Transport Visions

Transportation Requirements

The second of eight reports from the Transport Visions Network

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Preface

Futurology - *the study or prediction of the future of mankind.*

1. At the beginning of the 21st Century, the UK transport profession in all its guises is very active. The Transport White Paper in 1998[1] set a new agenda to address the burgeoning levels of travel demand and motorised traffic. In the face of short-term workloads and objectives it is tempting to put to one side the potentially distracting business of transport futurology. After all, has not the time for debate and imaginative forward thinking now passed with the publication of the new White Paper and 'Transport 2010'[2] which outlines the Government's £180bn spending plan for transport? Is it not now time to begin 'bedding in' the new policies and practices that will serve us for the next decade or two? The answer is no. While action is urgently needed to address present-day problems, complacency about the future and the transport challenges it will bring must be avoided at all costs. Hence forward thinking remains crucial.

2. Reports documenting attempts to set out transport visions are not new and examples are plentiful. In the run-up to the new millennium, many people contemplated the future of transportation and numerous documents were published presenting predictions and visions. In the UK, the RAC Foundation[3] convened an advisory group to assess the relationship between cars and the environment and to identify research priorities. The Engineering Council[4] set up working groups to examine challenges and solutions for the UK's future needs for transport. They started with a simple vision of 'access for all' and 'transport without costs' and identified what needed to be done to realise the vision, including a timetable for action. Within the Department of Trade and Industry's Foresight Programme, DTI[5] reports the work of a task force that examined the implications for transport of four different 'environmental' futures for the period 2010-2040. The task force produced recommendations for policy and research that were robust against each of the futures.

3. Meanwhile away from transport, the ESRC explored social and economic trends in Britain up to 2010[6]. The Institute for Transport Studies at the University of Leeds[7] provided a vision for the future of transport in Britain for the next thirty years by interviewing those involved in transport about what might happen and how it could be achieved. The Europe 2020 group[8] considered the future of transport and communications in Europe. They considered the impacts on population, lifestyles, economy, environment, regional development, urban and rural form, goods transport, passenger

transport and communications of three different scenarios – a growth scenario, an equity scenario and an environmental scenario.

4. David Banister[9] presented a 'Eurovision' for sustainable urban development and transport in 2020 developed via specifying environmental, regional development and efficiency targets, tracing two paths towards these targets and back-casting to determine actions required to achieve them. William Garrison and Jerry Ward[10] offered their visions of transportation systems that will better serve the needs of the United States in the future. They include better ways of managing congestion, new types of vehicles, revised possibilities for cities designed to meet the varied needs of their inhabitants and different ways of moving people and freight over long distances.

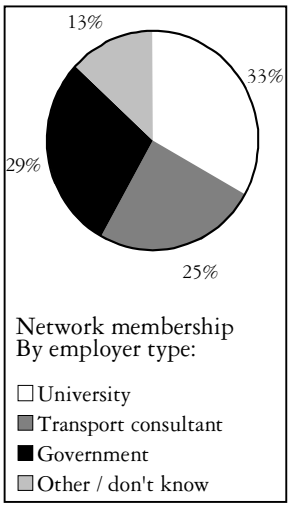
5. What, then, is the justification for yet another transport visions report and indeed a series of reports? There are three principal justifications. Firstly, the world is an ever-changing place. The future is not predetermined and waiting to be discovered, it only becomes reality once it becomes the present. As such, attempts at transport visions must be regularly revised in light of the changes we experience, such as the emergence of mobile communications. The uncertainty of the future also means that no single vision can claim to be accurate. The only certainty is that transport and travel patterns will always be dynamic. Visions from a variety of perspectives enable a more informed consideration of the future.

6. Secondly, we are at a propitious point in time in the UK. The present and pending acuteness of car dependence and traffic congestion and their associated effects has pushed transport high on the public and political agenda. Longstanding solutions to problems are no longer appropriate (at least by themselves) and politicians and other key decision-makers are prepared to listen to new and possibly radical propositions. The time is ripe for the imaginative thinking and innovation that can be derived from transport futurology.

7. Thirdly, almost without exception, all previous vision documents have been the product of senior professionals. Listed in the acknowledgements of such reports are the likes of Professors, Chief Executives, Chairmen and Directors. Conspicuous by its absence is the explicit acknowledgement of young professionals. All the reports in this series have been produced exclusively by young professionals – men and women aged 35 or under. Being 'young' does not give any special insight into the future. However, with young professionals comes the prospect of new ideas and perspectives that can potentially challenge existing mindsets. Furthermore, the young professionals of today will be the decision makers of tomorrow with a responsibility for delivering effective solutions. It is hoped that the act of engaging young professionals in a transport visions debate will in itself be of value to the individuals concerned through assisting in

their professional development and the forging of new professional relationships with important future influence.

8. This report and others in the series are a product of the Transport Visions Network. The Network was conceived by Drs Glenn Lyons, Kiron Chatterjee and Greg Marsden of the Transportation Research Group (TRG) at the University of Southampton. The TRG has been responsible for securing funds for co-ordinating and reporting on the Network. Funding has been kindly provided by the Engineering and Physical Sciences Research Council, the Rees Jeffreys Road Fund and the Department of the Environment, Transport and the Regions. The Network was established at the end of 1999 and formally began its business in February 2000 with the aim of addressing and reporting on eight transport 'themes' during a 36-month period. Membership of the Network has been open to anyone aged 35 or under. The membership predominantly consists of transport professionals who have a range of background disciplines and experience. Membership of the Network has totalled around 220 people with local authorities, transport consultancies and universities all well represented alongside other organisations.



9. The reader will find that the discussion is focussed on visions for the United Kingdom, reflecting the fact that the Network's founders are UK based, as are the majority of its members. Nevertheless, Network membership also has representation from a number of other countries including: Australia; Austria; Belgium; Canada; Chile; Czech Republic; Denmark; Finland; France; Germany; Greece; Hong Kong; India; Italy; Japan; Mauritius; Netherlands; New Zealand; Norway; Pakistan; Portugal; Republic of Ireland; Romania; Russia; South Africa; South Korea; Spain; Sweden; Switzerland; Taiwan; and the United States of America. We feel that our visions could apply in many respects to other 'developed' nations and possibly also to less 'developed' nations.

10. So, what do we hope the value and impact of our reports will be? Pragmatists might be anxious to determine whether or not the reports can shed any light on solving today's problems. Others might expect that our reports should abandon convention and offer truly provocative and far-fetched forays into a distant future. Perhaps we have been able to reconcile both of these aspirations. Our principal goal is to challenge existing mindsets and to reinforce the importance of forward thinking in transport research, policy and practice. We hope to reach a wide audience and provoke fresh ideas and perspectives. If we have been successful then our reports should help to influence current policy debate. We hope they will also inspire a stream of adventurous research proposals. Mostly, we hope that our reports will enjoy a fruitful existence as reading material before being consigned to join their predecessors on bookshelves gathering dust.

Introduction

To the reader in a hurry



This report presents the Network's views on the guiding principles for the design of future transport systems. We have termed these Transportation Requirements. The report identifies twelve Transportation Requirements and includes a section for each one and outlines background information and the discussions from which each Requirement emerged. The intention is that the Transportation Requirements will form a framework for the Network's subsequent consideration, in later reports, of visions concerning more specific transport solutions and developments.

11. The Transport Visions Network is exploring the future of transport in the 21st Century. The first report in this series, *Society and Lifestyles*, considered a myriad of issues and trends that are shaping or have the potential to shape the way we live in the future and our travel needs. It presented six different scenarios for the future. This second report considers guiding principles for the design of future transport systems. These are developed taking account of the possibilities for the future identified in the first report. In later reports the Network will explore possible solutions to current as well as emerging transport problems. The Network will not be seeking merely to guess or predict what the future of transport holds in store. In acknowledging that the future is not predetermined and is ours to shape, later reports will identify developments we would like to see and perhaps those we should guard against. However, before this can be pursued it is considered important to agree upon principles for future transport policy and development. This report might be deemed, in effect, to be a statement of Transport Visions Network policy – an advisory framework within which to pursue specific visions for the future of transport.

12. At the outset to discussions leading to this report the following definition was taken as a context for developments:

> *"Transport – connecting people and resources to opportunities"* [11]

13. It is appropriate to explain the process of discussion that took place in order to understand the background to this report. The Network did not, at the outset, list a series of Requirements upon which to base discussion. This would have been too prescriptive

and have precluded a comprehensive coverage of potential issues. Instead, Network members were presented with a series of discussion topics and accompanying background and factual material alongside suggestions of issues to consider under the following headings:

- personal mobility;
- goods movement:
- economic prosperity;
- sustainability;
- social inclusion;
- support of electorate;
- journey purpose; and
- regional development.

14. On this basis there was extensive discussion with a total of over 350 email messages exchanged. During the discussion, a number of areas for which Requirements were appropriate became apparent. A set of Requirements was then drafted and distributed and further discussion took place at a one-day workshop. The draft set of Requirements was critically reviewed and a revised set was agreed upon and is reported here. In so doing, relevant material from Network discussions has been summarised and supplemented by background information, facts and projections to provide the context and rationale behind the Requirements identified. Quotations appearing in the text of the report without any attribution are statements made by Network members during either email or workshop discussion.

15. It was timely that, during the course of the discussions, the Government's ten year spending plan for transport, 'Transport 2010'[12], was published. In presenting our Transportation Requirements (listed below) in the following twelve sections of the report, we have sought to highlight and reflect upon the related statements and standpoints of Government, drawing in particular upon the Transport White Paper[13] and the ten-year spending plan. The concluding Section of this report considers the extent to which each Requirement relates to current Government policy objectives.

16. Credit is due to all those Network members who actively contributed and special thanks must go to the Editorial Board of this report.

Transportation Requirements

1. There should be an equitable distribution of access to a range of key real and virtual destinations that support people's quality of life.

2. The absolute level of resource use for transport activities should be controlled and the resource efficiency of mobility should be maximised.

3. Users should pay the full internal and external costs of transport and these should be made transparent. Where appropriate, transport uses or users providing external benefits should be subsidised.

4. In the provision and operation of transport systems the adverse effects on the environment should be minimised according to agreed principles and targets.

5. There should be discrimination and prioritisation between different types of trips and activities.

6. Transport should not exacerbate the adverse effects of lifestyle on health and safety and should aim to reduce these effects wherever possible.

7. Electronic and other non-mobile means of communication should be considered as transport options and treated accordingly in policy and practice.

8. Land use efficiency should be maximised and net land take by the transport system minimised.

9. The reliability of the transport system and its operation should be regarded as a fundamental system management goal.

10. Transport should not exacerbate problems of social participation and should aim to reduce these problems wherever possible.

11. Stakeholders should play an integral role in the entire life cycle of problem identification, solution formulation, implementation and evaluation.

12. Transport users should be enabled and encouraged to make fully informed choices.

1 Accessibility

"There should be an equitable distribution of access to a range of key real and virtual destinations that support people's quality of life."

Context

17. One of the five key overarching transport objectives underlying current UK transport policy is:

> *"To promote accessibility to everyday facilities for all, especially for those without a car"*[14]

18. The meaning of the term *accessibility* needs to be examined. A number of definitions of accessibility exist. It is defined by the Chambers English dictionary as *"ease of reaching"*. Developments in information and communications technology are changing the very nature of accessibility with potential influences on our transportation needs and the requirements from our transport systems.

19. Within a transport context, the term has been used in several different ways, including the following[15]:

- ease of access to the transport system itself in terms of, for example, the proportion of homes within 400 metres or approximately 5 minutes walk of a bus stop;
- ease of access to facilities, with the emphasis being on provision of the (transport) facilities necessary to meet people's needs within certain minimum travel times;
- value which people place on having an option available which they might use only under non-routine circumstances (such as when the car breaks down); and
- ease of participation in activities (for personal travel) or delivery of goods to their final destination (for goods travel), provided by the interaction of the transport system, the geographical pattern of economic activities, and the pattern of land use as a whole.

20. In March 1999 the DETR announced a programme of 27 multi-modal studies intended to give consideration to problems and solutions affecting all modes of transport in relation to the strategic road network. In assessing solution options the studies have adopted the New Approach to Appraisal[16] (NATA) in which solutions are judged according to objectives relating to environment, safety, economy, accessibility and integration. NATA requires that transport schemes take account of the following criteria which relate to accessibility:

- access to the transport system (measure of number of people who have access to a car or live within 250m of a daytime hourly public transport service);
- severance; and
- option values (availability rather than use of a transport service).

21. A review of recently submitted Local Transport Plans[17] has shown that most authorities deal with access in terms of availability of public transport rather than accessibility of facilities, as defined in the second bullet point under paragraph 19. By contrast, land-use planners have often sought to evaluate access in terms of accessibility of facilities. It is broadly accepted within land use and transport planning communities, however, that it is considerably more difficult to measure access to specific facilities than it is to measure the availability of public transport.

22. The third definition under paragraph 19 (which is one of the NATA sub-objectives for accessibility) is the only one of the definitions that has a readily definable monetary interpretation. The first three interpretations of accessibility under paragraph 19 are embodied within the general framework provided by the fourth. Thus, the fourth use may be regarded as the all-embracing measure of accessibility.

23. The nature of accessibility itself appears to be changing, as increasingly goods and services can be accessed by individuals or groups – without recourse to physical movement. Accessibility in physical space is being complemented by accessibility in virtual space through advances in technology, defying familiar principles of distance, nearness, or spatial interaction. Sociologists refer to this as 'non-corporeal' mobility[18].

24. The breadth of interpretation of 'accessibility' led to Network members presenting a variety of contrasting viewpoints on this topic, contesting in particular how future social equity and mobility can be conceptualised and planned.

Accessibility in a world of mobility

25. We live in a culture of high and increasing levels of mobility. The average number of miles travelled per person per year (all non air modes) has increased by 28% from 5317 miles in 1985/6 to 6806 miles in 1997/9, with a 2% increase between 1995/7 and 1997/9[19]. We are travelling further and taking part in a wider range of activities. Much of this increase has come through greater private car use, increasing affluence and the desire or need for a much broader range of facilities and activities. Travel patterns are increasingly complex within predominantly low-density urban layouts. Against such a backdrop, it is not considered realistic or necessarily desirable to provide parity in accessibility to the same range of activities for all. However, the Network supports the concept of identifying a number of key facilities that should be easily accessible to all.

26. Imposing a maximum level of personal, motorised mobility would represent one possible, albeit contentious, approach to restraining travel and the spatial range of activity patterns. Such a limit would encourage people to make their location decisions (domestic and business) on the basis of maximising accessibility to

frequently used facilities. In addition, such a measure would encourage business to maintain accessibility to suppliers and customers.

27. The communications revolution could mean that there are even greater opportunities for achieving higher levels of accessibility to a range of services without (necessarily) increasing physical mobility, but instead exercising virtual mobility. However, there are currently and potentially in the future, imbalances in access to e-facilities across the UK populace. Close attention must be paid to individuals who miss out on activities that can be carried out in this way, such as employment that is not adaptable to teleworking. Many jobs necessitate other associated on-site employment. These jobs often employ people on a low socio-economic rung who do not possess adequate transportation options (physical or virtual). Not everyone will have a high bandwidth Internet connection. A fuller discussion of the role of electronic communication as a substitute for physical transport can be found in Section 7.

Accessibility and land use

28. Improving accessibility could be achieved through land use planning and policy mechanisms to avert development of activity centres that are accessible solely via motorised mobility. This notion is supported in current Government policy (e.g. PPG13[20]). Planning policies to increase building densities and encourage a mix of land uses in conjunction with good urban design can reduce time barriers by enabling people to reach a wider range of facilities by walking, cycling or using public transport.

29. Controls over car parking and the management of new developments could encourage car share clubs, where people pay at 'point of use' for using communally available cars and rely on a network of suitable pick-up and drop-off points for such vehicles. Higher land-use densities make such a system more viable as more customers are within walking distance of such points. However, the extent to which density can be increased will be constrained by existing development and land use. Recent trends point to an increasing acceptability of car-free developments (e.g. Edinburgh) that could link to the car-share-club concept. The importance of land-use and transport interactions is revisited in Section 8.

Levels of accessibility

30. There will always be a variable distribution of accessibility and mobility levels across individuals. Accordingly, the Network initially considered the merits of defining minimum acceptable levels of accessibility and identifying the benefits to be derived from achieving such levels.

31. The concept of minimum levels of accessibility was felt to be unacceptable, however. To some people the minimum level would be considered good whilst to others it would be considered poor. Fundamentally, for people to exist they must already have an

adequate level of accessibility to all the key real and virtual destinations that they need to reach. The quality of that existence is the heart of the issue and it is the role of transport professionals, society and the Government to set quality standards and work towards them. Reference should therefore be made not to 'peoples' existences' but to their individual 'quality of life'. Talk of 'minimum levels' in this context was considered too cautious. Instead, 'a good level of accessibility' to enable people to access local services easily has, therefore, been accepted as the target.

32. Within this context the Network discussed proposals for a hierarchy of access needs. Access to work in particular will remain a dominant concern across the socio-economic spectrum and this might sit at the top of the hierarchy. People will always need to travel to work (some of the time). For example, computer consultants might be needed to work on a call-out basis to service the computers of teleworkers. The nature and extent of travel for work will depend on the degree to which the 'Workers to the Workplace' or 'Workplace to the Workers' scenarios presented in the first report in this series, *Society & Lifestyles*, are taken up[21].

33. However, accessibility to work by itself does not define an individual's quality of life. Other areas of prime importance are access to education, food and health. Access to local facilities such as parks, other neighbourhoods, arts, sports, leisure, places of worship, heritage, and nature was also deemed valuable. Whilst it was not considered feasible to determine access needs at an individual level, it was felt that the objectives of the transportation system should be focussed on a number of key access needs, the access needs that sustain life. For example, a choice of cheap and convenient modes to get to a food retailer, a post office, healthcare facilities and a range of workplaces and educational establishments.

Defining an Accessibility Requirement

34. In the future almost everyone will be able to afford to and know how to use virtual means to get access to certain services. In the meantime, the metered provision of Internet facilities by Internet Service Providers and Telecommunications companies is likely to hold back the growth of this virtual use across most sections of society. Concern was raised that there would be implications for social participation, education and health if virtual access became predominant and acted to reduce people's mobility. It was argued that primary emphasis should be placed on access to real rather than virtual destinations. The implication should be to achieve standards regarding real destinations first and then address virtual destinations. It would be possible to ensure everyone has access to virtual services, but not to force everyone to use them. However, new social practices may emerge around these developing technologies, particularly with the younger generations, as evidenced by the ways that young people communicate with mobile phones.

35. Providing good accessibility is not an overall solution to transport problems, as good accessibility does not necessarily mean that people will limit their travel. People do not always choose housing and jobs with accessibility as the top priority. It is also acknowledged that those things considered necessary to support our quality of life are not fixed but will change and probably expand in response to future social and economic developments.

36. The Accessibility Requirement should reflect the above concerns over defining minimum levels of accessibility. It should also embody the role of telecommunications as an alternative additional means of providing access to services (e.g. NHS Direct[22]).

TRANSPORTATION REQUIREMENT 1

There should be an equitable distribution of access to a range of key real and virtual destinations that support people's quality of life.

2 Mobility

"The absolute level of resource use for transport activities should be controlled and the resource efficiency of mobility should be maximised."

Context

37. The horizons of our travel desires continue to expand, as they have done over the course of history. There is a need to consider how best to manage the demand for mobility so that it does not jeopardise the environment and well-being of future generations.

38. The expressed aim in the Transport White Paper is *"to increase personal choice by improving the alternatives (to car use) and to secure mobility that is sustainable in the long term"*. It also seeks to reduce the need to travel[23]. The Government's ten year spending plan for transport further expands this by stating that *"the challenge is to ensure that this increased mobility does not undermine our quality of life, so that travel and its benefits can be enjoyed by all"*[24].

39. The European Commission's 1996 Public Transport Green Paper stated that *"the convenient, economic and safe movement of people must be at the core of transport policy making and provision"*.[25] The Engineering Council argues that there is a public view of personal mobility as a fundamental human freedom. It argues that emphasis must be placed on a combination of personal mobility rights and responsibilities[26].

40. The Government's New Approach to Appraisal (NATA)[27] requires account to be taken of the following criteria which relate to personal mobility and goods movement:

- journey ambience;
- accidents;
- security;
- transport economic efficiency;
- reliability; and
- transport interchange.

Mobility limits

41. If our current patterns of mobility are having a damaging effect on the environment (a theory supported by the United Nations' Intergovernmental Panel on Global Climate Change and the UK's Royal Commissions on Environmental Pollution) then one solution would be to limit mobility. Clearly such a policy would face significant opposition. Less radical policies and aspirations embodied within the Transport White Paper have themselves come under fire: *"This is the biggest indictment of transport policy at the end of the millennium; a policy that encourages parish-pump values instead of broadening horizons, celebrates physical exertion over engineering, and tells us not to travel at all unless absolutely unavoidable"*[28]. Any radical departure from established convention is likely to be met with criticism and concern from some quarters. This, in itself, should not preclude such developments being considered and potentially pursued.

42. The 1998 Road Traffic Reduction Act[29] provides a step towards the need to consider limiting motorised mobility. It allows local areas to consider setting traffic reduction targets. The 1999 Standing Advisory Committee on Trunk Road Assessment[30] suggests that there can be cases where road traffic reductions may provide economic benefits.

43. The Government's ten-year spending plan for transport includes a target *"to reduce road congestion on the inter-urban network and in large urban areas in England below current levels by 2010 by promoting integrated transport solutions and investing in public transport and the road network"*[31]. A Network member stated that public and political opinion saw demand management as being much more palatable than demand reduction: *"The reluctance of government to explicitly endorse reduced motorised mobility and instead talk about reducing congestion, provides another reason why there can be little sense of a need to tackle car use per se at an individual/local level"*. This sentiment is an illustration of the free-rider problem – there is little incentive on an individual level to reduce personal motorised mobility because the benefits of such an action would be likely to be reaped primarily by others who may in turn be making no personal effort to reduce their motorised mobility [32].

Mobility efficiency

44. Motorised mobility limits should not be formulated in simple anti-car terms given that other transport modes also have negative impacts. It is, instead, the congesting, polluting and health effects of excessive car travel, which must be addressed. Personal mobility, both motorised and non-motorised, needs to be managed to reduce its negative side-effects, together with the development of technologies to improve the resource efficiency of all motorised transport modes.

45. Public transport needs to offer a high degree of flexibility in order to compete effectively with the private car in terms of providing for personal mobility. Similarly, flexibility needs to be provided for effective modal competition in goods transport where the success of road transit is due not only to the free use of transport infrastructure (i.e. the road network) but also to the mode's flexibility, universal availability and possibility for varying delivery mechanisms and schedules. People in developed societies have come to expect that products should be delivered either to their homes or to nearby stores, even if they dislike the environmental and safety impacts of the lorries making those deliveries. A reversal of the growth in tonne mileage undertaken by road is desirable; this could be achieved both by transferring some longer-distance freight movement to rail (or water), and by supporting more local economic activity (e.g. farmers' markets). Nevertheless, road freight traffic can never entirely be removed (not least because of insufficient capacity in the rail network, even with planned expansion). Indeed, it is likely to continue to prevail for local freight movement or for the final leg of

a freight journey undertaken primarily by rail (e.g. from railhead to a store or a home). The resource-efficiency of such movements by road therefore requires attention.

Sustainable mobility

46. One aspect of current policy is to improve the efficiency of our transport systems, particularly through the application of Intelligent Transport Systems (ITS). ITS can assist technologically in the efficient movement of vehicles through the transport system. The main emphasis in applying ITS developments, however, should be the improved efficiency of people and goods movements rather than (simply) the movement of vehicles. It is people and goods that the transport system needs to connect to opportunities.

47. In addressing concerns about growing levels of mobility, a key aim should be *"to achieve sustainable levels of energy and resource consumption"*. If this can be addressed then increasing levels of mobility might become more acceptable. The argument to reduce car-based mobility might then become less clear-cut when, in future, such mobility uses energy derived from renewable sources. Irrespective of the means of propulsion associated with different modes, other resources (including land take) are still likely to be consumed. There is also the problem of disposal of the consumed resources, e.g. rubber tyres and petrochemicals, at the end of their life cycle.

48. Reducing non-renewable resource use should be a key focus of improving transport systems. This encompasses fuel, minerals, metal, rubber tyres and time, as well as the atmosphere's ability to absorb the waste products of energy consumption (notably greenhouse gases). Hence the Requirement below has been formulated in terms that are not mode-specific and allow a more holistic consideration of transport futures.

49. A change of emphasis from reducing motorised mobility to improving its efficiency and its sustainable use of resources raises other issues. More car-based mobility can erode accessibility via other modes and ultimately by car as well. This occurs because as mobility increases, accessibility decreases as the goods, services and other facilities become more dispersed as more facilities are used over a wider area, either in addition to or at the expense of local facilities. Whilst efficiency of mobility should be maximised, accessibility to local key services must also be maintained.

TRANSPORTATION REQUIREMENT 2

The absolute level of resource use for transport activities should be controlled and the resource efficiency of mobility should be maximised.

3 Costs

"Users should pay the full internal and external costs of transport and these should be made transparent. Where appropriate, transport uses or users providing external benefits should be subsidised."

Context

50. This Section assesses costs associated with travel and considers the implications of distributing those costs more appropriately amongst users. The marginal cost of making a trip by car is often more than the cost of making the trip by public transport but travelling by car is considered to be more attractive in many cases and is often perceived to be cheaper. Attempts to discourage car use face the reaction of an electorate of which the majority own cars.

51. In 1953, only 7% of an average British household's weekly expenditure was spent on transport. By 1994/95 it had risen to 15% (the European average). We now spend nearly as much on transport as we do on food or housing. This increase has taken place in the context of an 11-fold growth in car traffic, an indication of both the fall in the real cost of motoring and the rise in real incomes.[33] At the same time as the real total costs of motoring have fallen, public transport fares have increased by around 30% in real terms[34].

52. Fuel blockades in September 2000 organised by a number of hauliers and farmers brought severe disruption to the United Kingdom and highlighted the importance that is placed on the price we pay for transport. In addition to resentment at the absolute price, the price we pay relative to other competing countries, particularly in the EU, has been the source of much concern from road hauliers and motorists. However, Colin Buchanan and Partners have demonstrated that if the total taxation costs to own and run a car are considered (i.e. purchase tax, ownership tax, road tolls, and fuel tax) then Britain ranks 8th (of the 16 countries surveyed) in Western Europe[35].

53. Costs associated with owning and operating a vehicle come in a number of forms. Fixed purchase costs include the price of the vehicle itself, yearly road tax, insurance premiums, breakdown cover and annual maintenance checks. The principal variable cost is fuel whilst other variable costs include servicing, maintenance and depreciation. Of these, expenditure on fuel is most dependent on mileage driven.

54. In April 1990 the price of one litre of unleaded petrol was 41.4p with 60% of the price being made up of duty (19.5p) and VAT (5.4p). In April 2000 the price of a litre of unleaded petrol was 80.0p with 76% of the price being made up of duty (48.8p) and VAT (11.9p). The DETR's statistics show that in real terms, fuel is about 18% more expensive than it was in 1964. However, this is offset by a fall in car purchase price in real terms to about 76% of its 1964 level[36].

55. In the face of public opinion that we already pay too much for transport, the concept of as yet unpaid externalities needs to be brought to the fore. Congestion, air pollution, climate change, noise, vibration, injuries, danger and the loss of freedom for non-motorised

road use (including children's play) are all examples of externalities. An externality is where *"one person's actions have direct costs or benefits for other people which that individual does not take into account"*[37].

56. The Government's New Approach To Appraisal (NATA)[38] requires account to be taken of the following criteria under the heading of economy:

- transport economic efficiency (travel time, vehicle operating costs, user charges, transport provider costs, government subsidies/taxes);
- reliability; and
- wider economic impacts (regeneration, development dependency).

57. All of these considerations must be given monetary values, except wider economic impacts, which are assessed qualitatively. The economic costs of transport accidents must also be taken into account (under the heading 'safety').

Externalities

58. The Blueprint series of books written by economist David Pearce attempts to cost different resources. Blueprint 5 found that motor transport in the UK paid only a third of the cost it caused to the environment[39]. A fatality was estimated to cost over £1million to the economy. With an average of 10 a day (and over 100 serious injuries) in Great Britain, this constituted billions of pounds of external costs. Added to that should be the health costs of pollution, economic costs of delays caused by congestion, and the less easily quantified costs of social exclusion/community severance. Estimates of the yearly external costs of motor vehicles for the UK range from around £15-£60billion.

59. Estimating values of externalities, particularly for elements such as air pollution as opposed to congestion, is complicated. Delucchi[40] compares the methodology and results of a number of studies from the US and Europe and estimates that environmental externalities represent between 36% and 64% of all external costs, and between 3% and 16% of the total social cost of motor-vehicle use.

60. If the cost an individual pays for travel (the marginal personal cost) is smaller than the sum of the cost of their own journey and the delays they impose on others (the marginal social cost), then they are likely to use private motorised transport for trips that are unnecessary. The Network broadly supports the concept of 'internalising the externalities' of the transport market. In this way, the charges that each individual faces for a journey should reflect the private cost to them and the costs or benefits to society as a whole of their trips. A report by the Standing Advisory Committee for Trunk Road Assessment (SACTRA)[41] on transport and the economy

considered that transport costs should reflect the full cost of externalities to best serve the economy. It saw that transport policy should not just be concerned with providing cheap or quick transport or providing transport at all but it should also aim to provide accessibility that reflects the costs it imposes. However, a number of important issues regarding externalities remain to be answered and these are considered below.

61. There are serious difficulties in deciding how to quantify external costs, reflected in the range of values that have been obtained in studies to date. This is one reason we cannot yet pay them, although it is not an argument against trying to determine them or ultimately adding them to the total cost an individual should pay.

62. Other reasons or explanations for our current underpayment of the full social costs of transport include:

- the concept is politically unacceptable;
- it is too difficult (technologically and institutionally) to change the way we charge for travel; and
- the concept of externalities is too difficult for a significant proportion of society to grasp.

63. The umbrella term *externalities* sheds no light on the underlying range of categories of costs. Are the costs assessed at the local, regional, national and/or international level? Are the costs assessed in terms of 'cradle to grave' (i.e. the full life cycle of a motor vehicle from production to scrapping)? At what point can the full external costs be accurately calculated and defined? There is no unified agreement or definition concerning the cumulative, quantitative, and perceived dimensions of scale of the full external costs of vehicle use.

64. Attempts to cost externalities run into even more serious difficulties where the impacts occur in the future and/or where these are felt by non-human life forms. Plants and animals have no voice in the economic market place, however environmentally orientated, nor do future human beings. The risk that future impacts may be under-valued is compounded by the traditional economic practice of discounting the value of money over time, such that, a life today is considered to be worth more than one in thirty years time. Undervaluing the future is particularly serious in the case of global warming, where the impacts (if and when they occur) may be too far in the future for sufficient value to be placed on emissions of greenhouse gases today. It is estimated that there is a 25-year lag between the actions taken to reduce greenhouse gases and those reductions registering in the atmosphere[42]. It may be, however, that in the light of the recent damaging flooding of large parts of the

UK, these valuations will be given more significance in future deliberations concerning external costs.

Paying

65. The costs for transport need to be defined as either fixed or variable. Public transport ticket costs can be variable (e.g. a single off-peak ticket) or fixed (e.g. a season ticket). The most significant change to transport costs that has occurred over recent years has been the substantial increase in tax on fuel.

66. Fuel tax increases can serve two purposes. The first is to attempt to reduce the total amount of travel. The second is to generate revenue for the Government. A recent report by Glaister and Duncan into the effect of fuel prices on motorists[43] states that *"it is tempting to assume that since car ownership and use so clearly increase with average income, raising fuel taxes will disadvantage the rich more than the poor. We have shown this is an over-simple view".* They also state that *"motorists find ways of economising on their use of fuel so raising fuel prices is more effective in reducing the quantity of fuel used than in reducing the volume of traffic".*

67. The Network believes that, under current pricing arrangements, increased car ownership inevitably leads to increased car use. Once the high fixed costs (road tax, insurance, etc.) have been paid there is little incentive to travel by any other mode given the availability of the car and the relatively low marginal costs of each trip. The total marginal costs (petrol, parking, tolls) are currently too low, in spite of widespread public perceptions to the contrary. The inherent weakness of the present methods of taxing car use is aptly illustrated by the following observation: *"My car costs about £5 a day without moving off the drive, I do 8000 miles a year. Which works out at about 23p a mile, just to own it and petrol costs 12p a mile, the more I drive the cheaper it becomes to use the car, as my up-front costs are fixed. If the true cost of car ownership can be spread according to distance travelled, then it can be made to become more expensive the more you drive, therefore tempting people off the road."*

68. Charging for use of infrastructure is currently receiving much attention with the provision of powers to public authorities to introduce road user charging and charging for private non-residential parking. Fuel consumption is a crude proxy for congestion-related externalities. Road-user charging according to congestion levels offers a more consistent and representative way of charging for the delays caused to other users. There are some concerns over the use of a blanket price for an area of a city in that it is indiscriminate of trip purpose and could redistribute land-use and demand patterns within an area. Charging for one area also implies that congestion in one area is worth more than congestion somewhere else. Intelligent Transport Systems could offer a longer-term solution to this inconsistency, particularly when vehicles can

be located through Global Positioning Systems and their location linked to traffic network performance.

69. Concerns exist over the exemption of aircraft fuel from tax. Given the burgeoning growth in this sector and the disproportionate level of greenhouse gas emissions per mile, non-taxation of aviation fuel has led to an uneven playing field on which other, more sustainable modes cannot compete. This is illustrated by the ease with which short haul flights are able to compete with road, rail and water-based modes. Consideration should be give to requiring air users to pay directly for a far greater share of their externalities than at present.

The future of pricing

70. The concept of users paying full external costs is laudable, but has serious implications for accessibility and social inclusion. The participation of lower income groups could be severely affected. The role of subsidies and the model of subsidy must be carefully defined and implemented in future transport solutions. In determining full external costs, defining the benefits that society derives from a trip is also a difficult and perhaps unmeasurable task. Despite the difficulties highlighted, however, this model offered the most widely accepted way forward.

71. Regardless of the rationale behind pricing for transport in the future, it is felt that the full spectrum of costs of travel by each mode should be made transparent. During the recent fuel crisis the level of fuel taxation was justified both in terms of raising revenue for public services and for discouraging excessive fuel use. Society will more easily accept transport costs if it knows why it is paying them.

72. Transparency of pricing will have to be introduced sensitively. Providing more information should make things better rather than worse (e.g. Byrne *et al.* found that drivers were unaware of their operating costs and that there was potential for a behavioural shift once this was addressed[44]). With technological advances, a proximity smartcard could log the full cost of a journey and compile a breakdown of costs according to fuel, parking, road access, etc. The system could update calculations according to real time conditions, e.g. congestion.

TRANSPORTATION REQUIREMENT 3

Users should pay the full internal and external costs of transport and these should be made transparent. Where appropriate, transport uses or users providing external benefits should be subsidised.

4 Environment

"In the provision and operation of transport systems the adverse effects on the environment should be minimised according to agreed principles and targets."

Context

73. The environmental impacts of transport have been recognised for many years. Environmental by-products of transport can affect noise levels, local air quality, levels of greenhouse gases, the landscape/ townscape, biodiversity, heritage of historic resources, etc.[45]

74. Action at a European level has brought about reductions in toxic exhaust emissions (for example, in 1993 when catalytic converters became mandatory)[46]. Local air quality often remains a concern though, particularly in urban areas. The Department of Health noted in 1998 that *"the deaths of between 12,000 and 24,000 vulnerable people are brought forward every year by the effects of air pollution from all sources"*[47].

75. Road transport is the third largest source (after industry and homes) of end user emissions of CO_2, an important greenhouse gas. CO_2 emissions are directly proportional to the fuel consumption of a vehicle. Limited improvements in fuel efficiency resulting from the production of lighter vehicles have been negated by more energy consuming add-ons (e.g. power steering) and the rise in traffic. Transport is one of the fastest growing sources of CO_2. The European Commission has negotiated an agreement with car manufacturers to reduce CO_2 emissions by 25% by 2008[48].

76. Noise and vibration have usually been seen as less significant issues than local air quality and climate change. Their impacts are not life threatening, but both can threaten quality of life considerably and vibration can cause substantial property damage. The main issues regarding noise pollution relate to reducing the noise at the tyre and road surface interface. Diesel engines are noisier than petrol engines and large goods vehicles and buses can therefore produce much greater and potentially more disturbing noise levels. Goods vehicles can also be noisy due to the vibration of the vehicle body or the movement of the load. Poorly sited freight operating depots can be a further source of noise disturbance. The night-time ban on large HGVs, which exists in many cities to protect residents from noise pollution, has had the effect of displacing HGV travel to peak daytime periods and thereby increasing congestion. There is limited action that can be taken to reduce motorcycle noise, as there is less ability to add cladding and other noise reduction techniques[49].

77. Less is known and written about the impacts of vehicles on the built and natural environments, although some elements have been quantified[50]. Nevertheless, the impacts of transport on these elements of the environment must be considered in the Government's New Approach to Appraisal (NATA) methodology via a scoring system.

78. More action is required to reduce the fossil fuel resource consumption of transport and the corresponding greenhouse gas

emissions. The United Nations' Intergovernmental Panel on Global Climate Change recommended a 60% cut in greenhouse gas emissions by 2050[51].

Renewable energy

79. In the future, zero or low-emission vehicles might be powered by sources derived from renewable energy and if so the principle concern is the pace at which transition is achieved. Some of the delay involved is caused by the need to wait for technology to mature. Another delaying factor is the wait for the development of the right market conditions for such technologies to compete against the internal combustion engine, which itself is becoming more efficient. Environmental problems will remain, however. Road building, for example, will continue to have environmental consequences, such as the loss of habitats and bio-diversity.

80. The use of suitable pricing mechanisms (as discussed in Section 3) should have a strong influence on take-up rates of new technologies. However, such pricing mechanisms can be used inappropriately. For example, there would be little point in encouraging drivers to switch to Liquid Petroleum Gas (LPG), on the basis that it is both cleaner and cheaper, if tax on LPG was then increased as soon as consumers switched fuels and revenues from petrol duty decreased.

Freight and air travel

81. Strong links between the environment, urban design and land-use planning are also evident. Better location of facilities and improved accessibility has the potential to reduce the need to travel, particularly by private motorised modes of transport. Reduced land-take for roads, reduced land-take for parking and reduced severance through lower traffic levels will all help to reduce the negative environmental impacts of travel. The draft revised PPG13[52] goes some way towards reflecting these issues, which are to be considered by the Network in the next report in this series.

82. Concerns remain over the environmental impacts of freight movement and air travel. Road freight vehicles have a much greater power requirement than cars and solutions for their use of renewable energy seem far off. However, some initiatives are emerging such as Sainsbury's solar powered refrigeration units installed on articulated vehicles which harness the power of the sun to keep fruit and vegetables fresh en route to stores[53].

83. Action to reduce the environmental impacts of air travel is long overdue and has to be taken at an international level. Continued expansion in this sector raises the prospect of a significant growth in emissions, principally at high altitudes.

84. The Network supports the idea of working towards targets in achieving environmental improvements, at least until the possibility of internalising all of the costs of transport becomes a reality, in which case targets will not be required.

85. The process of selecting the Best Available Technique Not Entailing Excessive Costs (BATNEEC)[54] is supported in achieving these goals provided the 'do nothing' costs are correctly represented for comparison. BATNEEC tries to balance the risks of taking no action or limited action with the need and cost of current preventative techniques to ensure the most effective and appropriate action is taken given the knowledge available at the time.

86. There is a strong interaction between the Environment Requirement and other Transportation Requirements defined within this document, particularly those concerned with Land Use, Accessibility and Costs. In the short to medium-term, environmental concerns are likely to have a major influence on transport policy. In the longer-term, with the possible advent of zero emission vehicles, concerns such as accessibility may have greater importance.

TRANSPORTATION REQUIREMENT 4

In the provision and operation of transport systems the adverse effects on the environment should be minimised according to agreed principles and targets.

5 Trip Type

"There should be discrimination and prioritisation between different types of trips and activities."

Context

87. The demands placed upon our transportation systems are derived from a range of journey purposes. Attempts to prioritise different trips and activities are fraught with complex difficulties but offer the prospect of improving the overall operation of our transportation systems.

88. Personal trip-making decisions vary according to a number of factors including:

- trip-maker characteristics (car availability, driving licence, household structure, income, etc.);
- trip purpose (commuting, education, shopping, etc.);
- time of travel (morning peak, off-peak, evening peak etc.);
- mode of travel (characterised in terms of travel time, monetary cost, comfort, convenience, reliability, security, availability and cost of parking, etc.);
- route of travel.

89. Historically, urban transportation modelling systems have considered the dimensions listed above and necessitated an understanding of them. However, the purpose of these models has typically been to reproduce observed traffic/passenger flows and subsequently forecast flows relating to future scenarios. This in turn enables policymakers to assess options for changes to the transport networks in terms of level of service and notably in terms of transport supply that can adequately accommodate projected transport demand.

90. Since our transport systems primarily serve the purpose of enabling the movement of goods and human participation in activities, thereby supporting the functioning of society, it seems reasonable that they should be designed and managed accordingly. In particular, transport supply should be managed in accordance with consideration of the relative importance of different trip purposes. The Table below reflects the relative contributions of different personal purposes (activities) to transport demand according to National Travel Survey data collected between 1991-4. Considered alongside this must be goods movements. Goods moved by road in 1999 in terms of billion tonne-km by commodity were: food, drink and tobacco – 41.5 (28%); bulk products – 40.1 (27%); chemicals, petrols and fertilizer – 13.8 (9%) and miscellaneous products – 53.9 (36%)[55].

Table 1. Average km travelled and number of journeys per week per person by journey purpose[56]

Purpose	Total kms	% of total	Total journeys	% of total
Commuting	37.4	18.7	3.2	15.8
Business	22.4	11.2	1.0	4.9
Education	5.6	2.8	1.3	6.4
Shopping	24.0	12.0	4.3	21.2
Personal Business	12.1	6.0	1.8	8.9
Visit Friends/Relatives	36.1	18.0	2.8	13.8
Social & Entertainment	20.8	10.4	2.0	9.8
Holiday/Day Trip	26.7	13.4	0.6	3.0

Commute and school trips

91. Traditionally, morning and evening peak periods have been considered the principal problems to address and particular attention is given in policy terms to commute and education trips accordingly. Currently, however, work activities (including learning) account for only one third of personal travel while social activities including leisure and personal business account for two thirds of personal travel. Non-work travel is increasing at the fastest rate[57].

92. Government policy within the Transport White Paper[58] seeks to address work-related travel and the school run. Legislation has been passed to enable congestion charging and workplace parking levies to be implemented and Travel Plans for Employers (formerly known as Green Transport Plans) are being promoted. Developments targeted at the school run aim to reduce the need for children to be driven to school by private motor vehicle by encouraging safer routes for walking and cycling and stimulating bus use.

93. Other measures that are being considered include escort schemes, before and after school clubs, adjustments to the school day, improvements to local transport services, traffic management and school facilities for cycling. Such policies are concerned with attempting to restrict further dependence on the car and to reduce, in particular, the number of single occupant vehicle trips by taking steps to encourage a redistribution of trips across alternative modes and means of travel. In effect, such endeavours are attempting to balance total transport supply and demand within an area. There is less concern about the relative importance of different types of trip-making or about the prospect of attributing priority to the transport needs of different activities in terms of either total travel, time of

travel or mode use. The Network considered a number of aspects of trip types in the context of prioritisation.

Trip distance

94. It would seem from the Government's ten year spending plan for transport that the Government has prioritised long distance travel in its expenditure plans, with two-thirds of investment targeted towards motorway, trunk road and rail improvements.[59] Increasing capacity on long distance routes across modes renders long distance travel more attractive and risks promoting longer commute, leisure, business and freight journeys. However, investment leading to capacity increases and reductions in journey time by road and rail might be beneficial in suppressing growth in inter-urban air travel. Long distance corridor improvements can also benefit local travel. For example, upgrading the East Coast Mainline and providing more capacity will benefit those travelling from Wakefield to Leeds[60]. The commitment to increased spending on roads in the Government's ten year spending plan for transport has re-ignited debate over whether road building supports economic competitiveness or whether it merely generates increased traffic and hence more congestion (as well as other adverse impacts) elsewhere on the network.

95. Concentrations of traffic problems, especially in urban areas, arise because of the vast number of shorter distance journeys. As noted in the Transport White Paper[61], *"nearly three-quarters of all journeys are under five miles and 45% are less than two miles. Even though many of us could walk or cycle these short distances, or catch a bus, we have increasingly used our cars – a quarter of all car journeys are now under two miles".* Fuel consumption and emissions per mile are lower over longer journeys than for short journeys – a car must travel several miles following a cold-start before the engine has warmed up to its efficient operating temperature. However, short distance journeys are arguably the most difficult to negotiate by public transport.

96. Public transport travel times for short journeys can be substantially higher than for those undertaken by car. Unreliability of service becomes proportionally greater as journey distance decreases – *"a bus being ten minutes late for a journey that would take ten minutes by car has a higher impact than a bus being ten minutes late for a public transport journey taking a total of four hours"*. The lack of a door-to-door service using public transport (excluding taxis) becomes more prevalent for shorter journeys. Public transport operations for short journeys are limited to mainly radial services to and from central urban areas. Lack of familiarity with local public transport services can be significant in discouraging use. The Network considered that for both long and short distance trips there would be some journeys for which public transport use would prove more efficient and should be encouraged. However, there will also be situations where public transport cannot offer an alternative service and this must be acknowledged and managed.

97. 'Long' or 'short' can be misconstrued as absolute or linear terms reflecting trip length. Trip 'length' is a function of cost, time and convenience. Modes differ in their cost structure, speed as well as their environmental impact. A commute of 50km by one mode might be just as environmentally friendly/unfriendly or time consuming as a commute of 5km by another mode.

Need versus desire

98. The Network considered at length the notion that some trips are necessary whilst others are desirable and that the former might be prioritised over the latter. Present policies seek to reduce or manage motorised travel in terms of its total volume or temporal or spatial distribution. There is little or no discrimination in terms of the underlying necessity for making the trip. Prioritising according to necessity could be used to discourage certain travel or to price it to reflect its impact on congestion and external costs. The concept has an appeal but, as with so many notions of policy, progressing from concept to reality reveals a number of underlying difficulties. In this case the principal difficulty becomes one of how to determine what constitutes a necessary trip or distinguishes it from a desirable one. However, current government policy on accessibility (discussed in Section 1) attempts to highlight a number of everyday facilities which should be available to all and this might be seen as a move in this direction.

99. Need relates to journey purpose but also to the extent to which the use of the car as a mode of travel is necessary. The RAC Car Dependence report[62] recognised that car trips exist within a range from those trips for which the car is the only viable option through to trips for which there are viable alternatives with very little justification for car use. For individuals with alternatives to the car at their disposal, car use is arguably a desire. Yet in contrast, a significant minority have little choice if they are to travel but to use the car. One can, for example, sympathise with the village dweller served by one bus every other day (although accessibility is being improved by measures such as the Rural Bus Grant, Rural Bus Challenge and 'hail and ride'[63]) who is forced into car dependence and for whom high fuel tax appears unfair. If, however, the same individual commutes by car into the city to work having moved to the village to enjoy an enhanced environment, then that person's car use might be deemed a desire rather than a need. One of the most fundamental causes of demand for travel is where we choose to live, work and play. Hence discriminating between essential and non-essential travel is further complicated by the requirement to address need and desire relating to medium to long term decisions rather than only on a trip-by-trip basis.

100. Alternatively, society might wish to prioritise desire over need. Regular, mundane trips (often in congested traffic conditions) which might be termed necessary such as the daily commute, the weekly visit to the supermarket or the school run might be the very trips we

would all prefer to see reduced. This would provide the capacity for (more) desire-motivated trips which (in terms of the associated activities), by definition, are those we tend to enjoy and which allow individual expression. The dramatic increase in air travel in the pursuit of sunnier climes for holidays highlights the increasing amount of leisure travel and suggests that such desirable travel is something society is not likely to readily relinquish, even though these trips are also taking place in increasingly congested conditions. Boring need-based travel might therefore be the priority for virtual alternatives (teleworking, teleshopping, etc.).

Temporal priority

101. The relative importance of trips should, perhaps, be based upon the importance of the activities for which they are being made and in turn priorities could be time dependent. For example, school trips might be given priority between 8.00am and 9.00am while freight might have priority from 6.00am to 8.00am. Freight trips made outside of the allotted 'necessary' period might then be discriminated against in price terms since they have become desirable rather than necessary trips (at least in a temporal sense). Individuals' resistance to this concept might be tempered by the knowledge that within a specific time band the transport network is cheapest and more efficient for their use whilst at other times the cost would increase. Equally, the cost of modal alternatives might be low when road costs are at their highest to encourage people to use the rail network; and vice versa for when rail is busiest or most expensive for example during a rail-freight priority band. (Of course, rail companies already use variable pricing mechanisms to distribute use across time.)

102. Such notions of detailed prioritisation prompt practical concerns over how to administer such a system. However, if the high expectations of telecommunications and Intelligent Transport Systems are realised then the capabilities of network monitoring and individual profiling should also exist. This would allow network operators to 'intelligently' judge the extent of necessity/priority for every trip a person makes based on their personal circumstances, the nature of the trip, the current availability of transport supply to meet demand and other factors. Each trip would then be priced accordingly. The origins of such considerations arise from a paper 'Infrastructure and Transportation in the 21st Century – Ever Increasing Circles?' [64] in which the authors raised the notion of slot booking for road trips alongside existing slot booking for other transport modes/nodes – air, ferry, freight depots, etc.

103. It might be argued that, increasingly, goods movement should be given a higher priority than personal mobility in terms of use of the transport network on the grounds that, until such time that we can teleport goods, there is no virtual alternative to their physical movement. However, this notion prompts equity concerns, for example, in terms of the potential to further inhibit opportunities

for personal mobility, particularly for the socially excluded. Inherent dangers might exist within attempts to increase the priority of goods movement. Short and longer term opportunities to encourage businesses to seek operational and distribution methods that rely less on road network capacity or its efficient use might be stifled. Movement of goods has evolved in terms of operational procedures and geographical locations as a result of unrestricted access to an expanding road network.

Benefits to society

104. Prioritisation should not address trip-making in isolation. It should consider the impacts of such prioritisation on social goals and values and be able to adjust its influence accordingly and in response to future changes in those values and goals. This would not be a trivial matter to resolve in practice. It could be argued, for example, that somebody's leisure journey, a long weekend away, is an unnecessary long journey. Yet, whilst it may be unnecessary for the traveller, for the hotelier that journey is essential. Leisure travel can reinvigorate work-weary individuals and thereby improve their morale and productivity levels. This observation might further bring into question whether society views leisure travel as necessary or desirable. The Network broadly supports the need to address discrimination and prioritisation between both trips and activities but recognises the inability to be more prescriptive until specific solution options to address such a need are considered in detail. A genuinely participatory democratic debate would be needed (in accordance with Transportation Requirement 11) to establish the relative priorities which the public might want to assign to different types of trip or activity.

TRANSPORTATION REQUIREMENT 5

There should be discrimination and prioritisation between different types of trips and activities.

6 Health and Safety

"Transport should not exacerbate the adverse effects of lifestyle on health and safety and should aim to reduce these effects wherever possible."

Context

105. Satisfying the need and desire to travel can result in adverse health and safety effects for travellers and society as a whole. In order to aspire towards safe and healthy travel and healthy lifestyles the way we travel and how much we travel must be assessed.

106. As stated in Section 4, up to 24,000 people are estimated to die prematurely each year while a similar number are admitted to hospital, because of exposure to air pollution, much of which is due to road traffic[65]. Motorists and their passengers are at most risk from exhaust fumes. Car drivers face pollution levels inside their vehicles that are two to three times higher than those experienced by pedestrians. Car commuters may receive more than a fifth of their total exposure to some pollutants from their daily journey to and from work[66].

107. Although serious road casualties have declined, many people are still killed or seriously injured on our roads (see Table 2 below) and in other transport accidents. Children and the elderly are particularly vulnerable. Accident statistics do not reflect the fear of accidents widely felt amongst pedestrians and cyclists, which in terms of its prevalence may not follow the trends in the Table below.

Table 2. Road accidents on all roads in Great Britain[67]

Year	Fatal ('000)	Fatal and serious ('000)	All severities ('000)
1989	4.9	58.2	260.8
1990	4.7	55.7	258.4
1991	4.2	47.9	235.9
1992	3.9	45.3	233.1
1993	3.5	41.5	229.0
1994	3.3	42.6	234.2
1995	3.3	41.7	230.5
1996	3.3	40.6	236.2
1997	3.3	39.6	240.3
1998	3.1	37.8	238.9
1999	3.1	36.4	235.0

108. We have been slow to recognise the impact that decisions about transport, land use and infrastructure have on health. Alongside impacts from air quality and road traffic accidents, car dependence encourages a sedentary lifestyle. Physical activity equivalent to 30

minutes (in total) of brisk walking on all, or most, days of the week provides preventative and protective benefits for a wide range of health conditions (including cardiovascular disease, diabetes, depression and osteoporosis). *Active transport* like walking, cycling and/or using public transport instead of car travel could have dual health benefits by providing physical activity and reducing the adverse health effects of motor vehicle transport[68]. Indeed, in 1999 the Government published its Making T.H.E. Links guide to developing local initiatives to promote walking and cycling in which it outlined the importance of joined up Transport, Health and Environmental initiatives[69].

109. Stress is on the increase and travelling to work contributes to the stress levels of most commuters. Stress contributes to heart disease, high blood pressure, and strokes and also affects the immune system[70]. Commuting is often stressful and tiring with long or difficult journeys. The rigid divide between the workplace and the home brings about competing demands and a poor work/rest-of-life balance[71]. In 1990 almost half the US population lived in 39 metropolitan areas within which 83% of people drove to work. 13% of commuters in the US had at least a 45-minute journey to work. In 1995, 26% of US commuters left home between 5am and 7am and a further 42% commuted to work between 7.00am and 8.30am. In Britain, 70% of people travel to work by car. 17% of workers spend between 40 and 90 minutes travelling to work[72].

110. Stressful driving conditions lead to, and are exacerbated by, 'road rage'. Road rage as a phenomenon has been somewhat sensationalised by the media. One study defines road rage as an incident in which *"an angry or impatient motorist or passenger intentionally injures or kills another motorist, passenger, or pedestrian, or attempts or threatens to injure or kill another motorist, passenger or pedestrian".* In this sense, road rage incidents can be distinguished from other traffic incidents by their wilful and criminal nature[73]. Incidents range in severity. 47% of British company car drivers say they have experienced the most common form of road rage, namely being subject to a verbal abuse or gesture. 45% say they have been tailgated by another vehicle[74].

Acceptable risk

111. In the light of the major concerns about asthma, especially amongst young people, air quality is a key health impact of the transport system. To those who do not suffer from asthma, a few days of bad air quality might seem tolerable. Similarly, if one's own children are not run over by a car then some risk in the transport network may seem acceptable. Should inherent risk in the transport system be acceptable now or in the future? Targets set within the Government's ten year spending plan for transport include; *"to reduce greenhouse gas emissions by 12.5% from 1990 levels, and move towards a 20% reduction in carbon dioxide emissions by 2010"* and *"to reduce the number of people killed or seriously injured in Great Britain in road*

accidents by 40% by 2010 and the number of children killed or seriously injured by 50%, compared with the average for 1994-98"[75].

112. In Sweden the Government has adopted *'Vision Zero'*, the long-term goal of which is that no one will be killed or seriously injured within the Swedish road transport system[76]. Although that will never actually be achieved, by aiming towards a zero target the authorities can justify far more radical measures. The extent to which risk is minimised depends upon society's willingness for this to be done and in turn the need to internalise the external affects associated with road safety as discussed in Section 3.

Transport as a solution – not the cause

113. It is tempting to lay the blame for certain health and safety problems on transport and yet, whilst transport might contribute to or exacerbate such problems, it is not solely to blame. Modern lifestyles and the pressures associated with individuals who are cash rich and time poor lead in turn to stress, tiredness and aggression. Such problems can eventually manifest themselves as a traffic accident, a confrontation between motorists or a child having an asthma attack. Transport is intrinsically linked to lifestyles and yet it should be possible to develop transport systems and policies so that they become part of the solution rather than the cause of health and safety problems. Opportunities themselves within this context are likely to be varied and provoke mixed views. For example, there could be merit in encouraging the one-third of households without a car to maintain their position on the grounds that the absence of a private car reduces sedentary behaviour and thereby promotes good health. Such a notion might fly in the face of other objectives to reduce social exclusion brought about by a lack of affordable mobility and Network discussions concluded that attention should be focussed on the larger proportion of the population whose travel behaviour needs to be challenged. Cycling and walking strategies represent key initiatives to render transport part of the solution. If we pursue a regime of prioritising trip types (as discussed in Section 5), care must be taken to ensure that this framework does not restrict opportunities for transport to improve health.

TRANSPORTATION REQUIREMENT 6

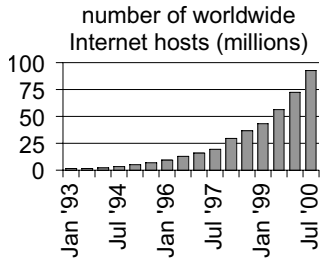
Transport should not exacerbate the adverse effects of lifestyle on health and safety and should aim to reduce these effects wherever possible.

7 Electronic Communication

"Electronic and other non-mobile means of communication should be considered as transport options and treated accordingly in policy and practice."

Context

114. Electronic communication now pervades our everyday lives and has the capacity to profoundly impact upon the operation of our transportation systems and our needs from them.



115. The rapid take up of home-based Internet access is likely to be accelerated by the predicted growth in television Web access, and the spread of connectivity: in the workplace; in cybercafés, and in community venues such as libraries and schools. In this context the Internet as a communications medium will become as commonplace in our lives as print media and the telephone. The number of worldwide Internet hosts has increased by 1400% between July 1995 and July 2000[77]. Third generation (3G) mobile phones signal the way ahead with a convergence of technologies such that we are likely to have in-home and mobile multi-media communications consoles. 3G phones are billed as representing *"videoconferencing in a taxi"* and *"sharing your Moroccan vacation with your friends – from Morocco"*[78]. Such technological advances are continuing to enrich the experience of virtual interaction, presenting an increasing range of opportunities to communicate and participate in society without the need for travel and face-to-face encounters.

116. At the outset, most new technologies are a luxury but over time they become more commonplace and are often subsequently considered a necessity. A home computer with Internet connection is no longer priced beyond the reach of the majority of the population. Indeed, the *virtual mobility* afforded by such technology can prove considerably cheaper to the individual than the price of motorised mobility and yet the former can also enhance accessibility enabling the individual or household to access information, goods, services and communities on-line. For many in society whose accessibility is limited by location or physical, financial, time or psychological constraints on mobility, the emergence of a new mode of travel – virtual mobility – might reshape their lives and the extent and nature of their physical mobility. The Network's first report, *Society and Lifestyles*, considered the potential role of the virtual commute in reshaping our future working lives, for example. However, the social needs and benefits of face-to-face communication should not be disregarded.

117. As electronic communication has grown so too have expectations concerning electronic commerce (e-commerce). E-commerce is defined as *"the buying and selling of goods and services, and the transfer of funds, through digital communications"* [79]. In 2000, 81% of UK businesses were 'connected'. 57% of businesses either allow their customers to order online or order online from their suppliers. However, two-thirds of those businesses that offer their customers the ability to order online find that the percentage of purchases ordered online is less than 10%. 34% of UK businesses either allow their customers to make payment online or pay their suppliers online[80]. E-commerce sales of goods and services in the US in the

second quarter of 2000 accounted for 0.68% of total sales[81]. In the US popular categories for online sales include books and CDs whilst low penetration categories include grocery shopping[82]. Expectations may at present be exceeding actual progress but governments around the world are convinced of the importance of e-commerce and its role in a global economy. Unmetered access to the Internet is likely to lead to exponential growth in Internet use and e-commerce in the UK. It is estimated that the market for home delivery will be 2.5-10% of UK grocery sales by 2005[83]. In 1999, the UK was the largest e-commerce market in Europe, with retail e-commerce estimated at £1.2 billion and business to business e-commerce estimated at £800 million[84].

118. Electronic communication can replace high street shopping and purchasing with the potential removal of personal shopping trips. However, the purchased items themselves must still be delivered. Views remain mixed concerning changes in the underlying travel related to goods movements. A report for the RAC puts the reduction in car shopping travel due to e-commerce at 10% by 2010 with only a slight increase (0.5%) in travel by delivery vans[85]. Meanwhile work in the Netherlands estimates that e-commerce will take a 10% share of the food products market by 2005 but that this will lead to the use of smaller vans instead of larger distribution vehicles for deliveries with an 8% increase in road journeys relating to business-to-customer e-commerce[86]. A DTI Foresight report also expressed concern about future inefficiency in deliveries amongst competing retailers leading to an increase in traffic[87]. As the Institute of Logistics and Transport has noted, *"no longer will the high street be the focal point for consumer goods deliveries; instead it will be almost every front door in the land"* [88].

119. It is clear that electronic communication is reshaping mobility and accessibility and is likely to significantly influence patterns of people and goods movements on our future transport networks. However, if fewer people use town centres then other social and safety problems could occur in the same way as with out-of-town retail competition.

Increasing efficiency of goods movement

120. As is often the case, the product or technology is essentially neutral; it is how it is applied which determines the nature of its impacts on society and travel. This observation was reflected in the mixed views of the Network concerning how electronic communication would impact on travel. In particular there appear to be distinctly different possible future scenarios for goods deliveries relating to e-commerce.

121. From an optimistic standpoint, a range of opportunities appears to exist for efficient deliveries of goods. If deliveries of individual orders destined for a particular area can be consolidated into one delivery batch then the number of delivery van trips can be reduced.

This would be particularly so if separate competing companies co-operate in the logistics of deliveries for mutual efficiency gains, as is already done by UK supermarkets whose deliveries are co-ordinated centrally by the industry's Institute of Grocery Distribution[89]. Opportunities for efficiency gains are likely to increase as the aggregate volume of goods distribution arising from e-commerce reaches a critical mass. However, even if, in the short-term, orders are individually delivered it will be easier to control patterns of commercial delivery trips than existing patterns of personal shopping travel. The prospect of a growth in community offices for teleworking raised in the Network's *Society and Lifestyles* report offers an opportunity for centralised delivery points within communities. This could minimise the presence of goods traffic in residential areas for all but the largest of deliveries. Similarly the Avon model[90] of local community distribution of e-commerce orders delivered to a 'community depot' might become popular for certain goods types. The logistics industry could be expected to be supportive of this type of initiative, since it would resolve the difficulties of being expected to deliver to every front door in the land.

Decreasing efficiency of goods movement

122. There was also a more negative view of the impacts of electronic communications. There was concern that all too often overly optimistic interpretations of the transport implications of emergent advances in information and communications technology are made. New technologies often stimulate naïve and ill thought out responses. The knee-jerk reaction to WAP mobile phones for example has been *"aren't they great and how powerful they will be in giving people more information on the move and enabling better travel choices to be made"*. The knee-jerk reaction may be the correct one, but the secondary and tertiary effects of such devices may exacerbate transport problems. Although the British Government in its sell-off of the third generation of mobile phone licences raised £22.5bn[91], it is interesting to note that a similar auction held by the Swiss Government for its three licences only attracted three bidders[92]. Presumably, telecommunications operators in Switzerland have had the benefit of hindsight in assessing the progress of WAP mobile phone technology elsewhere in Europe.

123. E-commerce might reduce the need for weekly shopping trips by car and increase the propensity to use public transport. However, with less time spent shopping, increases in other leisure travel might emerge.

124. Home shopping might lead to goods being transported over greater distances negating any ethos of local consumption of locally produced goods, which requires less transport and has the prospect of reviving local communities. It is unlikely that localised production and consumption will be able to survive in the face of e-commerce that will accentuate the dominance of effectively marketed popular brand products.

125. The efficiency of goods deliveries is questionable in an e-commerce scenario: *"When I go to town I might go to twenty different shops and buy something from ten and put them in my car – one trip there, one trip home. With e-commerce I buy something from ten different suppliers and ten different delivery vans deliver them."* Minivans driven by people who are unfamiliar with the access roads in residential areas are potentially harmful to the environment and to health and safety. However, if rivalry between businesses and the desire to use delivery van liveries as marketing devices can be overcome then the consequences of this scenario might not appear so bleak. The logistics industry might have an added incentive to support the development of local distribution centres (as mentioned previously) along the lines of the German 'City Logistics' model[93]. If such centres were developed as multi-modal interchanges (with connections to both road and rail networks) there would be considerable opportunities to replace a large number of long-distance road-freight trips with rail trips with a local fleet of smaller vans or lorries carrying deliveries of all goods into a particular town or area. This would minimise the number of vans required for the final leg of a freight journey from the rail-head to its end destination.

126. The nature of transport impacts is influenced by the nature of goods being distributed. Books and CDs, for example, are usually delivered by conventional postal services with minimal impact on residential deliveries. Such goods can be easily delivered through letter boxes whereas bulkier goods may require additional trips, as they often need to be collected from depots because of the impracticalities of home delivery during daytime hours. For goods such as clothing, consumers have a tendency towards comparison shopping and the return of unwanted goods is likely to be much higher with consequent implications for further delivery van trips.

127. The potential for 'abuse' of transport networks by Internet companies prompts the suggestion that there should be obligatory Travel Plans for such companies with the establishment of a supporting regulatory body. There was concern within the Network that most e-commerce firms are able to set themselves up without planning permission, the most common mechanism for delivering Travel Plans. There will be a need for greater planning controls over the physical infrastructure associated with e-commerce, such as distribution depots and data storage centres.

128. The extent of e-commerce penetration is unclear. It may remain a niche service for the few. The Office of National Statistics has indicated a distinct divide between the 'have-nets' and 'have-nots' with Internet access in lower income groups running at about 3% whilst in higher income groups it runs at about 50%[94]. However such higher income customers of e-commerce may be more inclined to expect prompt delivery of their orders at a convenient time in

return for a suitable delivery charge that could compensate in commercial terms for transport inefficiency of deliveries.

Virtual mobility as a transport option

129. A diversity of views was expressed concerning future impacts of electronic communications on lifestyles, business operations and in turn the transport system. However, there was widespread consensus within the Network, that whatever the impacts might be they would be significant and should be addressed by those involved in transport and land use planning and policy making. Moreover, both physical and virtual travel takes place to participate in activities. As such, whether it is a matter of roadwidth or bandwidth providing transport supply and capacity, both should be treated as transport options able to provide mobility and accessibility. Electronic communication, like physical mobility, also has the potential to reduce or exacerbate social exclusion and health effects.

130. Whilst the UK Government is keeping abreast of developments in electronic communications it does not appear to explicitly acknowledge the possibilities for virtual mobility to perform a role within an integrated transport system and encompass it in transport policy formulation and expenditure. The Transport White Paper states that *"we are committed to making fullest possible use of new technologies to deliver the New Deal for transport"*[95]. Yet within the Government's ten year spending plan for transport there is scant mention of the Internet at all beyond its role in delivering a national multi-modal traveller information service (Transport Direct[96]). The document notes only that *"the likely effects of increasing Internet use on transport and work patterns are still uncertain, but potentially profound, and will need to be monitored closely"* and that *"predictions of the effects of greater use of the Internet, of e-commerce, and of teleworking vary considerably"*[97]. However, the Government has sought to incorporate electronic communication in addressing the problems of rural communities and the rural economy through its Rural White Paper where virtual access to goods, services and markets forms an integral part of Government policy and strategy.[98]

131. If joined-up-government is a vision to be realised then the Network believes that transport policymakers must do more than acknowledge that electronic communication will affect transport. There must be an explicit inclusion of electronic communication in transport policy making and expenditure. By arguing that electronic communication be considered as a means of transport it is envisioned that decisions might in future be made whereby provision of more virtual capacity might be promoted ahead of investment in physical capacity, e.g. road building. In the future the vast majority of households will have computers with Internet access. Internet TVs can already be purchased for less than £200. Internet access and use could become the focus of subsidy as an alternative to public transport use. The Network is not suggesting that virtual mobility can offer a complete or satisfactory substitute

for physical mobility in all cases, but that in some cases it could perform a valuable role and should be accounted for and addressed accordingly in transport policy formulation.

132. Electronic communication is not unique to the Internet and should be treated more broadly as including all forms of non-mobile communications – in other words *non-corporeal mobility* or *non-mobile communication*. Policy formulation is about assessing options. Future transport models should explicitly include non-mobile communications alongside trip-making using walking, cycling, car, bus, rail, air, etc.

TRANSPORTATION REQUIREMENT 7

Electronic and other non-mobile means of communication should be considered as transport options and treated accordingly in policy and practice.

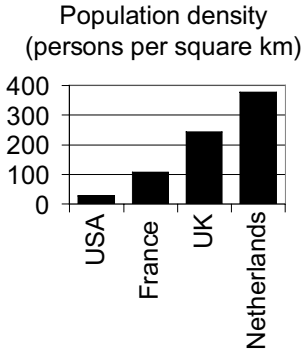
8 Land Use

"Land use efficiency should be maximised and net land take by the transport system minimised."

Context

133. Land use planning is concerned with the shaping and management of the environment in which we live. It plays an important role in sustainable development as it deals with the physical relationships between economic, social and environmental objectives[99]. Land use plays a key part in determining the nature of our transport systems. Principles applied in land use planning can help to promote better transport systems. Land Use Planning is the title of the subsequent report in this series in which the topic will be addressed in detail. In formulating Transportation Requirements, we have considered what might be the overarching aims of land use planning.

134. Studies comparing travel patterns in different areas show that[100]:



- distance travelled and use of the car decreases in areas of high population density;
- distance travelled decreases in areas with greater provision of local facilities;
- trips are shorter and made less often by car in large settlements (very large cities appear to be an exception where longer trips occur);
- within a city, trips made are shorter in the inner area, increasing towards the edge and decreasing again at the periphery where stand-alone towns are located;
- a lower proportion of car journeys are made by people living close to a bus stop or railway station; and
- trips are shorter and made less often by car in areas of compact mixed use (e.g. areas close to city centres).

135. The UK Government believes that *"by influencing the location, scale, density, design and mix of land uses, planning can help to reduce the need to travel, reduce the length of journeys and make it safer and easier for people to walk, cycle or use public transport"* [101]. Its planning policy guidance on transport (PPG13) sets out how the Government's objectives for transport and land use are to work together more effectively. The main points are:

- major generators of travel demand to be located near to public transport interchanges;
- local facilities to be accessible by alternatives to the car;
- housing to be accommodated in existing urban areas as far as possible with increased densities where accessible by non-car modes;
- rural housing, jobs, shopping, leisure and services to be located at local service centres; and

- parking policies to promote alternatives to the car. This involves the use of maximum parking standards.

136. The emphasis in the planning policy guidance is to ensure that there is a choice of access by a range of transport modes. This suggests that there is a clear link between land use and the accessibility considerations discussed in Section 1.

137. The Government's planning policy guidance on housing (PPG3) suggests ways to promote more sustainable residential environments[102]. Large new housing developments should be located around major nodes of public transport corridors. Mixed-use development such as flats above shops should be encouraged. The residential environment should be designed to be green and attractive. An efficient use of land is required with a greater number of dwellings per hectare. In general, the priority is for infills or urban/village expansions, rather than new settlements.

138. The Government's ten year spending plan for transport[103] reiterates that the role of planning policy is to produce more sustainable and less dispersed patterns of development which should help reduce the need to travel. It states that this can only make an impact in the longer term. Even with the policies outlined above, an area the size of Hertfordshire is anticipated to change from rural to urban uses between 1991 and 2016[104]. Nevertheless, the Urban Task Force anticipates that 60% of new housing required between 1996 and 2021 will be accommodated on recycled land[105].

Accommodating choice

139. The effects of land use on travel patterns are well studied. One Network viewpoint stemmed from looking at this relationship from the opposite point of view. In our pursuit of faster access to more places there is the need for more road space and easier access to the road network. This leads to lower building densities, pushing destinations further away, which in turn further increases the demand for more roadspace. The pursuit of speed leads to us trying to chase destinations that are getting further away – 'ever increasing circles'.

140. Car parking in the UK requires a land area twice the size of Birmingham. The average European city devotes 25-33% of its surface area to car parking and road space, compared to almost 75% in Los Angeles[106]. As with road building, increases in the amount of land used for car parking provision lead to low density development. Minimising the land take for parking can be achieved by a variety of means, including underground or multi-storey car parks, smaller vehicles, car sharing clubs and restrictive parking standards for planning permission. These have quite different implications for other aspects of travel.

141. There may be a limit on the extent to which land use planning and policy can influence people's choices on where they carry out activities. On an individual level, our decision of where to live is highly personalised. We want to live where we choose, or can afford to, and be serviced from there. Housing infrastructure is much more fixed to a location than service facilities. Much existing housing stock was built decades or even hundreds of years ago. Today it may have poor access to jobs and services. However, it is common for different members of the same household to work in different places so a motorised commute trip may be unavoidable.

Planning for e-commerce

142. The nature of goods distribution is being changed by the emergence of e-commerce as discussed in Section 7. Existing warehouses are being converted for use to distribute goods ordered via the Internet. Smaller distribution vehicles may be used to serve a large number of individual homes. As markets adjust, distribution networks will follow suit to operate in efficient ways that combine distribution efforts between suppliers. If e-commerce encourages consumers not to visit retail outlets for certain goods, then it is logical to presume that these retailers will see a 'surplus' in floor space. Re-distribution of space can be encouraged to ensure that no new space is required, i.e. supermarkets may become distribution centres supplying the e-commerce market. Given their easy access to transport networks, in edge-of-town/out-of-town locations, this is the logical location one would expect to find such distribution centres. The planning system needs to anticipate the advantages and disadvantages of e-commerce and act accordingly.

143. The role and purposes of green belts and other constrained land may need to be re-assessed with a view to achieving/developing a more sustainable pattern of development. There may be occasions when a development in the green belt may produce a 'net sustainable gain' to society. Reassessment is already occurring. For example, a study has taken place to assess how development until 2016 will occur for Cambridge. The study includes a fundamental review of the City's green belt where releases could occur to provide a more sustainable pattern of development. This approach is advocated in Regional Planning Guidance and is supported by PPG3[107]. The German Government has built a network of multi-modal freight terminals (GVZ Gueterverkehrszentrum[108]) in green-field sites across the country.

144. Network members felt that land use efficiency should be maximised whilst land take by the transport system needs to be minimised. However, these aims may not always be compatible with other objectives. An efficient transport system may require four railway lines, since one railway line might lead to an unreliable, slow and inefficient system. These four railway lines may themselves eliminate the need to build additional road space by displacing travel demand from road to rail. The problem of such conflicting

objectives might be reconciled if the aspiration becomes one of *optimising* land use efficiency and net land take by the transport system. However, optimisation is not likely to be easy to interpret, as it requires a suitable trade-off to be determined. A useful concept is that of 'net sustainable gain' development and 'net sustainable loss' development. The Network believes that it is more useful to talk in terms of net land take and not overall land take. Minimising the net land take of the transport system deals with broader issues of efficiency and not just quantity.

TRANSPORTATION REQUIREMENT 8

Land use efficiency should be maximised and net land take by the transport system minimised.

9 Reliability

"The reliability of the transport system and its operation should be regarded as a fundamental system management goal."

Context

145. The reliability of our transportation systems is a matter of fundamental importance for transport users and therefore measures that seek to specifically target the improvement of reliability have the potential to strongly influence travel choices.

146. Factors influencing the journeys that are made and the choice of transport mode used include: time; monetary cost; (un)reliability; (in)convenience; (in)security and (dis)comfort. Collectively these factors can be considered to reflect the generalised travel cost of a journey and this is widely used in studies to assess travel choices. As individuals, it is assumed that we all wish to minimise the 'cost' of a journey and make travel choices accordingly. Attributes such as monetary cost and time are tangible and measurable and often assumed to be of primary importance within a set of such attributes. Yet there is evidence to suggest that other attributes may be equally or more important. For example, a study of traveller-information requirements[109] which asked over 500 individuals to prioritise five travel factors yielded a collective response with the following rank order:

1. Reliability
2. Time
3. Convenience
4. Cost
5. Comfort

147. Reliability, as a priority for transport systems and travel, features heavily within the Transport White Paper[110]. It is recognised that motorists will not readily consider using public transport unless it is as reliable as private travel. Better management of the road network is vital to the improvement of system and individual journey reliability. Congestion and unreliability of journeys add to the costs of business with modern business practices putting firms at even greater risk from delay and congestion. *Just in time* production, for example, means that some companies no longer hold large stocks of raw materials, components or finished products on site, depending instead on their suppliers meeting their needs at short notice. Concern has been expressed that congestion can result in 'just in time' becoming 'just too late'[111]. The Government is keen to improve reliability for journeys across all modes.

148. The passenger rail industry uses punctuality and reliability within its measures of level of service. Punctual is defined by the shadow Strategic Rail Authority[112] as a train being within 10 minutes of the stated arrival time for inter-urban routes, 5 minutes for local routes and 30 minutes for sleeper trains. Reliable is defined as a train completing at least 50 percent of its scheduled route mileage. It is interesting to note that many transport operators, particularly airlines, have started to amend their timetables by extending the length of time set aside for each journey.

Consequently, unscheduled delays do not necessarily lead to a 'late' arrival, enabling the operator to avoid punctuality problems or penalties. The current advertised flight time from London Gatwick to Paris of 1 hour 35 minutes, for example, makes it the same as it was in the 1930s.

149. In November 1999 the Secretary of State for Transport announced a number of initiatives to improve the quality of bus services including new national targets agreed with the bus industry for reliability and investment. The detailed target for reliability was *"no more than 0.5 per cent of scheduled bus mileage to be lost for reasons within an operator's control (including peak hour congestion)"* [113].

150. The Government's New Approach To Appraisal[114] (NATA) has, under the heading 'economy', a sub-objective of reliability or, more specifically, improving journey time reliability for passengers and freight. NATA acknowledges the differing theoretical approaches to defining reliability. For public transport that has timetabled arrivals, reliability can be considered in terms of lateness and in turn consideration of average lateness and variability of lateness. For journeys by private road vehicles it is assumed that drivers are aware of average journey times including variations caused by factors such as different traffic conditions at different times of day. Thus reliability should be measured in terms of the unpredictable variability in travel times about these averages.

Justifying just in time?

151. Goods movement as part of the process of production and distribution is ultimately governed by cost. This includes the need not only to move goods quickly but also to do so in a scheduled manner with reliable delivery times. Hence, reliability of our transport systems in terms of goods movement should take a high priority in developing future transport systems. Yet, in taking just in time deliveries as a case in point, it is necessary to question whether such forms of goods movement are desirable and sustainable and if they should be supported within priorities for our transport systems. Indeed, such practices have been found themselves to exacerbate traffic problems – an article in the *Detriot News* claims that whilst the practice of just in time saves businesses money it adds 35% more lorries to the road network[115]. In Great Britain the amount of goods moved annually by weight has decreased between 1989 and 1999 by 8%. Over the same period goods movement in terms of tonne-kilometres has increased by nearly 13%[116]. Current practices in goods movement would appear to run contrary to sustainable development.

Reliable passenger transport

152. When considering a journey, individuals have different priorities in terms of the different attributes of travel. Some people will value cost more than time whilst others will value reliability more than security. Nevertheless, reliability features highly at a collective level. It might arguably hold the key to improving the effectiveness of

traffic management. Reliability facilitates prediction of conditions on the transport network. Many traffic management initiatives are aimed at developing responsive systems in an attempt to cope with unreliable and unpredictable conditions. A reliable transport system reinforced by effective management would empower travellers to make more informed decisions, less influenced by possibly distorted perceptions of reliability and travel times across modes and services.

153. Achieving journey time reliability might be at the expense of other attributes of a journey, notably journey time itself. Such trade-offs have to be considered when attempting to improve bus reliability. Without a comprehensive system of bus lanes, reliability in times of congestion can only be achieved by increasing dwell time at stops. Passengers will often resent dwell time just as much as they will resent unreliability. Reliability is likely to depend upon the availability of spare capacity in the transport system that can be used to absorb unforeseen events or incidents. For example, a three-lane motorway might operate using only two lanes and the third lane would only be brought into operation to restore full capacity in response to an incident. Such notions again present the prospect of a trade off between journey time reliability and journey time. It might become a choice between the system, which provides at its best a six-hour journey but has the risk of a ten-hour journey, or the system, which provides a certainty of an eight-hour journey on every occasion. Indeed, if the issue of float time added to a journey because of a lack of reliability is considered, by introducing a more reliable but possibly slower transport system, there is a potential opportunity to reduce float times. This could lead to an overall reduction in total time set aside for a journey.

154. In pursuit of a reliable transport system it may be argued that increased infrastructure capacity is required. In certain circumstances this may be appropriate but should be considered within the framework of the other guiding principles and recognising that increased infrastructure provision generally creates extra demand for travel.

Reliability and system operation

155. The variable speed limits on the M25[117] are an example of a counter-intuitive measure that gains support because it benefits those who are being asked to compromise. By individuals reducing their speeds the system is in fact able to operate more efficiently (and reliably) and subsequently the journey time is reduced.

156. Substantial research and development has been invested in the pursuit of real-time information and telematics. Yet consider what has given rise to the need for such 'solutions' – the transport system is unreliable. In a perfectly reliable transport system scheduled time and real-time would become one and the same. It might therefore be argued that to tackle reliability is to prevent the problem whilst to

tackle real-time information provision is only an attempt to alleviate the problem.

Reliability as a priority

157. The Network expressed some concern that prioritising reliability might overshadow and compromise other aspects of transport system operation and level of service. Trade-offs are perhaps inevitable although illustrations of improved reliability delivering benefits rather than disbenefits to other aspects have been touched upon. The intention is not to ignore other aspects, but to recognise the prospect of a reliability-based system producing a step change in system design, usability, efficiency and satisfaction. Pursuit of a reliable transport system might necessitate coping with short-term problems as capacity of the network is perhaps reduced with a greater imbalance between transport supply and demand. Likewise in the short-term businesses might be forced to rethink their approaches to the production and distribution process, but with the prospect of longer-term gains with the improved certainty of distribution planning and management.

TRANSPORTATION REQUIREMENT 9

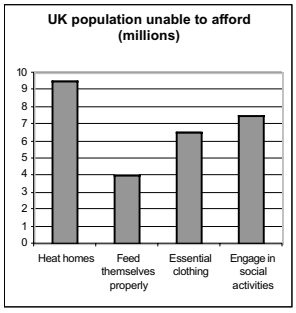
The reliability of the transport system and its operation should be regarded as a fundamental system management goal.

10 Social Participation

"Transport should not exacerbate problems of social participation and should aim to reduce these problems wherever possible."

Context

158. This Section considers the relationship between transport and social participation and assesses how the future development of transport systems should take particular note of this. Social exclusion is a topic that has gained greater recognition in transport policy in recent times. According to the Countryside Agency[118], *"social exclusion is multi-dimensional, describing what happens when people are unable to participate in the civic, social, economic and cultural opportunities that most take for granted. It incorporates a range of experiences, relating, for example, to income and poverty, education, employment, health, housing, access to services, and relationships within families and with the wider community".* The DETR has developed an Index of Multiple Deprivation[119] based on six 'domains' of deprivation: income; employment; health deprivation and disability; education skills and training; housing; and geographical access to services.



159. The links between social exclusion and transport have been examined and seven categories of exclusion have been identified that may limit mobility[120]:

- physical exclusion – physical barriers to services;
- geographical exclusion – a relative lack of transportation provision;
- exclusion from facilities – lack of access to facilities because of time and income constraints in the use of transport services;
- economic exclusion – income and transport network constraints for accessing information about training and employment opportunities;
- time-based exclusion – the difficulties of organising child care and other caring commitments to allow time for travel;
- fear-based exclusion – 'fear' of using transport; and
- space exclusion – security and space management strategies that discourage certain individuals from using transport services.

160. Nearly a third of households in Britain do not have a car – some 13 million people[121]. The numbers who rely on public transport, walking or cycling is even higher because in those homes where there is a car not everyone has regular access to it. In some places, poor public transport and lack of a car are significant contributory factors to social exclusion. Most users of public transport rely on buses to get about. Bus users have had to face fares rising by almost a third in real terms since 1980.

161. The Transport White Paper includes objectives for tackling social exclusion[122]:

- tackling isolation in the countryside;
- tackling the transport needs of women, disabled and elderly people and people on low incomes;
- through traffic management, calming and reduction reuniting communities cut in half by traffic;
- monitoring the impacts of policies on different groups in society;
- producing better public transport and easier access to workplaces and other everyday facilities for all, especially people on low incomes;
- reducing the need to travel through better planning and technology
- reducing the fear of, and level of, crime on the transport system; and
- promoting better conditions for those working in transport.

162. The Government's New Approach to Appraisal (NATA) requires account to be taken of the following criteria relating to social inclusion under the heading of accessibility (as mentioned in Section 1): (1) access to the transport system (a measure of the number of people who have access to a car or live within 250m of a daytime hourly public transport service); (2) severance; and (3) option values (availability rather than use of a transport service). For the multi-modal studies of problems on the trunk road network, the Government requires that a supporting analysis is carried out to show the distribution of the overall impacts. The analysis is assessed so that a judgement can be made about the fairness of their impacts across those affected by the strategy or plan[123].

163. The Network considered the role of transport in enhancing social participation. One argument is that as long as mobility costs money those in the higher socio-economic classes can always afford more than those at the other end of the spectrum can. There will always be a proportion of society who will be involuntarily excluded from transport services. This suggests that the best way of tackling social exclusion is to provide the opportunity for everyone to have a reasonable income.

164. Where there is failure to ensure everyone has a reasonable income, there are different ways in which transport policy can play a part in promoting social participation. It can facilitate social inclusion by providing for a reduced need for physical mobility and encouraging greater use of non-private motorised transport. These

are overall ambitions that serve a number of different goals (social inclusion, economy, environment, etc.).

165. People on low incomes are disproportionately public transport dependent and as a result are more affected by transportation service delivery problems. Many of these people live in inner city areas. Although they may develop close networks with people in their local area and some essential services may be located nearby, they can also face particular challenges in accessing jobs, supermarkets, places of worship, parks and other basic needs. It is important to tackle transportation equity as a priority instead of automatically adjusting to the 'new' needs of suburban dwellers. There could, for example, be legal standards specifically laying out transportation equity performance measures that must be met for transportation projects to receive authorisation and funding.

Pursuit of access

166. As our society becomes wealthier over time, those on lower incomes who cannot afford cars are left further behind. They are unable to access training and compete effectively in the job market. One option is to give those on lower incomes cheaper access to a car. This, however, would help to perpetuate our overall dependency on cars and obstruct attempts for a transition from a mobility-orientated society to a society where mobility is not so important. It should also be remembered that some people are unable to drive a car. For example, young people, old people, disabled people and those who have been unable to acquire/retain a driving licence. A better option might be to stimulate localised employment and services. For instance, provision of a mobile library may improve access more effectively (and possibly more cheaply) than provision of bus links from the relevant settlements to the nearest town.

167. National Transport Tokens Limited[124] offer a transportation currency that may be used to purchase travel on buses, trains, trams, ferries and taxis (subject to the policy of the local authority distributing travel 'subsidies'). Recipients of the currency have a choice in terms of how they convert this currency into mobility, unlike a bus pass. A concern of this approach is that it may have a stigma attached to it in the same way as for school children with meal tokens or for asylum seekers with vouchers. The universal use of smartcard technology, however, could address this concern, as it would be completely discrete, rendering anonymous the use of subsidised cards.

168. It is recognised that on its own transport cannot solve all social, economic and environmental problems. There will often be a trade off between positive environmental or economic impacts and negative social inclusion impacts. This could be compensated for elsewhere in society. For example, congestion charging is likely to bring about environmental and efficiency benefits, but in the absence of compensating mechanisms could also compound social

exclusion. Congestion charging revenue could be spent on increasing minimum wages, investing in deprived communities, targeting education blackspots, etc. This could provide more social participation benefits than insisting, for example, that the revenue be spent on building a tram link to a deprived community. Viewing transport in a fuller social context and talking about the possibility of complementary measures enables us to tackle transport problems without expecting to cure all ills.

169. Affordable and convenient public transport and other alternatives need to be available, but not just to the socially excluded. Society's travel patterns should be tackled as a whole and not divided into socio-economic groups. Addressing the impacts of the socially included majority, whose travel behaviour has the greatest impact on traffic congestion, is probably of greater importance. Nevertheless, people who are *not* considered to be socially excluded may experience similar accessibility problems to those who *are* considered to be socially excluded. For example, a busy parent taking their child to school.

170. The Network believes that transport on its own is not to blame for social exclusion but it should not make matters worse and it should improve things where possible. Technology is seen by many as a tool to tackle social exclusion. For example, the Internet could provide remote access to services that are not available physically. Caution is required here because many aspects of participation will not be able to be addressed by new technology. Physical interaction with other people will remain an important element of social participation.

TRANSPORTATION REQUIREMENT 10

Transport should not exacerbate problems of social participation and should aim to reduce these problems wherever possible.

11 Stakeholders

"Stakeholders should play an integral role in the entire life cycle of problem identification, solution formulation, implementation and evaluation."

Context

171. The role played by stakeholders in the future development of transport systems is an important issue for the acceptability of new solutions. According to a survey of British social attitudes[125], public awareness of transport problems is much greater than its willingness to support measures aimed at relieving them: *"Attitudes towards transport still suggest that our overall concern about congestion and pollution, while significant, is not strong enough to translate into support for policies acting as 'sticks' in order to reduce car use and move people towards greater use of public transport. People are more likely by far to support 'carrot' policies to encourage such a change in behaviour, in particular reductions in public transport costs and improving service quality… Opposition to 'stick' measures in transport lessens if these seem well targeted – as in the case of peak-hour charging for drivers in urban centres."*

172. Involving local people, businesses, environmental interest groups and transport users and operators in their planning and development may increase the acceptability of new transport measures. In its Transport White Paper[126] the Government set out how it would involve the public in developing transport policy. The aim is for *"local people and business to have a real say and real influence over transport".* It says *"we will expect local authorities when preparing their Local Transport Plans to consult widely and involve their communities and transport operators in setting priorities for improving transport. In approving local transport plans, we will want to be sure that they fully reflect this consultation and that the views of local people have made a difference".* Also the Government committed itself to work with local authorities to increase the take-up of Green Transport Plans (now known as Travel Plans for Employers). These are travel plans aimed at reducing car use for travel to work and for travel on business. They are to be achieved through partnerships with local authorities, business and the wider community.

173. In the multi-modal studies of problem locations on the trunk road network, it is required that stakeholders are involved as part of a planned programme[127]. This is to involve: (i) provision of information to the public of plans and developments; (ii) consultation where views are sought at particular stages and fed back into the development process; and (iii) participation of stakeholders through a steering group directly involved in the development process.

174. The media can play an important role in influencing public opinion on transport matters. With the need to have public support for transport policy, it is important for policy makers to secure positive coverage from the media on their initiatives. The Public Relations side of transport planning has historically been neglected and policy makers need to be very careful to supply the media with information at appropriate stages in the planning, development, implementation and evaluation of an initiative.

175. The Network considered how best to involve the public in transport policy development. There are two viewpoints. The first viewpoint is that consultation is important because the stakeholders have first-hand experience of local transport problems and without their input the solutions may not be well founded. Participation in decision making is also important so that stakeholders share ownership of the decisions affecting their lives and are keen to ensure they work. The second viewpoint is that people have a tendency to defend the way of life they know. They cannot be expected to fully appreciate the need for change and to come to terms with the time needed for change to happen and achieve benefits. By taking heed of their views there is a risk of having misguided policies. Consultation should not be devalued by unnecessary use or by becoming a method of abdicating political responsibility. Professionals and politicians should present a balanced view and not be influenced by local issues or short-term gains and they must continue to take the lead on some issues. The second viewpoint reflects a wider debate about the role of government in a democracy – whether its job is to follow public opinion or to lead it. This question is particularly relevant in the case of issues like transport, where there are apparent contradictions between people's personal preferences ("I want to drive my car") and their collective or political preferences ("I wish the government would do something to reduce the number of cars on the road").

Consultation versus education

176. Educating the public about transport is a difficult area. Who decides on the issues? Who decides what viewpoints to discuss? Who is qualified to do the educating? Education about transport in schools could be useful, but it would have to compete in an already packed curriculum. Consultation is a means of raising transport issues with the public and encouraging them to think about the implications of different policies. Greater advertising of non-car transport could also play a role in encouraging the public to think about transport more broadly.

177. In defence of the first of the two viewpoints identified above, consultation can result in relevant issues being identified by the stakeholders. It is often the case in local situations that the 'uneducated' public have a better knowledge of the situation than the professionals and politicians and are able to 'educate' them. If the stakeholders are made aware of fundamental problems through public consultation, difficult political decisions should be easier to make.

178. It is costly, challenging and requires political will to carry out a satisfactory and effective consultation process. Many people will not take an interest in an initiative until it is about to become a reality, by which time it can be too late. Grabbing attention is half the battle and not always something that decision makers may be keen to do. With any consultation there will always be people who

complain that they did not get their say and people who get the impression that decisions were made without consultation. This indicates the importance of publicising the results of the consultation process. These points suggest a more effective form of democratic inclusion would be to ensure that rather than just consulting, opportunities are available for public 'participation' in the development of policy.

179. Local decision makers can have great influence but will be constantly concerned about economic competition with adjacent areas. Transport problems affect areas larger than just the immediate local vicinity, as even a simple journey to work is likely to cross-jurisdictional boundaries. This suggests that transport solutions must often be considered at a regional and national level. Determining methods of involving stakeholders in regional and national decision making is a major challenge. It is important for Government to develop transport policy using a coherent 'top down' approach to set an agenda within which local decisions can be considered.

180. The Network believes that the involvement of stakeholders is required in the full life cycle of solution development. In particular, they should be involved in the most easily overlooked stage of the process, namely the evaluation of solutions. Stakeholders have a valuable role to play in identifying successes and/or weaknesses in a policy or project, such that lessons for the future can be picked up by the politicians, transport professionals and stakeholders themselves. The inclusion of the term "life cycle" in the Requirement below is an explicit acknowledgement of this feed-back mechanism. The implication is that the process is circular *not* linear.

TRANSPORTATION REQUIREMENT 11

Stakeholders should play an integral role in the entire life cycle of problem identification, solution formulation, implementation and evaluation.

12 Information

"Transport users should be enabled and encouraged to make fully informed choices."

Context

181. The increasing volume of information present in our lives suggests that information should have an important role in the future development of transport systems. Individuals make travel choices based on their perceptions of the relative merits of alternative options. Information influences their perceptions. Telecommunications technology provides new opportunities for disseminating travel information. In the Transport White Paper the Government set out its ambition to create a nation-wide public transport information system by 2000[128]. Meanwhile, the Highways Agency is establishing a Travel Information Highway which will pool data for use by the public and other interested parties[129]. More recently, the Government has launched the Transport Direct[130] project which aims to help people plan journeys, compare routes and prices and book multi-modal journeys using the Internet.

182. Concerns have been raised that lack of public transport information may be a self-perpetuating facet of car dependency. When people stop using public transport services, they lose their knowledge about the services on offer. As a result, they may be reluctant to revert to public transport either because they do not wish to make the effort to find out what services are available, and/or because they assume that the public transport option is worse than it really is. High profile and easily accessible public transport information is therefore needed to overcome these obstacles.

Informed decision making

183. Given the developments in information systems, it is important to reflect on how information is used by people. For most journeys people do not review their choices. They may only review them when there is some kind of disruption. Searching for information is time consuming and people are reluctant to look for it unless absolutely necessary. When people think about making a new type of journey they are most inclined to look for information. In choosing between options people consider a number of factors (e.g. monetary cost, duration, reliability, need to interchange, comfort, etc.). It is an enormous challenge to supply the full range of information sought by different individuals. Another point to remember is that a long-term choice, such as purchasing a rail season ticket, influences the scope for future choices.

184. Information is of little use in increasing the use of a transport mode if its service is poor compared to other modes. Information can play a valuable role, however, in drawing people's attention to a new option or an enhanced option. A future can be envisaged where multi-modal journeys can be planned and arranged through a widely accessible system. The system could provide details of the price of travel including a breakdown of the different costs (e.g. fuel, labour, administrative, environmental, etc.) and could provide a through ticket from front door to destination.

185. People make many lifestyle decisions that constrain their travel opportunities. The implications of these decisions need to be brought to people's attention through information. In general, people only consider alternatives at certain points in time, for example, when they start a new job. Pro-active efforts need to be made to identify these opportunities before they happen and act upon them with the provision of appropriate information. When people are contemplating a potential new journey they are likely to be thinking not only about travel considerations but also about other considerations of the activity they are planning. For example, during what hours is the activity possible? Travel information needs to be combined with other relevant information so that better decisions can be made.

186. The Network felt that there should be a Requirement concerning information and the ability of people to make informed transport choices. In a good transport system information should be accessible to everyone. Using the information should be optional but it should be available. Users should be encouraged to make informed rather than misguided choices.

TRANSPORTATION REQUIREMENT 12

Transport users should be enabled and encouraged to make fully informed choices.

Conclusion

187. This report has set out what the Network believes should be the guiding principles that shape the future of transport in the UK. It comes as no surprise that some of the twelve Transportation Requirements that have been identified bear a strong resemblance to current Government policy on transport. Indeed, it would be cause for concern if it had been otherwise. Nevertheless, the Network has established its own variations and differences of emphasis. These have been explored within the report and reflect to some extent the longer-term view that the Network is able to take. In drawing this report to a conclusion, therefore, it is appropriate to present all twelve Transportation Requirements and to briefly indicate the extent to which we believe they are consistent with current Government policy objectives. The following indicators are used:

 – Highly compatible with Government policy emphasis

 – Some commonality with Government policy emphasis

 – Distinctly different to Government policy emphasis

Requirement 1

 *"There should be an equitable distribution of access to a range of key real and virtual destinations that support people's quality of life."*

188. Government policy is to promote accessibility to everyday facilities, particularly for non-car owners. The Transportation Requirement above is not specific in singling out car owners and non-car owners. Equitable accessibility to real destinations supports the need for local facilities available to all. The role of virtual access in supporting quality of life takes account of the potential to replace some physical activities with electronic substitutes. Government policy at this stage does not strongly address the role of virtual access despite the Government's interest in securing unmetered Internet access as a way of increasing Internet use.

Requirement 2

 *"The absolute level of resource use for transport activities should be controlled and the resource efficiency of mobility should be maximised."*

189. The term 'sustainable development' is much used in recent UK transport policy documents. However, there is no clear definition of what the term means with respect to transport, and in practice the term is often applied to policies and projects that are merely 'less unsustainable' than continuing with past practice. For instance, the Government's ten year spending plan for transport[131] expects to achieve a reduction in greenhouse gas emissions from the transport sector, but the target reduction falls some way short of the 60-80% reduction advocated by the International Governmental Panel on Climate Change[132]. The Government's ten-year spending plan for transport goes some way towards the Transportation Requirement for resource efficiency by advocating cleaner fuels and more efficient engine technology. It contains no traffic reduction targets, however, and it predicts/sets targets for growth in the use of virtually all transport modes. This Transportation Requirement recognises that resource use must be managed to safeguard the quality of life of future generations. Maximising mobility efficiency is similar to making the best use of transport networks (Government policy) but more strongly implies making the best use of the modes within them.

Requirement 3

☹ *"Users should pay the full internal and external costs of transport and these should be made transparent. Where appropriate, transport uses or users providing external benefits should be subsidised."*

190. Current taxation policies for transport do not yet represent an internalising of external costs of transport, since the Government has not endorsed any estimates of these costs. Emphasis has been placed on the role that differentiated fuel taxes have on encouraging use of more environmentally friendly fuels and how high fuel prices reduce climate change gases. However, mixed messages regarding the purpose of such taxes (e.g. as revenue raising mechanisms for other public services) have also been presented. The need for transparency is a new element to the discussion on costs. Future road pricing schemes with ring-fenced funding may offer a step towards achieving this Transportation Requirement. The principle of 'hypothecation' (whereby revenues from transport charges are linked to expenditure on more sustainable transport projects) has gained limited ground in UK transport policy in recent years. The Transport Act (2000)[133] gives local authorities powers to levy workplace parking or congestion charges, which will be ring-fenced for spending on integrated transport projects. Increases in fuel duty were also to be ring-fenced for integrated transport expenditure, but the Chancellor has now ruled out any such increases until at least 2002.

Requirement 4

😐 *"In the provision and operation of transport systems the adverse effects on the environment should be minimised according to agreed principles and targets."*

191. New methods of appraisal recently developed have provided a more satisfactory way of incorporating a wider range of environmental concerns that previously had not been fully considered. However, clear principles and targets have only been established in respect of air quality, although the requirement to carry out assessments of other impacts (noise, biodiversity, landscape) clearly helps to focus attention on measures to minimise adverse impacts in the context of individual transport projects. Despite the Government's domestic and international commitments on greenhouse gas emissions, carbon dioxide and other greenhouse emissions from transport are set to rise under the Government's ten year spending plan for transport[134], and no targets have been set for controlling these.

Requirement 5

😐 *"There should be discrimination and prioritisation between different types of trips and activities."*

192. The Government has policies targeted at specific trip types as evidenced by legislation to enable charging for workplace parking to reduce car commuting and by the encouragement given for developing safer routes to school to reduce car-based school escort trips. However, in terms of allocating transport system supply across the (competing) trip and activity types that comprise travel demand there is little if any attempt to prioritise.

Requirement 6

😐 *"Transport should not exacerbate the adverse effects of lifestyle on health and safety and should aim to reduce these effects wherever possible."*

193. Britain has one of the best road-traffic safety records in Europe. Current policies recognise the health implications of transport beyond the single issue of road traffic accidents. There is, nevertheless, much more scope for improvement in this area with a need for transport to play its part in recognising and addressing the consequences of sedentary, busy and stressful lifestyles. For example the British record on road safety may be influenced to an unquantifiable degree by the fact that the perceived danger on Britain's roads deters many people from walking or cycling, and in the case of parents from permitting their children to do so. This may have contributed to low levels of pedestrian and cycling activity, and hence an absence of the potential health benefits from the use of these modes. Whilst the Government's Transport White Paper and guidance on Local Transport Plans recognise the health benefits of

promoting walking and cycling, they receive limited support in the Road Safety Strategy and the ten year spending plan for transport[135].

Requirement 7

☹ *"Electronic and other non-mobile means of communication should be considered as transport options and treated accordingly in policy and practice."*

194. The DETR acknowledges that electronic communication is likely to have an increasing influence but does not explicitly acknowledge the possibilities for virtual mobility to perform a role within an integrated transport system and encompass virtual mobility in transport policy formulation and appraisal. The Government's planning policy guidance makes little reference to electronic communication. By contrast, European policy on Trans European Networks[136] (TENs) places electronic networks alongside road, public transport and pipeline networks, in a clear acknowledgement of their potential importance for transport policy.

Requirement 8

😐 *"Land use efficiency should be maximised and net land take by the transport system minimised."*

195. In its land use planning policy, the main emphasis of the Government is on increasing the accessibility of places to modes other than the car. Land use efficiency is one of Government's criteria for promoting more sustainable residential environments. The Government, however, has made no explicit policy commitment to curbing future land take by the transport system. The Transportation Requirement above adopts land use efficiency as a more general principle. Additionally, it is specific about the issue of net land take. It remains to be seen whether the forthcoming revision of the Planning Policy Guidance on Transport[137] (PPG 13) and the associated guidance on Local Transport Plans[138] will deliver adequate mechanisms to achieve these policy objectives.

Requirement 9

😐 *"The reliability of the transport system and its operation should be regarded as a fundamental system management goal."*

196. The Government, notably within its new approach to appraisal[139], identifies reliability as an objective in considering future transport options and the Transport White Paper[140] gives the issue repeated attention. Reliability remains, however, one of a number of competing objectives within the policy framework. The Network advocates a more forceful stand in promoting the need for reliability to underpin all other objectives.

Requirement 10



"Transport should not exacerbate problems of social participation and should aim to reduce these problems wherever possible."

197. The Government is seeking to promote social inclusion with a variety of objectives across and within its different departments. For example, a variety of transport objectives set out in the Transport White Paper[141] are aimed at promoting social inclusion. The Transportation Requirement above seeks to provide a unifying objective for social participation which can help to prevent conflicting initiatives being pursued.

Requirement 11



"Stakeholders should play an integral role in the entire life cycle of problem identification, solution formulation, implementation and evaluation."

198. The Government requires public consultation in Local Transport Plans and Development Plans and stakeholder participation in the multi-modal studies. The Transportation Requirement above sets a stronger framework arising from the belief that stakeholders must be part of solution development. They have something unique to offer and through sensible, and in many cases targeted, consultation there is a much greater chance of a successful outcome.

Requirement 12



"Transport users should be enabled and encouraged to make fully informed choices."

199. The Government's Transport Direct[142] initiative is establishing the way towards a multi-modal journey planning system, incorporating real-time information and booking/ticketing capabilities. The Transportation Requirement above highlights the view that information should play a more fundamental role in influencing people's travel decisions. It should bear not only on journey planning decisions but also on decisions on the location of homes and, where applicable, businesses. Our Transportation Requirement means that travellers should use transport information not in isolation but in combination with other information that could influence their short or long-term travel decisions.

Transport 2010

200. It was timely that, during the course of the Network formulating its views on Transportation Requirements, the Government's ten-year spending plan for transport, *Transport 2010*, was published providing further indications beyond the Transport White Paper of Government priorities for the future[143]. Whilst the Network has not sought to formulate detailed reactions to the document we were anxious to consider if its objectives were likely to create favourable circumstances for our (longer term) Transportation

Requirements to be fulfilled. The following text provides a brief interpretation.

201. The Government's ten year spending plan for transport includes a strong emphasis on infrastructure investment which implies pursuit of greater ease of travel and increased, or at least sustained, possibilities for exercising mobility. Whilst such investment should assist in prioritising transport system reliability (Requirement 9) the fact that virtually all modes have either targets or predictions for increased travel must mean that resource use for transport will increase, potentially conflicting with Requirement 2. The plan includes a target to *"reduce congestion on the inter-urban network and in large urban areas in England below current levels by 2010 by promoting integrated transport solutions and investing in public transport and the road network"*. We consider that this could be construed as a policy of multi-modal predict and provide. This would be likely to prove unsustainable in the longer term.

202. As noted earlier in this report the plan pays scant attention to electronic communication as something with the potential to reshape or substitute for physical mobility (Requirement 7). Whilst it acknowledges that *"social and technological changes will also alter patterns of behaviour in unforeseen ways",* this is an area warranting more explicit attention and potential investment in view of the longer term consequences.

203. Inevitably, economic considerations are a principal element in the formulation of a £180 billion spending plan. An underlying objective is the need to promote the competitiveness of British business and the economy. A number of our Transportation Requirements might arguably compromise this underlying economic objective: providing equitable accessibility (Requirement 1), controlling transport resource use (Requirement 2), paying the full costs of transport (Requirement 3), minimising adverse environmental impacts (Requirement 4), discriminating trip types (Requirement 5), improving health and safety (Requirement 6), controlling land used for transport (Requirement 8); and improving social participation (Requirement 10). Nevertheless, the case might equally be made that the Transportation Requirements to maximise the efficiency of mobility and land use (Requirements 2 & 8), to promote reliability (Requirement 9) and to promote virtual mobility and non-mobile communications (Requirements 1 & 7) could all facilitate economic competitiveness. The Network will be specifically addressing financial and economic issues in its eighth report.

204. In terms of the Transportation Requirement to discriminate and prioritise between different types of trips and activities (Requirement 5) there is no explicit reference within the Plan to support this aim. Where there is discrimination and prioritisation it

is between modes. The Plan seeks to increase rail travel by 50% whilst increasing bus travel by only 10% and this is reflected in its investment priorities. Such discrimination might have negative implications for social participation (Requirement 10) as the bus tends to be the mode used most by those in the poorest sections of society in both rural and urban areas. However, we do acknowledge that, set against past trends in levels of bus travel, a 10% increase would, in itself, be a significant achievement.

205. The Plan restated the Government's commitment to environmental targets stated in its manifesto and in the Kyoto and other EU agreements. Greenhouse gas emissions from transport, however, are set to rise under the Plan, contrary to the Network's Environmental Transportation Requirement (Requirement 4).

206. Network members felt that transport should seek to make a more positive contribution within our society. As well as the opportunities that transport creates, there are problems that transport can exacerbate and these should be limited. Rather than merely seeking to minimise the negative social impacts of transport, though, we should look to see how it could contribute to the bigger picture of constructing a world that is equitable and sustainable. Transport should be part of the whole range of social policy, not solely 'connecting people and resources to opportunities' or creating prosperity for a proportion of the population. We hope that the Transportation Requirements developed through this report will move us towards such a future. In support of this concept and with the need to consider the end goals throughout the solution development in our forthcoming work, we have adopted the following mission statement.

MISSION STATEMENT

"Transport should support and contribute to the functioning of an equitable, sustainable and healthy society through the Transportation Requirements defined by the Transport Visions Network."

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