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for Transport

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Highway Appraisal

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Transport Analysis Guidance (TAG)

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This TAG Unit is guidance for the **APPRAISAL PRACTITIONER**

This TAG Unit is part of the family **A5 – UNI-MODAL APPRAISAL**

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1 Purpose of this Document

1.1 Background

- 1.1.1 The purpose of this document is to provide an introduction to the interpretation of the multi-modal, study-based, appraisal advice in TAG for highway project appraisal. It provides advice on the need for the approach to scheme design and development to reflect the need for a balanced improvement across all potential impacts, rather than the maximisation of transport economic efficiency and safety.
- 1.1.2 The appraisal of highway schemes needs to be conducted in accordance with TAG to maintain consistency with the appraisal of other modes.
- 1.1.3 In [TAG Unit A3 – Environmental Impact Appraisal](#), advice can be found on the links between TAG's treatment of environmental impacts and the advice given in Volume 11 of the Design Manual for Roads and Bridges (DMRB), which deals with the environmental assessment of highway projects. All other units in the Appraisal unit series (A1, A2 and A4) provide the guidance needed to ensure that the appraisal of highway impacts is in line with the approach set out in TAG, including all salient social impacts (e.g. safety) and impacts on economic efficiency, wider economic impacts and distributional impacts. The sections in these TAG Units which deal with highway project appraisal focus on the most detailed level of appraisal and therefore provide the bridge between a full TAG appraisal and a DMRB Stage 3 level assessment, normally undertaken following the identification of the preferred route. Advice is also provided on the bridge between DMRB Stage 1 and 2 levels of assessment and TAG, for schemes at a less developed stage in the process.
- 1.1.4 The DMRB assessment is an important initial step in this process as it provides the information required for a TAG appraisal and the supporting back up information and justification for the appraisal. For openness, clarity and consistency TAG requires the appraisal findings to be reported in an Appraisal Summary Table (AST). The AST is described in [Guidance for the Technical Project Manager](#), which also describes how appraisal fits into the whole decision-making process and gives further advice on the application of TAG to highway schemes and their alternatives.

2 Scheme Design and Appraisal

2.1 Appraisal as a Tool for Creative Development of Solutions

- 2.1.1 When design and appraisal work hand in hand, each informing the other, designers are wielding a powerful tool with which to develop and create effective solutions. This emphasis on appraisal as a continuous process has long been a feature of scheme development. The appraisal framework within TAG further encourages this interactive design and management process.
- 2.1.2 Scheme impacts may be summarised in qualitative, quantitative or money terms. Regardless of the way in which assessment is recorded, throughout the appraisal process all are given equal prominence. This supports the search for solutions that not only target problems that are immediately apparent, but also deliver wider benefits that enhance overall scheme value.
- 2.1.3 This thus makes it easier to promote solutions that have the best overall justification. Specific implications of a rounded approach are as follows.
- A wide range of solutions should be sought. Solutions involving partnership with other bodies should be considered.

- All significant impacts should be taken into account. The full range of sub-objectives should be considered, irrespective of the main problems the scheme seeks to address.
- Positive design features should become an integral part of the solution. Even if their incorporation offers benefits unrelated to the main problems that have been identified, enhancements that offer overall value should become part of the core design.
- There is no requirement to maximise a project's monetised benefit to cost ratio. Impacts that are not in money terms should be given the same consideration as those in money terms.
- Nor is there a requirement to achieve a specific benefit to cost ratio.
- The appraisal framework provides the freedom and flexibility for designers and project managers to promote better balanced projects that support a wider range of objectives. By promoting better design, solutions will achieve broader appeal and, by attracting support that is more widespread, may move towards implementation at a faster pace.

2.2 The Planning Framework

2.2.1 It is important to understand the relationship between the new planning regime, the appraisal framework, and the three stages of highway appraisal. In DMRB the 3 stages of highway appraisal are:

Stage 1 – the purpose is to identify the advantages, disadvantages and constraints of broadly defined improvement options, producing an environmental constraints map and identifying key issues;

Stage 2 – assessment of identified range of scheme options, suitable for public consultation, based on more information than at Stage 1, allowing comparison between alternatives and identifying the significance of effects; and

Stage 3 – assessment of the Preferred Scheme involving a detailed assessment of all issues and preparation of an Environmental Statement or Stage 3 Scheme Assessment Report to DMRB 11.3.1.

2.2.2 The appraisal framework is concerned with the way in which solutions are identified as well as the way in which they are appraised. In essence, the appraisal framework includes:

- the identification of the problems to be addressed (and/or the identification of local or project- specific objectives to be met);
- the identification of a wide range of solutions to be considered; and
- the distillation of the solutions to identify the preferred solution.

2.2.3 This process is compatible with the three stages of highway appraisal. Problem identification will usually have been completed at Stage 1, identification of potential solutions will generally span Stages 1 and 2, and the selection and refinement of the preferred solution will be carried out in Stages 2 and 3.

2.2.4 However, a key requirement of the appraisal framework is the need to consider a wide range of alternatives, aimed at solving the problem, rather than merely mitigating the symptoms of the problem. Satisfying this requirement is inherently difficult because some potential solutions may not be deliverable by the body carrying out the study. For example, some potential solutions to road problems might involve public transport, or might require combined action by the Highways Agency and local highway authorities.

- 2.2.5 Regional or local strategies may provide a long term regional framework for local transport plans and transport providers, including the Highways Agency. In many cases they may identify the problem to be addressed and significantly reduce the range of potential solutions to be considered. They may often identify the solution as a road improvement scheme, rather than (or perhaps complementary to) a project involving other modes. Project managers should explore the full range of options, usually in partnership with other transport providers. These investigations will often be completed early in the appraisal process, reducing the range of potential solutions to be examined in more depth at later stages.

2.3 Practical Recommendations

- 2.3.1 TAG appraisal requires completion of the AST. Appraisal practitioners, on completing this table, should refer to [TAG Unit A1.1 – Cost Benefit Analysis](#) to derive key parameters such as price base, discount rate and so on.
- 2.3.2 The Department's TUBA software is a useful standard source that is used to convert transport model output (cost matrices) into transport economic efficiency benefits and disbenefits (see [TAG Unit A1.3 – User and Provider Impacts](#)).
- 2.3.3 The Department produces a tool to appraise safety impacts, COBALT, that uses model outputs to determine changes in accidents and the costs and benefits of such changes. Please refer to the [COBALT manual](#) and guidance on accident appraisal in [TAG Unit A4.1](#).
- 2.3.4 To assist the analyst, TAG is accompanied by various **appraisal worksheets** for each impact. Analysis that has been completed using the guidance within DMRB may be easily converted to these TAG worksheets, with reference to the relevant TAG guidance.

3 Key Traffic Modelling and Forecasting Issues

3.1 Modelling Issues

- 3.1.1 Modelling must be tailored to suit the circumstances of a scheme: small schemes in uncongested networks may only require consideration of reassignment; larger schemes, or those in congested networks, will usually need to take account of suppressed and induced traffic. This is discussed further in [TAG Unit M2 – Variable Demand Modelling](#).
- 3.1.2 Where other modes, public transport and cycle/pedestrian, may be affected or could contribute to the solution, multi-modal modelling will be required.

3.2 Forecasting Issues

- 3.2.1 Forecasting should be consistent with the Department's National Trip End Model (NTEM) planning and trip end data, and should have regard to local factors, including the impact of local developments and local transport plans. It should pay careful attention to uncertainty, especially with respect to local factors – no firm line should be drawn between what should be included and what may be ignored – sensitivity tests will be essential (see [TAG Unit M4 – Forecasting and Uncertainty](#)). It is important to ensure that environmental assessment is based on the same forecast assumptions as economic appraisal and includes the same sensitivity tests.

4 Document Provenance

This Transport Analysis Guidance (TAG) Unit is based on former TAG Unit 1.3 – Trunk Roads, itself based on Chapters 1 to 3 of Applying the Multi-Modal New Approach to Appraisal to Highway Schemes (DETR, 2001).

Appendix A Assessment of impact on active modes

- A.1.1 Where active modes are not explicitly modelled and the impact on them is relatively small, as is typical for a highway scheme, a proportionate approach should be used to assess these impacts. This is often reported qualitatively using the standard seven-point scale in the [Appraisal Summary Table](#). This is in line with guidance in Design Manual for Roads and Bridges (DMRB) Volume 11 Section 3 Part 8, which provides details of the assessment of the impact on pedestrians, cyclists, equestrians and others.

A.2 Economic Impacts

- A.2.1 Combining the number of active mode users affected (number of persons) with how much they are affected (in minutes) in each case should be sufficient information to formulate an overall assessment score (in person 'minutes') for transport economic efficiency impacts on active mode users. This approach involves developing a schedule, for each important route, of changes in typical journey lengths (times and distances) and likely changes in travel patterns, with an estimate of the number of people affected in each case. The analyst may then complete Worksheet 1 below.

| Worksheet 1 Economy: Pedestrians, Cyclists and Others | | | |
|--|----------------------|---------------------------------------|-------------------------|
| | Numbers affected (a) | Change in journey time in minutes (b) | Combined impact (c=a*b) |
| Pedestrians (i) | | | |
| Route 1 | | | |
| Route 2 | | | |
| Etc | | | |
| All pedestrian routes | | | |
| Cyclists (ii) | | | |
| Route 1 | | | |
| Route 2 | | | |
| Etc | | | |
| All cycle routes | | | |
| Equestrians and others (iii) | | | |
| Route 1 | | | |
| Route 2 | | | |
| Etc | | | |
| All other routes | | | |
| ALL MODES | Sum of all routes | Sum of all routes | Sum of all routes |
| Reference sources: | | | |
| Assessment scores: | | | |
| Qualitative comments: | | | |

- A.2.2 Using the information in the worksheet, the assessment score may be obtained using the following guidelines. Define the changes in journey times as: small (less than one minute), moderate (between one and two minutes) and large (greater than three minutes) and the numbers of travellers affected as: low (less than 200 in total), moderate (between 200 and 1000) and high (greater than 1000). Then the assessment can then be based on the following matrix of impacts where beneficial impacts occur if journey times are reduced or adverse impacts if journey times are increased.

- A.2.3 In some circumstances, quantified information may not be readily available. Where this is the case, analysts should use their judgement to make an assessment of whether the numbers affected are low, moderate or high and whether the changes in journey times are small, moderate or large, and use the following criteria to derive the assessment score:

| Table 1 Qualitative 7-point scale of impacts on active modes | | | |
|---|---------------------|----------|----------|
| Journey time changes | Travellers affected | | |
| | Low | Moderate | High |
| Low | Neutral | Neutral | Slight |
| Moderate | Neutral | Slight | Moderate |
| High | Slight | Moderate | Large |

- A.2.4 The qualitative results should be recorded in the 'other' column of the Transport Economic Efficiency (TEE) table and, where significant, the results should be noted in the 'Summary of key impacts' column of the Appraisal Summary Table (AST).

A.3 Other Impacts

- A.3.1 Even if a transport scheme is not aimed at active modes specifically, it may have important effects on their use, particularly where it causes mode shift. For example, urban road improvements might increase car use, reducing the number of active mode users.
- A.3.2 Even where active mode users are not explicitly modelled, but where the scale of impact is significant enough, some assessment, preferably quantitative, should be undertaken into impacts on other elements of the appraisal, particularly health benefits. Transport schemes might also impose externalities on active users in terms of journey quality or changes in actual and perceived safety (see section [TAG Unit A4.1 – Social Impact Appraisal](#)).
- A.3.3 Basic estimates of expected changes in active mode use, along with other clear assumptions, sufficient evidence and sensitivity tests, should allow the analyst to produce estimates of the monetary costs or benefits of these other impacts. This should follow the methods outlined in section [TAG Unit A4.1](#) in a proportionate manner.