

Transport Appraisal And The New Green Book

TAG Unit 2.7.1

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Department for Transport

Transport Analysis Guidance (TAG)

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1 Transport Appraisal And The New Green Book

1.1 Introduction

- 1.1.1 On 17th January 2003, the Treasury published a revised edition of its Green Book, *Appraisal and Evaluation in Central Government*. This is a best practice guide to carrying out appraisal and evaluation of policies and capital projects. It is used by all central government departments and executive agencies. It aims to make the appraisal process throughout government more consistent and transparent. This note sets out how the New Approach To Appraisal (NATA, as described in *Guidance on the Methodology for Multi-Modal Studies*, GOMMMS, now TAG) has been changed to reflect the guidance given in the Treasury's new Green Book (GB). Key points are in bold text.
- 1.1.2 The need to make changes to the NATA has provided the opportunity to bring it more in line with the Department's guidance *Better Policy Making: Integrated Policy Appraisal in DTLR* (IPA). The IPA is a good practice tool of use to anyone embarking on a policy project. It allows the user to review the widest possible range of impacts - economic, environmental, social and distributional - and thus ensure a robust approach to policy development. It includes a standardised summary of the impacts in a form that can be used in submissions to Ministers, public consultations, and so on. This is similar to the NATA's Appraisal Summary Table (AST) (TAG Unit 2.7.2).

1.2 Overall approach

- 1.2.1 The new Green Book (GB) presents appraisal and evaluation as a process, starting with the identification of the rationale for intervention, proceeding through the development of outcomes to be achieved and appraisal of a range of solutions to implementation, monitoring and evaluation. This process is well established for transport investment. In particular, the NATA is based on a very similar appraisal process, from consideration of problems through to the identification of a preferred solution.
- 1.2.2 The GB recognises the need to take account of all the economic, social, environmental and financial impacts of an intervention. The GB uses the term 'economic appraisal' for this process. The NATA is fully consistent with this approach. The need to integrate consideration of environmental, economic and social impacts is central to the NATA method. The NATA Appraisal Summary Table (AST) is designed to provide decision takers with a concise overview of impacts across the board.
- 1.2.3 The GB recommends that options should be appraised using cost benefit analysis, with supplementary techniques to be used for weighing up those costs and benefits that remain unvalued. It defines cost benefit analysis as "analysis which quantifies in monetary terms as many of the costs and benefits of a proposal as feasible, including items for which the market does not provide a satisfactory measure of economic value".
- 1.2.4 The emphasis on quantification in monetary terms is clearly an important issue for the appraisal of transport investment, where several significant environmental and other impacts are identified but not, currently, valued. The Department is committed to extending valuation to a wider range of the impacts of transport investment. Valuation is planned for impacts such as noise, local air quality and global emissions, but is further off for 'land take' impacts such as landscape, heritage, biodiversity and so on. The Department's ambition to extend monetary valuation to more of the impacts of transport investment will bring the NATA closer to the GB ideal, bringing greater transparency to decision making.

- 1.2.5 The GB recognises that there may be important impacts that cannot be quantified or monetised. Where that is the case, the GB emphasises the need to take these impacts into account - it does NOT recommend that consideration should be restricted to those impacts that can be valued. Where there are unvalued costs and benefits, the GB recommends that cost effectiveness analysis or multi criteria analysis can help balance unvalued impacts against monetised ones.
- 1.2.6 The GB notes that the most common technique used where there are unvalued costs and benefits is weighting and scoring, or multi-criteria analysis. In particular, multi-criteria analysis can handle circumstances where there are several different kinds of impacts that cannot readily be valued. The GB also notes that the weights used in multicriteria analysis cannot be decided by 'experts', but must take account of the views of stakeholders and decision takers. The NATA is a form of multi-criteria analysis. All of the impacts of a transport intervention are brought together in the Appraisal Summary Table (AST) and supporting analyses. Those impacts that can be monetised are presented in monetary terms as well as in quantitative terms, but no other weighting information is provided. Decision takers must apply their judgement, taking account of the views of stakeholders determined through participation, to weigh up the impacts to reach an assessment of the overall value for money of the proposal.

1.3 Costs and Benefits

- 1.3.1 The GB is aimed at the appraisal of government action, which must be based on an assessment of how any proposed policy, programme or project can best promote the public interest. The GB identifies two key questions:
- Is the rationale for intervention clear?
 - Are the benefits of intervention expected to exceed the costs?
- 1.3.2 The NATA addresses the first question through its emphasis on the need to identify the problems to be addressed and the local objectives that are to be progressed. The summary information required for a NATA appraisal must include a statement of the problems and local objectives, together with an assessment of the extent to which they are addressed by the option being considered.
- 1.3.3 The second question is the core topic addressed by the NATA option appraisal process. As discussed above, the NATA brings together all costs and benefits, whether monetised or not, in the Appraisal Summary Table, thus enabling decision takers to consider whether the benefits of a proposal are greater than the costs.
- 1.3.4 It has long been common practice to use benefit to cost ratios to choose between options for a transport proposal. Advice in GOMMMS recommends that these should be calculated using two aggregations of financial costs and revenues:
- Investment and operating costs incurred by public and private sector transport providers; and
 - Costs to central and local government, including grant and subsidy and net of revenue (but excluding changes in indirect tax revenue).
- 1.3.5 The GB recommends that decisions should be based on net present values of benefits minus costs, rather than ratios of benefits to costs, so the need to define a cost for use in a benefit to cost ratio is less important. However, the distribution of impacts between government and society is clearly a key issue in

the justification of Government action. Thus, the Department has decided to recommend an aggregation of costs that highlights the impact of a proposal on public accounts. **Within the NATA approach, the 'public accounts' impact is defined as net costs incurred by central or local government bodies (including public sector agencies).** It includes investment and operating costs, grant and subsidy and changes in indirect tax and other revenues. Investment and operating costs incurred by private sector providers should be treated as disbenefits, offsetting changes in private sector providers' revenue. This change reinforces the NATA's focus on the assessment of impacts on different economic interest groups. It also highlights the suitability of NATA for the appraisal of projects other than those involving only public spending.

- 1.3.6 In some circumstances, it may be useful to adopt alternative aggregations. For example, the GB notes that, where there is a budget constraint, the ratio of the net present value to the expenditure falling within the constraint may be a useful indicator. Where this is the case, the basis of the alternative must be carefully explained, and the analysis must also show the overall impact on public accounts as defined above.
- 1.3.7 For many transport proposals, this change is unlikely to make much difference. The following paragraphs discuss some circumstances where there may be significant impact on the way that results will be presented.
- 1.3.8 When appraising road user charging, public accounts may show a net revenue, rather than a cost, since revenue from charging will, in worthwhile cases, exceed the costs of implementation and operation. On the other hand, the monetised element of benefits to consumers and business will usually be negative - this will depend on whether the benefits to remaining road users from reduced congestion exceed the increase in their costs of road use necessary to deliver the reduction in traffic volumes.
- 1.3.9 The presentation of proposals involving partnership between the public and private sectors may also be affected. The new guidance will require private sector costs to offset benefits gained by private sector operators, rather than being pooled with public sector costs. The result is that both public sector costs and benefits to society will be reduced.
- 1.3.10 Paragraph 5.25 and footnote 4 of the Green Book refer to the handling of costs and benefits to non-UK residents in appraisal in the following terms:
- "5.25 In principle, appraisals should take account of all benefits to the UK⁴. This means that as well as taking into account the direct effects of interventions, the wider effects on other areas of the economy should also be considered. These effects should be analysed carefully as there may be associated indirect costs, such as environmental costs, which would also need to be included in an appraisal. In all cases, these wider effects should be clearly described and considered.*
- Footnote 4: All impacts (including costs and benefits, both direct and indirect) on non-UK residents and firms should be identified and quantified separately where it is reasonable to do so, and if such impacts might affect the conclusions of the appraisal. Generally, proposals should not proceed if, despite a net benefit overall, there is a net cost to the UK (for instance, after taking into account environmental costs)."*
- 1.3.11 Clearly, for the majority of transport schemes the proportion of total costs and benefits that accrue to non-UK residents is insignificant. In such cases it would be unreasonable to expend resources attempting to identify and quantify separately the costs and benefits on non-UK residents and firms. But appraisals for schemes that have a significant impact on non-UK residents should include a

section in the Supporting Analyses that separately identifies the impacts on non-UK residents from those on UK residents.

- 1.3.12 It is important to note that transport schemes that benefit non-UK residents and firms do have indirect or wider economic benefits to the UK. While these effects can be hard to measure, they should not be ignored if they are material to decisions about how much transport capacity to provide and on its benefits. In the absence of a direct measure of the wider economic benefits of a scheme, appraisals may include the user benefits to non-UK residents and firms. In doing so, benefits should not be double-counted; if the user benefits to non-UK residents are included in the appraisal an additional estimate of the value of improved services to business travellers enabling increased inward investment and external trade should not also be included. It may be difficult to appraise accurately the quantification and valuation of such benefits, in which case it may be appropriate to express these benefits as a range.

1.4 Price base and taxation

- 1.4.1 The GB recommends the use of market prices as the basis for appraisal. The NATA requires the use of a market price base, arguing that this is presentationally consistent with the use of 'willingness to pay', as recommended in Sugden's report *Developing a Consistent Cost-Benefit Framework for Multi-Modal Transport*. The NATA is, therefore, consistent with the GB in this respect.
- 1.4.2 The GB states that adjustments for differences in taxation are only necessary where it may make a material difference to the decision. This is likely to be the case for many transport appraisals. The inclusion of fuel duty as well as VAT in the cost of fuel for road users means that any options that switch consumers' expenditure between road transport and other goods, which are generally subject to VAT alone, are likely to have an effect on indirect tax revenues. Also, the zero VAT rating applied to public transport fares means that any option that affects public transport use also has an effect on indirect taxation. The NATA already takes account of indirect taxation impacts and no change is required. However, as discussed above, changes in indirect tax revenue are now included in the calculation of costs to public accounts, rather than in the estimation of benefits.
- 1.4.3 Note that this is a separate issue from that of potential differential tax receipts from PFI schemes. Where publicly financed options are compared to PFI options, taxation differences should be considered and adjustments explicitly made if not doing so would affect decisions. Specific guidance on this is available on the Treasury Green Book home page.

1.5 The Transport Economic Efficiency table

- 1.5.1 The decision to separately identify impacts on public accounts has been discussed above. This has required changes to the calculations carried out in the Department's standard software tools, TUBA, COBA and QUADRO and summarised in the Transport Economic Efficiency (TEE) table, see *The Economy Objective* (TAG Unit 3.5). **The Department has taken this opportunity to make further changes to the way transport economic efficiency results are presented.** These are discussed in the following paragraphs. Examples of the new tables are at the end of this note.
- 1.5.2 The analysis of costs to central and local government has been separated from the analysis of benefits to business and consumers to form a 'Public Accounts' table. This change is expected to reduce the tendency to relate costs solely to transport economic efficiency benefits and reinforce the principle that costs must be compared with all benefits, whether monetised or not.

- 1.5.3 This new table includes the information provided in the 'public sector provider' and 'other government' sections of the old TEE table. The information is rearranged into 'local government' and 'central government' sections. **In this table, costs appear as positive numbers and revenues as negative numbers.** The analysis leads to a net present value of costs to central and local government.
- 1.5.4 The information formerly provided in the 'user benefits' and 'private sector provider' sections of the old TEE table has been rearranged and further disaggregated into 'benefits to consumers' and 'benefits to business'. The latter includes benefits to business users of transport and benefits to private sector transport providers. As before, costs in the TEE table appear as negative numbers. The results are summed to give the total net present value of non-government benefits.
- 1.5.5 This change reflects the advice in the GB that appraisal should identify impacts on business, charities and the voluntary sector, in line with the requirements of regulatory impact assessment. It also brings the NATA more in line with the Department's Integrated Policy Appraisal guidelines.
- 1.5.6 It is important to note that benefits to business and consumers are restricted to those benefits that are calculable from changes within the transport system. They do not include benefits due to changes in land use or values, productivity and so on arising from a transport proposal. Such benefits should be reported separately, and entered under 'wider economic impacts' on the Appraisal Summary Table (AST), see TAG Unit 2.7.2.
- 1.5.7 The new TEE table includes entries for the disbenefits (delays, increased vehicle operating costs and increased numbers of accidents) to transport users caused by construction and maintenance. These impacts can often be significant and thus should be taken into account.
- 1.5.8 The TEE table and the new Public Accounts table both include entries for developer contributions. In the TEE table, these appear as negative benefits, while in the Public Accounts table they appear as revenues. Including these contributions in the Public Accounts table clarifies their effect in reducing demands on public funding for schemes, while their inclusion in the TEE table highlights their impact on business.
- 1.5.9 **Summary statistics, such as net present value (NPV) and benefit to cost ratio (BCR), are presented in a third table.** These statistics draw on the results presented in the public accounts and transport economic efficiency table. They should also draw on analyses of accident benefits and, where appropriate, any other analyses that provide a monetised estimate of benefit. This table includes a warning that, where there are significant benefits or disbenefits that have not been monetised, the summary statistics presented may not be a good indicator of value for money and should not be used alone in taking decisions.

1.6 The Appraisal Summary Table

- 1.6.1 **The Department has also made changes to the layout of the Appraisal Summary Table (AST).** These changes reflect the changes made to the Transport Economic Efficiency table. The 'transport economic efficiency' line has been replaced with three lines, providing summaries of the impacts on public accounts, business and consumers. An example of the revised AST is included in *The Appraisal Summary Table* (TAG Unit 2.7.2).
- 1.6.2 Under the 'public accounts' heading, separate entries should be provided in the 'quantitative assessment' column for impacts on central government and on local government. The overall impact on public accounts should be entered in the 'assessment' column. These figures should be carried forward from the Public

Accounts table discussed above. As in the Public Accounts table, these values should be in 'present value of costs' terms, thus costs should appear as positive numbers. Key clarifying information should be provided in the 'qualitative' column. In particular, if either of the entries in the 'quantative assessment' column is negative (implying a net income for central or local government), this should be noted.

- 1.6.3 The 'business' heading should include three entries in the 'quantative assessment' column, covering impacts on business users of transport (that is, on freight and on people making journeys in the course of work), on private sector transport providers, and on other business impacts. The 'assessment' column should provide the overall impact on business. These figures should be carried forward from the 'business' section of the Transport Economic Efficiency table discussed above. Note that the 'other business impacts' entry should be restricted to developer and other contributions to central or local government for transport purposes – all other impacts on business should be recorded under the 'wider economic impacts' heading on the AST. The values provided should be in 'present value of benefits' terms, thus benefits should appear as positive numbers.
- 1.6.4 The 'consumers' section should include in the 'assessment' column a single entry, covering impacts on consumer's use of transport for all non-work travel, including commuting. Note that this should not include accident, security, journey ambience (or quality) or reliability impacts – separate entries are provided on the AST for these. Values provided should be in 'present value of benefits' terms, as for impacts on business.
- 1.6.5 Current guidance insists that the AST must be presented on a single page. As discussed above, the GB recognises the need to take account of all the economic, social, environmental and financial impacts of an intervention. The NATA Appraisal Summary Table (AST) is designed to provide decision takers with a concise overview of impacts across the board. The single page format reduces the risk that some impacts will be overlooked or that some may be given disproportionate emphasis. Information provided in the AST – especially in the 'qualitative' column – should be restricted to that which is essential for decision making.

1.7 Discount rate

- 1.7.1 The discount rate is used to convert costs and benefits that occur in different time periods to 'present values' so that they can be compared. It is based on the principle that, generally, society prefers to receive goods and services now, rather than later, and to defer costs to future generations - this is known as 'social time preference'.
- 1.7.2 The discount rate is a separate concept from inflation. Before applying discounting, costs and benefits should be expressed in 'real terms' or 'constant prices', as opposed to 'nominal terms' of 'current prices'. Where the effect of expected future inflation has been included in future cash flows, it should be removed by deflating by the relevant deflator.
- 1.7.3 The GB recommends a discount rate of 3.5%. **The Department requires the new rate to be used to calculate the present value of all future costs and benefits.** The GB also recommends that lower discount rates (linked to proportional decreases in the projected rate of growth in income) should be used for discounting costs and benefits arising more than thirty years ahead. Major transport investment has conventionally been appraised over a 30 year period from the date the project opens or otherwise comes into use. This date, in turn, is often several years in the future. Thus, the lower discount rates recommended in the GB are likely to be applicable for the later years of an appraisal. The Department's standard appraisal software (COBA, TUBA and

QUADRO) has been amended to use the standard rate of 3.5% for the period up to 30 years from the year of appraisal and the lower rate of 3.0% thereafter. The GB advises that the discount rate should fall again (to 2.5%) after 75 years, but few, if any, transport appraisals are likely to require appraisal that far into the future.

- 1.7.4 Major transport investment projects result in assets that have useful lives extending beyond the commonly adopted 30 year appraisal period. The choice of a 30 year appraisal period for major transport investment was based in part on the presumption that discounting will reduce costs and benefits beyond that period to a level that can be ignored. This is no longer the case, and the Department is considering what advice to give about methods for extending the appraisal period, either directly or by estimating residual values. In the interim, past guidance on the appraisal period remains applicable unless the proposal has an unusual profile of costs and/or benefits, in which case further advice should be obtained from the Department.
- 1.7.5 It is important to note that the change in the discount rate conceptually applies to *all* costs and benefits, whether monetised or not. The present value of future environmental and other costs and benefits that currently cannot be monetised should be assumed to be greater than before, in the same way as future monetised costs and benefits. Thus, monetised costs and benefits alone should not now be given greater relative weight than in the past.

1.8 Risk, Uncertainty and Optimism Bias

- 1.8.1 The GB puts considerable emphasis on the need to take account of risk, uncertainty and optimism bias in the estimation of both costs and benefits.
- 1.8.2 Within the transport sector, past practice has been to include an allowance for contingencies in the estimation of costs. In at least some sectors (notably the highway sector), these allowances have been reduced as proposals have been developed. The allowances recommended for highways were based on a comparison of forecast and outturn costs at different stages in the appraisal process, thus they were, in effect, optimism bias adjustments. In addition, in some sectors the use of quantified risk assessment in cost estimation has become increasingly common. Where risk assessment has been carried out, this has tended to be treated as an alternative to the use of contingency allowances.
- 1.8.3 In line with the GB advice, the Department now requires all proposals to include an allowance for optimism bias in cost estimates. This applies even where risk analysis has been carried out. However, good risk analysis can reduce the allowance required for optimism bias. The aim of the approach is to provide better estimates of the final cost of a proposal from the earliest stages of development. In general, the approach requires the inclusion of allowances for risk *and* optimism bias, though it may not be cost effective to carry out risk analysis for low cost proposals. The size of the optimism bias adjustment required will reduce as project definition improves and/or as risks are identified and taken into account. In practice, reductions will be linked to formal stages in the development of projects. For example, for highway schemes, reductions will be specified at public consultation/preferred route, order publication and works commitment stages. Where risk assessment has been carried out and project costs include an allowance for risk, the size of the optimism bias adjustments required will be further reduced. Note, however, that allowance for risk is *not* a complete substitute for optimism bias adjustment.
- 1.8.4 As recommended in the GB, the Department is reviewing available empirical evidence to establish optimism bias adjustments for use in the appraisal of transport proposals. It is expected that optimism bias adjustments will vary by mode and project type for different stages in project development. In the

interim, advice on appropriate values to be used can be obtained from the Department or, for trunk road schemes only, from the Highways Agency.

- 1.8.5 It is good practice to carry out risk assessment for major (that is, those costing more than £5m) projects at each key stage in the development of the proposal. **Where risk analysis is carried out, a 'most likely' allowance for risks must be included in cost estimates.** Advice on risk assessment is available internally within the Highways Agency and is published in *Major Schemes in Local Transport Plans* (TAG Unit 1.4). Useful advice is also provided in the GB. A risk register should be included in appraisal documentation. The register should include, for each risk, its likelihood of occurrence, how it will be managed, and the amount of risk costs included in the cost estimates.
- 1.8.6 Turning to the benefits side, the evidence for optimism bias in the transport sector is unclear. Evaluation of major highway schemes has revealed a wide spread of outcomes, compared with forecasts. Analysis based on traffic flows one year after opening suggests there is no systematic bias, but limited analysis based on flows five years after opening suggests that forecasts that ignore induced traffic tend to under estimate outcomes. In the light of the Standing Advisory Committee on Trunk Road Assessment (SACTRA) report *Trunk Roads and Generated Traffic*, the Department issued advice on induced traffic which addresses this source of bias.
- 1.8.7 Evaluation of major public transport schemes is still very limited, though there is a perception that optimism bias may be an issue. There is concern over the robustness of the patronage forecasts for public transport schemes, particularly for light rail systems. Further work is required to provide a robust assessment of this.
- 1.8.8 However, there is clear evidence that risks and uncertainty can have significant effects on estimates of benefits for both road and public transport schemes. For example, variations in patronage can significantly affect the benefits of public transport projects, while highway schemes have been shown to be sensitive to unexpected changes in land use. The GB recommends that, where the evidence is insufficient to support adjustments to benefits, sensitivity analysis should be used.
- 1.8.9 Sensitivity analysis has, in the past, been widely practised in the transport sector. On the highways side, key tests have included the use of national high and low growth scenarios, coupled with sensitivity testing for significant local factors. For LRT, the Department requires analyses of the risk that patronage will not meet expectations. However, as discussed above, evaluation has shown that there is significant uncertainty as a result of planning and land use, while the advent of multi-modal studies introduces significant uncertainty about the timing and/or delivery of other elements of local transport strategy.
- 1.8.10 Benefit estimation often requires the use of complex modelling that is both costly and time consuming to use. Thus, the Department recommends that these issues should be considered by developing central, optimistic and pessimistic scenarios, rather than by carrying out fully quantified risk analyses. (In some cases, additional scenarios and/or sensitivity tests may also be required, to test the impact of key uncertainties.) Development of these scenarios should be based on a risk analysis. This should identify and assess the risk associated with all relevant land use, transport, patronage and other factors that could affect the impact of the project being considered. Development of the three scenarios required for sensitivity analysis should be based on the assessed risks, taking account of any dependencies between factors as appropriate. Further advice on this will be provided shortly.

1.9 Distributional issues

- 1.9.1 The GB highlights the need to consider distributional issues and recommends the adjustment of benefits to reflect the impact of proposals on different income groups. It also notes the need to consider other distributional impacts, such as those associated with gender, marital status and race.
- 1.9.2 The Department is planning to carry out a review and revision of the treatment of distributional issues in transport appraisal. Until that is completed, the approaches recommended in GOMMMS and its daughter documents should continue to be used. These are outlined below.
- 1.9.3 Currently, the adjustment of benefits to reflect the impact of proposals on different income groups is limited to time savings. Since the 1960s, a standard or 'equity' value of non-work time savings has been used to value in-vehicle time savings for all locations, modes, incomes and non-work journey purposes. This standard value is a mileage-weighted average. Thus, although it provides some distributional weighting, it is not a social weighting scheme as recommended in the GB.
- 1.9.4 The Department is keen to see a wide range of other distributional issues considered in a consistent manner. Guidance on the NATA requires the core Appraisal Summary Table to be supported by an analysis of 'distribution and equity'. This more comprehensive approach enables the inclusion of distributional analysis across dimensions other than income, such as between regions, between rural and urban areas, by gender, by race and so on. It allows appraisal to address issues raised in documents such as the Social Exclusion Unit's report *Transport and Social Exclusion* and the Countryside Agency's *Rural Proofing Checklist*.
- 1.9.5 In addition, for transport economic efficiency impacts and impacts on public accounts, the NATA requires the results to be presented in a format which provides information on the distribution of costs and benefits across different economic interest groups. The information in the Transport Economic Efficiency table makes clear how a project impacts on the members of different economic interest groups, such as transport users and public sector transport providers. Similarly, financial and non-financial impacts can be readily distinguished from one another. The latter kind of disaggregation is particularly important when projects are sponsored or co-sponsored by private sector firms, or by public sector agencies which are expected to act in a quasi-commercial way (that is, to have regard to their own financial balance sheets). The information in the Public Accounts table shows whether costs (including grant and subsidy) and revenues affect central or local government, and the impact of proposals on indirect tax revenues. Note, however, that most of the impacts shown in these tables are 'first round' effects that may be transferred to other economic interest groups in the longer term. For example, time savings may lead to increases in rents and hence transfer benefits from travellers to landlords.

Table 1

Economic Efficiency of the Transport System (TEE)

Consumers	ALL MODES	ROAD	BUS & COACH	RAIL	OTHER	
<i>User benefits</i>	TOTAL	Private Cars and LGVs	Passengers	Passengers		
Travel time						
Vehicle operating costs						
User charges						
During Construction & Maintenance						
NET CONSUMER BENEFITS	(1)					
Business						
<i>User benefits</i>		Goods Vehicles	Business Cars & LGVs	Passengers	Freight	Passengers
Travel time						
Vehicle operating costs						
User charges						
During Construction & Maintenance						
Subtotal	(2)					
Private sector provider impacts						
				Freight	Passengers	
Revenue						
Operating costs						
Investment costs						
Grant/subsidy						
Subtotal	(3)					
Other business impacts						
Developer contributions	(4)					
NET BUSINESS IMPACT	(5) = (2) + (3) + (4)					
TOTAL						
Present Value of Transport Economic Efficiency Benefits	(6) = (1) + (5)					

Notes: Benefits appear as positive numbers, while costs appear as negative numbers.
 All entries are discounted present values, in 1998 prices and values

Table 2

Public Accounts

	ALL MODES TOTAL	ROAD INFRASTRUCTURE	BUS AND COACH	RAIL	OTHER
Local Government Funding					
Revenue					
Operating Costs					
Investment Costs					
Developer and Other Contributions					
Grant/Subsidy Payments					
NET IMPACT					
	(7)				
Central Government Funding					
Revenue					
Operating costs					
Investment Costs					
Developer and Other Contributions					
Grant/Subsidy Payments					
Indirect Tax Revenues					
NET IMPACT					
	(8)				
TOTAL Present Value of Costs (PVC)					
	(9) = (7) + (8)				

Notes: Costs appear as positive numbers, while revenues and 'Developer and Other Contributions' appear as negative numbers.
 All entries are discounted present values, in 1998 prices and values

Table 3
Analysis of Monetised Costs and Benefits

Noise		
Local Air Quality		
Greenhouse Gases		
Journey Ambience		
Accidents		
Consumer Users		
Business Users and Providers		
Reliability		
Option Values		
Present Value of Benefits ^(see notes) (PVB)		
Public Accounts		
Present Value of Costs ^(see notes) (PVC)		
OVERALL IMPACTS		
Net Present Value (NPV)		$NPV=PVB-PVC$
Benefit to Cost Ratio (BCR)		$BCR=PVB/PVC$

Note : This table includes costs and benefits which are regularly or occasionally presented in monetised form in transport appraisals, together with some where monetisation is in prospect. There may also be other significant costs and benefits, some of which cannot be presented in monetised form. Where this is the case, the analysis presented above does NOT provide a good measure of value for money and should not be used as the sole basis for decisions.

2 Further Information

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

For information on:	See:	TAG Unit number:
Appraisal Summary Table	<i>Transport Appraisal and the New Green Book</i>	TAG Unit 2.7
Highway Schemes	<i>Applying the Multi-Modal Approach to Appraisal to Highway Schemes</i>	TAG Unit 2.6
Major Public Transport Schemes	<i>Major Schemes in Local Transport Plans</i>	TAG Unit 1.4
TEE Tables	<i>The Economy Objective</i>	TAG Unit 3.5

3 References

Better Policy Making: Integrated Policy Appraisal in DTLR (IPA)

HM Treasury (2003) revised edition of its Green Book, *Appraisal and Evaluation in Central Government*

Sugden (1999) *Review of cost/benefit analysis of transport projects*

HETA (Mar 2001) *Transport Users Benefit Appraisal User Manual, TUBA User Guidance with accompanying TUBA software*

David Simmonds Consultancy and Marcial Echenique & Partners (1999): *Review of land-use/transport interaction models. Report to SACTRA.*

ICG; HETA (Mar 2001) *Interim COBA11 Guidance with accompanying COBA11 software.*

Countryside Agency's rural proofing guidance on their website at <http://www.countryside.gov.uk/ruralproofing/>
Social Exclusion Unit. *Making the Connections: Final Report on Transport and Social Exclusion*

4 Document Provenance

This Transport Analysis Guidance (TAG) Unit is based on *Guidance on the Methodology on Multi-modal Studies Supplement 3, Transport Appraisal and the New Green Book* (DfT, 2003).

Enquiries relating to the application of this guidance to specific transport proposals should be addressed to project sponsors or the relevant divisions in the Department of the Highways Agency. General enquiries may be addressed to

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