

Guidance Note For Light Rail, Ultra Light Rail and Personal Rapid Transit

Guidance on Preparation of a Business Case

April 2012



UK
Tram

Chapter 1 - Introduction

1.1 Purpose of Advice Note

This Note is intended to provide practical help to promoters considering a light rail (LRT), ultra light rail (ULR) or personal rapid transit (PRT) scheme and highlights strategic and detailed issues they will need to consider. The guidance provides signposting to other assistance and information which will be of interest to promoters.

This guidance is intended for promoters in England outside London. However, much of its contents may also be of interest to potential promoters of schemes in London, Scotland, Wales and Northern Ireland.

Whilst this guidance focuses on LRT, ULR and PRT schemes, much of the content will also be applicable to other rapid transit modes. This guidance includes advice on how promoters can decide which mode is the most appropriate for their particular circumstances.

Promoters should also refer to the Department for Transport's ("the Department") *Guidance to Local Authorities seeking DfT Funding for Local Transport Major Schemes*¹ which provides general guidance on the preparation and evaluation of major scheme business cases.

We recommend that promoters refer to the Advice Notes that are available for light rail, ultra light rail and personal rapid transit on the UK Tram website.

1.2 What are LRT, ULR and PRT?

Light Rail Transit

The terms 'tramways' and 'light rail' cover a range of electrically powered and rail-guided passenger transport systems. The important considerations are that the systems are for local passenger movement and that all tramway systems have a significant element of their operation (measured either as a percentage of the system length, or as a significant economic element of the scheme) in the highway. As a system is given increasing levels of separation from, and priority over, other traffic it moves from being considered a tramway to being a light rail system. The systems can range from operations where the trams run on tracks in the highway, through systems with some street running with traffic priority, to a point where the system is segregated from other traffic. Some systems, such as the Tyne and Wear Metro and the Docklands Light Railway, may be fully segregated from the highway. All modern systems will be fully DDA-compliant, and where possible will have level boarding from platforms of appropriate height at all stops.

The flexibility of tramways and light rail allows a variety of alignments to be used. These can range from pedestrian precincts, use of parts of the public highway, newly constructed

¹ Available at <http://www.dft.gov.uk/pgr/regional/ltp/major/majorschemeguide/>

segregated routes and converted conventional heavy railways to viaducts and tunnels. Existing UK systems demonstrate all of these forms of operation.

Ultra Light Rail (ULR)

ULR is an intermediate transport system that uses self-powered or externally powered trams/railcars with or without some form of energy storage. Vehicles have lower axle weights than Light Rail, thus infrastructure costs can be reduced. There may be no external electrification, overhead wires, sub-stations and cables. It is, therefore, potentially easier to route and find cheaper alignments.

Personal Rapid Transit (PRT)

Personal rapid transit (PRT), also called podcar, is a public transport mode featuring small automated vehicles operating on a network of specially built guide ways. PRT is a type of automated guided transit (AGT), a class of system which also includes larger vehicles all the way to small subway systems.

In PRT designs, vehicles are sized for individual or small group travel, typically carrying no more than 3 to 6 passengers per vehicle. Guide ways are arranged in a network topology, with all stations located on sidings, and with frequent merge/diverge points. This approach allows for nonstop, point-to-point travel, bypassing all intermediate stations. The point-to-point service has been compared to a taxi or a horizontal lift (elevator).

Throughout the remainder of the document the term “*transit system*” is used to mean light rail, ultra light rail and PRT

1.3 Structure of this Document

The remainder of this document is structured around the following key chapters:

- **Chapter 2: Strategic Case** – presenting an overview of the wider strategic issues that a promoter should consider prior to submitting a business case for a light rail, ultra light rail or personal rapid transit scheme.
- **Chapter 3: Option appraisal and value for money** – summarising existing guidance on the appraisal of rapid transit schemes and highlighting some of the major considerations in the appraisal of alternatives.
- **Chapter 4: Commercial** – providing guidance on specific aspects of light rail, ultra light rail, and personal rapid transit scheme development which promoters will need to consider in relation to commercial issues.

- **Chapter 5: Financial** – summarising the funding sources available for schemes and setting out the range of costs that should be considered by scheme promoters.
- **Chapter 6: Delivery** – setting out the key factors which promoters should consider in order to ensure effective delivery of schemes.
- **Chapter 7: Approval processes** – providing an overview of the various stages of the approvals process for major rapid transit schemes.

Chapter 2 - Strategic Case

2.1 Introduction

This chapter covers the wider strategic issues a promoter will need to consider before deciding to submit a business case for any *transit system* (light rail, ultra light rail or personal rapid transit scheme) where government funding is being requested. It should be read in conjunction with Chapter 3 which considers how options should be appraised.

2.2 Selecting the right option

In all major scheme business cases the Government expects promoters to start by clearly identifying the problems to be addressed and the objectives that need to be met. The business case should not start from an assertion about the preferred modal solution. The Department's *Guidance to Local Authorities seeking DfT Funding for Local Transport Major Schemes*, gives more guidance on the development of options.

Promoters should consider the potential of all of the different forms of rapid transit solution for addressing the needs of a particular corridor including whether a bus-based or an alternative *transit system* would be more appropriate. This is important because Government funding approval for any scheme is subject to the promoter clearly demonstrating that the chosen form of rapid transit solution offers the highest value for money solution to the problems and objectives that need to be addressed. The Promoter's business case should clearly set out the methodology and evidence for arriving at the preferred solution.



The particular characteristics of each scheme will need to be taken into account in determining the right solution. Details of current passenger flows each way in the peak hour will provide a helpful "sense-check" on whether the transit system in question is likely to be the best solution (taking into account the Commission for Integrated Transport (CfIT) advice detailed below).

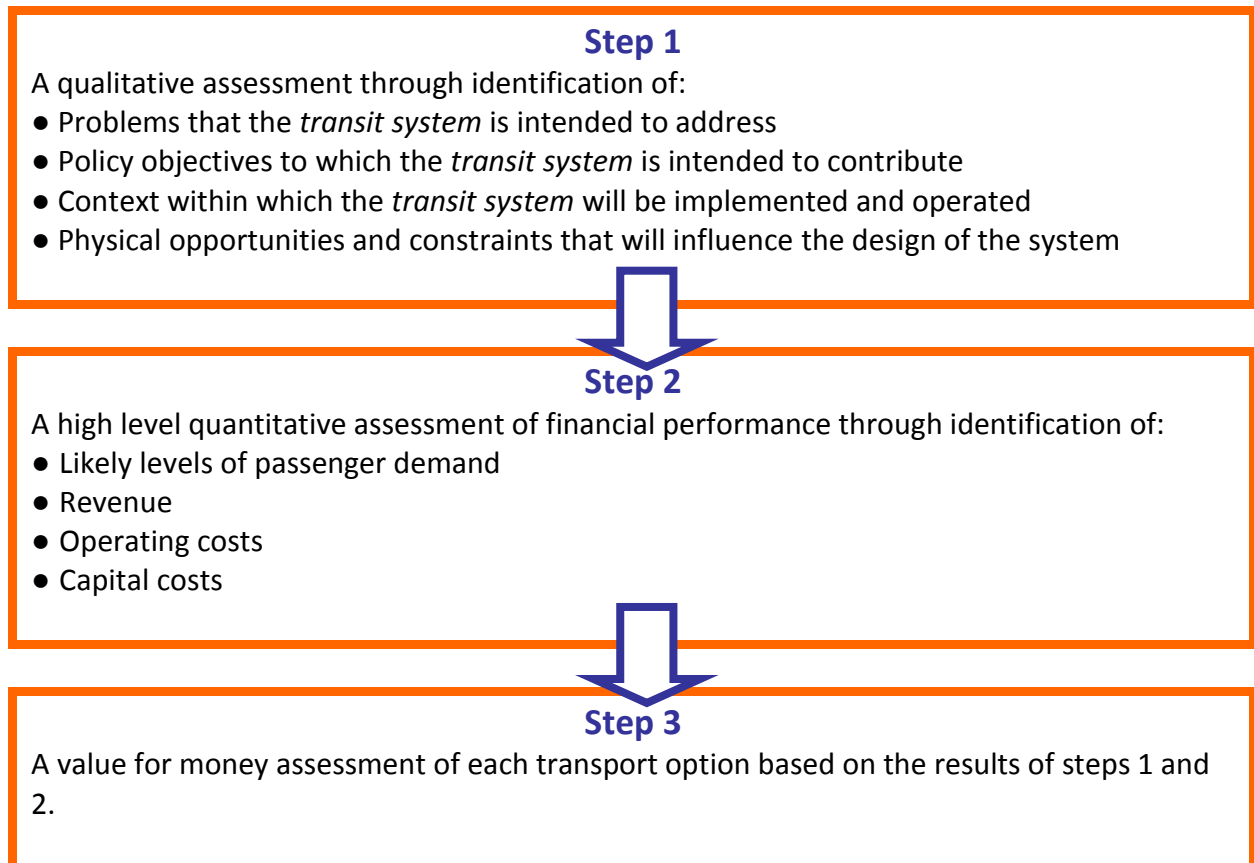
In order to help promoters select the most suitable, affordable and cost-effective transport solution, CfIT published, in September 2005, a guidance report on *Affordable Mass Transit*².

² Available at www.cfit.gov.uk/docs/2005/amt/index.htm

The Government will expect promoters to have worked through the advice in Phase 1 of the guidance before deciding to go forward with a particular *transit system*.

Phase 1 of CfIT's guidance suggests an initial approach to determining what the right option might be.

This comprises 3 steps:



Other options

There are a number of alternative options. This Advice Note does not seek to name them all, as it will be for the promoter to consider the most appropriate options. However, these might include:

- Enhancement of heavy rail – which may be suitable where existing rail networks can be enhanced, or where very high demand levels are anticipated;
- Bus-based rapid transit systems;
- More innovative approaches, such as optically guided bus systems, trolleybuses;
- Wire guided bus systems;
- Tram-train.

The Government will expect promoters to have considered appropriate bus-based solutions, with a range of levels of segregation from general traffic that meet the overall scheme objectives. Ambitious bus-based options, such as highly segregated Bus Rapid Transit (BRT) systems, may offer some of the advantages of *transit systems* at somewhat lower capital costs.

A high quality BRT system would include superior quality vehicles accompanied by fixed physical infrastructure in terms of dedicated stops, high quality shelters, real time information and off-board ticket machines. It could operate as a complete system, with distinctive branding, priority at junctions, and significant lengths of segregated track.

In considering different bus-based solutions, promoters should bear in mind the need to consider whole life costs associated with bus schemes. They should also take into account the different operating parameters and degree to which bus-based solutions can expect to influence mode split and assist in delivering the wider economic and regeneration impacts that may be associated with light rail. In making these judgements, full use should be made of all relevant evidence.

2.3 Link to wider objectives and priorities

Proposals for *transit systems* must take account of wider objectives and policies at local, regional and national level. This should include not only transport objectives and policies but also wider policies, such as those relating to **regeneration, social inclusion, environment, health and climate change**. Proposals should particularly take account of the policies and objectives set out in an authority's Local Transport Plan.



Promoters will also need to take account of land use planning policies at both strategic and more local level. Relevant policies, with which *transit systems* might deliver mutual benefits, include: town centre car parking; pedestrianisation; clear air zones etc.

When considering objectives and policies, promoters should consider the five objectives for transport set out in the Department's New Approach to Appraisal (NATA)³, i.e. environment, safety, economy, accessibility and integration.

³ http://www.dft.gov.uk/WebTAG/webdocuments/1_Overview/1_Introduction_to_Transport_analysis/index.htm#1_3

Chapter 3 - Option appraisal and value for money

3.1 Introduction



This chapter offers guidance to promoters considering how to appraise *transit system* proposals.

Promoters should consider the advice set out in the following sets of guidance:

- The guidance modules on the Department for Transport's appraisal and modelling website "WebTAG"⁴
- The Department for Transport's Guidance on Value for Money
- "The Green Book" by HM Treasury (2003)⁵
- CfIT's Affordable Mass Transit Guidance⁶
- In the case of light rail UITP Guidelines for the planning and design of a light rail scheme⁷

This chapter does not replace or replicate the above guidance. Instead it draws attention to some of the major considerations in appraisal *transit systems* alternatives.

The promoters of *transit systems* are encouraged to discuss appraisal issues with the Department as early as possible. Appraisal issues are usually complex and scheme circumstances vary hugely, so no amount of written guidance on its own will provide advice to promoters sufficient to cover all questions that might arise.

The appraisal process is intended to help promoters to identify the right scheme, as well as enabling them to make the economic case for a particular scheme. Promoters should always begin their project development by defining the transport problems and demonstrating that the scheme relates to those problems. The Government expects promoters to show evidence of assessment of a reasonable range of solutions that may meet some or all of those objectives; the Department for Transport will not progress submitted business cases that do not show that this process has been undertaken.

Building a robust assessment of the benefits of schemes hinges largely on four factors:

⁴ Available at www.WebTAG.org.uk

⁵ Available at http://www.hm-treasury.gov.uk/data_greenbook_index.htm

⁶ Available at www.cfit.gov.uk/docs/2005/amt/index.htm

⁷ Available at <http://www.uitp.org/publications/pics/pdf/LRG123.pdf>

- robust and realistic patronage forecasts;
- good estimates of the modal shift from car and the resulting benefits of reduced road congestion;
- robust estimation of wider economic and environmental benefits;
- robust and realistic estimates of the scheme costs.

The remainder of this chapter provides an overview of the process that promoters should follow in narrowing down scheme options and sets out the factors to be covered in determining overall value for money.

3.2 Initial indication of value for money

Promoters should consider the Department's value for money guidance as soon as it becomes possible to calculate the benefits and costs of a scheme and forecast user demand. It is often possible to scope potential demand for *transit systems* on corridors before a robust set of appraisal results can be obtained.

Once early appraisal results become available, if it appears that the scheme would have low or poor value for money on the basis of monetised benefits alone, the promoter should consider whether scheme re-scoping, further appraisal work and/or the non-monetised impacts are likely to make the scheme medium or high value for money overall. If the promoter thinks that the non-monetised benefits of the transit system could be large and positive overall, they should speak to the Department about how they can demonstrate their case.

3.3 Schemes already in development and refurbishment schemes

The advice in this chapter applies to the promoters of schemes that already have Conditional Approval or Programme Entry, as well as those seeking Programme Entry. It is recognised that some promoters have already developed models that may not meet all of the requirements of the latest guidance. In these instances the promoter should discuss with the Department what work it would be reasonable to undertake to update their models.

Refurbishment schemes may require a simpler demand forecasting approach. As requirements will vary by scope of the scheme it is recommended that the promoter consults with the Department on a case-by-case basis.

3.4 Assessing new *transit system* proposals against alternatives

The Department recognises that promoters will be offering solutions that are objective-led and that *transit system* proposals will only arise through careful consideration of the transport and wider policy needs. Promoters should take the widest advice on system

selection including: EU advice and European Commission transport policies, advice from transport authorities and professional bodies across the EU, advice set out in the Department's appraisal guidance on WebTAG and the Treasury Green Book, in conjunction with the Affordable Mass Rapid Transit Guidance by CfIT.

WebTAG unit 1.1 provides a readable overview of how promoters should use transport appraisal analysis to solve problems. WebTAG units 2.1, 2.2 and 2.3 provide promoters with general advice on how to define transport problems and objectives and work through to creating a long list of solutions.

Stage 1

Once the needs of the area are understood, the first stage of considering alternatives can begin. Stage 1 is a strategic assessment of alternatives, including different technologies and different geographical areas of coverage. A wide range of options should be considered, including those that would be difficult to implement – a way round obstacles may be found if the solution merits detailed investigation work. Options should only be discarded if they are clearly undeliverable or when there is clear evidence that they would not meet the promoter's objectives.

Promoters should consider all opportunities and constraints that might affect the ranking of potential solutions. Outline Appraisal Summary Tables (AST) can be used to show how each option performs against central government's objectives for transport on a seven-point scale from large beneficial to large adverse. WebTAG unit 3.2 provides detailed guidance on how to use the AST to compare options.

Additional multi-criterion analysis is often helpful in showing how alternatives compare in terms of meeting local policy objectives. The qualitative comparison enables the best performing options to be short-listed. Where a new mode is being considered, promoters should consider how it will fit with existing modes and its attractiveness to potential users.

At the end of Stage 1, the preferred form of rapid transit should be tested to establish how it performs under quantitative testing (Stage 2).

Stage 2

Stage 2 should be a relatively high level quantitative assessment of economic and financial performance. These include, but are not restricted to, demand, revenue, capital costs, and operating costs. WebTAG unit 1.4 should be read by all involved in the appraisal of a major scheme; it provides promoters with an overview of the main appraisal issues and provides considerable sign-posting to more detailed guidance. Promoters who require a more detailed understanding of appraisal should read WebTAG units 2.5 and 2.7.

The results of Stage 2 analysis should be compared with the conclusions drawn at Stage 1. At this stage promoters should bear in mind that all of the key variables could change as option design develops. Sensitivity testing should be carried out to show the extent to which financial and economic performance and the ranking of options is dependent on underpinning assumptions, especially on scheme scope, costs and demand. When the result of Stage 2 is known, promoters who are considering submitting a major scheme business case to the Department should share the results of their analysis with them.

At least three options should be taken forward for quantitative testing at Stage 2; these will usually be known as:

- the preferred option (the one that performed best at Stage 1);
- the next best option; and
- the lowest cost alternative.

These options should be carried through the appraisal process to Stage 3 regardless of the ranking of performance and value for money at Stages 1 and 2. Changes to cost or benefits estimates during the appraisal can mean that options that perform similarly economically can change ranking in terms of value for money. In some circumstances after Stage 2 the Department will accept a business case containing only a preferred option and a lower cost alternative, but this will need to be agreed with the Department in advance.

Stage 3

At Stage 3, as the scheme design and implementation strategy is developed, a full appraisal of the shortlisted options (including a detailed assessment of costs and both quantitative and qualitative benefits) should be undertaken. Stage 3 appraisal is needed before submission of a business case. It should build on the results of Stage 1 and 2.

Promoters should be mindful of the impact that changes to the scheme design or circumstances might have on the absolute and relative value for money of alternatives. More detailed sensitivity and scenario testing should be carried out at this stage. A quantified risk assessment (QRA) based on the scheme design should also be prepared at this stage. The QRA should consider the impact of scheme specific as well as generic risks. Allowance for Optimism Bias on capital cost estimates should be applied throughout the appraisal process (see guidance later in this chapter and in WebTAG on applying Optimism Bias uplifts).

The Department's recommended appraisal and modelling guidance should be used to produce a detailed appraisal which the Department will review as part of the business case for Programme Entry. The Department will review the promoter's re-appraisals as changes are made at subsequent approval stages. Promoters should allow for 3-4 months for the Department's review of a light rail scheme, provided the material submitted to the Department is complete and meets the Department's appraisal guidance – the Department will review material at the earliest possible opportunity and will inform promoters whether additional data is needed. Promoters will need to be aware that incomplete business cases

take longer to assess. The Department will often commission an independent audit of some aspects of the appraisal, so business cases should be written in a way that is accessible to someone unfamiliar with the scheme.

3.5 Modelling demand and costs

Demand is central to the economic justification for *transit system* investment. The Department requires that demand will be high enough to create revenues that exceed operating costs. Similarly, user and non-user benefits must be greater than capital and operating costs over the appraisal period. In most cases capital investment will only be justified economically or financially where it can increase public transport market share.

The economic and financial case for transport infrastructure depends crucially on demand and change to travel costs. It is therefore essential to build well-specified models that represent the key features of existing transport and that can accurately predict how people will respond to changes in circumstances and to the scheme itself. These models should demonstrate a strong linkage to real-world experience within the EU and should not rely upon theoretical constructs. It is important to consider how the rest of the existing transport system will respond to the scheme and to developments that are likely to occur and how these will affect the performance of the overall transport network.

The modular units in WebTAG provide promoters with advice on what principles need to be considered when building modelling tools. Promoters should start by referring to WebTAG units 2.4 and 3.1 – unit 2.4 in particular is accessible for promoters who wish to understand the nature of modelling work needed to assess different proposals, even if they are likely to delegate the work itself to specialists. For experts, the sub-units of WebTAG unit 3.1, 2.9, and 3.10, and 3.11 offer detailed guidance on modelling and forecasting.

Promoters should consider the extent to which long term land use changes might result from the availability of *transit systems*. Corridor models used at project level are generally incapable of capturing land-use/transport interaction effects. Strategic models are often capable of picking up long term interactions between travel cost between and within zones, and changes to land use, but they often cannot represent travel patterns in sufficient spatial detail for individual schemes. Promoters should therefore use models that capture land-use transport interaction to predict the need for, and select the location of, a scheme but the scheme appraisal will usually require a more detailed model.

3.6 Patronage

If the demand models are correctly specified the promoter will be able to accurately estimate patronage. Predictions still need to be “sense-checked” and benchmarked against



patronage on similar schemes elsewhere within the EU. The Department will expect promoters to provide sufficient detailed information to inform this sense-check, including projected boardings, alightings and loadings in each direction along the proposed routes.

Care should be taken to ensure that patronage estimates take account of system performance and characteristics which will have a direct bearing on patronage. Key variables that will affect patronage include: in-vehicle journey times, the level of priority that can be given to vehicles over other road users, reliability of services, ride comfort and fare regimes.

Care should also be taken not to over-estimate attractiveness of a new mode, or underestimate how long it will take people to change their travel behaviour to use the new mode. Promoters should consider what evidence is available, or could be collected, to underpin their assumptions.

Where patronage is assumed to come from an existing mode such as car or bus, promoters should think carefully about the reasons why people might not change their behaviour as readily as the modelling suggests. This might be because preferences towards a mode such as car have been underestimated. It is also worth considering the possibility that businesses that depend on existing modes will cut prices to compete and protect their market share, e.g. bus operators may aggressively cut fares.

External factors can change in ways that the promoter did not expect and this might lead to patronage and benefits turning out significantly above or below expectations. Key variables that are largely outside the promoter's control include:

- Local economy;
- Demography;
- Congestion; and
- Competition from other transport modes.

Inevitably all forecasts contain an element of uncertainty. Promoters should sensitivity test variables that are likely to have an impact on scheme patronage and benefits, as well as sensitivity testing patronage itself. Advice on sensitivity testing is provided later in this chapter.

3.7 Fares and Revenue

The fare regime is likely to depend on the objectives of the promoter, the procurement methods, commercial incentives and the state of the market. In the short term, setting fares is usually a trade off between delivering economic benefit and raising revenue. The allocation of fares and revenue risk will have a key effect on incentives to increase patronage or meet revenue requirements and is important in predicting patronage and revenue.

3.8 Cost Benefit Analysis

This section summarises the monetised costs and benefits that promoters will need to consider. WebTAG units 3.5 and 3.9.2 set out how to use modelling output to create an appraisal of monetised costs and benefits.

Benefits arise through changes in travel behaviour that reduce the generalised cost of travel, increase transport network capacity and efficiency and through new demand for trips arising from the presence of better transport facilities or economic and demographic change. Benefits accrue to users of the scheme and non-users. In addition to the benefits that a new mode might offer to users (such as faster journey times and a more pleasant journey experience), non-users may experience reduced congestion and therefore reduced journey times and vehicle operating costs as a result of the scheme. These monetised benefits do not include all benefits arising from a scheme; promoters are reminded of the environmental and social benefits that are currently not monetised within the English cost benefit analysis; nevertheless, these benefits are real and are considered further in section 4.10 of this note.

Transport schemes can also create disbenefits to certain parties. For example, the priority accorded to transit vehicles at certain junctions or reduction in road space may delay other road users. The appraisal should take into account all of the main sources of benefit and disbenefit so that the net benefit to society is shown. These benefits should be assessed relative to a realistic 'do-minimum'.

Reliability is a key benefit of any mode that is segregated from general road traffic, or one that has priority over other traffic at junctions. Unfortunately no satisfactory method for estimating reliability benefits to public transport users exists at present, so it is suggested that an allowance for reliability be included in the mode constant the mode constant is a value which represents the attractiveness of a certain mode to the user. This is based upon a number of factors which are assumed to contribute towards the attractiveness of a mode e.g. reliability, image, journey times etc). The mode constant should be sensitivity tested to establish whether the economic case is dependent on it. The Department will work with other bodies to develop methodologies for assessing reliability benefits.

3.9 Wider benefits

Promoters should assess the wider benefits and disbenefits of all options using the methods set out in WebTAG units 3.3, 3.4, 3.5, 3.6, 3.7 and 3.8. This includes an assessment of each option's performance against central government's five objectives for transport. Wider benefits to be considered include:

Environment

The WebTAG guidance must be followed in full for all sub-objectives of environmental performance. WebTAG unit 3.3 contains detailed advice.

Social inclusion

Under the supporting analysis equity criteria (unit 3.8.3), and access to the transport system sub-objective (3.6.3) promoters should consider the extent to which the scheme will serve deprived or economically disadvantaged people, particularly in terms of serving their need for access to health, education, food, and jobs. The marginal personal benefit of accessibility improvement is likely to be higher for these groups, particularly where car ownership is low.

It is helpful if promoters provide supporting evidence for social inclusion benefits such as details of the area surrounding their proposed alignment, and illustrate how the scheme improves access to services.

Wider economic benefits

The Department is reviewing its advice to promoters on the assessment of wider economic impacts; whilst this review is taking place we suggest that promoters consider a number of research papers on this subject which are provided on the DfT website.⁸

3.10 Costs, Risk and Optimism Bias

Realistic and robust cost estimates are central to the assessment of alternative solutions and the value for money analysis of the preferred scheme. To reflect the increased emphasis the Government places on the robustness of costs estimates, a new section of guidance, dedicated to advising promoters on estimating costs and risks and adjusting them for Optimism Bias, has been produced and placed on WebTAG, unit 3.5.9



(Optimism Bias is a cost which has to be added onto the overall scheme cost to reflect the fact that there is a systematic tendency for people to be over-optimistic about scheme outcomes. Optimism Bias is therefore a means of balancing out the likelihood that benefits of the scheme may be over-estimated and negative impacts may be under-estimated).

In addition to the technical advice this unit offers on estimating costs and quantifying scheme capital cost risks, the guidance re-enforces two key messages:

⁸ Available at: <http://www.dft.gov.uk/pgr/economics/rdg/webia/>

- Optimism bias adjustment is required for all schemes, even where there is a quantified risk assessment. Optimism bias applies not just to the base cost but also to the risk adjusted costs and so Optimism Bias adjustment factors must be applied to the risk-adjusted costs.
- The base cost must include a sensible allowance for inflation. The economic appraisal and other parts of the scheme business case must include the projected cost of building the scheme in the years it is planned to be built. Inflation assumptions should be evidence based, and the timescales for construction should be realistic, allowing for reasonably expected delays, so that costs are estimated for the correct year. The Department is happy to discuss this issue with promoters.

3.11 Sensitivity and Scenario Tests

The promoter should show the results of sensitivity tests of key downside risks on the benefits and costs, such as:

- patronage shortfalls relative to expectations;
- level of patronage at which scheme net benefits would be zero;
- poor system performance (eg extended journey times, reduced frequency, lower mode constant);
- higher operating costs;
- higher capital costs;
- lower non-user benefits due to higher than expected induced traffic;
- lower time savings;
- reduced scheme scope; and
- competitive response from other transport modes.

Promoters should also provide the results of scenario tests combining changes to system performance with changes to external factors, e.g. poor system performance and reduced growth in employment trips.

3.12 Summary

This chapter has offered an overview of appraisal issues that are important in assessing the case for *transit systems*. The table below sets out places where promoters can seek additional guidance on each topic.

Topic	Sources of guidance
Assessment against alternatives	WebTAG units 2.1, 2.2, and 2.3, 1.4 and 3.9 CfIT Affordable Mass Transit guidance
Modelling demand	WebTAG units 2.4, 3.1, 2.9, 2.10, 3.10, 3.11
General appraisal advice	WebTAG unit 3.2
Cost benefit analysis	WebTAG units 3.5 and 3.9.2 HM Treasury Green Book 2003
Wider benefits	“Transport, Wider Economic Benefits and GDP” by DfT
Patronage and revenue	WebTAG unit 3.9.2
Estimating costs, risks and adjustment for Optimism Bias	Primarily WebTAG unit 3.5.9, but unit 1.4 and the HM Treasury Green Book are also useful
Sensitivity and scenario testing	WebTAG units 3.9.2 3.11.4

Chapter 4 - Commercial

4.1 Introduction

As with all major projects, the commercial approach to the delivery of a *transit system* is a fundamental part of the planning of the scheme and all scheme promoters must give early and robust consideration to how any proposed scheme will be implemented.

This chapter seeks to build on the *Guidance to Local Authorities seeking DfT Funding for Local Transport Major Schemes* and provide guidance on specific aspects of light rail scheme development that promoters will need to consider.

Given the range of different circumstances that may relate to specific scheme proposals, the Government does not consider it appropriate to set out a mandated or preferred commercial model for any *transit system* development.



However there are a number of areas that the Government requires promoters to give full consideration to as part of the scheme development and these will be assessed by the Department, as part of the overall business case, in the light of experience, best practice and scheme context.

The nature of *transit systems* is such that the capital values are typically higher than other local transport major projects and their nature brings significant technical risks such as systems integration that need to be considered carefully at scheme inception.

It should be noted that UKTram has prioritised work on procurement models for tram systems and the early findings of this are available on the UKTram website⁹.

⁹ www.uktram.co.uk

4.2 Procurement Strategy

The core of the proposed commercial strategy for a scheme will be the proposed procurement strategy. For *transit systems* this will need to cover both the construction and operational phases of the system.

In the UK a number of different models have been adopted over time depending on local circumstances and prevailing market conditions, including the use of Private Finance Initiative (PFI) schemes where these have been judged to offer best value for money.

It is expected that promoters will need to consider whether a PFI procurement strategy is likely to offer best value for money. The Government requires that all such procurement strategy assessments are carried out in accordance with HM Treasury guidance on the selection of PFI procurement routes. More information about approaches to PFI is available on the HM Treasury website.¹⁰

In carrying out a procurement options appraisal, promoters should consider the full range of procurement options available and in particular that there are a number of different procurement models that could be pursued for a PFI scheme. Use of a PFI approach does not necessarily require either the transfer of revenue risk or responsibility for operations to a concessionaire. PFI procurement models that should be considered alongside non-PFI options should include, but are not limited to, the following:

- A design, build, finance, maintain and operate model with transfer of all revenue risk to the concessionaire;
- A design build, finance, maintain and operate model with no or limited transfer of revenue risk to the concessionaire; and
- A design build, finance and maintain model with separate arrangements for the operation of the system.

Alongside the PFI options, non-PFI options will need to be assessed and consideration given to how, amongst other aspects, systems integration issues would be managed.

In assessing the procurement strategy, promoters must consider the likely period over which there will be certainty of the requirement that would be placed on any concessionaire. In particular, where significant **network expansion** is expected during the lifetime of any concession, the ability for the initial contractual arrangements to deliver the expanded network whilst maintaining value for money and the impact of having to terminate any such contracts early would need to be considered. Contract lengths will also need to be consistent with any emerging EC Regulations (see Section 7.3 below).

The consideration of a PFI procurement route and non-PFI options must be based on the underlying value for money and is independent of any accounting or affordability implications of the particular approach.

¹⁰ http://www.hm-treasury.gov.uk/ppp_index.htm

In developing the procurement strategy promoters are strongly encouraged to discuss their approach at as early a stage as possible with the Department.

4.3 Specific areas to be addressed

Based on the nature of *transit systems* and recent procurement experience, there are a number of key areas that will need to be assessed in developing the most appropriate procurement strategy:

Area 1: Revenue Risk

The transfer of revenue risk to any operator can be a powerful performance incentive in the right circumstances. However it is also likely that where there is little or no evidence of revenue levels or there are significant external threats to the estimated revenue levels then any commercial operator may take a prudent view of future revenue income in developing its commercial proposals. This may undermine the value for money of a full transfer of revenue risk in such circumstances. This will need to be considered carefully on a case by case basis.

Particular factors that will need to be considered in determining the best value for money treatment of revenue risk in the procurement strategy include: who sets the fare levels; what are the competing transport choices; the degree to which demand growth is dependent on external development proposals; whether the financial impact of revenue variation is offset by availability payments to a concessionaire; the proposed term of the contract; prevailing market conditions etc.

In a number of schemes, promoters have considered implementing revenue sharing mechanisms to balance the performance incentive and uncertainty aspects of revenue risk. Promoters are encouraged to consider these fully.

Area 2: Design Risk

Promoters need to consider which party will be responsible for the detailed system design and any consequential impact that issues arising from that design might have. In particular where the detailed design work is not being done by the same party that has responsibility for the build or operational performance of the system, very clear assessments of how the risks relating to any subsequent shortcomings in the design will be managed need to be made.

Area 3: Utilities

The diversion of utility infrastructure prior to service commencement and possible service disruption arising from the need to access utilities after service commencement need to be assessed and a strategy proposed. Previous experience has shown that for systems with

significant street running sections these issues can bring large costs and uncertainty in contractors proposals that may erode value for money.

Promoters should consider the degree to which utility infrastructure needs to be diverted and also how the financial and other risks associated with subsequent service disruptions is managed.

UKTram has prioritised work in this area and promoters are strongly encouraged to consider the recommendations from this work.

Area 4: Third Party Interfaces

Practical and commercial interfaces with third parties such as commercial landowners, Network Rail, and relevant Highways and Planning Authorities can present uncertainty in early scheme development and difficulties for contractors in determining timescales and final prices with confidence. Promoters therefore need to allow for these risks in their initial scheme appraisals but also ensure that the proposed procurement strategy offers the best value for money way of dealing with them.

Consideration should be given by promoters to investing in the development of early agreements with third parties where this can provide greater certainty and value for money.

Area 5: Network Flexibility

As referred to in section 4.2 above, the options for future development of any proposed system into a larger network should be considered in developing the initial procurement strategy.

Promoters will need to assess whether the proposed contractual structure can provide a value for money route to deliver potentially uncertain future requirements while also complying with relevant procurement regulations. The cost of early termination of contractual arrangements to allow for network expansion should be assessed.

The capability of the technical design of the proposed scheme including rolling stock should also be assessed in the light of future expansion.

Area 6: Systems Integration

Successful *transit systems* require a number of different technical elements to function together effectively, for example, track, rolling stock, power supply, signalling systems, ticketing systems and depot facilities.

Promoters should not underestimate either the risks associated with the integration of these systems or the risk premium which may be associated with requiring any contractor

or concessionaire to be responsible for them. Given that efficient integration is a necessary pre-requisite for any system, promoters are encouraged to consider how integration risks can be managed and develop a procurement strategy which allocates these risks and achieves value for money.

Chapter 5 - Financial

5.1 Introduction

This chapter sets out the issues for promoters to consider with regard to funding opportunities for a *transit system* covering both Government funding and alternative sources. In addition a summary of the range of costs that should be considered by scheme promoters is also provided.

5.2 Government Funding

Government Funding will need to follow the Department's *Guidance to Local Authorities seeking DfT Funding for Local Transport Major Schemes*.



There is one main source of Government funding – Major Schemes Allocation to Local Transport Boards. In addition Local Enterprise Partnerships may have access to Regional Growth Funding.

Government funding will not be available to support operating subsidies and promoters will need to supply the Department with their finance modelling to demonstrate that such subsidies are not being funded by the

Government.

5.3 Prudential Borrowing

The Prudential Capital Finance System was introduced when the Local Government Act 2003 came fully into force in April 2004. The Act allows councils to fund local improvements by borrowing money without government consent, provided that they can afford to take on the debt.

5.4 Local Contribution

For *transit systems* Government will expect promoters to find local contribution of at least 25% of scheme costs.

Authorities should seek to minimise the amount of scheme costs that fall to the public sector. They can do this by exploring fully the scope for contributions from potential beneficiaries such as local developers and transport operators. Such contributions will be treated as local contributions and will count towards a promoter's 25% of the funding requirement.

There are other sources of local contribution. These can include (not exclusive):

- European grants (such as ERDF) if available (see below);
- direct promoters' contributions not refunded by the Department (see 6.4 Preparatory Costs below);
- local business contributions;
- increased local taxation;
- income from demand management schemes such as road charging; and
- sale of land or other assets.

Given the scale of local contribution needed, promoters will need to be clear what the various sources are, and demonstrate confidence that these will be forthcoming.

5.5 Preparatory costs

The Government expects that promoters will bear their own preparatory costs prior to Programme Entry.

Those costs paid by the promoter and not being reimbursed by the Department following Programme Entry may be counted towards the local contribution. These costs will include those for all works associated with the promotion and preparation for public inquiries and any necessary land in advance payments.

Costs expended by the promoter during early stage option appraisal and feasibility studies to achieve Programme Entry will not be shared with the Department and will not count towards the local contribution.

5.6 Cost Estimates

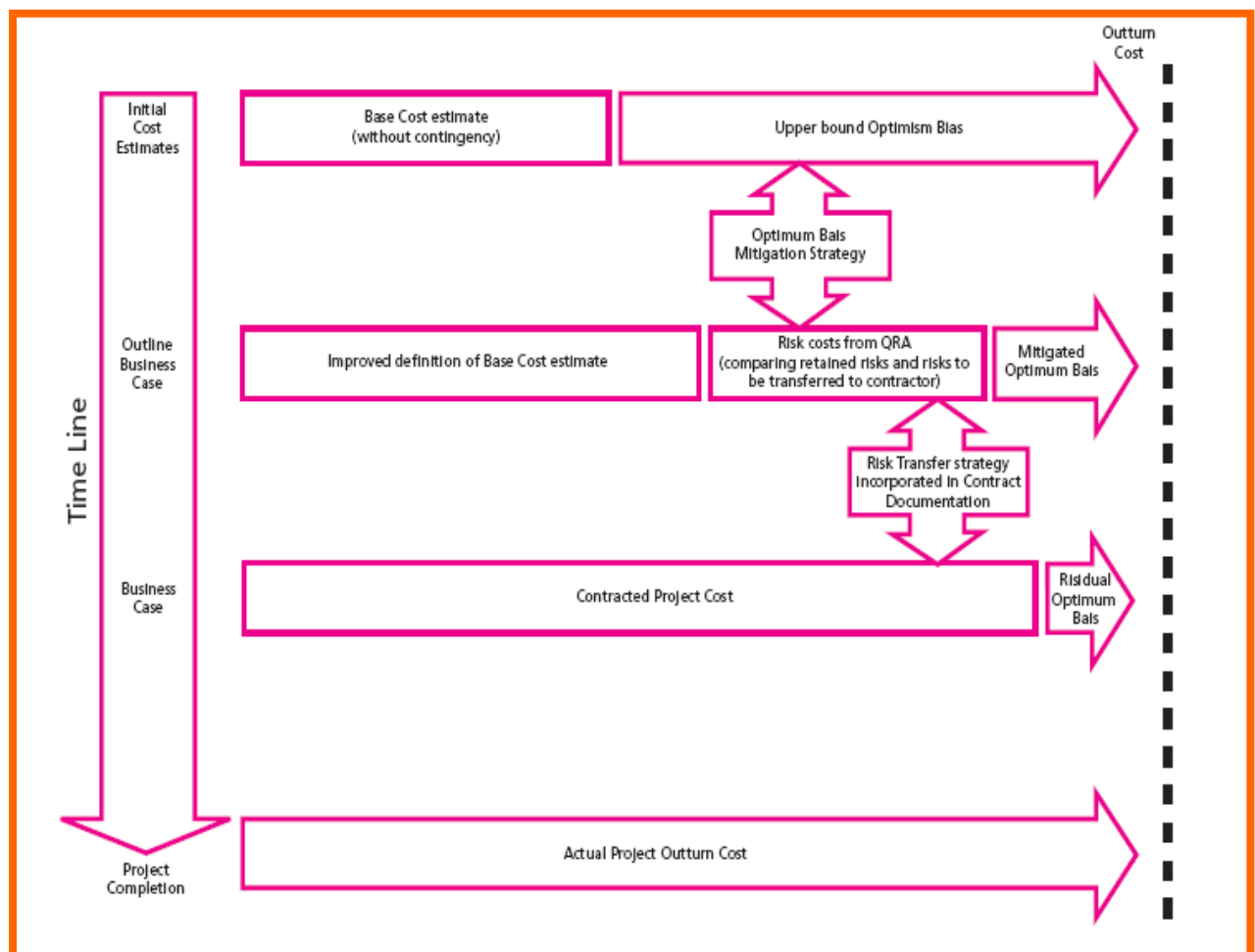
Promoters should follow the Department's methodology for preparation of robust cost estimates, including Quantified Risk Assessments, as appropriate for the development stage. It should be noted that the Department's methodology places the responsibility for funding higher than expected risk costs firmly with promoters, and therefore the agreed base estimate will need to be a careful balance of risk and affordability.

5.7 Cost Ranges

Promoters should demonstrate how risks and inflation have been considered, costed and accounted for.

Promoters should consider Optimism Bias in accordance with Treasury's Green Book and Bent Flyvbjerg's ancillary report commissioned by the Department¹¹. Promoters should robustly demonstrate how, at what level and why the Optimism Bias percentage increase has been chosen at each stage.

The normal progression of cost estimation, taking into account base cost, risk and Optimism Bias should flow as shown in the following diagram as a scheme progresses through its development stages.



¹¹ http://www.dft.gov.uk/pgr/regional/ltf/major/coll_proceduresfordealingwithopt/eduresfordealingwithopti3688.pdf

Chapter 6 - Delivery

6.1 Introduction

This chapter sets out the key factors which promoters should consider in order to ensure effective delivery of schemes. This includes the consideration of appropriate project management structures, peer review processes and compliance with wider legislation, including European Union considerations and state aid issues.

6.2 Project Management

The Government will need to be satisfied that promoters have appropriate project management arrangements and personnel in place to deliver any *transit system*. This is essential if a scheme comprises a number of separate contracts, eg for: design and build; provision of vehicles; operations; and maintenance. A key risk to the successful delivery of a project will be the large



number of key interfaces and relationships that will need to be managed simultaneously. The promoter will need to fully demonstrate as part of the Project Management Plan the process for identifying, integrating and managing the systems interfaces during the design and delivery process.

Promoters will need to set out their formal project management methodology early in the process and provide information as detailed in Section 4.2 of the DfT Guidance on Major Projects¹² (Guidance to Local Authorities seeking DfT funding for transport Major Schemes). Promoters can make use of the various guidance and information available on project management and procurement referenced in that section.

6.3 Gateway reviews

Section 4.3 of the DfT *Guidance on Major Projects* sets out the requirements for Gateway reviews. A Gateway review is an assessment of a project or programme carried out at crucial junctions in its development, in order to provide assurances that it can progress successfully to the next step. The Gateway process is owned and administered by the Office of Government Commerce (OGC) and is explained in detail on their website¹³. Gateway

¹² <http://www.dft.gov.uk/consultations/archive/2005/glastms/guidancetolocalauthoritiesse1611>

¹³ Available at www.4ps.gov.uk/PageContent.aspx?id=40&tp=Y

reviews are to be carried out by competent and experienced organisations that have a demonstrable track record in management and delivery of major public private partnership infrastructure projects. The Gateway Reviews will be programmed and initiated by promoters.

6.4 European Union Issues

The current Community rules governing the award of public service contracts are set out in Regulation (EEC) No 1191/69¹⁴ as amended by Regulation (EEC) No 1893/91¹⁵.

In July 2005, the European Commission published a proposal for a new Regulation on public passenger transport services by rail and road¹⁶ which would replace the current Community rules. The Council reached a political agreement on this in June 2006. Among other things, that agreement would affect light rail schemes in the following ways:

- Length of concession is limited to 15 years, or 22½ years if the public service operator provides significant assets which are linked to the passenger transport service;
- However, If justified by the amortisation of capital in relation to exceptional infrastructure, rolling stock or vehicular investment and provided the contract was competitively tendered, a concession may have a longer (unspecified) duration. In such a case, the Government would need to justify its longer duration to the Commission within 1 year after the conclusion of the contract;
- Most light rail concessions are currently competitively tendered. However, local authorities have the ability to let some concessions without competition. The Regulation would set limits on work outside the authority area on any body involved in a concession which was not competitively tendered; and
- Promoters will need to publish details of concessions they intend to let at least year in advance of doing so.

Promoters should be aware that the agreement reached by the Council has been approved by the European Parliament and will be in force from December 2009.

6.5 State Aid

Promoters will also need to consider carefully whether their proposals raise any state aid issues.

In the award of any public sector contract care needs to be taken either that the award does not constitute “state aid” (as determined under Community law) or has been specifically authorised by the Commission. Recent judgments of the European Court, notably the

¹⁴ Available at <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:31969R1191:EN:HTML>

¹⁵ Available at <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:31991R1893:EN:HTML>

¹⁶ Available at www.ec.europa.eu/transport/rail/passenger/doc/com_2005_0319_en.pdf

Altmark judgment¹⁷, have clarified the application of the state aid rules to the transport sector.

The basic principle is that member States should not confer special favours on particular private companies in a way that could distort competition and trade between member States (including “over-compensation” by paying them more than a reasonable market price for a particular service). In principle, the award of a contract following open competitive tender, so that the successful bidder receives no more than a fair market price for the service provided, would not normally constitute unlawful state aid. A contractual arrangement which “overcompensates” a private company (pays the company substantially more than the market rate) could however amount to unlawful state aid - this is unlikely to occur where there has been a fair competitive process for the award of the contract. The ramifications of this principle can, nevertheless, become highly complicated.

Even where no contractual arrangement exists, public expenditure could constitute a state aid if it confers a special benefit on a particular operator (or class of operator).

In considering whether competition may be distorted as a result of public expenditure, the effect on transport operators other than light rail (if there are any providing similar services) also needs to be taken into account. This principle also means that there could be state aid issues if the provision of a light rail system resulted in a benefit to the light rail operator as opposed to the local bus operators and prejudiced the competitive interests of bus operators.

6.10 Evaluation and Information Sharing

Promoters will be required to carry out an evaluation of the success of their scheme and to make the results of this evaluation available to the Department. It is likely that the evaluation will be published. It will be the promoters' responsibility to collect the necessary pre and post implementation information to carry out a robust evaluation.

Promoters should consider how they intend to evaluate the success of a scheme at the earliest possible stage. The scope of the evaluation will be subject to the Department's agreement prior to scheme approval.

The *Guidance to local authorities seeking DfT funding for Local Transport Major Schemes* includes a section on evaluation which promoters should consider as part of their evaluation proposals. The Department has recently published new guidance on the evaluation of major schemes¹⁸.

New promoters may have no direct experience of developing a *transit system*. They can buy in expertise, but it is likely that they will need to address the same issues that other promoters have already addressed. There is therefore a need for experience and expertise

¹⁷ Case C-280/00 Reference by Germany for a preliminary ruling in the proceedings between Altmark Trans GmbH, Regierungspräsidium Magdeburg v Nahverkehrsgesellschaft Altmark GmbH".

¹⁸ Available at www.dft.gov.uk/pgr/evaluation/evaluationguidance/

to be captured and made available for all future scheme promoters. The Government will make it a condition of approval that promoters share their knowledge and experience with other potential promoters, so far as lawful, in response to reasonable requests. Organisations such as UK Tram, Confederation of Passenger Transport (CPT) and Light Rapid Transit Forum may also be able to provide expertise and advice to new promoters.

Chapter 7 - Approval Processes

7.1 Introduction

This chapter provides an overview of the various stages in the scheme approval process which promoters of major rapid transit schemes will be required to follow including liaison with the DfT.

7.2 Approval Stages

The *Guidance to local authorities seeking DfT funding for Local Transport Major Schemes* sets out a new approvals process containing three formal approval stages, as summarised below:

Programme Entry

Before Programme Entry is granted promoters will need to submit a Major Scheme Business Case containing all the information set out in the Department's *Major Schemes* guidance. All transit systems are likely to require the approval of the Treasury as well as the Department before Programme Entry is granted. Treasury approval would be sought by the Department once the Department had concluded that it was minded to support a scheme.



Conditional Approval

An application for Conditional Approval would normally be made following the granting of statutory powers, but before procurement has commenced. For PFI schemes, the proposed procurement route will need to be approved by the Treasury's Project Review Group (PRG) before Conditional Approval is granted.



Full Approval

Full Approval will be given only once firm prices are available, normally when procurement has been completed. Full Approval is the Government's confirmation that funds are available and that work can commence.

Before Full Approval is granted for a scheme, the Department will require letters from the Section 151 Officers of each of the local authorities promoting the scheme (or, in the case of a metropolitan area, from each district that is part of the PTE area which is promoting the scheme, as well as from the PTE and the PTA themselves), confirming that they: understand that central Government funding is capped; undertake not to come back to the Government for additional funding; and accept that the PTE, PTA and districts (for metropolitan areas) or the local authority promoters are together responsible for addressing any cost increases.

If Major Scheme Funding is being sought, the scheme will also need to have been prioritised by the Local Transport Body.

7.3 How DfT will work with promoters

The section above sets out the formal process for approval of a scheme. However, the Government would not expect authorities to submit a fully worked up major scheme business case for any rapid transit based project without having first had preliminary discussion with the Department and Government Office on the feasibility of the proposal, which may include the submission of draft business cases for discussion prior to formal submission.

The Department is keen to work with scheme promoters as early as possible in the development process and would, therefore, advise promoters to make contact with the Department at the outset of the project development to discuss the development of the project as a whole and identify all of the significant issues that will need to be addressed in the scheme's development.

Such initial discussions will help to identify and address potential areas of difficulty before proposals are submitted. They will also help the Department to process applications more speedily once received. Pre-application discussions will be on the understanding that these discussions would be on a "without prejudice" basis. Whilst such discussions should help to smooth the process, they cannot in any way be binding on either party.

Once an application for **Programme Entry** has been received, the Department will continue to work closely with promoters to resolve any outstanding issues. Chapter 3 explains how the Department will carry out its appraisal of the scheme. Throughout this stage, it is likely that the Department will need to discuss many issues with the promoter.

If Programme Entry is granted, the Department will expect to have regular discussions with the promoter concerning the next steps they are taking. The Department and promoters will agree the nature of such discussions when Programme Entry is agreed and liaison arrangements will be included within the Programme Entry letter.

Once **Conditional Approval** has been granted, the Department will again expect to have regular updates from promoters as they finalise their contractual aspects. Liaison arrangements will be set out in the Conditional Approval letter.

Once **Full Approval** has been granted, the Department will expect to be informed if anything impacts on the agreed delivery programme. In particular, if anything occurs that could affect the proposed funding schedule, the promoter must let the Department know immediately.