STAG Technical Database Section 4

Option Generation, Sifting and Development

April 2009

Transport Scotland

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1	4.1.1 Do-minimum and reference case	September 2008
2	4.1.1 Do-minimum and reference case	April 2009

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4. Option Generation, Sifting and Development

It is vital to develop options that reflect the full range available and that seek to meet a study's defined objectives, not just immediate manifestations of problems. In the past, option development has perhaps been given less attention than the new transport policy framework may require: guidance is therefore offered on the generation of options, the sifting process and option development.

4.1 Introduction

The purpose of Option Generation, Sifting and Development is to derive a range of options which should provide the solution/s to meet the Transport Planning Objectives and alleviate the problems or opportunities identified.

This phase of Pre-Appraisal must not be started until a thorough Analysis of Problems and Opportunities has been completed and, until robust Transport Planning Objectives are set.

It is vital to derive options which fully reflect the range available and at this early phase in the process, this exercise should not be constrained. It is imperative that practitioners cast the net wide in generating options as potential solutions to the identified transport problems and opportunities; both stakeholder participation and wider consultation can have a role to play. In larger exercises, option sifting will be necessary to reduce the number of options and their combinations to manageable levels.

Option Generation, Sifting and Development should be carried out in a logical, transparent and therefore auditable manner. To this end, practitioners may find it appropriate to adopt a formal structured decision making process. Stakeholder and wider consultation may have an important role to play in this process.

To allow alternative options to be considered, outline designs may be required and an assessment made of capital and other costs, and implementation timescales. There is, however, no requirement to develop alternative options (of any mode) to the same degree as those that have a transport planning history. What is required is a pre-feasibility assessment of alternative options, sufficient to allow appraisal to take place.

4.1.1 The Do-Minimum and Reference Case

Do-Minimum

The options generated must be appraised against a 'do-minimum' option that includes transport improvement commitments that have policy and funding approval and from which it would be difficult to withdraw. These commitments may apply to public transport and parking as well as roads and traffic management. This includes projects for which tenders have been invited or let and projects to which Ministers have given a firm commitment. For transport improvements which affect the trunk road network or rail infrastructure, commitment from Transport Scotland or Ministers is required before a scheme should be included in the do-minimum. For improvements which impact upon local authority controlled infrastructure, the commitment of the relevant local authority is required. The do-minimum should also include minor changes which can be expected to be carried out as conditions deteriorate.

The do-minimum is intended to represent the transport situation over the course of the 60 year appraisal period if no intervention were to occur. As such, the relevant baseline for the do-minimum will not necessarily relate to the existing situation. When dealing with transport infrastructure options, a long lead time to implementation is normal and the baseline might therefore relate to a situation several years hence. There will

therefore be a requirement to project the existing situation, and to assess impacts against this forecast. All options should be appraised against the same do-minimum. Where different options have different appraisal periods, with one option opening in 2009 and another in 2011, for example, then the appraisal of the options with earlier opening year should be extended so that all option appraisals end at the same date.

Predicting the future is an extremely difficult task, and so the assumptions that underpin the do-minimum scenario should be explicitly outlined. It is also recommended that, if possible, transport models be used to forecast future changes in transport. However, where it is deemed impractical to use a transport model, either because no relevant model exists or due to reasons of scale and funding, practitioners will have to use their own judgement to determine likely future traffic growth. Transport Scotland recommends that regional growth forecasts from the Land Use and Transport Integration in Scotland (LATIS) bureau service (see Section 17.2.16) should be used as a starting point. Where the assumptions that underpin the do-minimum diverge significantly from this approach, this should be tested using reference cases as a sensitivity. See below.

It is sensible to that the do-minimum should reflect expected changes in local land-use/development. This will include transport improvement commitments that have policy and funding approval and from which it would be difficult to withdraw, as discussed above.

Predicted future changes in land-use should be based upon documented evidence, such as local authority structure plans. However, practitioners should bear in mind that these documents will typically represent a local authority's aspiration for the local area, and should adopt a cautious approach to the forecasts for land-use and development contained within them, particularly when these forecasts imply levels of growth which are significantly above the national trend. It will often be appropriate to subject predicted land-use changes to sensitivity tests, for which a reference case can be used. When considering future land-use changes, practitioners must ensure that a clear geographic scope is included in the do-minimum scenario.

Where there is uncertainty surrounding the appropriate do-minimum forecast to be used in an appraisal, liaison with Transport Scotland is recommended to agree the relevant assumptions.

Reference Case

Practitioners may also find it helpful to develop a 'reference case', which includes other non-controversial but as yet uncommitted transport schemes and/or development profiles, and which can be used as a baseline for option comparison.

Practitioners should also consider the use of reference cases to test the assumptions that underlie the do-minimum scenario. Transport Scotland expect that any assumptions of local growth in either transport or land-use which is significantly above the national long-term trend would be subject to such sensitivity testing.

Practitioners should not feel limited to developing a single reference case. Instead, the development of reference cases should be viewed as a vital part of sensitivity testing, to highlight how robust the results of the appraisal are to future changes in local land-use, development, or traffic growth.

The reference case does not replace the do-minimum scenario but should be used to complement the STAG Process.

Where there is uncertainty surrounding the appropriate reference case forecast to be used in an appraisal, liaison with Transport Scotland is recommended to agree the relevant assumptions.

4.2 Option Generation

Once the situation in the study area has been examined, problems and opportunities identified and Transport Planning Objectives set, the next step is to start developing options which will achieve the desired transport outcomes.

The most common way of generating or defining options for analysis is to assess solely how the problem being confronted can be ameliorated or eliminated. In more simple applications this might be seen as acceptable, but even so, this should be done in the context of the Transport Planning Objectives set for the work. The Transport Planning Objectives may (and will in larger scale studies) encompass a range of matters over and above merely solving the problem which gave rise to the analysis in the first place.

The generation of options can only be considered to be all-embracing if an objective-based approach is followed. That is, explicit consideration is given to deriving options with the intent of meeting the Transport Planning Objectives, rather than investigating how extant options with some history may contribute.

In general terms, options should be generated through the following sources:

- As ideas/outputs from the consultation and participation process;
- Ideas/proposals which have a history and which (or derivations thereof) remain viable options;
- Through the statutory planning and policy process, both for transport initiatives and land-use plans; and
- As ideas/outputs from a structured decision making process followed by the team undertaking the study.

The range of policy instruments available to the practitioner include but need not be limited to:

- Land-Use Measures;
- Infrastructure Measures;
- Management Measures;
- Information Provision; and
- Pricing Measures

The extensive list of more specific policy instruments found under these headings provides a useful starting point. It provides a checklist of the range of specific policy instruments that are likely to be relevant to different studies and indicates the types of objectives they can help contribute to.

Where appropriate, practitioners should investigate the possibility of packaging measures in order to achieve the desired transport outcomes. It is possible that no one measure on its own is likely to provide a solution to the transport problems within a study area.

Packaging measures effectively can:

- Reinforce, extend or complement the impact of a particular measure;
- Mitigate potential adverse impacts of a particular measure; and
- Increase public acceptability of a particular measure.

It is important to recognise cumulative impacts which may arise from the packaging of measures. This should be accounted for fully during analysis.

4.2.1 Policy Instruments

Practitioners have available to them a wide range of instruments of transport policy. These are the means by which the objectives established for the study can be achieved, and problems identified can be overcome. Over sixty types of policy instrument are identified below, each categorised by the type of intervention: land-use measures, infrastructure measures, management measures, information provision and pricing measures.

4.2.1.1 Land-Use Measures

Development mix refers to how land-uses are arranged in relation to each other. By locating development in such a way that houses are closer to places of work, schools, shops and leisure facilities, the need to travel and distances travelled can be reduced.

Development density refers to the number of people or jobs in a given area. Higher densities enable more opportunities to be reached within a given distance, and hence may encourage shorter journeys and use of slow modes. By increasing population and employment densities, they may also make public transport more viable.

Parking standards are the controls applied to private non-residential (PNR) parking through the planning system. Local authorities to specify the maximum parking standards in their development plans, and set national maximum standards for certain land-uses, including retail, leisure and B1 offices. As with parking controls and pricing, parking standards are applied to meet demand and regulate supply to influence demand.

Company Travel Plans are best described as a strategy applied by a company with the aim of reducing its transportation impacts and to influence the travel behaviour of its employees, suppliers, visitors and customers. In the UK, these are usually voluntary schemes whereby companies at existing sites encourage employees to use alternatives rather than driving alone. Recent tax changes also encourage employer funding of public transport. The largest benefits from these plans will result when a majority of companies in an area implement such schemes. Company travel plans may also be required by a local authority to be submitted alongside a major planning application.

Flexible working hours is the practice where employers permit employees to vary their attendance pattern. This instrument is designed to reduce demand for peak travel and the resulting congestion. They may also encourage car sharing or switching to public transport as employees can adjust their working hours to match the schedules imposed. A variant of flexible working is the four day week in which employees work the same hours per week, but travel on one fewer day.

Telecommunications. Tele-working is an arrangement between employees and employers with regard to conducting work at home or from a remote work centre. There are potential transport benefits (reduced vehicle travel kilometres, environmental and safety impacts) and non-transport benefits, including improved productivity of labour, increased labour supply, reduced expenses and improved quality of life.

4.2.1.2 Infrastructure Measures

Roads

New Road Construction. Increasing road capacity to reduce congestion has come under increasing criticism as, in some circumstances, new road construction can induce additional traffic, thereby partially eroding the road user time-saving benefits[1].

Direct environmental concerns associated with road improvements include land-take, habitat destruction or loss of landscape quality. There are also indirect impacts. New road schemes may encourage longer journeys and increased speeds. This in turn will make public transport, cycling and walking relatively less attractive, and increase fuel consumption and carbon dioxide emissions. Moreover, new roads may well, if not carefully designed, worsen accessibility across the alignment, particularly for pedestrians and cyclists.

New roads can, however, by bypassing particularly sensitive urban areas, achieve environmental and accessibility improvements. In this way, orbital roads can have a different impact from radial ones. However, these are only likely to be sustained if steps are taken to redesign the roads that have been relieved of traffic.

Road improvements can also contribute to a reduction in accidents, by transferring traffic to higher quality roads whose accident rates should be much lower than those of typical urban streets. To some extent this effect, too, may be eroded by the induction of new traffic and increased speeds.

New roads can be extremely expensive and provision for environmental protection may result in further cost rises. Even significant time and accident savings may be difficult to justify when set against such costs.

New off-street car parking can contribute to user travel time savings by reducing the need to search for parking space. However, lack of parking also acts as a control on car use, and expansion may simply encourage additional car use. New off-street parking may therefore be best combined with a reduction in on-street parking. This should reduce searching traffic (since parking locations are clearer), improve the environment and increase safety. It may, however, aggravate accessibility and security problems.

Public Transport Provision

Conventional rail provision includes significant upgrades to existing infrastructure, as well as the reopening of closed rail lines and provision of new stations. Such schemes can reduce travel time for existing users and attract users from other modes, and contribute positively to the environment by transferring journeys off the roads.

Rail infrastructure measures can also contribute positively to accessibility, by reducing access distances to public transport, by reducing waiting times and, particularly, by increasing in-vehicle speeds, since the trains are protected from road congestion.

Light rail can be expected to have a similar impact to conventional rail in many respects. Its main differences are that it can operate on street, have more frequent stops, and achieve better penetration of town centres. Light rail schemes are expensive, not least because of the requirements of street running.

[1] SACTRA (The Standing Advisory Committee on Trunk Road Assessment (1994)). Trunk roads and the generation of traffic. London. HMSO.

Guided bus can provide a lower cost alternative to light rail. Totally separate rights of way can be provided along the length of the whole route, or solely where buses need to bypass congestion, as in most UK options. This allows much more extensive suburban coverage than can usually be achieved with light rail.

Park and ride is a form of integrated transport that allows private transport users to park their vehicles at a large car park and travel into the city centre using a public transport mode. By increasing the public transport use, park and ride can reduce congestion, environmental intrusion and accidents in inner urban areas. The impacts on environment and traffic outside urban areas are less clear. In some circumstances, park and ride may generate longer journeys and part of its demand may be extracted from passengers who previously used public transport for their whole journey. The net effect will depend on where the facility is located and implementation of complementary measures such as higher parking charges.

Terminals and interchanges provide a means of extending the coverage of public transport services, by reducing the time taken to interchange between bus services or between bus and rail. They also provide a focus for city centre bus services, and reduce the congestion of on-street stops and terminals. Good information provision, through ticketing, and simple, integrated timetables can also be used to improve existing and informal interchange facilities.

Cyclists and Pedestrians

Cycle routes provide dedicated infrastructure that separates cyclists physically from motorised traffic. They can achieve significant improvements in safety for cyclists and improve journey times. They may also attract more people to cycle in preference to driving, particularly if combined with other measures to make car use less attractive, such as parking restrictions.

Pedestrian areas can provide a dramatic improvement in the environment for pedestrians, increase safety, and enhance retail vitality in town and city centres.

Potential adverse impacts on accessibility for bus users, goods deliveries and for disabled people, and diversion to surrounding areas can be reduced through careful design. There is little evidence to support claims that pedestrian streets cause a loss in overall trade, although what changes may arise in the composition of shops is less well understood.

Freight Provision

Lorry parks provide a means of reducing the environmental impact of on-street overnight parking of lorries.

Trans-shipment facilities aim to provide a means of transferring goods from the larger vehicles needed for efficient line haul to smaller, less environmentally intrusive vehicles for distribution in town centres. Other options have envisaged trolleying of goods over short distances and underground freight distribution.

Encouragement of other modes is likely to focus primarily on rail-borne freight, but in appropriate cases could extend to water and pipeline.

4.2.1.3 Management Measures

Improved provision for the Car

Conventional traffic management includes a wide range of largely urban measures. These are well documented in IHT 1997[2] and include measures such as one-way streets, redesign of junctions, banned turns and controls on on-street parking. Such measures can have beneficial impacts on travel time and on accidents. Impacts on accessibility, bus services, deliveries, journey lengths and speeds will depend on the packaging and design of these measures. Effectiveness may also depend on enforcement.

Urban traffic control (UTC) systems are a specialist form of traffic management which integrate and co-ordinate traffic signal control over a wide area in order to control traffic flows on the road network. They use signal settings to optimise a given objective function such as minimising travel time or stops and can also be extended to provide for bus priority and integration with information systems. These tools can also improve environment and safety.

Intelligent Transport Systems (ITS) cover a range of applications of information technology for transport. This includes motorway access control (ramp metering), automatic incident detection (AID), image processing of CCTV, selective vehicle priority, queue management techniques and many other experimental measures. These can be deployed to relieve congestion and improve safety.

Accident remedial measures also cover a wide range of possibilities, and are much more fully documented elsewhere (IHT, 1990[3], 1997). Most black-spot treatment and mass action measures (such as skid-resistant surfacing) have high local safety benefits, but little impact beyond this. Area-wide measures are likely to have other impacts, and are considered below under the general heading of traffic calming.

Measures to Restrain Car Use

Traffic restraint measures are designed to reduce the adverse environmental and safety impacts of car (and commercial vehicle) use. They have traditionally focused on residential streets (but are increasingly being extended to main roads) and have involved two types of approach: segregation, in which extraneous traffic is removed; and integration, in which traffic is permitted, but encouraged to respect the environment.

Segregation can be achieved by the use of traffic management techniques such as one way streets, closures and banned turns, which create a ‘maze’ or ‘labyrinth’, which makes through movement difficult, and hence diverts it to more suitable routes. An alternative approach, more often used in city centres, is the traffic cell, in which an area is divided into cells, between which traffic movement, except perhaps for buses and emergency vehicles, is physically prohibited. Potential adverse impact on accessibility for local residents and on congestion and environment on diversion routes needs to be considered in designing such schemes.

Integration measures include traffic calming techniques such as low speed limits, speed humps, chicanes, pinch points, resurfacing and planting, all designed to encourage the driver to drive more slowly and cautiously. These can achieve significant reductions in speed and accidents. By making routes through residential areas slower, they can also induce re-routing to major roads, and hence a reduction in environmental impact. Such

[2] IHT The Institution for Highways and Transportation (1997). *Transport in the Urban Environment*.
[3] IHT (The Institution for Highways and Transportation) (1990). *Guidelines for Urban Safety Management.*

benefits may, of course, be offset by increases in congestion and environmental impact on the diversion route.

Other physical restrictions on car use. Possibilities include bus priorities, cycle lanes, extensive pedestrian areas, street-running rail such as tram or light rail systems and also traffic calming measures. By reducing traffic such schemes can offset some of the potential disbenefits such as increased travel time, and greater congestion. Physical restrictions on car use aim to reduce the volume of vehicles to achieve a more balanced allocation of road space.

Regulatory restrictions on car use have been used in several cities as an alternative way of reducing car use. Two main methods are in use; permits and number plate restrictions. In several Italian cities, permits are allocated to those who can justify needing their cars in the centre, and others are banned. A similar system is operated in Bologna, where 50,000 permits were issued restricting access to the centre. Number plate restrictions are in operation in Athens and Lagos, where an "odds and evens" system operates, in which cars with odd number plates can enter on alternate days, and those with even numbers on the other days. Such schemes can reduce congestion and journey lengths.

Parking controls can control car use by reducing the supply of spaces, restricting duration or opening hours, regulating use through permits or charging. Local authorities are able to impose any of these controls on on-street space and in publicly operated car parks. Parking controls are introduced to reduce the negative impacts of excess demand for parking, and to allocate scarce space according to priority needs.

Car sharing encourages drivers to share their cars with others or to 'car pool' by taking it in turns to drive. Such schemes are highly likely to be more successful when linked to other policies such as company travel plans.

Public Transport Provision

Bus priority measures aim to reduce journey times and improve the reliability of bus services. The most common measures are with-flow bus lanes; others include bus gates or bus only sections, exemption from banned turns, selective detection at signals, and UTC timings weighted to favour buses. Contra-flow bus lanes and bus access to pedestrian areas are designed specifically to reduce the adverse impact on buses of certain traffic management measures. Bus priority lanes can be designed to keep loss of capacity to other traffic to a minimum, for example by providing a setback at the stop line. In such cases travel time savings to buses can exceed 25% with minimal losses to other traffic. The segregation of traffic may also enhance safety. Combined with traffic management, adverse impacts on accessibility can be minimised. A more recent development in bus priorities has been the use of Greenways in Edinburgh, in which bus lanes are combined with intensive and well enforced, parking restrictions.

High Occupancy Vehicle (HOV) lanes are designed to discourage single or low occupancy car use by providing priority to vehicles with more than a minimum number of occupants and to buses. Trials of this in an arterial corridor in Leeds since 1998 suggest traffic flows fell by around 20% in the morning peak immediately after the introduction of the scheme. Average car occupancy in the morning peak has risen from 1.35 to 1.43 for the road as a whole (Leeds City Council, 2002[4]). Experience elsewhere has suggested that HOV lanes can provide greater benefits than conventional bus lanes, provided that the delays to buses are not great. The bus operators in the Leeds scheme have reported time savings of 3½ minutes along the 1.5km HOV lane section.

[4] Leeds City Council (2002) HOV Lane Information Sheet

Public transport service levels can be modified to increase patronage, and hence to attract diversion from car use. For bus services the main options are to increase route density or to increase frequency on existing routes. The first of these reduces walking time, while the second affects waiting time. Since both of these have a greater impact on passengers than does a similar change in time on the bus, they can be expected to be more effective in increasing patronage. The most appropriate allocation of a given fleet of buses between denser and more frequent routes will depend on local circumstances. Other bus service measures include the use of minibuses which can achieve greater penetration and may be more attractive, and demand responsive bus services, such as dial-a-bus. With rail services, the only option available is usually to increase service frequency.

Bus service management measures can be designed to improve the reliability of bus services and reduce operating costs, using fleet management procedures, and enhance their quality of service using real-time information. These measures are likely to be particularly beneficial in reducing uncertainty in travel time, and the extra waiting time resulting from irregular services, which are major disincentives to travel. Such measures can generate significant efficiency benefits, and contribute to reduced car use.

Cyclists and Pedestrians

Cycle lanes and priorities. The purpose of cycle lanes and other specific facilities for cyclists is to improve access, safety, personal security and convenience.

Cycle parking provision can be improved by, for example, introducing secure cycle parking, lockers or wardened facilities (such as in Leicester). By improving facilities and security for cyclists it may be possible to attract more people to cycling.

Improved **pedestrian crossing facilities** can improve safety and reduce travel time for pedestrians. It is not uncommon to find that total delay to pedestrians at city centre junctions exceeds that for vehicle users. In such circumstances, reallocation of signal time and linking of pedestrian phases, alone or as part of UTC, may achieve accessibility benefits and reduce severance. Other measures such as parking controls and footway widening may also improve environment and safety for pedestrians.

Freight Provision

Lorry routes and bans are primarily designed to reduce the environmental intrusion of heavy lorries and to improve safety. Routes can be mandatory or advisory. Bans can be area-wide (for example in the cells between lorry routes) or limited to particular roads, or applied solely to short lengths of road forming a screenline or cordon. They can be complete, or limited to certain times and certain sizes of vehicle, or with exemptions for access.

4.2.1.4 Information Provision

Improved Car Provision

Conventional direction signing can provide benefits to car users, and other traffic, by reducing journey lengths and travel times. Evidence suggests that around 6% of travel time may be accounted for by poor routeing, and that inadequate destination signing may as much as double the time spent searching for unfamiliar destinations (Jeffery[5], 1981). Conversely, direction signing can be used to divert traffic away from

[5] Jeffery, DJ (1981). *The Potential benefits of route guidance. LR997.* Crowthorne. *TRRL.*

environmentally sensitive routes; however, familiar drivers are unlikely to respond to such measures.

Variable Message Signs are digital road signs used to inform car drivers about specific temporary events and real-time traffic conditions. This enables drivers to be diverted away from known, but unpredictable congestion. They are very location-specific in their application, and hence in their benefits. Benefits will primarily be in terms of travel times; although environmental and safety improvements may also be achieved.

Real-time driver information systems and route guidance are a type of Intelligent Transport System application. Information from equipped vehicles or traffic sensors is used to provide radio or in-vehicle display messages (such as Trafficmaster) of delays, or to indicate preferred routes to avoid congestion. Dynamic route guidance systems can provide recommended routes to all equipped vehicles, dependent both on their destinations and the current traffic conditions. Most benefits will accrue to equipped vehicles, in the form of reduced travel times. Detailed mapping devices and combined route guidance and travel information systems are in development, and there is potential for systems of this sort to be linked in with wider ITS, allowing network managers to control the information sent to cars, and potentially enhance network efficiency.

Parking guidance and information systems use variable message signs to provide drivers with information on the location and the availability of spaces in car parks. Detectors identify car parks which are full or almost full, and trigger signs indicating the route to the nearest available. The efficiency and accessibility benefits from reduced searching may be associated with some reductions in environmental intrusion and accidents, depending upon local circumstances.

Measures to Restrain Car Use

Public awareness campaigns have been developed recently by several local authorities as ways of making residents, and particularly car users, more aware of the effects of their travel behaviour on the environment and in terms of sustainability, and to alert them to the alternatives available, including use of other modes and changes in destination and frequency of travel.

Public Transport Provision

Timetable and other service information. Improved information can generate additional patronage of public transport services. This, in turn, can have accessibility and equity benefits and help to reduce car use.

Real time passenger information is now being provided, not just at major terminals, but at individual stations and bus stops, and on trains and (on the continent) in buses. Such information, on delays and alternatives, enables travellers to save time by taking alternative routes. Its main impact, however, is in reducing the uncertainty and stress associated with late running services. There is now some evidence that larger bus operators are prepared to invest in such information systems, in conjunction with local authorities, in order to increase market share. Further recent developments are Trip Planning Systems (IHT, 1997), based on either dedicated terminals (at public transport interchanges and stations), over the telephone, or via the internet.

Operation information systems use ITS-based fleet management facilities to identify locations of buses and to reschedule services to reduce the impact of unreliability.

Cyclists and Pedestrians

Static direction signs can be used to enhance the use of cycle priority routes and to improve access within pedestrian areas for disabled pedestrians. Tactile footways are a further facility providing specifically for visually handicapped pedestrians. Public awareness campaigns can be used to encourage walking and cycling, and familiarise road users with appropriate signing.

Freight Provision

Static direction signs may be the main element in voluntary lorry routeing schemes.

Fleet management systems have been introduced widely for freight vehicles, enabling them to respond more rapidly to the changing demands of Just in Time delivery schedules, and reducing the number of empty return journeys. They can also extend to dynamic route guidance to avoid congestion.

4.2.1.5 Pricing Measures

Measures to Restrain the Car

Parking charges enable demand to be kept below the supply of parking space. The wider impacts depend on the alternative used by the car driver, since parking on the fringes of the controlled area, or in private parking spaces, will inevitably have less impact on the environment and travel time than switching to public transport.

Road user charging. Urban road charging (also called congestion charging or road pricing) is charging vehicles for the use of roads they drive on. Charges are aimed at reducing congestion and associated problems and charges could vary by location, time and vehicle type.

Public Transport Provision

Fare levels can be adjusted on all public transport services, and will have a direct effect on patronage and on car use. Fare levels can be more flexibly implemented than service level changes, and may thus have a greater absolute impact on car use. Fare reductions can, therefore, contribute to efficiency and environmental objectives, as well as improving accessibility for public transport users and hence equity benefits.

Fares structures include the introduction of flat and zonal fares as alternatives to conventional graduated fares, lower off-peak fares, and travelcards and season tickets which allow unlimited travel within a defined area. Changes in structure may contribute positively to efficiency, environmental and safety objectives, as well as improving accessibility by reducing the cost of marginal journeys. If appropriately designed, they may not impose a significant additional financial burden.

Concessionary fares provide certain sections of the population, including the elderly, disabled and young, with the opportunity to travel on public transport for free or at a reduced fare. The key benefits are in terms of equity and accessibility, in enabling people who would otherwise find public transport too expensive, or who cannot use cars, to travel.

Cyclists and Pedestrians

Pricing is rarely an issue for cyclists or pedestrians. However, some charges are made for secure cycle parking, especially if other amenities such as showers are available.

Freight Provision

The fiscal measures described above (parking charges, road user charging) are relevant for freight as well. Parking charges typically vary with vehicle type, and some congestion charging options envisage doing this.

4.3 Option Sifting

The option sifting process should be undertaken where an unmanageable number of options have been generated or where there is general consensus that options generated will clearly not achieve the intended objectives or meet the identified transport problems and/or opportunities.

There are a number of ways in which options can be shifted and practitioners should agree the approach with stakeholders (and where appropriate decision makers). Where appropriate, an 'Option Development Process' paper will help to chart the way through the study. This should be undertaken at the start of this stage in the transport appraisal process and amended as it evolves.

Practitioners should derive an approach designed to help people think through complex problems, combinations of decisions to be taken, conflicting points of view and uncertainty, allowing them to reach decisions about what to do. At this stage it is essential to document why options have been recommended for Part 1 Appraisal or why they have been sifted out prior to Part 1 Appraisal.

4.4 Option Development

The aim of the next step of the process is to develop a reasonable number of broadly defined alternative options that can be subjected to appraisal. The outputs of this work should then feed into a process of option refinement leading to the derivation of recommendations.

In parallel to the continuing development of the options a number of other tasks may be undertaken. The aims of these complementary tasks is:

- To confirm that the elements that will be examined are broadly feasible;
- To define each option carefully so that it can be analysed independently from other options with confidence; and
- To develop costing and timescale information sufficient for the STAG Study.

4.5 Participation and Consultation

The activities adopted for participation and consultation during the Analysis of Problems and Opportunities, and Objective Setting should continue and will inform:

- The identification of options for consideration; and
- The development of options or packages of options for appraisal.

At this early phase of the process, practitioners must cast the net wide - brainstorming, workshop discussions and other consultation and participation measures are encouraged. This will encourage new potential options to be identified, as well as those which might have been proposed for some time.

Debate and discussion of problems can form a valuable part of the process. It is equally important to involve people in generating, developing and assessing possible solutions. This is undoubtedly more difficult to achieve and may require use of more innovative methods. Provision of information prior to an exercise, for example outlining the problems and suggesting some policy instruments as possible solutions, can be useful in this respect.

4.6 Reporting

The methodology adopted for generating, sifting and developing the options should be described clearly and concisely in the STAG Report. In addition, all options generated, the do-minimum and any reference case should be described in full.

If options are rejected at the Option Sifting phase, the reasons for rejection should be briefly and clearly outlined. This may include identifying inconsistencies between options and Transport Planning Objectives.

In summary, the methods by which the Option Generation, Sifting and Development process is carried out must be comprehensively documented, with a clearly defined audit trail.