 2.1. The New Approach to Appraisal (NATA)

NATA is an approach for improving the consistency and transparency with which transport decisions are made. It presents the key economic, environmental and social impacts of decisions in a clear, consistent and balanced way using an Appraisal Summary Table and associated worksheets. NATA is the basis for appraising multi-modal studies, Highways Agency road schemes, Local Transport Plans major road and public transport schemes, Strategic Rail Authority schemes, seaports, and the Government's airports strategy.

NATA involves:

- agreeing a set of objectives;
- analysing present and future problems of, or relating to, the transport system;
- exploring potential solutions for solving the problems and meeting the objectives;
- appraising options, seeking combinations which perform better as a whole than the sum of the individual components; and
- selecting and phasing the preferred solution;
- undertaking supporting analyses of practicality and public acceptability; affordability and financial sustainability; and distribution and equity.

Appraisal is in relation to the Government's five objectives for transport:

Environment - to protect the built and natural environment

- to reduce noise
- to improve local air quality
- to reduce greenhouse gases
- to protect and enhance the landscape
- to protect and enhance the townscape
- to protect the heritage of historic resources
- to support biodiversity
- to protect the water environment
- to encourage physical fitness
- to improve journey ambience

Safety - to improve safety

- to reduce accidents
- to improve security-

Economy - to support sustainable economic activity and get good value for money

- to get good value for money in relation to impacts on public accounts
- to improve transport economic efficiency for business users and transport providers
- to improve transport economic efficiency for consumer users
- to improve reliability
- to provide beneficial wider economic impacts

Accessibility - to improve access to facilities for those without a car and to reduce severance

- to improve access to the transport system
- to increase option values
- to reduce severance

Integration - to ensure that all decisions are taken in the context of the Government's integrated transport policy

- to improve transport interchange
- to integrate transport policy with land-use policy
- to integrate transport policy with other Government policies

Further information on NATA is available in *The Appraisal Process* (TAG Unit 2.5).

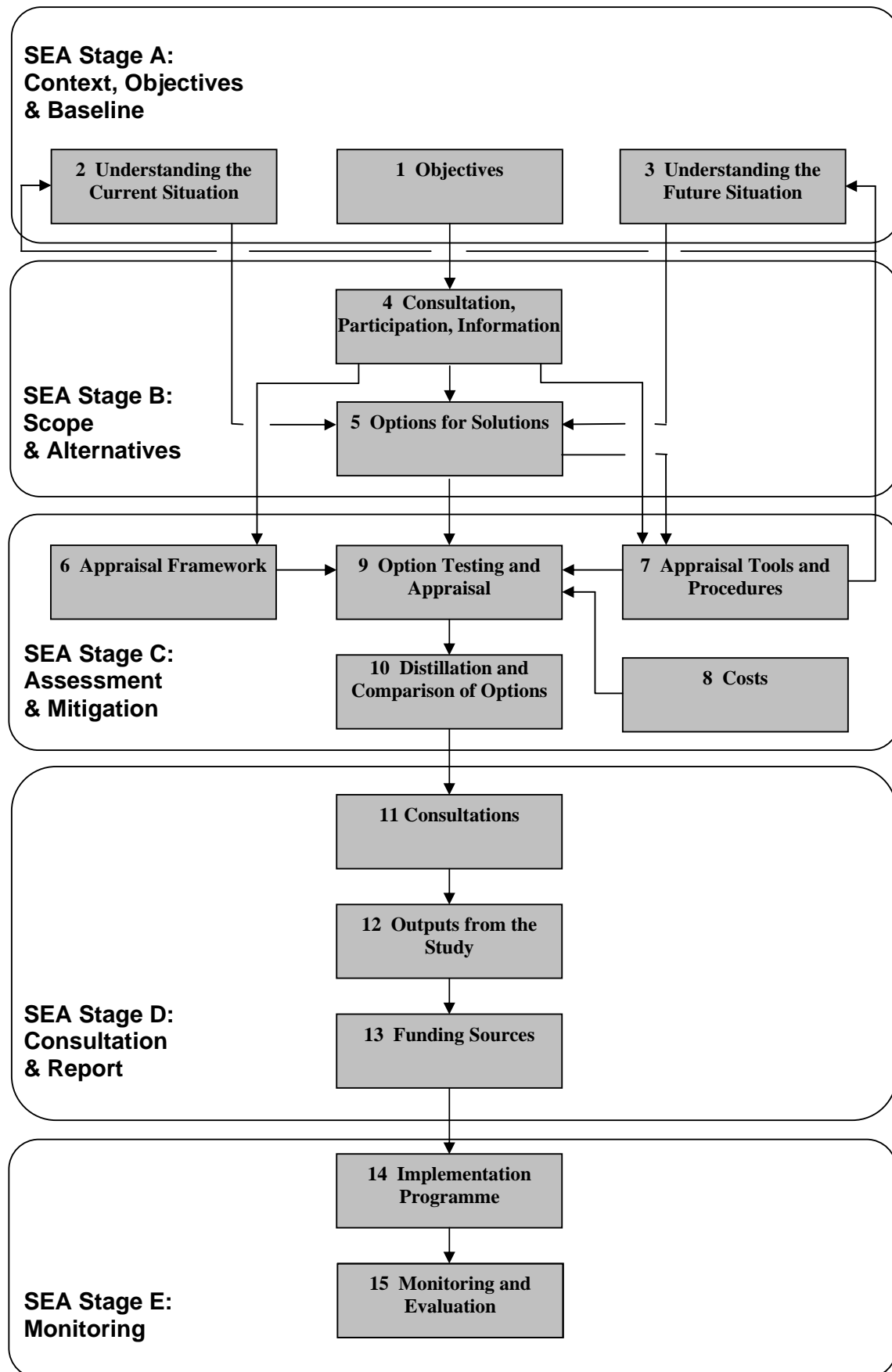


Figure 2.1: NATA and SEA stages

Table 2.2: Stages, decisions and outputs of SEA

NATA stage (from TAG Unit 2.5)	SEA stage	Purpose of this stage	Similarities/ differences between NATA & SEA
<p>1. Setting objectives and problem definition</p> <p>2. Understanding the current situation</p> <p>3. Understanding the future situation</p>	<p>A: Setting the context, identifying objectives and problems and establishing the baseline</p> <ul style="list-style-type: none"> • Analyse the environmental protection objectives, established at international, Community or national level, which are relevant to the plan. • Establish SEA objectives, indicators and targets. • Collect relevant information on the environmental context as relevant to the plan / programme, and its evolution without the plan / programme. • Outline the environmental characteristics of areas likely to be significantly affected. • Outline any existing environmental problems which are relevant to the plan including, those relating to any areas of a particular environmental importance, such as areas designated pursuant to the Birds and Habitats Directives (79/409/EEC & 92/43/EEC). 	<p>Document how the plan is affected by outside factors; suggest ideas for how any inappropriate constraints can be addressed.</p> <p>Streamline the subsequent baseline description, prediction and monitoring stages.</p> <p>Provide a base for effects prediction and monitoring.</p> <p>Focus on key environmental issues and opportunities; help to identify environmental problems, objectives and alternatives.</p>	<p>This SEA stage adds emphasis to the need to consider environmental issues at this stage of the process. SEA requires more information on the environmental baseline and identification of environmental problems.</p>
<p>4. Consultation, participation, information</p> <p>5. Options for solutions</p>	<p>B: Deciding the scope of SEA and developing alternatives</p> <ul style="list-style-type: none"> • Outline the relationship with other relevant plans, programmes and their environmental objectives. • Identify relevant alternatives at the strategic level. • Scope the likely significant effects of the plan and alternatives. • Consult with environmental authorities when deciding on the scope and level of detail of the information which must be included in the Environmental Report (Art. 5.4). 	<p>Help ensure that:</p> <ul style="list-style-type: none"> • the SEA covers key issues. • the plan better meets the Government's aims for more sustainable development. • the best plan alternative(s) is/are considered. 	<p>Plan alternatives should also aim to deal with environmental problems, or at least not make them worse.</p>
<p>6. Appraisal framework</p> <p>7. Appraisal tools and procedures</p> <p>8. Costs</p> <p>9. Options testing and appraisal</p> <p>10. Distillation and comparison of options</p>	<p>C. Assessing the effects of the plan</p> <ul style="list-style-type: none"> • Forecast the significant effects on the environment of the chosen strategy taking into account the objectives and geographical scope of the plan. • Outline the reasons for selecting the alternatives dealt with. • Propose measures to prevent, reduce and as fully as possible offset any significant adverse effects on the environment of implementing the plan or programme. Such measures should be costed and deliverable. • Describe the measures envisaged concerning monitoring in accordance with Article 10. 	<p>Defensible consideration of all likely significant environmental effects.</p> <p>Propose mitigation measures where appropriate.</p> <p>Propose a monitoring programme.</p>	<p>See Table 3.2: NATA and SEA Directive topics are similar but not exactly the same.</p> <p>Requirements regarding environmental mitigation are strengthened under SEA.</p>

NATA stage (from TAG Unit 2.5)	SEA stage	Purpose of this stage	Similarities/ differences between NATA & SEA
<p>11. Consultations</p> <p>12. Outputs from the study</p> <p>13. Funding sources</p>	<p>D. Consultation on the draft plan and the Environmental Report.</p> <ul style="list-style-type: none"> • Prepare an Environmental Report in which the likely significant effects on the environment of implementing the plan, and reasonable alternatives taking into account the objectives and geographical scope of the plan. The information to be given is listed in Article 5 and Annex 1 of the SEA Directive. • Give environmental authorities and the public an early and effective opportunity within appropriate time frames to express their opinion on the draft plan and accompanying Environmental Report before the adoption of the plan (Art. 6.1, 6.2). • Take consultation results into account • Make available: <ul style="list-style-type: none"> ○ the plan as adopted. ○ a statement summarising how environmental considerations have been integrated into the plan and how the Environmental Report of Article 5, the opinions expressed pursuant to Article 6 and the results of consultations entered into pursuant to Article 7 have been taken into account in accordance with Article 8, and the reasons for choosing the plan as adopted, in the light of the other reasonable alternatives dealt with. ○ proposals for monitoring. 	<p>Identify the opinions and concerns of the public and environmental authorities on environmental issues.</p> <p>Show how information and opinions on environmental issues have been considered.</p>	<p>The requirement to show how the environment has been taken into account in decision-making is more specific in the SEA Directive than in NATA.</p> <p>The Directive requires consultation on a <i>draft</i> plan.</p>
<p>14. Implementation programme</p> <p>15. Monitoring and evaluation</p>	<p>E. Monitor the significant effects of implementing the plan on the environment.</p> <ul style="list-style-type: none"> • Decide what needs to be monitored. • Identify the information required, including existing sources and the gaps. • Confirm when the remedial action would be required and identify what remedial actions might be needed. • Consider who is responsible for the monitoring activities, when it should be carried out and propose what the appropriate format for presenting the monitoring results. 	<p>Achieve implementation of the plan in accordance with the outcomes of the SEA. Ensure that adverse effects of implementing the plan can be identified and corrective action taken.</p> <p>Provide information for future SEAs.</p>	<p>NATA does not currently address monitoring.</p>

2.3 Who should carry out the SEA?

- 2.3.1 The Directive does not prescribe who should carry out the SEA, but the Responsible Authority will ultimately be accountable for complying with the SEA Regulations. SEA is likely to be most effective if undertaken by people who together can:
- fully integrate the SEA process within the application of NATA;
 - consider and respond to local circumstances as well as regional and national issues;
 - apply expertise and experience in SEA (e.g. impact identification, prediction and mitigation);
 - take a balanced view;
 - draw on good practice elsewhere;
 - assess the full range of environmental issues.
- 2.3.2 It is important to involve both people who are producing the plan and others, either within the authority or from outside, who can contribute a more detached and independent view to the exercise.
- 2.3.3 Consultation with Consultation Bodies is required during at least three stages: "screening" to determine whether an SEA is required (Stage A), "scoping" of the SEA study (Stage B), and consultation on the draft plan and Environmental Report (Stage D). The Consultation Bodies are the statutory environmental bodies, i.e. the Countryside Agency, English Heritage, English Nature and the Environment Agency. Further guidance on the role of the consultation bodies in SEA is available at *Consultation Bodies' Services and Standards for Responsible Authorities* (Countryside Agency et al, 2004).
- 2.3.4 The public must be consulted on the draft plan and Environmental Report. It may also be useful to involve the public more proactively in the SEA alongside the plan consultations. The Environmental Report should summarise who took part in carrying out the SEA. Consultation will be more effective if it covers all aspects of the plan rather than being restricted to those elements associated with the SEA Directive.

3 Stage A: Setting the context, identifying objectives, problems and opportunities, and establishing the baseline

What the Directive says:

The Environmental Report should provide information on:

'the plan's 'relationship with other relevant plans and programmes' and 'the environmental protection objectives, established at international, [European] Community or national level, which are relevant to the plan ... and the way those objectives and any environmental considerations have been taken into account during its preparation'. (Annex I (a), (e));

'relevant aspects of the current state of the environment and the likely evolution thereof without implementation of the plan or programme' and 'the environmental characteristics of the areas likely to be significantly affected' (Annex I (b), (c));

'any existing environmental problems which are relevant to the plan or programme including, in particular, those relating to any areas of a particular environmental importance, such as areas designated pursuant to Directives 79/409/EEC and 92/43/EEC'. (Annex I (d)).

3.1 Introduction

- 3.1.1 At this stage, the transport plan-making authority, in consultation with environmental authorities, compiles background information needed for a SEA. Such material is

needed at the outset, when broad transport plan alternatives are being developed. Much of this information will be common to an authority, rather than specific to a particular transport plan. Use of such data to support SEAs of a wide range of plans or strategies should be kept in mind when information is collected. Contact with colleagues within plan-making authorities covering the same geographic area is therefore critical to making the best use of information already held and reducing the risk of duplicating effort.

- 3.1.2 Preparing the Environmental Report is made easier if information is built up throughout the SEA: ***documentation of the SEA process should therefore begin at this stage and continue throughout the process.***

3.2 Developing SEA objectives and indicators

- 3.2.1 The SEA Directive does not specifically require the use of objectives or indicators in SEA, but they are a recognised way in which environmental effects can be described, analysed and compared. Each SEA objective should be a statement of what is intended, specifying a desired environmental outcome over a specified duration.
- 3.2.2 Objectives need to be chosen for use in the SEA and these should include relevant NATA objectives/sub-objectives as well as locally derived environmental objectives. Table 3.1 shows the links between NATA's standard objectives/sub-objectives and the SEA topics listed in the Directive.
- 3.2.3 As outlined in TAG Unit 2.2, NATA involves selecting local objectives to supplement the five overall objectives for transport and their sub-objectives. The number of local objectives should be kept to a minimum required to inform decisions. Local objectives should not restate national objectives, but should aim to provide a local focus. For example, the NATA's local air quality objective might be complemented by a local objective related to improving air quality in a specified Air Quality Management Area (AQMA).
- 3.2.4 The formulation of objectives for the SEA should take account of:
- environmental protection objectives from legislation e.g. the Birds Directive (79/409/EEC), Habitats Directive (92/43/EEC) and the Water Framework Directive (2000/60/EC);
 - environmental objectives from other relevant plans and programmes;
 - Regional Sustainable Development Frameworks; and
 - the results of baseline data collection (see Section 3.4) and consultation with the statutory environmental bodies and other stakeholders as appropriate.
- 3.2.5 The performance of the plan against the SEA objectives is measured by using *indicators* (ODPM, 2004a). Indicators can be revised as baseline data is collected and environmental problems are identified. It is also possible that the same indicators can be used in monitoring the implementation of the plan. However, state of the environment indicators are not always applicable to SEA as they may not inform the decisions of most relevance to the plan.
- 3.2.6 Where appropriate, local objectives may be linked to measurable *targets* (e.g. the objective "to improve air quality in AQMA Y" could be monitored against the target "to reduce air pollution by X% in AQMA Y by date Z").

Table 3.1: NATA sub-objectives and other topics to be addressed within an SEA

NATA Objective	NATA sub-objective	SEA topic (SEA Directive, Annex If)
Environment	Noise	Human health, population ¹ , inter-relationships
	Local air quality ²	Air, human health, population
	Greenhouse gases	Climatic factors
	Landscape	Landscape
	Townscape	
	Heritage	Cultural heritage including architectural and archaeological heritage
	Biodiversity ³	Biodiversity, fauna, flora, soil ⁴
	Water environment	Water
Physical fitness	Human health, population	
Safety	Accidents	Human health, population
	Security	
Accessibility	Community severance	Population
	Access to the transport system	
Economy	Public Accounts	Material assets ⁵
	Business Users & Providers	
	Consumer Users	

Notes:

¹ Population is interpreted broadly, referring to effects on people and quality of life. Many NATA indicators incorporate population.

² The NATA local air quality indicator does not cover regional air quality, though guidance is given on its assessment. Where regional air quality is likely to be an issue, a local objective may be formulated.

³ Biodiversity also covers geological interests.

⁴ Soil is not explicitly covered by NATA sub-objectives, but is an underlying factor affecting landscape, heritage, biodiversity and the water environment. Where effects on soil are likely to be important, a local objective should be formulated.

⁵ Material assets are not explicitly covered by NATA sub-objectives, but are reflected in the money costs incurred when they are consumed. Where effects on material assets such as infrastructure, property and sterilisation of mineral or other resources are expected to be of particular importance, a local objective should be formulated.

3.3 Assembling environmental baseline data and developing a future baseline

3.3.1 Baseline data provide the basis for forecasting and monitoring of environmental effects, and helps in the identification of environmental problems. Whilst SEA is unlikely to require extensive new data (e.g. through surveys), it will involve some secondary data collection and analysis. Consultation Bodies i.e. the Environment Agency, English Nature, the Countryside Agency and English Heritage, may be able to provide advice on appropriate data sources.

3.3.2 For each SEA objective (e.g. from Table 3.1), data should be collected to answer the following questions:

- How good or bad is the current situation? Is it getting better or worse? how is the environment likely to change in accordance with or differently from historical trends (e.g. due to human pressure or climate change)?
- How far is the current situation from thresholds, objectives or targets?
- Are particularly sensitive or important elements of the environment affected: people, resources, species, habitats?
- Are the problems of a large or small scale, reversible or irreversible, permanent or temporary, direct or indirect?
- How difficult would it be to offset or remedy any damage?
- Have there been significant cumulative or synergistic effects over time? Are there expected to be such effects in the future?

- 3.3.3 Appendix 4 suggests sources of baseline data and indicators. In theory, collection of baseline data could go on indefinitely. As such, a limit for data collection should be set reflecting the data needed to inform the SEA, and arrangements made to fill any data gaps for future plans or reviews through the monitoring process (Stage D). It may be appropriate to gather only enough data early on to identify strategic constraints and opportunities, and gather more detailed information subsequently e.g. during Stage C. To get the best value from the information, it should be kept updated for future plans; it should not be merely a snapshot of the situation at a particular time.
- 3.3.4 The SEA Directive requires a discussion of the likely evolution of the environment without the plan. For instance, air quality in an area may get better or worse in the absence of the plan. The “assessment years” (e.g. 5, 10 or 15 years) used in transport planning could be used as a basis in the first instance. However, for some environmental topics (e.g. climate change) much longer term trends may need to be considered. For others it may be appropriate to consider the future baseline associated with different assessment years as a form of sensitivity testing to reduce uncertainty. Section 4.4 of this document discusses how to consider the situation “without the plan”.

3.4 Identifying environmental problems and opportunities

- 3.4.1 The identification of environmental problems and opportunities of relevance to the transport plan is an important part of the definition of key transport problems for the plan (DETR, 2000). It also allows the plan to avoid or help solve these problems.
- 3.4.2 Evidence-led expert judgment will be the primary mechanism for identifying current and foreseeable future problems and opportunities. This can be based on:
- transport and land-use planners' and statutory environmental bodies' evidence of environmental problems in the area;
 - input from other stakeholders;
 - conflicts and opportunities identified by a preliminary review of other plans, programmes and environmental objectives (see also Section 4.3 of this guidance referring to activities conducted within Stage B);
 - conflicts between the current or future baseline conditions and existing objectives, targets or obligations; and
 - approaches to delivering the Government's five transport objectives.

4 Stage B: Developing alternatives and deciding the scope of SEA

What the Directive says:

"an Environmental Report shall be prepared in which the likely significant effects on the environment of implementing the plan or programme, and reasonable alternatives taking into account the objectives and the geographical scope of the plan or programme, are identified, described and evaluated" (Article 5.1).

One of the issues that must be covered in the Environmental Report is *"an outline of the reasons for selecting the alternatives dealt with"* (Annex 1h).

4.1 Introduction

- 4.1.1 At this stage, the alternatives and types of effect to assess, and the level of detail of the analysis are established. While the activities at Stage A can be carried out before work begins on the plan, those at Stage B are integral to the plan-making process and cannot be done effectively in isolation from it.

4.2 Scoping and involving the Consultation Bodies

4.2.1 The process of planning and agreeing the remaining SEA activities is called scoping. Scoping involves agreeing on:

- the programme of SEA activities within the overall NATA and plan-making process;
- key issues to be covered in the Environmental Report;
- the study boundaries in space and time;
- the level of detail that the Environmental Report should go into;
- a broad outline of the assessment approach to be adopted for each issue;
- strategic alternatives that should be discussed further in the Environmental Report;
- the role of avoidance, mitigation, enhancement and compensation measures;
- the existence of risk and uncertainty; and
- whom to involve, in what capacity, during the rest of the process.

Scoping is a way of focussing effort on the key issues in SEA, and ensuring that the SEA fulfils the requirements of all relevant stakeholders. Scoping will be more effective if it explicitly recognises the issues covered by NATA and the plan making process. It should ensure that the key issues for SEA are fully integrated within that wider context.

4.2.2 Scoping is carried out by the plan-making authority in consultation with Consultation Bodies: the SEA Directive requires that the Consultation Bodies are consulted on "the scale and level of detail of the information which must be included in the Environmental Report" (Article 5.4). Although the Directive does not require full consultation with the public until the Environmental Report is issued (see Stage D), early involvement in the scoping process may help to provide data or identify problems. As an input to the scoping process, the plan-making authority may find it useful to produce an outline of the headings to be used in the Environmental Report and overall plan appraisal report.

4.2.3 As more data are collected, the scope of the SEA should be refined. In particular, the study boundaries may need to be revised and the inventory of relevant key environmental resources may need to be extended. For example, this may arise when cumulative effects are identified (see Appendix 5).

4.3 Relationship with other relevant plans and programmes, and environmental objectives

4.3.1 A plan will be affected by, and will affect, a wide range of other relevant plans and programmes, and environmental objectives both within and outside an authority's jurisdiction. It is important to determine whether the plan gives rise to conflicts with such plans/programmes. Approaches to deal with any such conflicts should also be identified. TAG Units 3.7.1 and 3.7.2 provide further information on how to integrate the plan with objectives associated with other relevant policies, plans and programmes. Table 4.1 shows how it is possible to document this analysis.

Table 4.1: Documenting links with other relevant plans and programmes or environmental protection objectives

Other plan/ programme	Objectives or requirements of the other plan or programme	How objectives and requirements might be taken on board
Planning Policy Guidance 13	Reduce the need to travel	Adopt within the plan's objectives
Regional Spatial Strategy	Improve air quality in the region	Transport measures X, Y and Z are needed to reduce air pollutant emissions
Local Development Framework	Reduce traffic intrusion in specified parts of an Area of Outstanding Natural Beauty	Consider improving bus services and traffic management measures

4.3.2 Inconsistencies are bound to arise at times between the other plans, programmes or environmental objectives. These can be identified and documented using a compatibility matrix, as shown in Table 4.2. Where they clearly differ they can be

considered as alternatives in Stage C. In deciding how to resolve any conflicts, the relative timing of the plans, programmes or objectives concerned should be considered, as well as the degree to which they accord with current policy or legal requirements and the objective of the SEA Directive. For each plan further research may be needed to test whether objectives really are incompatible or whether win-win solutions can be found.

- 4.3.3 The transport plan may not be able to accommodate all of the requirements of the other plans, programmes or environmental objectives; or it may not wish to take on board the requirements (e.g. because they are not sustainable). The reasons for these choices should be explained; Table 4.2 shows an example of how to record this. Where tensions between objectives cannot be resolved, the compatibility assessment should clarify these so that appropriate trade-offs can be identified.

Table 4.2: Documenting (in)compatibility between different plans, programmes and objectives

plan, programme, objective	2	✓				
	3	X	?			
	4	-				
	5					
	6					
		1	2	3	4	5

Key:

✓	Compatible
?	Uncertain link
X	Incompatible
-	No link

Incompatibility between objectives (X above)	Revision of objective(s) to eliminate incompatibility	... or why objectives should not be revised

4.4 Identifying alternatives

- 4.4.1 **Identifying and (in Stage C) comparing appropriate strategic alternatives is also a key aspect of SEA and NATA⁴.** Examining alternatives should help to ensure that the plan's likely significant environmental effects are addressed during the preparation of the plan. It also assists in explaining to decision-makers and consultees why these strategies and measures, and no other, are being put forward.

- 4.4.2 Alternatives can be different ways of:

- achieving the objectives of the plan;
- achieving the aspirations of the local community;
- dealing with environmental problems (see Section 3.4);
- dealing with transport problems (as identified through TAG Unit 2.2).

- 4.4.3 One situation which needs to be considered in all SEAs is the likely expected evolution of the environmental baseline without the plan (see Chapter 3 of this document). For a transport plan, this "without the plan" scenario should be developed in line with certain principles such that it:

- Is based on current Government policies;
- Should assume that other adopted plans and programmes will deliver as planned – establishing what this means for the plan being developed is a significant task, drawing on the review of other plans and programmes discussed in Section 4.3;

⁴ The SEA Directive refers to 'alternatives', while the term 'option' is also used in the UK transport planning context. Here, the terms are taken to be synonymous and the term 'alternatives' is used in preference to 'options'.

- Should assume the continued implementation of strategies and measures planned in earlier adopted versions of the plan, unless they were planned to be time limited (thus, for example, a measure planned to be implemented for five years should not be assumed to be implemented beyond the planned five year period);
 - Should not assume any new strategies or measures even if these appear to be essential in the light of current Government policies or of other plans and programmes (thus, for example, enhanced public transport provision to complement a planned new hospital should not be included in the 'without plan' scenario) – these should be included in the alternatives to be considered.
- 4.4.4 It is important to note that the development of the “without the plan” scenario based on the above principles could lead to significant variations from a more simplistic analysis of national or local trends. Work to develop the “without the plan” scenario will also provide useful context for identifying potential cumulative effects (see Section 5.2 and Appendix 5 of this document for more guidance on cumulative effects).
- 4.4.5 As well as the “without the plan” situation, transport plan alternatives can be considered at several levels:
- Broad strategic approaches/alternatives for the plan, e.g. increasing choice, restricting transport demand through physical measures, restricting it through fiscal measures;
 - More detailed statements of policy direction and transport management approaches for more local areas; and
 - Alternative measures, broad locations and combinations of measures within a plan: TAG Unit 2.3 lists a wide range of measures that can be considered in various combinations.
- Figure 4.1 shows a possible hierarchical approach to identify alternatives. Fine-tuning of individual measures (e.g. designs for transport infrastructure measures) is done in project-level environmental impact assessments. Suitable alternatives may be beyond the Responsible Authority's immediate powers. However, an Authority may be able to take action (form partnerships with other organisations, for example) which would allow certain alternatives to be developed and implemented. Where the necessary actions have been explored and can be shown to be deliverable (partner organisations have demonstrated willingness to form a partnership, for example), these alternatives may be considered within the plan
- 4.4.6 Alternatives will often focus on specific measures, but should:
- include strategic level alternative strategies and measures, including demand management and fiscal measures.
 - be realistic: a deliberate selection of alternatives that have much more adverse effects than the proposed plan is not appropriate (European Commission, 2003).
 - help to achieve Government's transport objectives.

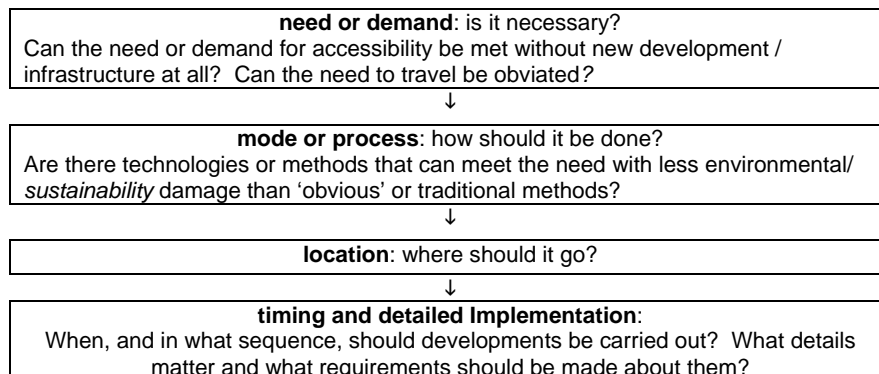


Figure 4.1: The sustainable "hierarchy" of alternatives (based on ODPM, 2004a)

5 Stage C: Assessing and mitigating the effects of the plan

What the Directive says:

In the Environmental Report, 'the likely significant effects on the environment of implementing the plan ... and reasonable alternatives ... are [to be] identified, described and evaluated' (Article 5.1). The Environmental Report should include information that may 'reasonably be required taking into account current knowledge and methods of assessment, the contents and level of detail in the plan [and] its stage in the decision making process' (Article 5.2).

Information to be provided in the Environmental Report includes:

- *'the likely significant effects on the environment, including on issues such as biodiversity, population, human health, fauna, flora, soil, water, air, climatic factors, material assets, cultural heritage including architectural and archaeological heritage, landscape and the interrelationship between the above factors. These effects should include secondary, cumulative, synergistic, short, medium and long-term, permanent and temporary, positive and negative effects' (Annex I (f) and footnote);*
- *'an outline of the reasons for selecting the alternatives dealt with' (Annex I (h));*
- *'the measures envisaged to prevent, reduce and as fully as possible offset any significant adverse effects on the environment of implementing the plan...' (Annex I (g))*

5.1 Introduction

- 5.1.1 The effects of the evolving plan should be predicted⁵ and assessed during the plan-making process. This could take place at several stages, as discussed at 4.3.2: when developing and comparing strategic alternatives and/or proposing groups of specific measures in an action plan. ***The final iteration should be at the level of the deliverable plan strategies and specific measures.***

5.2 Effects prediction

- 5.2.1 Predicting the effects of the plan should involve examining each strategy/measure in turn, and:

- Identifying the changes to conditions in the "without the plan" scenario which are predicted to arise from the strategy/measure. These can be compared both with each other and with the "without the plan" scenario in the relevant assessment years (see 3.4.3).
- Describing these changes in terms of their magnitude, the time period over which they will occur, whether they are permanent or temporary, positive or negative, probable or improbable, frequent or rare, and whether there are cumulative and/or synergistic effects.

This provides the basis for the later evaluation of impact significance (see Section 5.3).

- 5.2.2 Predictions do not have to be expressed in quantitative terms, though it is often possible to give quantitative but imprecise answers. Appendix 6 discusses how to deal with uncertainty in prediction and evaluation. Testing the accuracy of predictions is particularly useful where a plan's effects are uncertain, close to a threshold, or cumulative. Where qualitative predictions are made, they should not be 'guessed': they should be supported by evidence, such as references to any research, discussions or

⁵ "Forecasting" is often used as an alternative term at the strategic level.

- consultation. Assumptions, for instance about underlying trends or details of implementation should be stated. The Environmental Report should document any limitations in the information underlying the prediction: see Appendix 6.
- 5.2.3 Where a plan includes individual measures/schemes, these may have been subject to individual appraisal and accompanying project level environmental impact assessment, depending on their timing and scale (see Appendix 2). For example, project appraisals are mandatory for major schemes in LTPs (see TAG Units 1.4 and 3.9). However, this will not always be the case – some measures and schemes may not have advanced that far. Where such information is available the predictions should make use of it. However, the availability of such information should not dominate the plan-level predictions - SEA should focus on the plan as a whole, not on individual measures.
- 5.2.4 The SEA Directive requires an assessment of secondary, cumulative and synergistic effects. These are particularly important in transport planning: one transport measure often relies on other related measures to be effective, many impacts of transport are cumulative (e.g. greenhouse gas emissions), and transport measures can have indirect impacts (e.g. traffic generation by new roads). If an environmental feature is subject to significant cumulative effects associated with different environmental sub-objectives it may be necessary to revisit the plan to identify ways of reducing these effects. Appendix 5 discusses how the cumulative effects of the transport plan in conjunction with other plans can be addressed.
- 5.2.5 It is also important to assess the distribution of effects: who wins and loses under each strategy. The environmental effects upon communities may be presented in terms of effects upon different groups which may be categorised by where they live (rural or urban locations, for example), or by other attributes to do with age, car ownership and so on. This work should be carried out through using, and extending where necessary, the NATA distribution and equity supporting analysis (see TAG Unit 2.5, Section 1.5).

5.3 Effects assessment

- 5.3.1 Assessment involves judging whether or not a predicted effect is likely to be significant. The SEA Directive suggests criteria for determining the significance of an effect: see Box 5.1.
- 5.3.2 Carrying out the assessment involves answering, for each strategy or measure, the following questions:
- Is it clear exactly what is proposed?
 - Is the strategy likely to have a significant adverse effect in relation to each objective?
 - If so, can the effect be avoided or its severity reduced?⁶
 - If the effect cannot be avoided, e.g. by conditions or changes to the way it is implemented, can the alternative be changed or eliminated?
 - If its effect is uncertain, or depends on how the plan is implemented, how can this uncertainty be reduced?⁷
 - Will any social group be disproportionately disadvantaged/ affected by the alternative (see guidance in TAG Unit 3.8 regarding the NATA *distribution and equity supporting analysis*)?
- 5.3.3 A systematic approach to assessment and documenting effects is essential and Table 5.1 provides a template for a worksheet. A copy of the worksheet should be completed for each SEA objective/topic and may be published in the Environmental Report as an

⁶ Strategies should be developed so as to avoid the need for mitigation and provide environmental enhancement. The appraisal and SEA should also consider such opportunities. Where effects can easily, cheaply and certainly be mitigated, then those mitigation measures should be included in the strategy and assessed at this stage. The costs of such measures should also be included in the plan budgets. Otherwise they should be considered separately (see Section 5.5).

⁷ The relative lack of detail associated with strategic-level planning will generate uncertainties as to the magnitude of the environmental impact, mitigation required, and ability to deliver the mitigation enhancement measure. This is discussed at Appendix 6. Where this affects the selection of the preferred alternative, additional studies may be needed.

appendix. For NATA sub-objectives, the published worksheets (see TAG Unit 3.3) should also be considered, though they may not be suitable for use at the plan or programme level of assessment nor do they address the full requirements of SEA.

- 5.3.4 A summary matrix can be used to identify the interrelationships between effects associated with different SEA objectives/topics. Where a NATA Appraisal Summary Table is being produced, it should draw on information from the SEA (see Table 5.1). ***The aim of assessment is not to complete a table, but to ensure that the plan is as environmentally sound as possible.***

Box 5.1: Criteria for determining the likely significance of effects (based on the SEA Directive, Annex II)

1. The characteristics of the plan, including:
 - the degree to which it sets a framework for projects and other activities, either with regard to the location, nature, size and operating conditions or by allocating resources;
 - the degree to which it influences other plans and programmes including those in a hierarchy (e.g. Local Development Frameworks, Community Strategies, Air Quality Management Areas);
 - its relevance for the integration of environmental considerations in particular with a view to promoting sustainable development;
 - relevant environmental problems;
 - its relevance for the implementation of Community legislation on the environment (e.g. air quality standards).
2. Characteristics of the effects and of the area likely to be affected, having regard, in particular, to
 - the probability, duration, frequency and reversibility of the effects;
 - the cumulative nature of the effects (see Appendix 5);
 - the transboundary nature of the effects;
 - the risks to human health or the environment (e.g. due to accidents);
 - the magnitude and spatial extent of the effects (geographical area and size of the population likely to be affected; see Section 5.2);
 - the value and vulnerability of the area likely to be affected due to:
 - special natural characteristics or cultural heritage (e.g. does it affect designated areas or other sensitive areas such as wildlife corridors);
 - exceeded environmental quality standards or limit values (e.g. how close the baseline - current and likely future - is to exceeding any relevant standards);
 - intensive land-use (e.g. does the plan facilitate new areas of development);
 - the effects on areas or landscapes which have a recognised national, Community or international protection status.

Table 5.1: SEA worksheet for documenting effects and mitigation

SEA objective:	<i>e.g. improve local air quality</i>		Worksheet completed by and date:		
Plan strategic alternative or sub-component	Description of the value and vulnerability of the area likely to be affected	Description of the magnitude of the effect (see note *)	Level of certainty (high/ medium/ low) and associated comments	Description of mitigation and its implementation	Description of how the judgement was reached
<i>e.g. "alternative A1"</i>	<i>Note: for some objectives, this could require a more in depth analysis – see the treatment of landscape, townscape, heritage, biodiversity and the water environment in TAG Unit 3.3</i>				
Qualitative summary for the AST			Quantitative measure and units (where appropriate to the objective) for the AST		Assessment of significance (based on NATA scoring criteria or other significance criteria)

* Include relevant notes on timing and duration of the effects (short/ medium/ long term and temporary/ permanent) and potential cumulative effects (see Appendix 5)

5.4 Mitigation of significant adverse effects

- 5.4.1 Where a strategy is likely to have significant adverse environmental effects, measures should be considered to prevent, reduce or offset these effects. Proactive avoidance of adverse effects and enhancement of beneficial effects should also be considered⁸. **Mitigation is one of the key outputs of the SEA and should be considered concurrently with the assessment of alternatives.**
- 5.4.2 Mitigation can take a wide range of forms including:
- changes to the alternatives, such as adding, deleting or refining measures;
 - completely new alternatives;
 - technical measures required for the implementation stage, e.g. buffer zones, application of design principles;
 - requirements for project environmental impact assessments for certain projects (see Appendix 3); and
 - proposals for changing other plans and programmes.
- 5.4.3 Where mitigation measures have not been considered as part of the assessment of the strategy – for instance where their likelihood of implementation is uncertain or their effectiveness unclear – the "with mitigation" strategy should be assessed as an alternative to the "without mitigation" strategy.
- 5.4.4 **The costs of mitigation and any associated monitoring of the mitigation measures should be included in the strategy costs.**

5.5 Choosing preferred alternatives

- 5.5.1 Many alternatives can be rapidly eliminated from consideration on technical, financial, social or environmental grounds. However, alternatives that are considerably more environment-friendly should not be eliminated from consideration at an early stage of the plan making process purely on cost grounds. Similarly, measures that, of themselves, do not fully deliver the plan objectives should not automatically be disregarded: good strategies are often built up out of many small, coherent "fixes".
- 5.5.2 More detailed analysis should be carried out for key alternatives. In order to achieve the objectives of the Directive (see paragraph 1.1.2 of this document), it is essential that the comparison of key alternatives is carried out using the NATA Appraisal Summary Table and other appraisal strands – see TAG Unit 3.8. Comparison of alternatives based only on the SEA objectives would not achieve the objective of fully integrating environmental considerations into the preparation of the plan along with other considerations.
- 5.5.3 Alternatives that are selected for testing as part of the overall NATA and plan making process should also be assessed for their cumulative impacts (see Appendix 5).
- 5.5.4 The SEA and NATA appraisal do not make the decision about what alternative(s) to proceed with: they inform that decision. Nevertheless, as shown in Figure 4.1, better alternatives are those that have more positive and fewer negative environmental effects (particularly fewer long-term and/or irreversible negative effects). There should also be less uncertainty associated with their implementation.
- 5.5.5 Reasons for eliminating alternatives should be documented. Authorities should also document reasons for not considering seemingly attractive or practicable alternatives. Justifications for these choices should be robust, as they may have to be defended in court.

⁸ All of these measures together are called "mitigation measures" in this guidance.

6 Stage D: Consultation on the draft plan and Environmental Report

What the Directive says:

'The authorities [with relevant environmental responsibilities] and the public...shall be given an early and effective opportunity within appropriate time frames to express their opinion on the draft plan... and the accompanying Environmental Report before the adoption of the plan' (Article 6(2)).

'The Environmental Report, ... the opinions expressed [by consultees] and the results of any transboundary consultations ... shall be taken into account during the preparation of the plan... and before its adoption...' (Article 8).

'When a plan ... is adopted, the [environmental] authorities [and] the public ... are informed and the following items [shall be] made available to those so informed: (a) the plan ... as adopted, (b) a statement summarising how environmental considerations have been integrated into the plan ... and (c) the measures decided concerning monitoring' (Article 9(1)).

6.1 Introduction

The information from Stages A-C is now collated into a formal Environmental Report that is made available for consultation along with the draft transport plan. The consultation responses must be taken into account and the decision-making process must be documented.

6.2 The Environmental Report

6.2.1 The Environmental Report is the key written document produced for the SEA and must be clearly identifiable as the output from the SEA. It should normally be integrated with NATA reporting activities to form a "plan appraisal report incorporating the Environmental Report". In any case care must be taken to ensure that the Environmental Report is explicitly linked to and consistent with the information in the other parts of the NATA appraisal. For example, completed effects and mitigation worksheets (i.e. Table 5.1) can be directly linked to the NATA Appraisal Summary Tables. Table 6.1 shows a possible structure for the Environmental Report.

6.2.2 Appendix 7 provides further guidance on quality assurance as well as a checklist that can be used to test the quality of the SEA process and Environmental Report.

6.3 Consultation on the plan and Environmental Report

6.3.1 The Environmental Report must be made available to the public and environmental authorities along with the draft transport plan and the plan appraisal report. Environmental authorities and the public must be given an early and effective opportunity within appropriate time frames to express their opinion on the draft plan and the accompanying Environmental Report before adoption of the plan.

6.3.2 To meet the requirements of the Directive a "draft plan" publication stage should be introduced.

6.3.3 Where plans go through several successive consultation exercises, the implications for the Environmental Report should be kept under review. If alterations to the plan are likely to change the effects which have been predicted and evaluated, such information should be made available.

Table 6.1: Possible structure for the Environmental Report

Structure of report	Information to include
Summary and outcomes	<ul style="list-style-type: none"> • Non-technical summary • What difference has the process made?
Methodology used	<ul style="list-style-type: none"> • Who carried out the SEA, how, when, who was consulted, etc.
Background	<ul style="list-style-type: none"> • Purpose of the SEA and integration with NATA • Coverage of the Environmental Report with respect to plan components (e.g. relationship to appraisals for major and minor schemes in an LTP) • Plan objectives including NATA sub-objectives • Links to other plans, programmes and environmental protection objectives • Baseline environmental data, including the future baseline without the plan • Existing and foreseeable future environmental problems • Difficulties in collecting data, limitations of the data etc.
Plan issues, strategies and alternatives	<ul style="list-style-type: none"> • Description of significant environmental effects of the strategies • Table 5.1 for each strategy/alternative and links to the NATA Appraisal Summary Tables • How environmental problems were considered in developing the strategies and choosing the preferred alternatives • Other alternatives considered, and why these were rejected • Proposed mitigation and enhancement measures to deliver objectives
Implementation	<ul style="list-style-type: none"> • Links to project environmental impact assessment, design guidance etc. • Proposals for monitoring and reporting

6.4 Decision making and provision of information on the plan

6.4.1 Following receipt of comments from the public, Consultation Bodies, and other countries where these have been consulted⁹, the Directive requires such comments to be 'taken into account' during the preparation of the evolving plan.

6.4.2 **To satisfy the Directive, authorities should state how they have taken the findings of the SEA into account. This SEA Statement should be made available to stakeholders.** It will cover:

- Any changes to or deletions from the plan in response to the information in the Environmental Report.
- Ways in which responses to consultation have been taken into account. The summary should be sufficiently detailed to show how the plan was changed to take account of issues raised, or why no changes were made.
- Reasons for choosing the plan as adopted, and why other reasonable alternatives were rejected.
- Monitoring measures. The Environmental Report will already have documented proposed measures concerning monitoring; these can now be confirmed or modified in the light of consultation responses.

6.4.3 Responsible Authorities should ensure that the public and other consultees are informed and given access to the plan once it has been adopted.

⁹ See Article 7 of the SEA Directive which describes "Transboundary Consultations".

7 Stage E: Monitoring the implementation of the plan

What the Directive says:

Member States shall monitor the significant environmental effects of the implementation of plans... in order, inter alia, to identify at an early stage unforeseen adverse effects, and to be able to undertake appropriate remedial action' (Article 10.1).

The Environmental Report should provide information on 'a description of the measures envisaged concerning monitoring' (Annex I (i)).

7.1 Introduction

7.1.1 Monitoring allows significant environmental effects of the plan's implementation to be identified and dealt with early on. It allows the actual effects of the plan to be tested against those predicted in the SEA, and can provide baseline information for future plans. It also allows information to be assembled in advance of project EIAs thereby helping to make more informed decisions at that stage. Further guidance on monitoring is provided in Appendix 8.

7.2 Developing aims and methods for monitoring

7.2.1 The SEA Directive explicitly requires monitoring of the *significant environmental effects* of the plan. This goes beyond the current requirements of the NATA. The Directive's provisions on monitoring apply during the plan's implementation. But monitoring should already be considered during the choice of objectives and indicators (Stage A) and during the preparation of the plan.

7.2.2 Information used in monitoring will often be provided by outside bodies, including those which provide baseline data. Plan-making authorities should take care to ensure that monitoring information is appropriate to their needs and is up to date and reliable. Proposals for and outputs from monitoring should state the sources of the information.

7.3 Responding to adverse effects

7.3.1 Authorities should consider how they would react if monitoring reveals adverse effects. Details of any contingency arrangements could be included in the mitigation measures set out in the Environmental Report.

8 Further Information

The following documents provide information that follows on directly from the key topics covered in this TAG Unit.

For information on:	See:	Link:
An overview of NATA	<i>Introduction to Appraisal</i>	TAG Unit 1.1
NATA appraisal in more detail	<i>Appraisal</i>	TAG Unit 3.2
Examining objectives and Problems	<i>Objectives and problems</i>	TAG Unit 2.2
Environmental appraisal in NATA	<i>The Environment Objective</i>	TAG Unit 3.3
Major scheme appraisal in LTPs	<i>Major Schemes in Local Transport Plans</i>	TAG Unit 1.4

9 References

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10 Document Provenance

This Transport Analysis Guidance (TAG) Unit is a new document based on research by the Centre for Sustainability at TRL Limited and Levett-Therivel consultants. Technical queries and comments on this TAG Unit should be referred to:

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Appendix 1: Glossary

Alternatives: These are different ways of achieving the objectives. Alternatives are also referred to as options. "Alternative" is the term used in this guidance.

Consultation Bodies: Organisations with a particular status for involvement in the SEA under the Regulations. In England these are the Countryside Agency, English Heritage, English Nature, and the Environment Agency.

Cumulative effects: The effects that result from changes caused by a project, plan, programme or policy in association with other past, present or reasonably foreseeable future plans and actions. Cumulative effects are specifically noted in the SEA Directive in order to emphasize the need for broad and comprehensive information regarding the effects.

Environmental appraisal: A form of environmental analysis used in the UK (primarily for development plans but also some Local Transport Plans) since the early 1990s; more recently superseded by sustainability appraisal. Some aspects of environmental appraisal foreshadow the requirements of the SEA Directive.

Environmental assessment: A tool for integrating environmental considerations into decision-making by assessing the significant environmental effects. In the SEA Directive, an environmental assessment means "the preparation of an Environmental Report, the carrying out of consultations, the taking into account of the Environmental Report and the results of the consultations in decision-making and the provision of information on the decision", in accordance with the Directive's requirements.

Environmental Report: Document required by the SEA Directive as part of an environmental assessment, which identifies, describes and evaluates the likely significant effects on the environment of implementing a plan or programme.

Indicator: A means by which change in a system or to an objective can be measured.

Local Transport Plan: Local Transport Plans (LTPs) provide 5-year integrated transport strategies, devised at local level in partnership with the community.

Measure: An individual action to deliver the objectives of the plan. The term measure is used in this guidance to encompass a wide range of actions including projects, schemes, demand management, traffic management and policy proposals.

Mitigation: Used in this guidance to refer to measures to avoid, reduce or offset significant adverse effects on the environment.

Monitoring: Activities undertaken after the decision is made to adopt the plan or programme to examine its implementation. For example, monitoring to examine whether the significant environmental effects occur as predicted or to establish whether mitigation measures are implemented.

New Approach to Appraisal (NATA): see Box 2.1

Objective: A statement of what is intended, specifying the desired direction of change.

Options: See **alternatives**.

Project: An measure involving development such as new infrastructure. Some transport projects require an Environmental Impact Assessment in accordance with Directive 85/337/EC (as amended). Also known as a **scheme**.

Regional Transport Strategy: The Regional Transport Strategy (RTS) is prepared as part of the Regional Spatial Strategy (RSS) (previously Regional Planning Guidance). The RTS provides a regional and sub-regional context for the preparation of Local Transport Plans.

Responsible Authority: Under the SEA Regulations, the authority by which or on whose behalf the plan is prepared, or its successor.

Scheme: See **project**.

Scoping: The process of deciding the scope and level of detail of the SEA. This also includes defining the environmental effects and alternatives that need to be considered, the assessment methods to be used, the structure and contents of the Environmental Report.

Screening: The process of deciding whether a plan or programme requires SEA: see Figure 1.1.

Secondary effects: Effects which are attributable to the plan but which may not be obvious or direct. Secondary effects are specifically noted in the SEA Directive in order to emphasize the need for broad and comprehensive information regarding the effects.

Synergistic effects: A type of **cumulative effect** where two or more impacts combine to produce a complex interaction where the effect may be larger or smaller than component impacts. Synergistic effects are specifically noted in the SEA Directive in order to emphasize the need for broad and comprehensive information regarding the effects.

Strategic environmental assessment (SEA): A term used internationally to describe environmental assessment as applied to policies, plans and programmes. In this guidance, "SEA" is used to refer to the type of environmental assessment required under the **SEA Directive**.

SEA Regulations: The Environmental Assessment of Plans and Programmes Regulations 2004 (Statutory Instrument 2004 no.1633).

SEA Directive: Directive 2001/42/EC "on the assessment of the effects of certain plans and programmes on the environment".

Sustainability appraisal: A form of assessment used in the UK (primarily for Regional Planning Guidance and development plans) since the late 1990s. Sustainability appraisal considers social and economic effects as well as environmental effects. Sustainability appraisal has tended to be less detailed and more qualitative than many forms of environmental assessment.

Target: A specified desired end, stated usually within a specified time-scale.

Tiering: The linking of assessments for policies, plans, programmes and projects to achieve a logical hierarchy and avoid unnecessary duplication of assessment work.

Appendix 2: The application of SEA to LTPs

SEA of LTPs – Background

This appendix provides supplementary advice for applying this SEA guidance to a specific type of transport plan/programme – the Local Transport Plan (LTP). The appendix should be read alongside the other parts of this SEA guidance document as well as *Full Guidance on Local Transport Plans – Second Edition* (DfT, 2004).

LTPs provide a 5 year integrated transport strategy and include:

- local objectives consistent with government's overarching objectives for transport;
- an analysis of problems and opportunities;
- a coherent, integrated strategy to tackle the problems and deliver the LTP objectives;
- a 5-year implementation programme of schemes and policy measures;
- targets, performance indicators and other outputs which can be used to assess whether the plan is delivering its objectives.

As a result of consultation on the LTP guidance complete new LTPs are required by 31st March 2006 rather than the end of July 2005. Draft plans will be submitted in July 2005 but the DfT will regard these as provisional. Authorities will then have the opportunity to produce revised and finalised LTPs for submission by the end of March 2006. The first round LTPs will remain in force until March 31st 2006.

The DfT believes that in most cases an SEA statement, signalling completion of stages A-D of the SEA, will only be required for the final LTP in March 2006. Authorities may exercise some flexibility in when and how they carry out the SEA leading up to March 2006. However, to be effective the SEA process should be undertaken throughout the LTP2 planning process. The DfT is unable to offer legal advice to individual authorities on the application of the SEA Directive to their LTP development programme, or any potential legal risks, and recommends strongly that authorities take their own advice on these matters. Authorities will need to satisfy themselves that they have met the requirements of the SEA Directive.

The generic stages of transport planning, NATA and SEA outlined in Figure 2.1 of this guidance document are applicable to LTPs. The actual activities undertaken to develop an LTP will vary between authorities and in practice they will be carried out in an iterative rather than linear way.

The Local Transport Plan system aims to encourage high quality planning and effective delivery of local transport, and aims to provide a basis for tracking performance locally. In preparing LTPs, local authorities are to concentrate on four key themes:

- setting transport in a wider context;
- locally relevant targets;
- identifying the best value for money solutions;
- indicators and trajectories.

SEA supports other priorities and activities associated with a good LTP (see Table A2.1).

Table A2.1: SEA's contribution to other elements of a good LTP

	Key Elements of a Good LTP (based on Guidance on Local Transport Plans, Second Edition)								
	Shared Priorities					Practicalities	Value for money		Transport Innovations Fund
	Tackling Congestion	Delivering Access-ability	Better Air Quality	Safer Roads	Other Quality of Life	Consultation	Forecasting and modelling	Monitoring	
How does an SEA or SA aid other LTP elements?	SEA involves objective setting. Air quality is a key topic listed in the SEA Directive. Safety and accessibility relate to other SEA Directive topics (human health and population issues respectively).				SEA involves objective setting. Significant environmental and social impacts are assessed.	SEA requires early consultation, as well as on publication of the Report.	Forecasting and modelling can be used to predict significant environmental /sustainability impacts in the SEA.	SEA requires monitoring of the actual effects of the plan.	SEA promotes the identification of alternatives to solve environmental problems, including innovative approaches.

SEA of LTPs - specific advice for stage A: context, objectives and baseline

For a LTP, the selection of objectives and indicators will need to support:

- The objectives of the applicable Regional Transport Strategy;
- The Council's "sustainability appraisal" framework used for the SEA/sustainability appraisal of other plans such as the Local Development Framework;
- The shared priorities agreed between the Office of the Deputy Prime Minister and the Local Government Association in 2001. Assessment of councils' performance against these shared priorities will be a key part of the new Comprehensive Performance Assessment from 2005. Part of this framework will be used to assess how councils deal with the externalities of transport (including the effects of transport on pollution and the local environment). Therefore, it is important the SEA demonstrates the council's commitment to reducing the environmental impacts of transport; and
- Public Service Agreement (PSA) targets and core national indicators for transport.

This stage of the SEA of an LTP presents another opportunity regarding the "sharing" of baseline data collation and possibly other SEA activities with other plans and programmes within the authority's control. For these efficiencies to be realised, collaboration with other departments within the authority (e.g. land use planning, minerals planning, waste planning) is essential.

SEA of LTPs – specific advice for Stage B: scope and alternatives

The LTP preparation process places considerable emphasis on the identification and testing of alternatives. Good reporting of these alternatives and the reasons for their selection/rejection will be required as part of the SEA.

SEA of LTPs – specific advice for stage C: assessment and mitigation

As stated in Section 5.1 of this guidance **"The final iteration should be at the level of the deliverable plan strategies and specific measures"**. Recognising an LTP's dual role as a strategic plan as well as a "bidding document", the prediction and assessment of significant effects should ultimately focus upon two components of the plan: the LTP strategies and costed 5 year programme of measures.

The prediction and assessment may be best conducted on a "bottom up" basis, concentrating on understanding the effects of the programme of measures in the first instance. These effects can then be set in the context of any wider effects of the long term strategies. It is recommended that the SEA prediction and assessment activities are conducted on two versions of the LTP – with and without the major schemes.

SEA of LTPs – specific advice for Stage D: consultation and reporting

LTPs will need to be subject to public consultation before they are submitted to DfT. A draft LTP must be accompanied by the full results of the Strategic Environmental Assessment, published in the form of an Environmental Report.

DfT will not prescribe when or how the consultation on the Environmental Report and draft plan should be carried out. However, the public and statutory environmental bodies (the Environment Agency, English Nature, English Heritage and the Countryside Agency) will need to be given an early and effective opportunity to give comments on the LTP and Environmental Report before the LTP's submission. Feedback on how environmental considerations have been integrated into the LTP will also need to be provided to consultees in the form of a statement to accompany the final version of the Plan.

To satisfy the Directive, once the LTP has been finalised, authorities should prepare a statement explaining how they have taken the findings of the SEA into account. It is expected that authorities will publish the SEA statement at the time of submitting the full LTP by the end of March 2006.

These consultation requirements will be a key trigger for authorities to organise their plan-making timetable accordingly.

SEA of LTPs – specific advice for stage E: monitoring

Monitoring to meet the requirements of the SEA Directive should be linked to other LTP implementation and review activities. In particular, integration with the LTP Annual Progress Report process will provide an effective approach.

Appendix 3: Avoiding duplication in SEA: "tiering"

What the Directive says:

"Where plans and programmes form part of a hierarchy, Member States shall, with a view to avoiding duplication of the assessment, take into account the fact that the assessment will be carried out, in accordance with the Directive, at different levels of the hierarchy. For the purpose of, inter alia, avoiding duplication of assessment, Member States shall apply Article 5(2) and (3)" (Article 4(3)).

The SEA Directive recognises that plans and programmes form part of a hierarchy and that care is needed to avoid duplication in conducting SEAs. Responding to this issue is also known as "tiering" of assessments.

In the case of transport planning in England, the hierarchy comprises:

- National transport policy;
- Regional Transport Strategies (developed within Regional Spatial Strategies);
- Local Transport Plans and mode-specific plans (e.g. by the Highways Agency);
- Individual transport projects (also referred to as schemes), some of which are accompanied by Environmental Impact Assessment under the provisions of Directive 85/337EC (as amended).

In addition to this hierarchy, at each tier there may be a range of component/feeder activities and interim steps. For example, Multi-Modal Studies and their accompanying appraisals may feed into some Regional Transport Strategies. In that case, some parts of the SEA process may need to be initiated for the Multi-Modal Study (e.g. consultation on alternatives) and then carried forward into the Regional Transport Strategy/ Regional Spatial Strategy SEA is finally brought together, possibly a considerable time later. Similarly, there may be a range of local studies initiated to support Local Transport Plans. This requires careful consideration on a case by case basis (see Chapter 3 of this guidance). Understanding tiering may also be assisted by following the principles in Table A3.1 below.

Table A3.1: Advice on avoiding duplication in applying SEA to transport plans

Do...	Don't...
<ul style="list-style-type: none"> • carefully consider how to use any findings of earlier assessments and opportunities to share information between parallel assessments (e.g. LTPs and local development frameworks); • follow the principles and framework provided by the NATA (see WebTag); • clearly identify the role of subsequent assessments; • provide a complete record of assumptions and uncertainties relating to the assessment to help subsequent assessments; • put in place management actions to guide how the assessment results and monitoring provisions associated with the SEA will help to set a framework for subsequent assessments. 	<ul style="list-style-type: none"> • start from scratch unless it is clear that there is genuinely no useful information available from previous planning cycles and related appraisals; • assume that the findings of earlier assessments are up to date and accurate. Make appropriate checks; • repeat large amounts of data from an earlier assessment in new context in which it is not appropriate; • be afraid of identifying some issues which are appropriate to assess in more detail in subsequent assessments (where they will be carried out).

Appendix 4: Environmental baseline

The environmental baseline can be described in a variety of ways including

- text (e.g. Box A4.1)
- matrices (e.g. Table A4.1)
- maps, for instance of the location of designated sites, landscape areas, floodplains, tranquil areas.

Table A4.2 lists some possible data sources of baseline data for SEA. The first table lists sources that cover multiple topics. The second table lists sources that focus on specific NATA/SEA topics. The tables do not claim to be comprehensive and further information is available from studies such as that carried out for South West Regional Assembly, 2002. Regional and county level monitoring sites are very useful sources of additional data. Authorities should also always assess the value of any data in relation to its needs.

A data set may not be appropriate for an authority's purpose; it may be unavailable at the right scale, out of date, unreliable, partial or biased. Where data are problematic, choices will need to be made on whether to avoid using it, make use of it with an explanation of its limitations, or collect further data to remove uncertainty. Data collection should focus on issues and scales relevant to the plan in question, to avoid the preparation of a generalised "State of the Environment" report.

Box A4.1 Example of text describing the environmental baseline

Biodiversity

"Without the wide range of plants and animals around us we would not be able to survive on this planet. Every living thing contributes to the balance of Nature and the health of the planet and we, as human beings, are also part of this balance. However the impact of our activities is changing things far more dramatically than any other creature on Earth."

– Local Biodiversity Action Plan for X

Objective: Avoid damage to designated wildlife sites and protected species

Indicator: No./extent of Natura 2000 sites and Sites of Special Scientific Interest

There are 2 Natura 2000 sites and 15 SSSIs in X, notified by the Countryside Agency, and representing some of the best wildlife habitats, geological features and landforms. No measure of the condition or status of these sites was found.

References: Local Biodiversity Action Plan (LBAP) for X.

Table A4.1 Example of table summarising the environmental baseline

Indicator	Quantified data	Comparators and targets	“Without the plan” scenario (see Section 4.4 of this document)	Problems/ constraints	Data sources
BIODIVERSITY					
No./extent of designated sites (e.g. Natura 2000)					
% of designated sites in good condition					
Area of semi-natural woodland lost					
...					

Table A4.2 Possible data sources (based on ODPM, 2003)

General data sources	Level
Quality of Life Counts, www.sustainable-development.gov.uk/sustainable/quality99 (wide range of quality of life data)	Nat
Regional Quality of Life Counts, www.sustainable-development.gov.uk/indicators/regional/index.htm	Reg
Office of National Statistics (ONS), www.statistics.gov.uk (population trends, social and economic data, public attitudes, etc.), particularly www.neighbourhood.statistics.gov.uk (ward-level social/economic data)	Loc
DEFRA www.defra.gov.uk (quality or air, water, soil, etc.), particularly www.defra.gov.uk/environment/statistics www.defra.gov.uk/environment/statistics/pubatt/download/pdf/survey2001.pdf (public attitudes to environment) www.defra.gov.uk/erdp/docs/regchapsindex.htm (regional statistics)	Reg
Environment Agency, www.environment-agency.gov.uk/yourenv	Loc
ODPM, www.bvpi.gov.uk (local authority actions/activities; mostly response indicators)	Loc
British Geological Survey www.bgs.ac.uk (minerals, unstable land, contaminated land, groundwater)	Loc
Countryside Agency, www.countryside.gov.uk (countryside character, landscape)	Reg
Multi-Agency Geographic Information for the Countryside, www.magic.gov.uk (ward-level GIS data)	Loc
Regional Observatories and Information Partnerships, Intelligence Units (www.regionalobservatories.org.uk): East Midlands, www.eastmidlandsobservatory.org.uk East of England, www.eastofenglandobservatory.org.uk London, www.london.gov.uk North East, www.n-e-region.com North West, www.nwriu.co.uk South East (not yet available) South West, www.swro.info , www.swenvo.org.uk West Midlands, www.wmro.org.uk/servlet/Main Yorkshire and the Humber, www.yorkshirefutures.com	Loc
County council and other local monitoring sites	Loc

* Smallest scale of data available: National, Regional, Local

Data sources for specific NATA/SEA topics		
Topic	Data Sources	
Noise	DEFRA, www.defra.gov.uk/environment/noise (noise)	Reg
Air (local and regional)	Department for Transport, www.transtat.dft.gov.uk (traffic levels, modal split, environmental impacts)	Reg
	DEFRA, www.defra.gov.uk/environment/statistics/index.htm (days of moderate/poor air quality)	Loc
	Air Quality Archive, www.airquality.co.uk/archive/index.php	Loc
	Commission for Integrated Transport, www.cfit.gov.uk/reports	Nat
Climatic factors	Environment Agency, www.environment-agency.gov.uk (flood risk)	Loc
	DEFRA, www.statistics.gov.uk (greenhouse gas emissions)	Nat
Landscape/townscape	Countryside Agency, www.countryside.gov.uk (landscape character)	Reg
	MAGIC, www.magic.gov.uk (landscape character)	Reg
	ODPM, www.odpm.gov.uk (Green Belt)	Loc
Cultural heritage and landscape	English Heritage, www.english-heritage.org.uk (State of the Historic Environment report, designations)	Nat
	Pastscape, www.pastscape.org (listed buildings and monuments)	Loc
	Local Authority Historic Environment Record Centres (designated and non-designated sites)	Loc
Biodiversity, fauna, flora	National Biodiversity Network, www.nbn.org.uk ; www.searchnbn.net ; www.ukbap.org.uk (biodiversity action plans)	Loc
	Local Wildlife Trusts and Local Biological Record Centres	Loc
	Joint Nature Conservation Committee, www.jncc.gov.uk (site specific information e.g. Ramsar sites, wildlife and nature conservation, marine and coastal information)	Nat
	British Trust for Ornithology, www.bto.org (birds)	Nat
	Royal Society for the Protection of Birds, www.rspb.org.uk (birds)	Reg
	British Society for Botanical Info., www.bsbi.org.uk (flora)	Nat
	Plantlife, www.plantlife.org.uk (flora)	Nat
	British Butterfly Conservation Society, www.butterfly-conservation.org (butterflies)	Nat
	English Nature, www.english-nature.org.uk (designations)	Loc
	Forestry Commission, www.forestry.gov.uk (woodland cover)	Loc
Water	Environment Agency, www.environment-agency.gov.uk (water quality, floodplains, waste management, etc.)	Reg
	DEFRA, www.defra.gov.uk (water quality, groundwater conditions)	Nat
	Office of Statistics, www.statistics.gov.uk (water quality)	Nat
Physical fitness, human health, accidents, security	ONS, www.neighbourhood.statistics.gov.uk (population, households, crime, life expectancy)	Loc
	Home Office, www.homeoffice.gov.uk (crime, fear of crime)	Reg
	Department of Health, www.doh.gov.uk (statistics and surveys of health levels and health care provision)	Loc
	Department for Transport, www.transtat.dft.gov.uk (traffic levels, accidents, modal split, etc.)	Reg
Community severance	Highways Agency, www.highways.gov.uk/roads (severance)	Reg
Access to transport system, wider economic impacts	Department for Transport, www.transtat.dft.gov.uk (access to services)	Loc
	ONS, www.neighbourhood.statistics.gov.uk (property values)	Loc
Soil	ODPM, www.planning.odpm.gov.uk (land use changes)	Reg
	CIS, www.cis-web.org.uk (agricultural land)	Reg
	DTI, www.dtistatws.net/sd (contaminated land)	Reg
	Centre for Ecology and Hydrology, www.ceh.ac.uk	Loc

Appendix 5: Cumulative Effects Assessment

The SEA Directive requires an analysis of "the likely significant effects on the environment... These effects should include secondary, cumulative, synergistic... effects" (Annex I). The aim of cumulative effects assessment is to identify, describe and evaluate cumulative (including synergistic) effects, and enable them to be avoided, minimised or enhanced as appropriate. This appendix explains what cumulative effects are, how they occur, and how they can be identified, assessed and mitigated.

Background

Cumulative effects are the total effects of multiple actions on a receptor, as shown in the example of Figure A5.1. A *receptor* could be a geographical area, ecosystem, species, or section of the population. An *action* could be the activities resulting from a plan or programme, or individual people's activities. It can have occurred in the past, or could occur in the future. Adverse cumulative effects generally arise when effects occur too often or too hard to allow the receptor to recover, for instance where badger populations die faster than they replace themselves.

Examples of past transport-related cumulative effects are habitat fragmentation and community severance. Cumulative effects can also be positive, for instance improved access to rural services. Table A5.1 shows examples of cumulative effects linked to the topics listed in the SEA Directive. Multiple types of effect can also affect the same receptor: for instance a community can be affected by noise and air pollution and severance from transport developments.

Cumulative effects can be:

- Additive: the simple sum of all the effects (e.g. new jobs in an area of high unemployment);
- Neutralising, where effects counteract each other to reduce the overall effect (e.g. a new road on the left bank or a river encroaches on the floodplain, but equivalent flood storage capacity is provided by another project on the right bank);
- Synergistic, where effects interact to produce a total effect greater than the sum of the individual effects (e.g. a new footpath that links two existing footpaths, allowing more recreational opportunities than those provided by three separate footpaths). Negative synergistic effects often happen as habitats and resources get close to capacity: for instance a wildlife habitat can become progressively fragmented with limited effects on a particular species until the last fragmentation makes the areas too small to support the species at all.

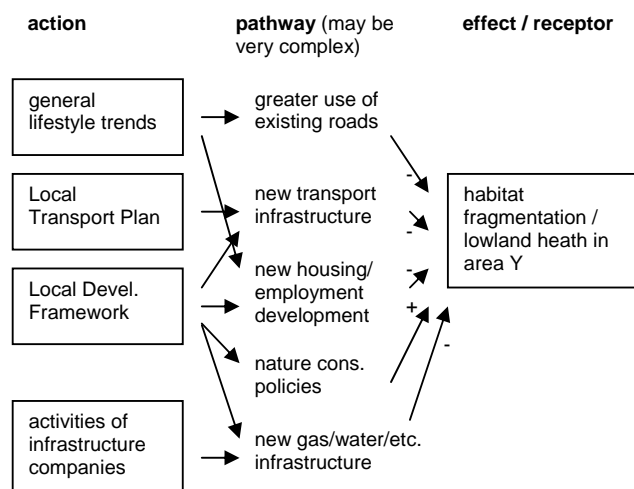


Figure A5.1. Example of how a cumulative effect is caused

Table A5.1. Examples of national level cumulative effects linked to SEA Directive topics

SEA topic (SEA Directive Annex I ^f)	Cumulative effects (can be positive as well as negative)
Population	<ul style="list-style-type: none"> • community severance • inequalities in access to services • sections of population cumulatively affected by e.g. more development and associated traffic
Human health	<ul style="list-style-type: none"> • incidences of obesity, asthma, etc. • changes in crime levels • changes in accident levels
Biodiversity, fauna, flora	<ul style="list-style-type: none"> • fragmentation of habitats • changes in biodiversity • species extinction • loss of high quality agricultural land • soil erosion
Climatic factors	<ul style="list-style-type: none"> • effects of climate change: high winds, temperature extremes etc.
Material assets	<ul style="list-style-type: none"> • rural diversification • changes in service provision (e.g. post offices, health care facilities)
Landscape	<ul style="list-style-type: none"> • changes in land use • changes in landscape character
Water	<ul style="list-style-type: none"> • eutrophication, acidification
Interrelation between factors	<ul style="list-style-type: none"> • loss of tranquillity

Cumulative effects are difficult to deal with on a project-by-project basis through environmental impact assessment. It is at the SEA level, and using a multi-agency approach, that they are most effectively addressed.

The focus of cumulative effects assessment is on receptors. Cumulative effects assessment asks whether the total effects on a given receptor of all actions, no matter who carries them out, form a significant impact. The test of significance of a cumulative effect is "can the receptor accommodate additional effects?". An understanding of the thresholds/capacities of the receptors to deal with effects is thus needed. For instance thresholds for assimilating greenhouse gas emissions are already being exceeded, whilst some landscapes might be able to accept considerable development without a degradation in their character.

Cumulative effects should be considered throughout the plan-making and SEA process, not at one stage. Cumulative effects on a given receptor are rarely aligned with political or administrative boundaries. Cumulative effects assessment must use the relevant receptor boundaries: ecological boundaries for natural systems, socio-cultural boundaries for human communities.

Carrying out cumulative effects assessment

Figure A5.2 shows how cumulative effects assessment can be integrated with SEA and transport plan making. Stages A to C are best carried out as part of the SEA scoping discussions early in plan-making, and concurrently so that they inform each other. All stages are best carried out in discussions with the other key organisations that contribute to the effect¹⁰.

A. Identify cumulative problems and opportunities. As part of the SEA's identification of environmental or sustainability problems, cumulative effects and/or receptors that are in decline and near their threshold should be identified. Thresholds are the level of stress below which

¹⁰ Carrying out multi-organisation meetings would obviate the need for each organisation to consult all of the other organisations on each effect.

populations, ecosystem functions or quality of life can be sustained. Thresholds may be identified based on existing guidance (e.g. PPSs on flooding and nature conservation); existing targets such as Biodiversity Action Plan targets; and capacity studies. In cases of high uncertainty, more rigorous targets should be applied until it has been proven that they can be relaxed.

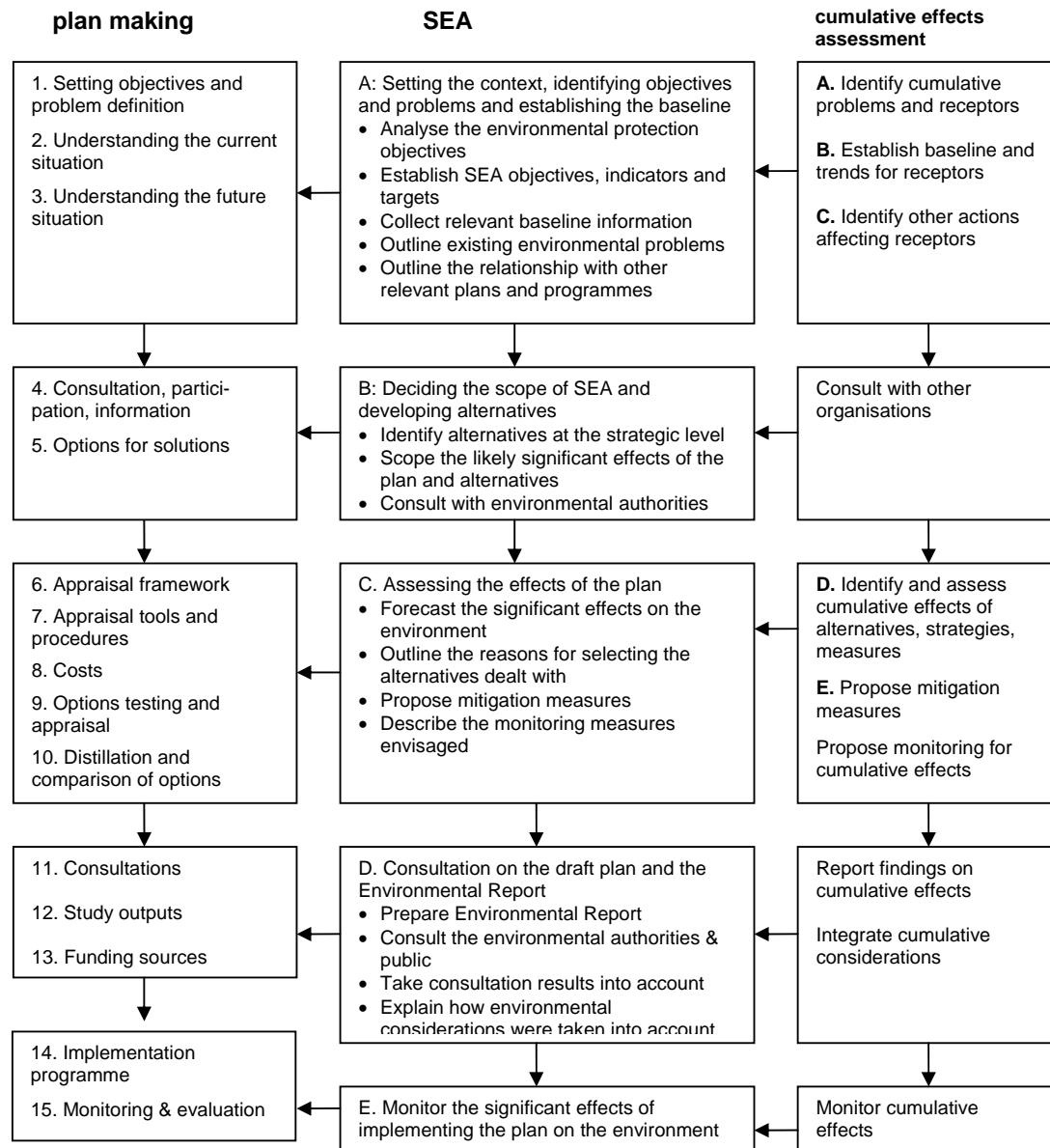


Figure A5.2. Links between cumulative effects assessment, SEA and decision-making
 Letters in bold refer to subsequent text which focuses on key cumulative effects assessment stages.

The list of effects from Table A5.1 can be supplemented with an analysis of regional and local level cumulative problems and opportunities, including:

- sections of population (e.g. groups particularly affected by accidents, or with poor access to services)
- geographical areas (e.g. non-tranquil areas, areas of community severance)
- resources (e.g. air quality management areas, areas of soil contamination)

- ecosystems and species (e.g. heathland, stone curlews)

Many potential cumulative effects may be identified. Agreement between the main parties involved in the cumulative effects assessment will be needed about key effects to focus on. The results of Stages B and C should assist in this.

B. Establish baseline and trends for receptors. An understanding of the trends and current status of the receptors without the proposed transport plan is vital to predicting what their quality will be after the proposed plan is implemented. If a receptor is already degraded or recovering from a previous impact, then the effects of new plans may be more serious. The time period and area over which different receptors/effects are analysed will vary from receptor to receptor. For instance climate change issues will be international and span decades, whilst community severance is more local and potentially short term. Table A5.2 gives an example of how the baseline could be documented. The focus of the baseline should be on outcomes (how the receptor will be affected) rather than inputs (what is affecting them or how the effects are already being mitigated).

Table A5.2. Possible way of organising and presenting baseline data (example)

Effect / receptor	(Outcome) data	Comparators and targets	Trend	Problems
Habitat fragmentation / lowland heath in area Y	None available	None available	Getting worse (county ecologist opinion)	County ecologist feels that this is a significant problem.
Access to open space	82% of population lives within 400m of open space	Target 90%	Getting better: 79% in 1997, and likely to improve with development X (planned for 2007)	No problem.

C. Identify other actions affecting receptors. For each effect/receptors identified in A., the role of other actions in leading to or solving the problem should be identified and described. This could include a discussion of how the cumulative effect has arisen over time. Techniques for doing this include:

- Causal network analysis (e.g. Figure A5.1);
- The last column of Table A5.3 can help to brainstorm plans that affect each receptor;
- Trend analysis or other predictions (e.g. about future traffic levels).

The analysis should consider the likelihood and timing/phasing of future actions: for instance whether one action depends on another one being completed first. Some actions may be more influential than others: this should be noted.

Table A5.3. Possible way of describing actions affecting receptors

Effect / receptor	Past actions	Possible future actions
Habitat fragmentation / lowland heath in area Y	Use of land for housing and transport infrastructure; agricultural intensification	BAP-related habitat restoration (depends on funding) Increased house building (very significant)
Climate change / worldwide	Greenhouse gas emissions from industry, transport etc.	Road traffic
Improved access to open space / residents in area X	No significant activities	Planning permission for new developments include requirements for open space provision Improved footpath network (depends on negotiations with individual landowners)

D. Identify, assess and mitigate significant adverse cumulative effects. The cumulative effect on each receptor of other actions with and without the transport plan should then be predicted and assessed. During the *prediction* stage – which identifies the *magnitude* of the effect, i.e. the difference between the with- and without-transport plan scenarios - the following points should be kept in mind:

- The type of plan and receptor will determine whether the prediction should be qualitative (e.g. "better/worse") or quantitative. Table A5.4 lists some techniques for identifying and forecasting cumulative effects.
- The forecasts should indicate the level of, and reasons for, any uncertainties. Uncertainty increases at the higher planning levels because scales are broader and issues are larger. The magnitude of cumulative effects may depend on how the plan is implemented, e.g. whether new transport infrastructure is located on a site of high or low biodiversity. This should be documented, and measures to ensure that implementation minimises any negative effects should be identified.

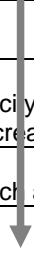
Table A5.4. Techniques for identifying and predicting cumulative effects

Method/description		Strengths	Weaknesses
Interviews etc.	Brainstorming sessions, interviews with experts and group consensus building activities can help to identify cumulative effects, provide data, analyse plan alternatives and components, and identify mitigation measures.	Flexible and can deal with subjective information.	Subjective and generally non-quantitative.
Matrices	A tabular format is used to organise and describe the interactions between actions and receptors. Table A5.5 shows an example.	Help to present and compare alternatives.	Do not address cause-effect relationships.
Causal chain analyses	Identify and illustrate the cause-effect relationships that result in cumulative effects. In doing so, they identify assumptions made in impact predictions, unintended consequences of the strategic action, and possible measures to ensure effective implementation. Figure A5.1 shows an example.	Illustrate complex links and identify cumulative effects.	Can be cumbersome.
Modelling	Quantifies the cause-effect relationships leading to cumulative effects. Modelling can take the form of mathematical equations describing cumulative processes (e.g. soil erosion), or expert systems that forecast the effects of various scenarios.	Addresses cause-effect relationships and gives quantified results.	Needs much data, and extrapolation of data is still largely subjective.
Overlay mapping and GIS	A computerised cartography system that stores map data linked with a database management system that stores attribute data. Cumulative effects can be displayed as superimposed (and possibly weighted) map layers. The vulnerability of receptors – how near they are to their thresholds – can also be mapped.	Incorporate spatial data; help to set the boundary of the analysis; identify areas where effects will be greatest.	Limited to effects based on location. Cost, quality and scale issues associated with digital data.
Scenarios	The plan's effects are described under different assumptions – scenarios – about future conditions outside the plan's control, e.g. under different economic growth scenarios.	Reflects uncertainties and suggests ways of reducing them.	Potentially time and resource intensive.
Extrapolation	The proposed plan's effects are predicted based on data from similar existing plans.	Based on real data.	Choice of existing plans is crucial: context etc. may vary.

The *evaluation* stage – which determines the *significance* of the cumulative effect - should focus on testing the forecasted effects against the threshold/capacity of the receptor where this exists (see Stage A). Where no targets exist, one can ask "can the population, ecosystem function, person's quality of life etc. be maintained indefinitely under this plan?". This is different from the main SEA process, which generally tests against environmental or sustainability objectives.

Significant cumulative effects should be used to screen out unacceptable plan alternatives and trigger the consideration of mitigation measures in Stage E.

Table A5.5. Cumulative effects of plan sub-components on receptors
(cumulative effects are read "down" as shown by the arrow)

Action	Effects/receptors		
	Fragmentation of low-land heath in area Y	Climate change	Access to open space in area X
Improved rural bus services	0	0	++
Park & Ride at X	- on site of high biodiversity in area Y	? reduces city centre traffic but could increase traffic to P&R	0
Cycle network	0	+ helps switch away from car use	+
Cumulative effects: 1+2+3	-	 +	+

Where appropriate assessment under the Habitats Directive is required, additional requirements apply: these are discussed in English Nature et al. (2004) *SEA and Biodiversity: Guidance for Practitioners*.

E. Propose mitigation measures. Mitigation measures should aim to first avoid loss or damage to the receptor and enhance it where possible; and then compensate for any unavoidable damage. For most cumulative effects, it will be impossible to precisely allocate responsibility among plan-makers regarding either the effects they "cause", appropriate mitigation measures, or reasonable mitigation costs. Generally mitigation within the authority's (not just the transport plan's) remit should be carried out where possible. This could include measures to achieve Biodiversity Action Plan targets; planning obligations regarding e.g. provision of open space or rural services; and establishment of a "mitigation bank" which requires developers to compensate for loss or damage to a habitat by providing equivalent replacement habitat. If the plan is likely to adversely affect the integrity of a Natura 2000 site, additional requirements apply: these are again discussed in the English Nature et al. (2004) guidance.

Some mitigation measures may only be capable of being delivered by parties other than the transport planning authority. Where mitigation cannot be carried out within the authority, then suitable mitigation should be discussed with those organisations that have the remit to do so, possibly in multi-agency meetings. Any remaining significant effects should be communicated to the relevant regional authority.

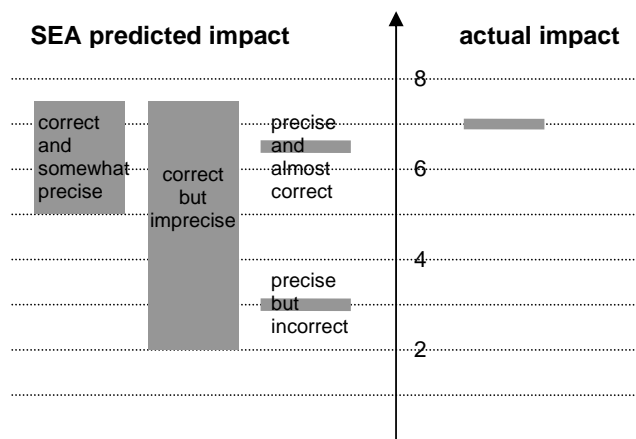
Appendix 6: Dealing with uncertainty

Dimensions and causes of uncertainty

There are many uncertainties involved in carrying out SEA: uncertainty in the environmental baseline and future business as usual, uncertainty in the delivery of the plan/programme measures and the characteristics of the environmental consequences arising that result. Uncertainty also exists on the delivery and efficacy of the proposed mitigation measures. Uncertainty can involve both incorrectness (getting to the wrong answer) – and lack of precision (a vague answer). Box A6.1 summarises the difference.

Box A6.1. Dimensions of uncertainty: Incorrectness and lack of precision

The diagram below illustrates the difference between correctness (“being right”, “making the correct prediction”) and precision (“being specific”). *Incorrect* descriptions/predictions/etc. can lead to the wrong decisions: for instance if alternative A is incorrectly predicted to have fewer negative impacts than alternative B, then A may be incorrectly chosen. The less *precise* the predictions, the less use they probably are to decision-makers. For instance, if alternatives A and B are both presented as “slightly positive”, this is not as informative as the knowledge that A is (say) twice as positive as B.



Relatively small levels of uncertainty can accumulate throughout the SEA process, to the point where the data that informs the final decision may be founded on an unsound assessment, as shown in Figure A6.1. Uncertainty can accumulate even within one stage: Box A6.2 gives an example.

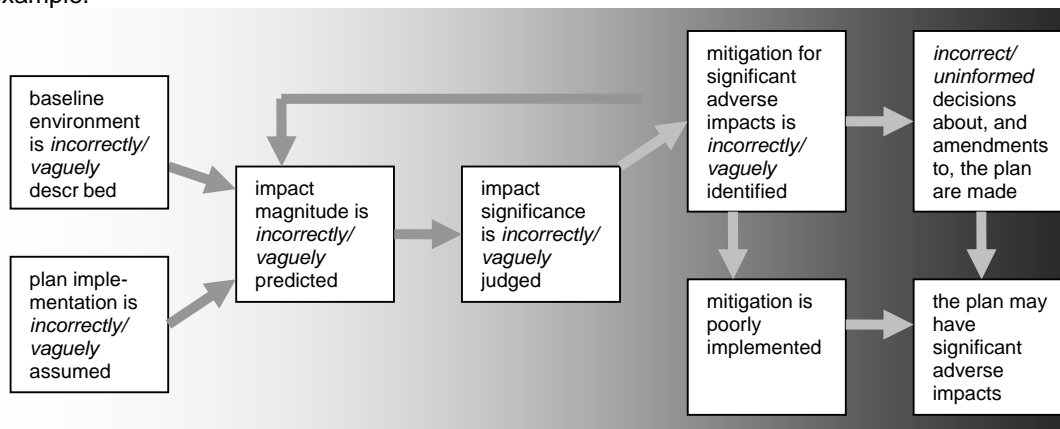


Figure A6.1. Accumulation of uncertainty

Box A6.2. Example of accumulation of uncertainty in impact prediction (adapted from Levett-Therivel (2003) *Implementing the SEA Directive: Five pilot studies*, report to South West Regional Assembly).

A regional strategy proposes to "support greater cultural and sporting activity". Quantifying the effect of this activity on air quality would require assumptions to be made about:

- the number and type of activities that might take place (say 5-10 major sporting plus 5-10 major cultural events/year)
- the number and length of journey associated with each event (say 200-1000 journeys per event, each 5-20 miles long)
- the type of journey (say 80-100% by car, 0-20% by bus)
- the emissions of air pollution x per type of vehicle per mile (say 5-10 μg of x per mile for cars, 2-3 for trains).

Multiplying together these ranges gives an impact prediction of 40,000 – 4.2 million μg of x /year. Clearly a range of more than two orders of magnitude has few benefits over a prediction of "air pollution would get worse"!

On the other hand, this does show that

- any cultural and sporting events will raise emissions of x , so that if x is already near its threshold and/or trends in x are already going in the wrong direction then further studies to reduce uncertainty or more mitigation measures to reduce the impacts are necessary;
- there are ways of minimising the production of x , for instance by holding events close to centres of population to reduce the number and length of journeys needed to get there, and by providing good public transport to the events;
- If more was known about the issue (e.g. about the number of journeys generated by such events, through monitoring of other similar events), then the range of predictions becomes narrower.

Uncertainty in decision-making

Decision-makers need information that is both correct and precise enough. However, while the aim should be to be *correct*, ultimate *precision* will almost never be possible and may well not matter. Indeed, the 'error bars' of a prediction may be so large that attempts to go further than a ranking or a description of the impacts will be misleading.

Even if more detailed and certain information is available, it will not necessarily lead to better decisions. Almost all decisions involve choosing between a range of positives and negatives, and which way the decision goes should depend on the relative importance given to them. This is not just a matter of linear weightings – decision-makers might decide that not letting one indicator go past a minimum tolerable value (e.g. air pollution), or not moving in the wrong direction at all (e.g. access for disadvantaged groups) should be an absolute constraint. These weightings are unlikely to ever be objectively 'right': they will always be subjective and thus 'contestable'. The rational, technocratic model of decision-making generally assumed by SEA is often not the case in practice.

Total certainty, even if achievable, is often not necessary in SEA. Examples are decisions where:

- an impact is clearly significant and a known level of mitigation measures is needed,
- a topic is clearly insignificant compared to other topics,
- the baseline status is clearly positive and the plan would clearly maintain or improve this status under all reasonable scenarios,
- one alternative is clearly better or worse than another alternative under all reasonable scenarios, or
- the significance of the impact would be the same whether mitigation measures are in place or not.

This is confirmed by the European Commission's (2003) guidance, *Implementation of Directive 2001/42/ on the Assessment of the Effects of Certain Plans and Programmes on the Environment*, which notes that:

"in the environmental report for a broad-bush plan or programme, very detailed information and analysis may not be necessary; whereas much more detail would be expected for a plan or programme that itself contained a higher level of detail."

SEA should be *fit for purpose*: as precise as necessary and feasible to inform the relevant decision. It should, for instance, help to identify:

- for each plan alternative, which impacts will be significant;
- for each plan alternative, significant cumulative impacts;
- which alternative is best for the environment;
- which aspects of the preferred alternative have the most significant impacts; and
- which "implementation rules" are crucial to avoid significant adverse impacts.

Imprecision should be reduced where doing so will help the decision, for instance where:

- the choice of alternatives is politically contentious;
 - cumulative impacts are likely to be significant;
 - the predicted impact is close to a threshold or target; or
 - the magnitude of the impact depends on the choice and implementation of mitigation measures, or on assumptions made about the plan implementation.
- ... although, even then, uncertainties (e.g. about whether bus fares are more or less attractive relative to cars) mean that predictions based on expert judgement will often be as precise as is honestly possible.

Reducing and communicating uncertainty in SEA

Table A6.1 suggests techniques for reducing uncertainty at different stages of the SEA process. Techniques for making SEA more *correct* include:

- Early participation of statutory consultees, elected members, NGOs, the public etc. This can help to ensure that the right baseline data is collected; inform what alternatives and mitigation measures to consider; and identify and, where appropriate challenge, assumptions about how the plan will be implemented;
- Interdisciplinary working, to challenge assumptions and suggest new solutions;
- Use of SEA guidance, checklists etc., to ensure that all likely impacts are considered;
- Collection/analysis of more, better baseline data over a longer period of time;
- SEA carried out by people who know about the area, the plan, sustainability, and impact prediction;
- Use of the precautionary principle: assuming that adverse impacts will occur until it is clear that they will not, and putting measures in place to ensure that no significant impacts occur;
- Triangulation: using several different sources of information, to see whether they lead to roughly the same solution;
- Consideration of cumulative, indirect and long-term impacts;
- Reference to other similar examples: this can help to ensure that all relevant impacts are identified, that appropriate criteria for judging significance are used, and that mitigation measures have the effect in practice that they are assumed to have in the SEA etc.;
- Capacity building of decision-makers about SEA, sustainability, etc.; and
- Use of an auditing organisation that helps to ensure that the SEA is done well.

These approaches – which are reassuringly straightforward – should help to avoid/reduce error. However, how indicators are defined and how much weight is given to changes in particular indicators is still intrinsically value driven, so 'avoidance of error' will not always achieve 'correct answers'.

Table A6.1. Techniques for reducing uncertainty (see text for explanation of techniques)

SEA stage	techniques for reducing uncertainty
A. setting the context, establishing the baseline	<ul style="list-style-type: none"> discussions with the statutory consultees etc. to agree appropriate indicators, timescales, spatial scales, data sources, etc. interdisciplinary working identification of key areas of uncertainty in the SEA
B. assumptions about the plan's implementation	<ul style="list-style-type: none"> as the plan evolves, discussions with the statutory consultees, elected members etc. about what it will "look like" on the ground
C. prediction of impact magnitude	<ul style="list-style-type: none"> reference to other similar examples clarification of assumptions made in prediction scenarios and sensitivity analysis use good, validated models reference to relevant guidance analysis of impact likelihood, duration, cumulative impacts, etc. to ensure comprehensiveness use of GIS where appropriate triangulation of information use of experienced SEA practitioners who know the geographic area and environmental topic
judgement about impact significance	<ul style="list-style-type: none"> involvement of statutory consultees etc. and interdisciplinary working use of 'true sustainability' targets and thresholds use of the precautionary principle
identification of mitigation	<ul style="list-style-type: none"> involvement of statutory consultees etc. and interdisciplinary working reference to other similar examples where the mitigation has been used in practice
D. decision-making	<ul style="list-style-type: none"> capacity-building of decision-makers start SEA early enough so that it can influence decisions compare alternatives/scenarios identify and document major sources of uncertainty in the SEA predictions
E. implementation and monitoring	<ul style="list-style-type: none"> put measures in place to ensure that the plan achieves its objectives, taking into account the need to be flexible and adaptable in line with government guidance

Techniques for making SEA more *precise* include:

- Identification of key areas of uncertainty in the SEA, and investigations to reduce the uncertainties. For instance, Table A6.2 identifies a source of uncertainty – the different impacts caused by new bus riders who previously walked/cycled, drove or did not make the journey. Table A6.3 explores it in more detail;
- Agreement on, and a clear statement of, assumptions used in the SEA, including assumptions about what the plan is expected to look like on the ground. Box A6.2 and Table A6.2 give examples;
- Scenarios to help identify the range/scale of possible impacts, including a scenario consistent with the precautionary principle. Box A6.2 gives an example;
- Sensitivity analysis can help to identify those variables that most affect the outcome;
- GIS: overlay mapping can help to identify locations with (or without) environmental constraints, buffer zones can be used to help protect Natura 2000 sites etc.;
- Identification of implementation 'rules' to help ensure that the plan is implemented as intended. Table A6.2 gives some examples;
- Reference to other similar examples or general trends, as shown in Table A6.3; and
- Monitoring of plans' significant effects to help improve the SEAs of future plan.

On the other hand, actions to correct imprecision may themselves introduce incorrectness in the SEA, for instance if inappropriate other examples are referred to or only a limited and biased group of people are consulted.

Techniques for *communicating* uncertainty include

- ranges to describe data/predictions (e.g. '50-65'), as in Box A6.1;
- symbols or colours instead of numbers (e.g. tick/cross, red/amber/green), as in Tables A6.2 and A6.3; and
- a clear statement of assumptions used, sources of uncertainty, and the level of specificity ("due to lack of information about ..., we can only say that...")

Table A6.2. Partial example of statement of assumptions in SEA, and identification of implementation 'rules' : quality bus network concept

Assumptions made: It is anticipated that the networks would not involve any major new road construction, but would involve minor works such as junction improvements and upgrading bus shelters which would not be specified in the LTP. Bus operators would be expected to improve the bus fleet, and the local authorities would take over traffic enforcement on the routes.		
NATA sub-objective*	Impact of quality bus network concept	For future stages: possible mitigation measures, further studies to reduce uncertainty
Noise	Not an issue at the strategic level, although there may be impacts associated with new junction configurations.	Consider including policy in LTP on designing new schemes to minimise their impacts on noise, water, biodiversity etc. Consider how to ensure that buses are quiet and well maintained. Carry out noise assessments at sensitive locations before schemes are implemented
Local air quality	Key impact. Potential for changes in air quality associated with new junction configurations and changes in traffic speed. Degree of improvement likely to depend on previous mode of travel of new bus riders	Consider how to ensure that buses are low emission, and that infrastructure is put in place to optimise smooth flow of traffic. Research air quality and greenhouse gas impacts of walking, cycling, car driving v. bus use (see Table A6.3 for example).
Greenhouse gases		
Physical fitness	Likely to improve slightly for people who previously drove; decrease for people who previously walked or cycled the journey.	
* SEA objectives could also be used		
	strong positive impact	
	weak positive impact	
	neutral impact, or partly positive and partly negative	
	weak negative impact	
	strong negative impact	
	impact depends on implementation	

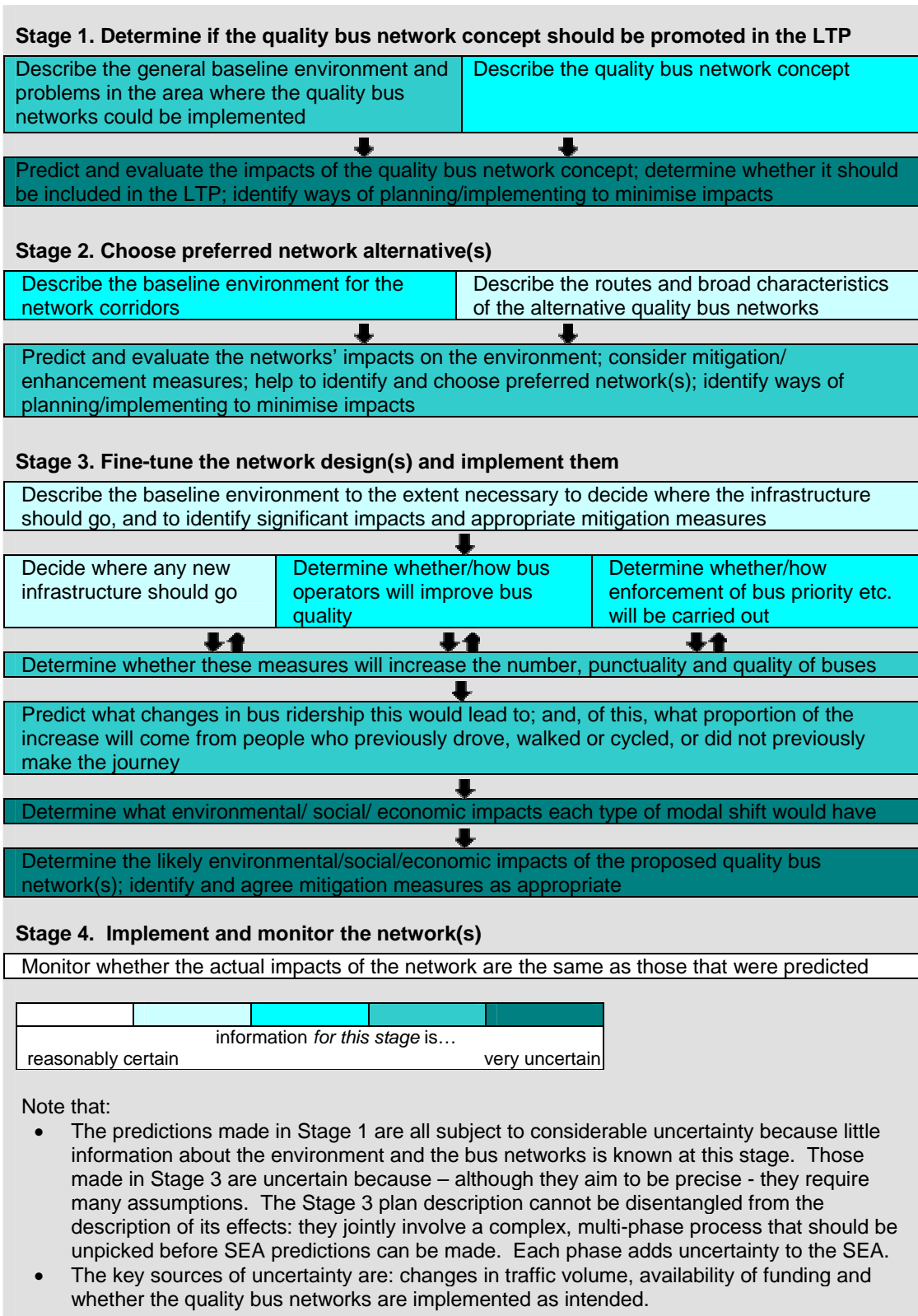


Figure A6.2. Example of identification of sources of uncertainty: quality bus network

Table A6.3. Partial example of how assumptions about impact predictions can be stated and supported: quality bus networks															
NATA sub-objective*	If the increased bus ridership is due to...														
	a shift from car to bus, then...	a shift from walking or cycling to bus, then...	new journeys being taken, then...												
Noise	Would improve if total noise from new bus services was lower than that from old bus services + the cars that the new buses replace: probably positive if <i>bus operators provide quiet buses</i>	Would improve if total noise from new bus services was lower than that from old bus services. <i>New buses would need to be quieter than old ones</i> because the frequency of new bus services is expected to increase.													
Local air quality	Would improve if total emissions from new bus services were lower than those from the old bus services + the cars that the new buses replace: probably positive if <i>bus operators provide low emission buses and the new routes speed up bus journeys</i>	Would improve if total emissions from new bus services were lower than those from the old bus services. More likely to be positive if <i>bus operators provide low emission buses and the new routes speed up bus journeys</i> .													
Greenhouse gases															
Physical fitness	People would walk to bus stop, so (limited) positive impact. Impact is proportional to how far bus stops are from origin and destination.	Fewer people would be exercising, so negative impact	No assumptions can be made. Broadly neutral.												
Accidents	Bus journeys are almost twice as safe (in terms of accidents per km travelled) as car journeys (DfT 2003). However walk to the bus stop would carry greater risks than driving a similar distance. Net impact uncertain.	Bus journeys are more than 20 times safer (in terms of accidents per km travelled) than cycling, and more than 10 times safer than walking (DfT 2003). Children are particularly likely to have walking and cycling accidents (Noland and Quddus, 2002). Positive impact, particularly if <i>children are encouraged to use buses</i> .	Would generate new bus passenger journeys plus the pedestrian journey to/from the bus stop. Each journey has a slight potential for an accident, so small negative impact												
<table border="1"> <tr> <td style="background-color: #008000;"></td> <td>strong positive impact</td> </tr> <tr> <td style="background-color: #90EE90;"></td> <td>weak positive impact</td> </tr> <tr> <td style="background-color: #FFFF00;"></td> <td>neutral impact, or partly positive and partly negative</td> </tr> <tr> <td style="background-color: #FFA500;"></td> <td>weak negative impact</td> </tr> <tr> <td style="background-color: #FF0000;"></td> <td>strong negative impact</td> </tr> <tr> <td style="background-color: #00BFFF;"></td> <td>impact depends on implementation</td> </tr> </table>			strong positive impact		weak positive impact		neutral impact, or partly positive and partly negative		weak negative impact		strong negative impact		impact depends on implementation	<p>Possible mitigation measures are shown in italics.</p> <p>References:</p> <ul style="list-style-type: none"> Department for Transport (2003) <i>Road Casualties in Great Britain 2002</i>, www.dft.gov.uk. Noland, R. and M. Quddus (2002) <i>An Analysis of Pedestrian and Bicycle Casualties Using Regional Panel Data</i>, Centre for Transport Studies, Imperial College, www.cts.cv.ic.ac.uk/documents/publications/iccts00270.pdf. 	
	strong positive impact														
	weak positive impact														
	neutral impact, or partly positive and partly negative														
	weak negative impact														
	strong negative impact														
	impact depends on implementation														

Appendix 7: Quality Assurance

Managing SEA Quality – Key Issues

The quality of the SEA process should be assured through a range of management actions. These include the choice of a good SEA team, the collection of appropriate data, the use of effective prediction techniques, consultation, and integration of the SEA findings into the wider NATA appraisal and the plan itself. Key issues which have a particular bearing on the quality of SEA of transport plans include:

- 1. Problem definition and the involvement of wide stakeholder interests:** The NATA and SEA processes both place emphasis on the consideration of “problems” including transport and environmental problems. This involves appropriate effort in the early stage of plan formulation, through the involvement of a wide range of stakeholders. Undertaken effectively, this process can pay dividends in terms of the ultimate value of the SEA and wider appraisal of the plan.
- 2. Input data quality:** Prediction and assessment methods used within SEA will often be reliant upon data from transport models and other planning and appraisal tools. Such input data will always have limitations and there may be inappropriate as well as appropriate uses of it in relation to conducting environmental assessments at the plan level.
- 3. Assessing and managing uncertainty:** At the plan level, predictions and assessments will necessarily be uncertain due to a range of factors associated with the “without the plan” scenario as well as the nature and effects of the plan strategy and measures. A good quality SEA will embrace uncertainty - demonstrating a transparent approach to identifying it and a practical approach to managing it. Appendix 6 discusses how uncertainty can be dealt with in SEA.

SEA Quality Assurance Checklist

The remainder of this Appendix provides an indicative quality assurance checklist (Table A6.1). The checklist is intended to help test whether the requirements of the SEA Directive are met, identify any problems in the Environmental Report, and show how effectively the SEA has integrated environmental considerations into the NATA appraisal and plan-making process.

The checklist is designed to be used by anyone involved in an SEA in any capacity: authorities who carry out SEAs, the organisations which they consult, inspectors, auditors, independent experts, and any interested or affected members of the public. It covers both the technical elements of the SEA and the procedural steps of the SEA process under the Directive and. It can be applied at any stage of the SEA to check the quality of work carried out up to that point.

Table A6.1: Quality assurance checklist for transport plan SEA

<p>Objectives and context</p> <ul style="list-style-type: none"> • The plan's purpose and objectives are made clear. • Environmental issues and constraints, including international and EC environmental protection objectives, are considered in developing objectives and targets. • SEA objectives, where used, are clearly set out and linked to NATA national objectives/ sub-objectives and local objectives. • Indicators and targets are defined where appropriate. • Links with other related plans, programmes and policies are identified and explained. 	
<p>Scoping</p> <ul style="list-style-type: none"> • Authorities with environmental responsibilities are consulted in appropriate ways and at appropriate times on the content and scope of the Environmental Report. • The assessment focuses on the important significant issues. • Technical, procedural and other difficulties encountered (such as technical deficiencies or lack of know-how) are discussed; assumptions and uncertainties are made explicit. • Reasons are given for eliminating issues from further consideration. 	
<p>Alternatives</p> <ul style="list-style-type: none"> • Realistic alternatives are considered for key issues, and the reasons for choosing them are documented. • Alternatives include 'do minimum' and/or 'business as usual' scenarios wherever relevant. • The environmental effects (both adverse and beneficial) of each alternative are identified and compared. • Inconsistencies between the alternatives and other relevant plans, programmes or policies are identified and explained. • Reasons are given for selection or elimination of alternatives. 	
<p>Baseline information</p> <ul style="list-style-type: none"> • Relevant aspects of the current state of the environment and their likely evolution without the plan are described – i.e. the “without the plan” scenario. • Environmental characteristics of areas likely to be significantly affected are described. • Difficulties such as deficiencies in data or methods are explained. 	
<p>Identification and evaluation of likely significant effects</p> <ul style="list-style-type: none"> • Effects identified include the types listed in the Directive (biodiversity, population, human health, fauna, flora, soil, water, air, climate factors, material assets, cultural heritage and landscape), as relevant; other likely effects are also covered drawing on appropriate NATA assessment methods. • Both positive and negative effects are considered, and the duration of effects (short, medium or long-term) is addressed . • Likely secondary, cumulative and synergistic effects are identified where practicable. • Inter-relationships between effects are considered where practicable. • Where relevant, the prediction and evaluation of effects makes use of accepted standards, regulations, and thresholds. • Methods used to evaluate the effects are described. • Sources and levels of uncertainty in the assessment are identified and reported. • Wider sustainability issues are also considered. 	
<p>Mitigation measures</p> <ul style="list-style-type: none"> • Measures envisaged to prevent, reduce and offset any significant adverse effects of implementing the plan are indicated alongside consideration of their costs and feasibility. • Issues to be taken into account in project EIAs are identified. 	

<p>The Environmental Report</p> <ul style="list-style-type: none"> • Is clear and concise in its layout and presentation. • Uses simple, clear language and avoids or explains technical terms. • Uses maps and other illustrations where appropriate. • Explains the methodology used. • Explains who was consulted and what methods of consultation were used. • Identifies sources of information, including expert judgement and matters of opinion. • Contains a non-technical summary covering the overall approach to the SEA, the objectives of the plan, the main alternatives considered, and any changes to the plan resulting from the SEA. • Integrates the SEA with the wider NATA appraisal and plan making process. 	
<p>Consultation</p> <ul style="list-style-type: none"> • The SEA consultations are conducted as an integral part of the plan-making process. • Authorities with environmental responsibilities and the public likely to be affected by, or having an interest in, the plan are consulted in ways and at times which give them an early and effective opportunity within appropriate time frames to express their opinions on the draft plan and Environmental Report. 	
<p>Decision-making and information on the decision</p> <ul style="list-style-type: none"> • The Environmental Report and the opinions of those consulted are taken into account in finalising and adopting the plan. • An explanation is given of how they have been taken into account. • Reasons are given for choosing the plan as adopted, in the light of other reasonable alternatives considered. 	
<p>Monitoring measures</p> <ul style="list-style-type: none"> • Measures proposed for monitoring are clear, practicable and linked to the indicators and objectives used in the SEA. • During implementation of the plan, monitoring is used where appropriate to make good deficiencies in baseline information in the SEA. • Monitoring enables unforeseen adverse effects to be identified at an early stage. (These effects should include predictions which prove to be incorrect.) • Proposals are made for action in response to significant adverse effects. 	

Appendix 8: Monitoring

The purpose of monitoring

Monitoring can be described as the systematic measurement of a parameter in terms of magnitude, time and space. Monitoring is not limited to quantitative or technological measurements, and may include qualitative issues such as severance or landscape quality.

Monitoring needs to have a pre-defined purpose. There is little value in measuring environmental parameters just for the sake of it. There also needs to be a framework or mechanism that enables monitoring to instigate amendments or remedial action as required.

The purpose of monitoring is to measure the environmental *outcome* of a plan (e.g. improvements in accessibility), the *performance* of a plan against pre-defined environmental objectives or targets, or *input* (e.g. improved public transport facilities).

Monitoring can be used to answer questions such as:

- Is the plan contributing to the desired environmental objectives and targets?
- Is the plan performing as well as expected?
- Are (mitigating) measures performing as well as expected?
- Are there any undesirable environmental effects? Are these within acceptable limits, or is remedial action required?
- Are the environmental impact predictions of the assessment accurate?

Effective monitoring can contribute to:

1. *Managing uncertainty*
 - Checking and adjusting plan implementation.
 - Identifying and managing unanticipated impacts.
 - Testing the accuracy of environmental impact predictions.
2. *Improving knowledge*
 - Improving impact prediction methods and the quality of future Environmental Reports.
 - Updating or filling gaps in existing environmental baseline information.
 - Keeping track of changes in the environment.
3. *Enhancing transparency and accountability*
 - Assisting in strengthening public involvement.
 - Verifying information in the Environmental Report.
4. *Managing environmental information*
 - Structuring information from various monitoring and evaluation activities.
 - Presenting monitoring information in a format appropriate for its purpose.

SEA monitoring should:

- Fit a pre-defined purpose
- Be customised for use at policy, plan or programme level
- Be focussed on the delivering information necessary to decision-making
- Be oriented towards problem-solving
- Address the significant key issues
- Relate to project EIA where appropriate, perhaps through tiering mechanisms
- Be transparent
- Be practical, easy to implement and cost effective
- Be a learning process

Proposed monitoring framework

The SEA Directive does not specify that monitoring of significant environmental effects has to be done for each plan or programme individually. Monitoring may cover several plans or programmes as long as sufficient information about environmental effects is provided for the individual plans or programmes. There is in other words scope for e.g. authority-wide monitoring, providing this can be done in such a way that the requirements of the Directive are met.

The appropriate level at which to monitor depends on the type and scale of the transport plan or programme to be monitored. For example, monitoring the environmental impacts of a local transport plan for a small rural authority may be largely focussed on the localised effects of individual strategies or groups of projects, whereas the monitoring of a regional transport strategy or a large metropolitan LTP may be focussed more at the level of the whole transport plan or programme area.

A step-by-step guide for how to develop a monitoring system for transport plans and programmes is provided in stages 1 to 6 below.

Designing a monitoring system

1. Determine what needs to be monitored
2. Identify what sort of information is required
3. Identify existing sources of monitoring information
4. Identify and fill any gaps in existing information
5. Determine when remedial action would be required and which actions could be taken
6. Develop a management plan outlining responsibilities, timeframes and presentation

1. What needs to be monitored?

The first issue to consider is exactly what needs to be monitored. Monitoring measures should be clear, practicable, and cost-effective. They must be clearly linked to the SEA process, for example:

- The objectives, targets and indicators that were developed for the SEA (see Section 3.3 of this guidance).
- Features of environmental baseline that will indicate the effects of the plan (see Section 3.4 of this guidance).
- The likely significant effects that were identified during the effects assessment (Section 5.3. of this guidance).
- The mitigation measures that were proposed to offset or reduce significant adverse effects (see Section 5.5 of this guidance).

Monitoring needs to be organised to focus on the entire transport plan/programme, where effects relate to the strategic objectives of the plan as a whole, including synergistic effects over and above the individual measures and over the lifespan of the plan.

It is not necessary to monitor everything or monitor an impact forever. Instead monitoring should focus upon:

- The significant environmental impacts that give rise to irreversible impacts upon environmental attributes of recognised value where monitoring seeks to identify trends in advance of such irreversible damage being caused.

- Significant impacts where considerable uncertainty has been evident in the SEA and where monitoring would enable preventative or mitigation measures to be taken.
- Impacts where a lack of information could constrain the decision making processes associated with the delivery of transport projects for example gathering of data over an extended timescale that would not be possible during an EIA.

2. *What sort of information is required?*

The type (e.g. quantitative or qualitative) and the level of detail of environmental monitoring information required will depend on the characteristics and level of detail of the plan and its forecast environmental effects.

- Wherever possible, it is preferable to measure *outcome* indicators (i.e. direct environmental effects).
- Any performance monitoring must be focussed on the *environmental* objectives, targets and indicators of the plan.
- In cases where it is difficult to establish the links between plan implementation and changes in the environment (i.e. cause and effect), it might be necessary to collect information on *indirect* factors such as implementation (e.g. progress of implementing a traffic reduction measure) or pressure factors/ input (e.g. emission levels). It might also be appropriate to undertake more 'general' monitoring of environmental change, which may involve measuring environmental effects or aspects of the environment that were not identified in the environmental assessment, or identifying changes in the environmental baseline. However, it is important to consider that the Directive requires the monitoring of *significant environmental impacts*, and that general monitoring (e.g. state-of-the environment reporting) might not be sufficient.

The monitoring of outcome indicators is however, fraught with technical difficulties in establishing causal links between the transport plan and the environmental conditions as many other factors may have a bearing upon the environmental conditions. Where outcomes are being monitored then the monitoring framework should be established in a way that seeks to take account of external factors and focus upon the links between the plan and the outcome.

Where the causal links between the plan output and the outcome are complex it may well be necessary to focus upon intermediate events, possibly to the extent that monitoring focuses upon outputs instead of outcomes. For example, it may be appropriate to ensure that the project delivery processes encapsulate the environmental issues identified in the SEA, leaving monitoring to ensure that the projects adopt satisfactory avoidance, mitigation, compensation or enhancement measures for that issue. The Driver, Pressure, State, Impact, Response (DPSIR) framework might be a useful way of identifying elements that can be monitored.

It should be recognised that some significant impacts that are being monitored may only become evident after extended timescales. Consequently, in some cases monitoring may extend over long periods while for other impacts a single observation may well be adequate.

3. *What are the existing sources of monitoring information?*

Many authorities undertake some form of environmental monitoring for transport plans. The monitoring is typically focussed on transport and traffic, and issues such as traffic flows, modal share, or public transport patronage. Some of these may have indirect impacts on the environment. However, the environmental monitoring that is undertaken for transport plans tends generally to be determined by what is required by regulations and legislation (e.g. the statutory requirement for assessment and review of local air quality under the Environment Act 1995), rather than being specifically linked to significant environmental effects as required by the SEA Directive.

In the case of LTPs, for instance, the performance of the plan is monitored against pre-defined targets and indicators and reported to the DfT in the form of an annual progress report (APR). The monitoring undertaken for the APRs does not necessarily include environmental effects, unless the authority has developed for instance targets for local air quality, environmental performance indicators, or environmental best value indicators.

Wherever possible, use existing monitoring arrangements to obtain the required information identified in stage 2. Some of the existing information will be of direct relevance and use, such as local air quality data for a plan where air quality impacts are predicted to be significant. Other monitoring activities may provide data which require some degree of analysis or manipulation. Consider issues such as:

- What are the existing monitoring arrangements for the transport plan, and does this provide any of required information?
- What are the existing monitoring arrangements for other transportation policies/plans/programmes/projects within the authority, and is there scope for disaggregating/aggregating data to obtain any of the required information?
- What are the existing monitoring arrangements within the authority for non-transport issues, and do they provide any of the required information (e.g. monitoring according to the provisions of other UK and EU legislation)?
- Is any of the required information available from other sources, e.g. neighbouring authorities or data sources used for establishing the environmental baseline?
- Does there information exist that might help to identify environmental change and/ or trends?
- What organisational structures are needed to deliver the monitoring, and what institutional responses are required to manage adverse trends and outcomes?

4. *Are there any gaps in the existing information, and how can these be filled?*

Extensive primary data collection is neither feasible nor appropriate for this level of monitoring. There are other ways in which the required information can be obtained in a cost-effective and efficient way. For example:

- Develop environmental performance indicators for transport plans in order to incorporate environmental monitoring into existing performance monitoring programmes.
- Expand existing monitoring systems to include additional attributes.
- Where applicable, enter into agreements with neighbouring authorities to standardise monitoring methods and share information.

5. *When would remedial action be required and what are the potential remedial actions?*

The SEA Directive states that monitoring must enable appropriate remedial action to be taken. In order for this to be achieved, there must be a mechanism or framework in place to trigger remedial action to be taken if and when required.

- Determine criteria or thresholds for when remedial action is required (i.e. what are the conditions that would be regarded environmentally undesirable/ unacceptable).

- Identify potential remedial actions that could be taken if a significant environmental impact was identified (e.g. review aspects of the plan that are failing and make amendments, develop avoidance, mitigation, compensation and enhancement measures, make amendments to plan implementation).
6. *Who is responsible for the various monitoring activities, when should these be carried out, and what is the appropriate format for presenting the monitoring results?*
- Determine time, frequency and geographical extent of monitoring (e.g. for performance monitoring this could develop out of the causal chain - e.g. be linked to timeframe for targets; and for effects monitoring whether the impact is short, medium or long-term).
 - Determine how much the monitoring will cost and where to get the financial resources.
 - Determine who is responsible for the different monitoring tasks, including the collection, processing and evaluation of environmental information.
 - Establish the most appropriate format to present the monitoring information with regard to its purpose and the expertise of those who will have to act upon the information (e.g. information may have to be presented in a form accessible to non-environmental specialists).

The tables below are suggested formats for how to manage the monitoring process and document the monitoring data in a systematic and transparent manner.

Documenting the monitoring data					
What needs to be monitored (effect, indicator..)?	What sort of information is required?	Where can the information be obtained (sources of information)?	Are there any gaps in existing information and how can these be resolved?	When should remedial action be considered?	What remedial action could be taken?

Managing the monitoring process					
Monitoring activity to be undertaken	Who is responsible for undertaking the monitoring?	When should it be carried out (dates and frequency)?	How should the results be presented/ appropriate format?	Status/ problems encountered	