INDEPENDENT TRANSPORT COMMISSION

The Land Use Effects of 'The 10 Year Plan'

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CONTENTS

SECTION 1

SECTION 2

FOREWORD

As Colin Clark wrote in 1957 ‘transport shapes city development but city form then shapes travel choices’. So it is with investment in national motorways, trunk roads and railways - except that they shape development and then travel choices in the surroundings of major cities.

‘Transport in 2010: The 10 Year Plan’. which the government published two years ago, set out a programme of investment of £180 million in road and rail transport infrastructure. The main goal set out in the Plan was to reduce congestion, something that, were it to be delivered, would no doubt be welcomed by the vast majority of travellers. The Plan will, even if it takes more than a decade to complete and even if it is somewhat chnged, will have other effects. One in particular will be the effect of higher capacity roads and railways radiating from large cities in shaping the choices people make about where to live, work and enjoy themselves. The Plan will thus permanently change the face of urban Britain.

Surprisingly, land use changes are only very slightly considered in the Plan. Given the importance of such effects, the Commission decided to ask Professor Sir Peter Hall and his colleague Dr Stephen Marshall to look into them. This paper contains the main findings of the Hall Marshall study and the Commission’s analysis of them.

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I would like to thank the Members of the Commission for their contributions to this report and the Rees Jeffreys Road Fund for providing the finance that make it possible.

Patrick Brown
Chairman
September 2002

CONCLUSIONS

Fifty years of investment in motorways and faster railways has transformed where Britons live, work and shop. Commuter belts have expanded into remote country districts. Shopping centres and business parks have opened up at out-of-town sites next to main roads. Places of entertainment, rather than being confine to towns and seaside resorts, now flourish in open country.

Two years ago the government, in its 10 Year Transport Plan, proposed a further round of major infrastructure investment. Yet the Plan says nothing about how reduced road congestion and faster railways might be expected to affect where people live and work. The Independent Transport Commission regards this as an omission. Decisions about national roads and railways have local side effects that should not be ignored. The Commission therefore asked Professor Sir Peter Hall and Dr Stephen Marshall to examine the 10 Year Plan and its likely effects on land use.

This note contains the Commission's views on the Hall Marshall report. Published with it is the second part of their findings.

Professor Hall and Dr Marshall concluded that the most notable effects of further expansion in radial infrastructure would be on commuter belts and distribution centres.

COMMUTER BELTS

The researchers expect the commuter belts of Britain's major cities to reach more remote country towns and villages. Areas of search for weekend cottages would spread too.

> Manchester's hinterland can be expected to expand further into North Wales, north Lancashire and the Lake District.
>
> Birmingham's hinterland is likely to penetrate further into Shropshire

and Herefordshire

London's commuters and weekenders, who already inhabit vast areas, seem likely to become more numerous in East Kent, Wiltshire, Devon and Lincolnshire

DISTRIBUTION

The effect of the Plan on distribution and industry would be felt where railways, carrying goods to and from the Continent, cross either the M25 motorway or Trunk roads that link the West Midlands to the East Anglian ports. Pressure for major distribution, warehousing and even manufacturing centres could be expected at such road/rail junctions.

DECENTRALISATION VERSUS URBAN RENAISSANCE

The Commission has itself considered the centrifugal effect on cities of faster and more capacious radial roads and railways. At best the outcome would be well-arranged decentralisation of homes and jobs to suburbs, country towns and villages combined with further economic revival within inner cities At worst radial infrastructure could retard or even frustrate efforts to create an 'urban renaissance' and so accelerate urban sprawl.

The main conclusion of the Independent Transport Commission is that insufficient study was made by the Government of the effects on land use of the inter-city infrastructure proposals of the 10 Year Plan. This is not a disastrous omission. It could and should be remedied as the Plan is updated. However, given the recent division of responsibilities for transport and land use between the Department for Transport and the Office of the Deputy Prime Minister, the Commission is concerned that the omission could persist. If it did, it would be serious.

1. INTRODUCTION

The inter-city road and rail investment programmes of the past fifty years have significantly changed where Britons live, work, shop and find their relaxation. Seventy mile an hour motorways and faster trains have enabled people to go faster and therefore further without taking more time. This explosion in domestic travel has a parallel in the shrinking of the globe under the influence of first piston and then jet engined aircraft.

Motorways and faster railways have changed the face of urban Britain. Tyneside's MetroCentre and Kent's Bluewater Park typify a shift to out of town shopping. Business parks that peek from behind the hedges of countless motorway junctions indicate changes in the geography of employment. Faster rail services across Cheshire, Buckinghamshire and East Anglia bring commuters to Manchester and London from ever more distant towns and villages.

Two years ago the government published its 10 Year Transport Plan and announced another programme of intercity infrastructure. As in the past, so over the coming 25 years, this investment will influence the location of homes and jobs. The Plan nevertheless had little to say about such effects. Land use concerns were seen to lie with planners in the regions and, to a lesser extent, with a series of 'multi modal' corridor studies which are currently being completed.

2. PROFESSOR SIR PETER HALL & DR STEPHEN MARSHALL

The Independent Transport Commission accordingly asked Professor Sir Peter Hall and Dr Stephen Marshall of the Bartlett School of Planning, University College London to examine the and land use implications of the Plan. They began by examining the literature on how transport affects land use and vice versa. Then they considered the development implications of the proposed investment in roads and railways radiating from London and the other large English cities.

It has been argued that the Plan has been overtaken by events and that, following the Hatfield crash, railway expansion will be substantially reduced. The Commission has sympathy with these views but has also noted the robust defence of the Plan by the government when responding to the highly critical report of the House of Commons Transport Committee. On balance it therefore seem likely that, while some completion dates will be extended and updating of the Plan will lead to changes, the original outlines seem likely to remain. This in turn suggests that major investment in inter-city roads and railways, as examined by Hall and Marshall, will take place.

3. TRANSPORT AND LAND USE INTERACTION

Transport affects where people live and work and where people live and work affects how they travel. This interaction was most succinctly set out by

Colin Clark, in 1957, when he wrote ***transport shapes city development but city form then shapes travel choices***. In fact, the interaction is more complex than this statement would imply. Where people live and work is influenced not just by the time and cost of travel but also by social and psychological factors. Some people chose to live near particular schools or hospitals. Others are influenced by fashion – be it for living in lofts, buying weekend cottages or selecting city neighbourhoods for their 24 hour vibrancy. Yet others move from cities because they are anxious about levels of crime, seek more space or long for trees and grass.

Furthermore with the coming of the 'motor age' and the adaptation of city regions to access by cars and lorries, motor travel is 'hard wired' into today's lifestyles. For those who are outside the 'club' of car owners, this has significant consequences.

4. BRITAIN IN 2010 – LAND USE AND PASSENGER TRAVEL

Professor Hall and Dr Marshall first examined the land use implications of continuing the policies of the late 1990s (the baseline). They then considered the effects of the Plan as adopted by the government. Finally they looked at the effects of the Plan combined with additional measures designed to constrain travel, fuel consumption and emissions (the sustainability scenario)

The baseline

Their assessment of conditions under the 'baseline' was that, within cities such as Manchester, Newcastle, Leeds and Birmingham, continuing road and rail congestion would prompt firms and households to go on seeking to move outwards – from the city to the suburbs and from the suburbs to places further out.

For London, with its far greater scale and much worse congestion, Hall and Marshall envisaged a dual effect, with some people spreading the commuting belt as far as Cornwall and Lincolnshire, while others, driven by congestion, opted for in-city living.

The Plan

The government's chosen investment programme envisaged £49 bn going to railways and £16.2 bn to 'strategic roads'. The railway schemes included the link (now under construction) to the Channel Tunnel from St Pancras, increases in capacity on the east and west coast main lines, and 'improved

commuter services in London and other cities'. Rail freight was foreseen to grow by 80 per cent. On the roads the Plan specified that the capacity of existing motorways and Trunk Roads would be increased by widening and the rebuilding of junctions.

The 'sustainability' scenario

In the 'sustainability' scenario officials showed the effects of 'greening' the Plan. This involved motorway tolls (during rush hours and at congestion hot spots), urban road user or workplace parking charges in 80 towns down to the size of Winchester, increased railway subsidies, and fiscal action to stop motoring costs from falling.

Effects

The Plan document makes clear that under both scenarios motorways would be less congested, railway services faster and that, within the big cities, the quality of living and travelling would rise. Hall and Marshall envisaged that, on balance, one effect would be the expansion of commuting and week-end home ownership to places 100 or more miles away from the big cities. The major metropolitan regions would become even more dispersed. More Manchester households would seek to live in North Wales, north Lancashire and Cumbria. For Birmingham, it would be Herefordshire and Shropshire and for London the growth areas would be East Kent (thanks to the Channel Tunnel rail link), the West Country and the East Midlands. Lincolnshire is forecast to become the fastest growing county in England.

Under the sustainability scenario, motorway tolls would make driving even more attractive to those with high incomes and would tend to promote lifestyles based on a mix of teleworking, commuting and even car pooling. Increased railway subsidies (which would increase crowding) could, at the same time, open up suburban or country living to more inner city residents, and prompt higher income households to move to more remote towns and villages.

5. BRITAIN IN 2010 – LAND USE AND DISTRIBUTION

In considering goods distribution, Hall and Marshall observe that the 10 Year Plan aims to bring about a major shift in goods movement from road to rail. This in turn implies a shift of manufacturing and goods handling to industrial parks sited at points where main line railways cross motorways or trunk roads. Such locations would see goods going to and from the

Continent by railway and transferring to and from lorries for distribution and collection in Britain.

Hall and Marshall envisage clusters of such industrial parks being located in the midlands and around London:

- Along and A14 from Daventry via Kettering to Huntingdon and Cambridge.
- Along the A45/A43 corridor from Northampton to Kettering and Corby.
- On the west side of the M25
- On the east side of the M25

Under the sustainability scenario, in which road user charges would thin out motorway traffic, quicker road distribution would enable larger territories to be covered from a smaller number of multi-modal industrial parks.

6. CONSEQUENCES

The Independent Transport Commission concludes that land use effects of the inter-city investment package set out in the 10 Year Plan are likely to be far-reaching.

- Faster and more dependable journeys by road and rail would enable more city centre workers to live further from their jobs. This could, in turn, retard urban regeneration in towns such as Manchester, Leeds and Birmingham.

- The extension of London's commuter hinterland would be particularly marked.

- In towns and villages subject to increased commuter inflows house prices would rise: in districts closer to metropolitan centres which were failing to attract residents prices could stabilise or fall – though it is not expected that this would apply to London.

- Modern manufacturing and distribution would tend to become more concentrated at locations offering opportunities for road and rail interchange.

A sustainability scenario would see road user tolls and charges and increased rail subsidies come into play. As a result:

- Long and middle distance rail commuting would further increase.

- More dependable road travel during rush hours would, for those who could afford the tolls and charges, make long distance car commuting an attractive proposition.

- The economic case for centralising distribution at road and rail interchanges would be reinforced.

7. DISPERSAL VERSUS URBAN REGENERATION

The government is, of course, not just committed to trying to reverse years of under-investment in Britain's transport infrastructure. A series of policy initiatives starting with the report of the Urban Task Force and the Urban White Paper set out parallel commitments to a renaissance in the quality of inner city living. A target has, meanwhile, been set to build 60 per cent of all new houses within urban areas.

The renaissance is already well established in the centres of most of Britain's great provincial cities. Birmingham, Manchester and Leeds have all transformed their centres during the past 15 years. Making similar progress with rejuvenating inner city residential districts is proving, as was widely expected, much more difficult. Poverty, drug dependency, lack of skills, unemployment and high levels of street crime are much harder to counter than ugly shopping streets dominated by heavy traffic.

This underlines the tension that exists between urban regeneration and radial transport infrastructure. One attracts people to live in cities, the other enables them to live outside them. The 10 Year Plan has struck one particular balance between these competing forces. Yet discussion of these issues is notable for its absence in the first edition of the 10 Year Plan.

At its simplest the argument is between compact and dispersed development. But this is too limited a proposition. Not only are Britain's metropolitan regions already dispersed but there is no prospect of existing cities being able to accommodate all foreseeable housing and other development demands within their boundaries. The future is therefore bound to see a mix

of city, suburban and dispersed urban development. Sadly the 10 Year Plan lacks a discussion of how the proposed transport investment will shape these different forms of development.

This omission is not necessarily disastrous. It could and should be remedied as the Plan is updated. However, given the recent division of responsibilities for transport and land use between the Department for Transport and the Office of the Deputy Prime Minister, the Commission is concerned that the omission could persist. If this was allowed to happen, it would be serious.

THE GOVERNMENT'S 10 YEAR TRANSPORT PLAN – LAND USE IMPLICATIONS

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Part 1. Transport and Land Use/Development: The Evidence

1.1 Introduction

1.1.1 In a classic paper Colin Clark (1957) argued that transport systems shaped city development, but that city form then shaped transport choices. This remains true. Decisions about transport investment, especially on roads versus public transport, will help shape decisions about the development of land: for instance on brownfield versus greenfield development, or urban extensions versus dispersed village growth. But land use forms, once set, will constrain future transport choices. In particular, as argued by a number of writers, certain forms – particularly low-density suburbs – will make it difficult or impossible to maintain viable public transport systems.

1.1.2 This Part of the paper discusses the most recent research evidence on these reciprocal influences. It is thus divided into two sections. First, it presents recent evidence on the influence of transport investment on land use development *(Section 1.2)*. Then, it presents the evidence on the reciprocal influence of land use on transport choice *(Section 1.3)*.

1.2 Influence of Transport Modes on Development: Key Findings

1.2.1 There is a great deal of relevant material on the question, but not much positive evidence suggesting any clear quantitative relationships. Many investigations into land-use-transport interactions are purely theoretical, relating to modelling studies (which we do not report on here). Some empirical studies address only part of the problem, such as the link from transport infrastructure location to accessibility, or from accessibility improvements to development. Much of the worthwhile evidence cited here relates back to a relatively small number of well-documented case studies.

1.2.2 The main findings of the review are presented here. A more detailed summary of the evidence is presented in Table 1.1 (presented at the end of section 1).

1.2.3 Transport infrastructure does have observable influence on land use, but the link is not always clear or consistent. Accessibility changes have been found to be relatively small, short term and local (Hall and Banister, 1995:279). Land use effects may take a long time to happen or may not happen at all.

1.2.4 Context is crucial. Two particularly important contextual items are:

(a) General economic situation

(b) Regulatory context, e.g. planning control.

1.2.5 Generally speaking, infrastructure investment was associated with land use development in buoyant economic context or, put another way, where there is demand for property (Cervero, 1998; Walmsley and Perrett, 1992:127; Banister and Berechman, 2000, 280-282). The impacts of public transport development were greatest where the this coincided with an upswing in the economy there (Cervero, 1998; Walmsley and Perrett, 1992:127). In general, Vickerman *et al.* point out that while variations in the *levels* of economic performance may equate with variations in accessibility, 'Attempts to explain *changes* in economic indicators, i.e. economic growth and decline, by transport investment or differences in accessibility has been much less successful' (1999:3).

1.2.6 Public transport-led development in particular tended to flourish where planning policy favoured public transport-oriented development or restricted car use/car-oriented development. Banister and Berechman are emphatic on the point: 'The need for supporting policies at all levels cannot be overemphasized.' (Banister and Berechman 2000:282). In general, contextual factors would include complementary zoning, taxation policies, relaxations on maximum permitted floor area ratios, availability of land (appropriately assembled) and a 'hospitable' setting (Greenberg, 1988; Walmsley and Perrett, 1992:136; Dabbing, 1998:173; Banister and Berechman, 2000:280-282). Conversely, in the absence of a favourable planning regime, very little effect on urban development was found (Walmsley and Perrett, 1992:126).

1.2.7 Generally, transport improvements may have a greater effect in facilitating new greenfield development (as in the classic tube extensions around London in the 1920s and 1930s) than in encouraging regeneration of existing areas. But this could be because the latter has not been encouraged until recently. Systems like the Docklands Light Railway and the Jubilee Line Extension are really too new for their impacts to be judged, and work is still taking place (see for example, Townroe and Dabinett, 1995; Townroe, 1995; University of Westminster, 1998).

1.2.8 Some of the empirical evidence challenges or confounds the conventional assumption of that transport influences land use, which then influences transport. According to Wegener (1995:158), this conventional model – which stresses the idea that people minimise travel costs – only works where accessibility is scarce. This would hold for big, congested traditional cities which characterised past eras. But for many present-day, western (especially American) and edge city cases, Wegener argues, it does not apply: the brute mechanics of distance and transport cost may be increasingly less important. Wegener suggests that 'small differences in accessibility are usually more than compensated by amenities such as clean air, quietude, closeness to nature or social prestige, and whatever differences in attractiveness remain are levelled off by the price elasticity of the real estate market' (1995:159). Of course, affluent people have been doing this at least since the ancient Romans. But inexpensive car travel and rising incomes have made it feasible for increasing numbers of people.

1.2.9 The theme of the declining significance of accessibility is echoed by Cervero and Wu (1998). It is also implied from findings in Sydney, where households moving to the outer suburbs were prepared to put up with significant increases in journeys to work (and sacrifice frequency of social ties) in order to access affordable owner-occupied housing (Burnley *et al.*, 1997).

1.2.10 In general one can say that transport investment is often necessary but not sufficient to generate development (Tolley and Turton, 1995; Walmsley and Perrett, 1992:127; Dabinett, 1998:172).

1.2.11 This 'necessity' would prove relevant in the following cases:

(a) Areas/eras lacking transport infrastructure generally (i.e., cases in early stage of development).

(b) In 'advanced' transport networks, where there is a significant step change in accessibility, such as a river estuary crossing (or Channel Tunnel) where previously separate economic systems merge (Charlesworth, 1984: 268).

(c) Also in 'advanced' transport network contexts, where there are 'bottlenecks' (Vickerman *et al.,* 1999).

1.2.12 In other words, in already advanced transport situations, such as in 'mature' cities and national transport systems, it would take a major step change – (b) or (c) above – to see significant effects. Otherwise, the economic or land use effects of new transport investment would be marginal (Grieco, 1994:3; Ingram, 1998:1026; Dabinett, 1998:172; Banister and Berechman, 2000). As Wegener puts it: "It is not surprising that, under conditions of ubiquitous accessibility, monumental transport improvements have little effect on location" (1995:159).

1.2.13 However, the above observations do leave some scope that in outlying areas (relatively 'undeveloped' areas in a developed country) the introduction of new transport infrastructure *could* have an estimable impact. Here, new infrastructure investment could have disproportionately significant effects on development. Hence, one might conclude, if this greenfield investment is in road infrastructure, the form would be car-oriented; if it is in public transport infrastructure, it could be transit-oriented.

1.2.14 Public transport is seen as having the potential to redistribute growth rather than generate growth (Cervero, 1998). Typically, of course, public transport systems have a radial layout, focused on the city centre. The benefits to city centres in association with new transport installations were observed in several cases. This included city centre development or consolidation in Lyon, Marseille and Montreal (Walmsley and Perrett, 1992: 114; Ingram, 1998), strengthening of the San Francisco CBD within the Bay Area (Ingram, 1998). Strong growth was also observed where major transport interchanges were located at new sites, edge-of centre or 'edge city' locations: Euralille, which is an edge-of-centre site (Hall and

Banister, 1995:280), and Shin Yokohama, an edge-city site (Hall, 1995; Banister and Berechman, 2000). It is also suggested that public transport can result in a more 'clustered' city in the long term (Cervero and Landis, 1995).

1.2.15 It is clear that transport infrastructure supply is observed to have development implications in the long term. This is seen historically in patterns of metropolitan or suburban growth based on rail and streetcar systems (Cervero, 1998; Walmsley and Perrett, 1992), and subsequently, the decentralisation and deconcentration precipitated by the motor vehicle. This means that "sprawl is built into the 'hardware' of the urban system, and is therefore very difficult to reverse" (Wegener, cited in Anderson *et al.*, 1996). On the other hand, *specific* impacts may only be of a short term nature (Hall and Banister, 1995: 279) or, put another way, a marginal accessibility improvement might confer an immediate development stimulus, but surrounding areas may shortly catch up again (Charlesworth, 1984:270).

1.2.16 Public transport investment may have a positive image and be seen as a catalyst for local regeneration (Hall and Banister, 1995:281). It may be useful for stabilising or boosting existing city centres, especially for retail (Walmsley and Perrett, 1992:113). But it cannot necessarily be assumed to lead to development just because it is 'there'. Also, it may be said that public transport not so much generates development as focuses its direction (e.g., one corridor as opposed to another) (Cervero, 1998).

1.2.17 Three well-considered cases which encapsulate many of the above points, with respect to public transport, are:

(a) *BART (Bay Area Rapid Transit)*: here, the impacts were perhaps less than anticipated, and underperformed relative to road investment. However, there was some evidence of strengthening of the centre (San Francisco); also, there good results for

previously outlying areas (i.e., previously transport-poor areas) which were relatively undeveloped when reached by the transit system (Cervero and Landis, 1995; Banister and Berechman, 2000).

(b) *Toronto Metro*: here, impressive results are reported for high-density development at public transport nodes, but this was backed by pro-active planning policies, and boosted by a strong and flourishing economy (Pill, 1988). According to Cervero (1998), the opening of the Toronto subway 'not only triggered the development of vacant or underused areas… but it also spurred the recycling of decaying in-town commercial buildings and blighted parcels'. Note the terms 'triggered' and 'spurred': these are careful not to claim outright cause and effect.

(c) *Shin-Yokohama*: at this site some 25km from central Tokyo, marked growth in the form of an 'edge city' style development was observed around a new off-centre Shinkansen (high speed rail) station, but only significantly so after linked with a frequent local underground connection to Yokohama city centre, which turned it into a regional transport node. (The significance of the node is that Shin Yokohama is the Shinkansen 'railhead' for the Japan's third largest city, on the express line between its first and second cities.) (Hall, 1995; Banister and Berechman, 2000)

1.2.18 Finally, this discussion would not be complete without recording a recurrent conclusion among the series of authors consulted for this review: that the case for a clear influence of transport on land use is literally not proven. These authors refer to:

- The death of research material available (Grieco, 1994);
- Conflicting evidence, or disagreement on direction of impact (McQuaid, 1995; Vickerman *et al.*, 1000);

- Limits to understanding, or lack of clear conceptual framework (Grieco, 1994; Linnekar and Spence; Hall and Banister, 1995:281; Banister and Berechman, 2000);
- Difficulty of measuring or quantifying impacts (Atkinson, 1988; Walmsley and Perrett, 1992:114; Vickerman *et al.*, 1999; Banister and Berechman, 2000) or in identifying exactly what is being measured (Hall and Banister, 1995:281);
- Difficulty in attributing causality or disentangling cause and effect (Hall, 1995; Walmsley and Perrett, 1992:114; Dabinett, 1998: 173; Vickerman *et al.*, 1999);
- Difficulty in generalising results or conclusions (Cervero, cited by Dabinett, 1998:173)

1.2.19 Indeed, one of the key references, Banister (ed.) (1995), cited by several subsequent authors, concludes with the observations that "the understanding of the dynamics of the development process and the role that transport might have as an agent to accelerate or slow it down is not well known… no clear message has emerged" (Hall and Banister, 1995:281, 285). This present literature review has not found any subsequent references which would refute those observations.

Table 1.1: Impacts of Transport on Land Use: Summary of the Evidence

Impacts are sorted first by impacted sector (industry, retail, etc.), then by transport mode (general, roads, transit). Note the number of stated impacts that are vague or faintly stated. Stronger statements are indicated in **bold**.

Effect of	*On*	*Impact or Evidence*	*Source*
M25	Accessibility	**Significant** improvements in peripheral areas.	Banister and Berechman (2000)
Transit plus TGV Lyon	City centre	City centre extended	Walmsley and Perrett (1992)
Absence of good communications	Development (in general)	**Good evidence** of inhibition	Charlesworth (1984)
High speed rail station → node (Shin-Yokohama)	Development	**Significant** development effects (only) when new underground link to city centre opened → Edge City	Banister and Berechman (2000), after Hall
New construction (in general)	Development (in general)	Only appreciable when 'missing links' merging two economic regions	Charlesworth (1984) (after Leith Committee)
Rail/transit Series of UK and German case studies	Development (general)	Not found to create significant boost	Hall and Hass-Klau (1985)
TGV	Development (greenfield)	Le Creusot – **conspicuous failure**	Hall (1995)
TGV	Development (edge of city centre ?)	Lyon Part Dieu – success	Hall (1995)
Transit San Diego	Development (general)	Little evidence of any actual development	Walmsley and Perrett (1992)
Transit Nantes	Development (general)	**Very significant sharp** increase in construction permits between 1983 and 1986 along tramway corridor, while permits in the city as a whole remained steady.	Walmsley and Perrett (1992)
Rail transit (general)	Development (location, intensity and timing of)	**Strong influence**, especially when supported by positive development incentives and coordinated land use/transit planning	Dabinett (1998: 173)
Motorway UK M62	Development (regional)	Little strong evidence	Charlesworth (1984) (after Gwilliam and Judge)
Transit	Employment	Helped to maintain activities in the	Walmsley and Perrett

Marseille		city centre	(1992)
Transit Tyne and Wear	Employment (Catchment areas)	Not found to increase employment levels or significantly change catchment areas.	Walmsley and Perrett (1992)
High speed rail (Shinkansen)	Employment and population growth	**Consistently higher** in areas with Shinkansen service	Banister and Berechman (2000:280-282)
Transit London, DLR	Employment	Partly responsible for new employment opportunities	Walmsley and Perrett (1992)
Metro Lille	Employment and Retail	Allowed people in declining areas to go somewhere else to work	Walmsley and Perrett (1992:127)
Freeway v BART	Employment growth	**20%** higher in corridors served only by freeways rather than those served by BART	(Banister & Berechman, 2000) after Cervero…
Public transport UK	Image/opinion	Lowest priority on list in survey of retailers' attitudes to 'success factors'	URBED *et al.* (1994)
Transit Sheffield Supertram	Image/opinion	Developers unable to attribute development directly, but 'claimed it had contributed in a positive way to their decisions.'	Dabinett (1998:177-178)
Motorway UK M62	Industry (Manufacturing)	Small impact	Charlesworth (1984) (after Dodgson)
Motorways UK	Industry (Industrial estates)	'Like pins to a magnet'	Charlesworth (1984) (after Ely in The Times)
Motorways UK	Industry (location)	A trend for developers to take estates near to strategic motorway sites rather than near labour supply	Charlesworth (1984) (after Foster in Financial Times, 1973)
Transit (Tyne and Wear)	Industry	'No significant effect on locational decisions'	Walmsley and Perrett (1992:130), after TRRL (The Metro Report 1986)
Transit Toronto	Office location	**90%** of office construction took place within 5 minutes walk of station (first 10 years)	Cervero (1998:83) (one half of a 'frequently cited statistic')
Various Amsterdam	Office location (City centre v Periphery)	Peripheral business park with good accessibility by car, but also subway and tram, and near airport, generated more development interest than central 'docklands' site near central station and hub of tram network.	Hall (1999)
Motorways UK	Property /land values	'Mixed views and limited evidence'	Charlesworth (1984)
Transit Sheffield Supertram	Property value (non residential)	Unable to identify any discrete Supertram influence.	Dabinett (1998:179).

Transit Sheffield Supertram, (and echoing Manchester)	Property value (residential)	Influence so small that it cannot be separately distinguished.	Dabinett (1998:179).
Transit Washington, D.C.	Property values	Homes near stations appreciated at a faster rate than similar homes further away	Walmsley and Perrett (1992:131)
Transit Tyne and Wear Metro	Property values	A localised effect on the housing market 'in a few inner urban areas, where the attractiveness of housing increased and some redevelopment took place'. In general, properties near the Metro gained and maintained a slightly higher value than those further away.	Walmsley and Perrett (1992:131)
Rail transit California	Property/Land values	Some degree of capitalization benefits	Cervero and Landis (1995)
Transit Toronto	Residential location	**50%** of high rise apartments took place within 5 minutes walk of station (first 10 years)	Cervero (1998:83) (one half of a 'frequently cited statistic')
Freeway v BART	Residential growth	**20%** higher in corridors served only by freeways rather than those served by BART	(Banister & Berechman, 2000) after Cervero…
Transit (General)	Retail	Increase in shopping, especially in central areas	Walmsley and Perrett (1992)
Transit Grenoble, Nantes	Retail	A number of new shops opened	Walmsley and Perrett (1992)
Transit Lyon	Retail	Increase in shopping activity (but some decline in inner suburbs).	Walmsley and Perrett (1992)
Transit Marseille	Retail	Helped to maintain activities in the city centre (partly at expense of retailers elsewhere)	Walmsley and Perrett (1992)
Transit (Tyne and Wear)	Retail	City centre has gained from improved access (partly at expense of small retailers elsewhere)	Walmsley and Perrett (1992:11)
Roads Japan	Urbanisation pattern	Proportion of urbanised land greater for corridors within 1km of trunk roads, than areas more distant from trunk roads	Doi and Okamoto (1996)
Busway (Adelaide)	Urbanisation pattern	Acceleration of development of the Regional Center and expansion of residential areas 'in accordance with the Metropolitan Development Plan'	Wayte (1988)
Streetcars USA (historic)	Urbanisation pattern	Massive decentralisation	Cervero (1998)

1.3 Impact of Land Use on Travel Choice: Key Findings

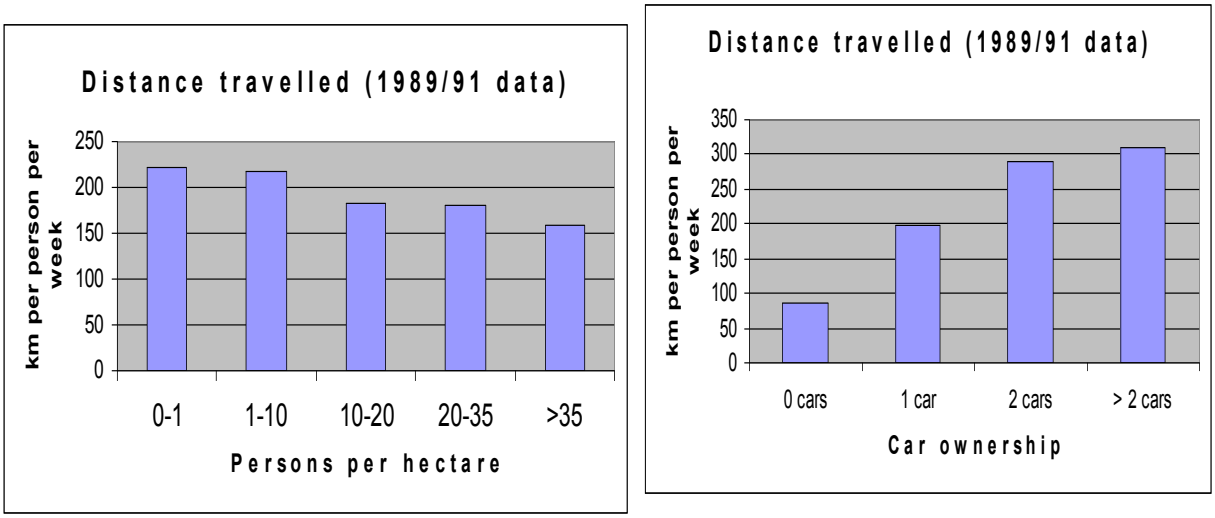
1.3.1 There is a great variety of relevant studies and results. The general themes are well known, but the robustness of results is not necessarily consistent, and the exact extent of cause and effect is not conclusive. Various authors comment on the complexity of the inter-relationships (e.g., Handy, 1997; TRB, 1996). Even where results appear to show clear correspondence between indicators, this clarity does not necessarily prove a straightforward underlying relationship.

1.3.2 Nevertheless, the general impression that denser, more compact, mixed use settlements, and the larger settlements tend to exhibit a greater propensity for travel by public transport and on foot, and to generate shorter journeys, is one often supported by evidence, and rarely if ever diametrically contradicted. However, in many cases there is no evidence of such relationships, no or weak statistical significance attached to them, or no proof of cause and effect.

1.3.3 Some selected excerpts of evidence, or summaries of general findings, are given below, to give an impression of the discerned impacts of different land use or urban form variables on travel.

1.3.4 ***Density.*** As the density of development increases, the average trip length, the use of the car, and the distance travelled all reduce (Banister, 1999) (Figure 3:a). This is also apparent for different levels of car ownership (Figure 3:b), though causality has not been proved. The greatest growth (in distance/car distance) has taken place in low-density locations. Higher density is also generally associated with increased proportion of shopping trips by public transport, increased proportion of commuting trips on foot (Stead and Marshall, 1998).

Figure 3 (a) Density and Distance *(b) Car Ownership and Distance*



(Based on Banister, 1999: Table 2)

1.3.5 ***Settlement size.*** There is suggestive evidence that trip lengths form a 'U-shaped' distribution with respect to settlement size. In other words, longer trip distances are found in rural communities and in the greatest conurbations, while shorter distances are observed in medium-sized cities (Orfeuil and Salomon, 1993:45; Wegener and Furst, 1999; Banister, 1999). The implication is that small settlements that are unable to support a large range of services and facilities may force local residents to travel longer distances in order to access the services and facilities that they require. On the other hand, the very largest, centralised settlements may lead to longer travel distances as the separation between homes and the urban centre becomes large. Large settlements with a very large range of jobs and services may also attract people living long distances away to travel to them (London is the outstanding case in the UK context). These factors may all influence travel patterns although it is unlikely that there is a simple relationship

(Owens, 1986; Gordon *et al.*, 1989; ECOTEC, 1993; Banister, 1996; Stead, 1999).

1.3.6 ***Location of development***. Where development is located in relation to settlements (core, periphery, ex-urban) will affect travel patterns. Housing located on its own creates car-based (long-distance) travel patterns (Banister, 1999). Headicar has found evidence that at the local level, there is much greater variation in travel behaviour relative to settlement characteristics than aggregated national statistics would imply (e.g., regarding settlement size). Journeys in the 5-10 and 10-25 miles bands have increased disproportionately; these distances typically involve travel outside a single settlement and consist of journeys to or between neighbouring urban areas. The relationships are complex: towns that are apparently more self-contained (e.g., due to relative isolation) may minimise some travel needs, but may generate greater travel distances for out of town services (Headicar, 2000). Orfeuil and Salomon (1993) reported a progressive increase in both journey length and car dependence from centre to edge of the city of Toulouse. Jansen's international comparative study (1993) discusses the falling population of core cities, and the gains in the rings of suburbs around them. He notes that for Helsinki, suburb-to-suburb commuting accounts for 50 per cent of all commuting. This compares with 33 per cent suburb-to-centre, 13 per cent within the central city, and 5 per cent centre to suburbs.

1.3.7 ***Land use mix***. The evidence here, it must be said, is also mixed. The mixing of land-uses affects the physical separation of activities and is therefore a determinant of travel demand. According to Stead *et al.* (2000), characteristics such as the mixing of land uses appear to explain variations in both travel distance and mode. Other land-use characteristics, such as the provision of local facilities, explain variation in travel distance but do not explain variations in travel mode. Stead and Marshall (1998) suggest that the level of mixed use may contribute to travel demand, particularly through the decentralisation of less specialised employment. Van and Senior conclude that mixed land uses encourage walking

and cycling, and deter car use, for light food shopping trips. However, they cast doubt on the strength, and even the existence, of the impacts of land use diversity on travel behaviour in general (2000, 141). Generally, their data suggest that mixed land uses may have partial effects on car ownership, mode choice and trip frequency. Unlike Cervero (1996), they find not even the remotest evidence that mixed uses influence commuting behaviour (Van and Senior 2000, 145).

1.3.8 There is little hard evidence of the ***impact of telecommunications*** on travel. The more thoughtful assessments are cautious, and conclude that more research is necessary. The impact of telecommunications seems to be complex since (1) it goes to the heart of issues not remotely connected to the brute mechanics of distance, speed and time, but how human society operates: our culture, the value we place on face-to-face communications, etc (2) The technologies are *new*. With land use, the basic units (households, cars, trains etc) are the same, even though their composition or characteristics may change over time. By contrast, there is no direct historical precedent of features such as the world wide web or the mobile phone - the combination of which allows working *while* travelling.

1.3.9 A general feature of the literature is a degree of scepticism about the effects of land use and/or telecommunications on travel. Typically a paper will challenge 'the conventional wisdom' that certain physical planning variables, or the adoption of new technologies, will have any effect on travel behaviour, for example: 'the myth of neo-traditional development' (Berman, 1996:348); 'the transportation benefits of neo-traditional design are likely to be overstated' (Crane, 1996; 62).

1.3.10 In general, then, there is often a discrepancy between those whose results suggest that A is associated with (or causes) B, and those whose results will deny it. The reasons for these discrepancies are manifold, for example, commentators may be comparing or examining *different things*, often at different levels of detail; they may be may be looking at *different parts of the same phenomenon* (e.g., different

parts of a density-transport 'curve' which will have different rates of change at different points); the results may be the same, but simply *interpretations are different* (half full/half empty glass). Finally, it is possible that, quite simply, the results *are* different: the relationships are so specific to their place, and the types of people involved, that only the crudest or most cautious generalisable conclusions are possible.

1.3.11 The US Transportation Research Board make a comment, in the context of the impact of urban form on transit, which has a more general resonance with the attempts to establish the impact of land use on travel:

> "... the *bundle of attributes* that makes for a successful pedestrian and transit-friendly station area or neighborhood is *difficult to break apart* through statistical means...the influence of neighborhood design is particularly problematic to evaluate" [emphasis added] (TRB 1996:2,22).

Part 2. The Scenarios

2.1 Introduction: Basic Assumptions

2.1.1 The scenarios are based on the modelling exercise in the Background Analysis to the government's Transport 2010 Plan. The exercise forecasts the impact of policies on traffic growth and congestion in England in different areas and on different road types. The transport scenarios have a time horizon of 2010. In forecasting the land use implications, it seems reasonable to assume that the resulting 2010 transport system would impact on locational decisions over the following 10-15 years. Thus they can be combined with the DETR's latest targets for land use, which are for 2021.

2.1.2 The basic assumptions need to be the same for all scenarios. This is reasonable, because the DETR assumes that its own policies will have no impact on the total amount of development, or on its regional distribution – only on its distribution within each region.

2.1.2 In line with the latest HM Treasury assumptions, the exercise assumes that the economy will grow at 2.5% per annum between 2000 and 2005, and by 2.25% per annum between 2005 and 2010, and that this will both increase demand for business and personal travel and will also increase the requirement for freight movement. The modelling exercise uses the latest Government projections for population growth (0.3% pa), household growth (0.7% pa) and household composition, all of which affect the number of journeys made.

2.1.3 Decisions about the amount of travel and the choice of mode are also affected by the relative costs of different means of transport: both money costs (for example fuel and fares) and the costs associated with, for example, travelling time, unreliability and overcrowding. Measures in the Plan influence many of these costs, but there are other costs that cannot be influenced, including the world price of oil. The model, based on an industry consensus, assumes that the price of oil falls from $28 in 2000 to $16 in 2010 (at 1999 prices).

2.1.4 These assumptions feed into a *Baseline Projection*, analysing what would happen to key transport and environmental outcomes in the absence of the Plan. Against this, the exercise then models the effect of individual components of the Plan, and the Plan as a whole: the *Plan Impact*. Finally, it assesses the impact of three possible *Illustrative Scenarios*, individually and together. They do not represent Government policy or local authorities' views. They illustrate the potential impact of some future changes and policy choices:

- constant motoring costs in real terms (compared with falling costs under Plan assumptions) and additional transport investment;

- wider take-up of local charging powers; and
- introduction of limited inter-urban charging.

2.1.5 As a starting-point, it is important to understand the current levels of congestion in different areas and on different types of road. Table 2.1 shows that the greatest problems of congestion are currently in our largest cities. This current variation needs to be borne in mind when considering the forecasts of congestion *growth* for different areas and roads presented later.

2.1.6 The importance of the level of congestion in the larger urban areas, above all in London, is that the volume of traffic in London plus these areas (87.9 billion vehicle-km, 1996) is almost as much as that of all other urban areas put together (94/5 billion vehicle km, 1996) (figures from National Road Traffic Forecasts, DETR, 1997).

Table 2.1: Estimated congestion in 2000 by area/road type compared with all-England average

	All roads					Inter-urban Trunk Roads
	All areas	London	Conurb-ations and Large Urban	Other Urban	Other	
Index of time lost per km (All road average = 100)	100	367	212	98	35	57

2.2 The Baseline Projection

2.2.1 The DETR's baseline projection is built in stages:

- forecasting the underlying growth in car traffic from changes in car ownership and car use by household type;

- forecasting the underlying growth in goods vehicle and van traffic by commodity sector from projections of trends in load factors, empty running, length of haul, and vehicle type split;
- changes to these underlying forecasts to take into account responses to increased journey times due to congestion and changes in money costs (for example fuel costs and congestion charges);
- changes to the forecasts to reflect the impact of other policy measures, including:
    - improvements to the attractiveness of public transport and rail freight (using, for example, the outputs of the LTS, passenger rail and rail freight models);
    - land use planning policies; and
    - sustainable distribution policies, influencing, for example, goods vehicle load factors and empty running.

2.2.2 The baseline projection starts from recent trends. Total road traffic in Great Britain has grown by over 70% over the last twenty years. This largely reflects rising incomes and increased car ownership leading to increased car use. Goods vehicle traffic has also grown strongly as the economy has grown. The growth in traffic has led to increasing congestion on the road network, particularly in urban areas. In recent years, the relationship between traffic growth and economic growth has eased. It has averaged less than 1:1 since the 1989 peak of the economic cycle. This reflects in particular:

- higher levels of car ownership – and hence reduced scope for further growth – amongst those household groups, for example the elderly and young adults, who previously had low levels of car ownership;
- rising congestion; and

- increasing application of policy measures that increase the attractiveness of public transport, walking and cycling.

2.2.3 The assumptions underlying the baseline projection are:

- no change in car ownership costs, non-fuel running costs or fuel duty in real terms;
- improvements in new car fuel efficiency sufficient to deliver the EC voluntary agreements with car manufacturers. Together with underlying fuel efficiency, improvements in the car fleet and the other assumptions, this results in an average reduction in motoring costs per car kilometre across the car fleet as a whole of some 20% in real terms between 2000 and 2010;

Table 2.2: Baseline 2010 traffic and congestion forecasts (% on 2000, England)

	All Roads					
	All areas	London	Conurb-ations and Large Urban	Other Urban	Other	Inter-Urban Trunk Roads
Traffic	22%	14%	16%	21%	24%	29%
Congestion	15%	13%	15%	15%	36%	28%

- no significant change in the quality of public transport;
- completion of the 37 trunk road schemes in the Targeted Programme of Improvements as set out in the Government's roads review document (but not the three schemes subsequently added to the programme).

2.2.4 The key points emerging from the baseline forecasts are:

- traffic growth is lower in urban areas, in part because congestion is already very high;

- traffic and congestion rise most rapidly outside urban areas, with congestion rising by 28% on the inter-urban trunk road network; and
- overall traffic growth (22%) is lower than forecast GDP growth (26%), which implies a ratio of around 0.8:1.

2.2.5 For *London*, the baseline forecasts for 2010 assume the following changes on year 2000:

- London population and household growth of 4% and 8% respectively;
- total London and central London employment growth of 4% and 5% respectively – towards the middle of the range of independent forecasts;
- car ownership growth of 12%, mostly in outer London;
- no increase in public transport fares in real terms; and
- no significant improvements to public transport services in London.

2.2.6 Under baseline assumptions, average peak public transport journey times (in terms of time taken to travel one kilometre) increase very slightly, by 0.2%, across public transport as a whole. Average peak journey times on the Underground increase by 2%. The number of 'crowded' underground links increases from 53 in 2000 to 63 in 2010, and the number of 'very crowded' links increases from 20 to 33[]. Traffic in central London grows by 2.5%–5% between 2000 and 2010. In outer London traffic growth is above 10% in many places. Congestion across London as a whole – already three and a half times the national average – rises by 13%.

2.3 The Baseline Projection: Land Use Implications

2.3.1 Basic assumptions need to be made in parallel about the operation of land use policies.

2.3.2 Rates of future change from rural to urban land uses were projected in a study for the then DOE by Peter Bibby and John Shepherd (Bibby and Shepherd 1997). They found, first, that between 1991 and 2016 some 169,000 hectares, or 1.3 per cent of the area of England, are projected to change from rural to urban uses: an area equal to the county of Hertfordshire. Second, by 2016 about 11.9 per cent of the land area of England will be in urban uses as against 10.6 per cent in 1991, a growth of 12.2 per cent on a very modest base. Thus, third, this projected conversion from rural to urban uses would account for some 2.3 per cent of the land area in rural uses which is "undesignated" - that is, not reserved in the form of National Parks, Areas of Outstanding National Beauty, Green Belts and the like. Fourth, between 1991 and 2016 households are projected to increase by 23 per cent but land in urban uses is projected to increase by only 12.2 per cent - a result of the fact that about half of all development has recently been in urban areas. Fourth, these conversions are equivalent to a change from rural to urban uses of about 6,800 hectares a year, about two and a half square miles, or about the area of the Borough of Poole in Dorset; a growth rate of less than 0.5 per cent per annum.

2.3.3 The impact will be geographically concentrated, especially in the South East. The relative rate of urban growth - expressed as a percentage of the urbanised area at the start - will be particularly high in what geographers call the golden belt, stretching from Cornwall and Devon through Somerset, Dorset, Wiltshire, Oxfordshire and Buckinghamshire to Northamptonshire, Cambridgeshire and Suffolk. However, nowhere does this proportion rise much above 20 per cent.

2.3.4 Later projections of land use change come from the Urban Task Force (1999), using more up-to-date figures drawn from land use change statistics (Table 2.3). They show regional variations in the proportion of all development that can take place on brownfield land. This is calculated to vary from 81 per cent in the West Midlands,

down to only 39 per cent in the South East. Unfortunately, the most acute pressures are found in the South East.

2.3.5 However, on the assumption of non-interventionist (and unsuccessful interventionist) policies, the government may not achieve its 60% of all development on brownfield sites. This will almost certainly prove to be the case in South East England; it may also be difficult in parts of the north, where local authorities may be inclined to grant permissions in order to achieve economic development. The precise impact of these policies has not been modelled; one impact is likely to be a rise in the values of larger older properties on greenfield sites, encouraging in-migration of higher-income groups with high rates of car ownership. Middle-and lower-income groups are likely to be squeezed by rising prices, especially in pressured areas of the country, and this may slow the rise of car ownership.

The projected changes in congestion may affect behaviour: people may base their locational decisions – where to live, where to put their businesses – either on the basis of relative deterioration or improvement over recent time, or on the basis of comparison with alternative locations at the present point of time. The rapid rise in congestion outside the major urban areas may itself act as a disincentive for households and businesses to move out, and even as an incentive to return – though it must always be kept in mind that congestion will remain significantly higher in the conurbations and above all in London. The rise in congestion is projected to lead to a certain slowing of growth in car ownership in relation to GDP growth, which will favour urban living. Congestion is likely to be more significant a factor than pollution, which will be showing substantial improvements in most areas.

Table 2.3 Average percentage of projected additional households likely to be accommodated in new housing on recycled land (1996-2021)

Region	No. of house-holds projected to form (1996-2021)	Estimate of how many additional dwellings are likely to be accommodated on recycled land under current policies (1996-2021)	Percentage of additional households likely to be accommodated in new dwellings on recycled land under current policies (1996-2021)	Percentage of new dwellings accommodated on recycled land in 1994 (last available complete regional statistics)	Estimated change on 1994 performance over period 1996-2021
North East	100,000	59,000	59	52	+7
North West	300,000	189,000	63	57	+6
Y&H	300,000	193,000	64	50	+14
East Mids	300,000	195,000	65	37	+28
West Mids	300,000	242,000	81	47	+34
Eastern	500,000	245,000	49	53	-4
London	600,000	367,000	61	81	-20
South East	900,000	352,000	39	47	-8
South West	500,000	245,000	49	34	+15
Total	3,800,000	2,087,000	55	49	+6

Source: Urban Task Force (1999).

2.4 The Baseline Scenario: Land Use Implications by Region

London

2.4.1 Both jobs and residents grow in the capital. House prices continue to increase as brownfield developments fail to match demand.

2.4.2 London's road traffic congestion, already the worst in Britain, grows slowly in central and inner districts but extends earlier and later in the day and on Sundays. Congestion grows faster in such suburbs as Bromley, Kingston, Ealing and Harrow.

2.4.3 Overcrowding on the Underground and on commuter railways gets worse. Higher income people continue to move to live in conversions near the City and West End where they can walk, scooter or cycle to work.

2.4.4 Motorbikes and scooters and small cars grow in popularity. More Tesco Metros and Sainsbury Locals support local living.

2.4.5 Middle income residents are forced by house price pressure to seek houses in east London and to move out of London altogether. Increasing numbers of retired people sell up and move away from London and the South East. Foreign in-migration persists at a high level.

The Rest of the South East (ROSE)

2.4.6 New houses are built on fields around many towns and villages but supply is not sufficient to meet demand and prices continue to rise.

2.4.7 More edge-of-town business parks develop. Larger firms decentralise to discrete, dedicated edge-of-town locations, following the model of Vodafone at Newbury and Fisons at Dorking.

2.4.8 Commuting from the Home Counties to London by rail continues to increase But congestion and overcrowding get worse, causing more people to seek local jobs to eliminate the burden.

2.4.9 Road congestion continues to rise on many local town and rural roads in the Thames Valley and in south Hertfordshire. Investment brings relief to some overcrowded junctions and links on motorways and trunk roads.

2.4.10 American-style living and travelling continues to grow but so do the economic costs of car dependency.

Rural Southern England (Eastern England, East Midlands, South West)

2.4.11 Jobs and population both increase as people move to take advantage of lower property prices and open roads. Traffic and congestion grow steadily but, as present levels are relatively low, they do not deter continuing in-migration from the cities.

2.4.12 In the South West retirement growth continues, and pressure on house prices – together with investment resulting from EU Objective 1 funding – makes Cornwall a boom area.

2.4.13 There is continuing commuter pressure, both from long-distance London commuters and from the Bristol-Gloucester area, on certain areas, in particular the southern Cotswolds, central Somerset and east Devon. This puts continued strain on an already-overcrowded road system.

West Midlands

2.4.14 Congestion increases on the M6 northwards to Stoke on Trent and on the M5 south toward Worcester. Hence, commuting by rail and tram increases, despite increased overcrowding and strain on the network. extending Birmingham's commuter area far into Shropshire and Herefordshire.

2.4.15 The city centre revival continues in Birmingham and attracts some new residents, but generally people move outwards to new houses in and beyond the green belts. Congestion within the West Midlands grows only slowly. Outside the conurbation in Warwickshire and Worcestershire, conditions develop in ways similar to those in ROSE.

The North West, Yorkshire-Humberside and the North

2.4.16 The exodus of people and jobs continues – attracted by the building of new suburban estates and business parks. This outward migration leads in turn to worse road congestion in favoured commuter belts: North Cheshire, south Lancashire, the Aire Valley.

2.4.17 Inside the cities there is continuing residential revival in the urban cores through "loft living" warehouse conversions for young professionals. Outside the cores the price of old houses remains stable, there is selective renaissance of the middle rings (including family-style estates); car commuting grows, and congestion increases slowly.

Comment and Conclusion

2.4.18 The Current Baselines scenario is thus a road and rail congestion scenario and, apart from London, a dispersion scenario and one that is associated with continuing traffic growth. In London it seems likely that the congestion would

tend to support in-city living and therefore brownfield development. Could more road congestion be thus supportive of urban renaissance?

2.5 Impact of the Government's 10-Year Transport Plan

2.5.1 On the basis of the baseline projection, the Plan addresses the challenge of tackling high existing levels of congestion, particularly in our largest cities, and forecast growth, particularly on the inter-urban network. The essence of the Plan is sustained investment in urban and inter-urban transport infrastructure, the introduction of road user charging in cities, a modest reduction (in big cities and on main roads) in road congestion, travel growth by road and rail and a shift in some travel from car to public transport.

2.5.2 Specifically the Plan, and the scenario, make these assumptions:

- Spending and outputs on local transport, London, passenger rail, rail freight and national roads as set out in Chapter 6 of *Transport 2010: The 10 Year Plan*. The Plan commits large resources to investment. For the railways, the Plan includes £15 billion of public investment, £7 billion of which will be provided through the Rail Modernisation Fund, and £34 billion of private capital. Together with £11 billion of public resource expenditure, this gives a total of £60 billion for rail funding over the next ten years. On the roads, the Plan includes £13.5 billion of public investment in the strategic road network plus £2.5 billion of private capital. Together with £5 billion of public resources expenditure, this gives a total of £21 billion for strategic roads over ten years. For local transport the Plan includes £19 billion of public investment and £9 billion private investment. Together with

public resources expenditure of £31 billion this gives a total of £59 billion over ten years. In London, the Plan includes £8 billion of public investment and £10 billion of private investment for transport in London. Together with public resource expenditure of £7 billion, this gives a total of £25 billion over ten years.

- Outcomes for rail include a 50% growth in rail passenger journeys overall, an 80% increase in patronage on inter-city lines, contributing to the reduction of inter-urban road congestion, more frequent services on commuter lines, better cross-country network connections, for example across the Pennines and through or around London, and increased reliability and punctuality, with quantified targets to be set in the light of franchise replacement. On the roads, the Plan aims at reduction in congestion on inter-urban trunk roads to 5% below current levels (compared with present forecast growth of 28%) by 2010. For local transport, the Plan aims at a 10% increase in bus passenger journeys by 2010; more reliable bus services, supported by a new customer satisfaction survey; better quality, less polluting, more accessible buses, with the average age of the bus fleet reduced to eight years by 2001 and speeding up introduction of low-emission vehicles; light rail passenger journeys at least doubled by 2010; and congestion in larger urban areas reduced from a forecast growth of 15% by 2010 to an 8% reduction, with congestion growth in other urban areas reduced from 15% to 7%. For London, the aims include a 50% increase in the number of bus passengers entering central London and across the whole network; a 10% reduction in average bus journey times, with larger reductions in key corridors, plus significant improvements in reliability, with long unscheduled waits largely eliminated; a possible 10%-15% reduction in road traffic in central London as a result of congestion charging; less disruption to traffic through better co-ordinated and better quality road and bridge maintenance; a 15% reduction in traffic congestion across London; new routes and faster journeys by light rail, tram or guided bus; a reduction in Underground overcrowding, improved reliability and improvements in customer satisfaction; access to jobs and other facilities through new cross-London and orbital rail routes.

- During the Plan period the Mayor introduces congestion charging in central London, and local authorities outside London introduce 8 congestion charging and 12 workplace parking levy schemes in the centres of most large urban areas the size of Blackpool and above. All net revenues are recycled into transport improvements in the urban areas concerned; and

- Traffic volumes and congestion are also reduced by land use planning policies, travel plans, sustainable distribution measures and local parking policies.

- On the railways, the challenge is to invest to provide the capacity to meet not only the underlying increase in demand, but also the additional demand that will be generated by improved service quality.

2.5.3 The Plan forecast is that total passenger rail demand will grow by 51% between 2000/01 and 2010/11, around 4.2% a year on average. This forecast includes 36% growth expected as a result of economic growth, reductions in fares in real terms and car traffic growth. Substantial improvements in service quality resulting from the investment in the Plan are expected to generate a further 15 percentage points of demand growth (Table 2.4):

- *Journey time improvements.* Based on established industry assumptions, improvements in journey times (taking into account waiting time) are expected to have almost a one for one impact on demand for the services concerned, increasing total demand by 8 points; and

- *Improvements in service punctuality and reliability, improved station facilities and other programmes of smaller enhancements* are also expected to increase demand, although it is difficult to quantify this effect. We have assumed that this contributes a further 7 points.

2.5.4 Just under two-thirds of the increased passenger rail demand due to fares reductions and service quality improvements will be from car users switching to rail. This switch is incorporated in the road traffic forecasts.

2.5.4 The main points from the *Plan* forecasts in Table 2.4 are:

- the Plan results in a 5 percentage point reduction in overall road traffic growth compared with the baseline forecast, with the reduction being most pronounced in areas where congestion is worst. The ratio of traffic growth to
- this focus on congestion reduction results in an absolute reduction in overall congestion compared to today, taking it to 6% below 2000 levels. The reduction in congestion is most significant in urban areas, with reductions of 15% in London and 8% in other large urban areas.[1] Congestion is forecast to be still above 2000 levels only in smaller urban areas and on non-trunk roads outside urban areas. However, as Table 2.1 has shown, these areas/roads currently have below average congestion;

[1] The comparison is even more startling against the Baseline projection for 2010: a reduction of 28 percentage points in London and 23 points in conurbations and large urban areas.

Table 2.4: 2010 Traffic and Congestion in England: Baseline, Plan and Illustrative Scenarios (% change on 2000)

		All Roads					
		All areas	London	Conurbations and Large Urban	Other Urban	Other	Inter-urban Trunk Roads
Traffic	Baseline	22%	14%	16%	21%	24%	29%
	Plan	17%	5%	10%	17%	21%	26%
	Plan plus constant motoring costs	13%	-3%	6%	14%	17%	21%
	Plan plus wider local charging	17%	5%	10%	17%	21%	26%
	Plan plus inter-urban charging	17%	5%	8%	17%	21%	23%
	Plan plus all three illustrative scenarios	12%	-3%	5%	13%	16%	18%
Congestion	Baseline	15%	13%	15%	15%	36%	28%
	Plan	-6%	-15%	-8%	7%	16%	-5%
	Plan plus constant motoring costs	-12%	-26%	-11%	4%	9%	-11%
	Plan plus wider local charging	-7%	-15%	-8%	7%	16%	-5%
	Plan plus inter-urban charging	-9%	-15%	-12%	7%	11%	-20%
	Plan plus all three illustrative scenarios	-15%	-26%	-15%	2%	5%	-25%

- those large urban areas that introduce local charges are forecast to benefit from reductions significantly greater than these averages, as a result of both the direct impact of the charges themselves and the additional expenditure on local transport improvements funded through charge revenues. The reductions within the charged central areas, where congestion is currently worst, will be even greater; however, no separate figures are produced for the suburbs, which may experience increased congestion as motorists drive around charging cordons and as some businesses relocate;

- congestion on the inter-urban trunk road network is reduced by 33 points, taking it to 5% below 2000 levels. However, this may well have a knock-on effect in making longer-distance commuting easier, as discussed below.

2.5.6 Table 2.5 applies the changes in congestion in Table 2.2 to the 2000 relative congestion rates from Table 2.1 to demonstrate the relative position in 2010. The key point, already noted in para. 2.1.6, is that though the Plan and Sustainability scenarios make the biggest proportionate reduction of congestion in London, the absolute level of congestion there remains far higher than in any other part of the UK.

Table 2.5: Relative congestion rates, 2010 (2000 National Level=100)

	All Roads					Inter-Urban Trunk Roads
	All	London	Conurb-ations And Large Urban	Other Urban	Other	
Year 2000 Base	100	367	212	98	35	57
Baseline	115	414	243	113	48	73
Plan	94	312	195	105	41	54
Sustainability	88	272	189	102	38	51
All 3 scenarios	85	272	180	100	37	43

Specifically, in London the plan scenario shows that road traffic in central London would be reduced by 10–15% because of congestion charging. Traffic growth over a large area of London would be reduced relative to baseline forecasts, although outside central London there will still generally be increases in 2010 compared to today. This is consistent with the findings of the ROCOL study. Public transport improvements reduce traffic growth by around 2–3% over a wide area of London. Congestion across London as a whole falls substantially. It is forecast to be 15% *below* 2000 levels (compared to a 13% *increase* under baseline assumptions). This appears highly optimistic! It is however important to notice that though the relative position of London and the large urban areas improves under the Plan, relative to the rest of the country, it still remains inferior both to

other urban areas, and even more so to other (i.e. non-urban) areas. In fact the last group experience slightly increased congestion under the Plan.

2.5.7 In evaluating the contributions of components of the Plan, key points are:

- *all* the components are important in delivering the improvements forecast for the Plan as a whole. For example, expenditure on trunk roads reduces the trunk road congestion measure by 13 points (more than any other single component); but together the rest of the Plan contributes 20 of the total reduction of 33 points;

- the comparison of public expenditure per vehicle hour saved places trunk road expenditure ahead of local transport and London, and substantially ahead of both forms of rail expenditure in terms of cost-effectiveness. However, the wider assessments drawn on for the Plan also reflected the much greater potential of local, rail and London expenditure to provide other benefits. For example, by 2010, passenger rail expenditure in the Plan is estimated to generate significant annual benefits to rail users in time savings and reduced overcrowding, equivalent to tens of millions of road vehicle hours saved at standard transport appraisal values of time. Of course, the estimation of benefits will depend on the assumptions and methods employed in their calculation, not least with respect to which users (drivers, public transport passengers, walkers) or non users are taken into account.[2]

2.6 10-Year Plan Impact Scenario: Land Use Implications

2.6.1 As noted earlier, the projected changes may affect behaviour: people may base their locational decisions – where to live, where to put their businesses – either on

[2] For example, COBA, the method of economic appraisal for trunk road schemes, has been criticised for considering only 'a tiny, arbitrary fraction of the costs and benefits of a major road scheme' (Adams, 1981:169).

the basis of relative deterioration or improvement over recent time, or on the basis of comparison with alternative locations at the present point of time. If the former, they may be more inclined to locate in London and the big cities; if the latter, they may continue to decentralise themselves and their businesses. However, it seems implausible that people will fail to respond to the very radical shift that will occur, under the Plan, to conditions in London and the other major cities *vis-à-vis* the rest of the country. The sharp improvement in London, in particular, is likely to make it more attractive to households with choice as compared with locations in the Rest of the South East. But this improvement is not likely to be uniform: already, there is much more investment in the east (especially in Thames Gateway) than in the west, where congestion may get worse.

2.6.2 But road congestion is not the only element in such decisions. The Plan itself will affect the competitive power of other forms of transport. Rail in particular is shown as a big gainer, with a baseline forecast of a 23% gain in traffic and a Plan forecast of a 51% gain based on radical improvements in service. This may well encourage more people to live farther from their work and to commute by fast train, as has been observed for a long time in southern England. (Further, road charging in the cities could speed the final stages of their journey to work, especially if they have the income to use expensive modes, like taxis). Some of the effects could be quite radical, given the increased speeds on (for instance) the West Coast Main Line and the Channel Tunnel Rail Link, which are likely to see big extensions of London's commuter hinterland. It is likely to place a premium on locations along rail corridors out of London and, increasingly, the major provincial cities. But, given that roads here will remain relatively uncongested, the effects could spread quite widely on either side of the rail routes themselves, especially around rural (parkway) and small-town stations where congestion is less. A rise in greenfield house prices is likely to reinforce these trends, as people move farther out, down the price gradient into more remote areas. It is not too fanciful to conceive of quite major shifts in the London commuter belt, towards

the midlands and north of England, and into the west country. And this could be further boosted by a shift to part-time home-working for some days in each week. Likewise, since inter-urban road congestion is also projected to diminish under this scenario, higher-income households may increasingly commute between a weekday city apartment and a large distant greenfield house. The house builders will be under great pressure to meet these demands, although they constantly assert their ability to do so.

2.6.3 Diversion to rail could be equally important for rail freight, which is forecast to show a baseline growth (in tonne km.) of 10% because of heavy capacity constraints (the unconstrained growth forecast being no less than 38%), but a Plan increase of 80% implying an 11% market share, and a constant motoring costs growth of 120% (13% market share) (Table 2.6). The assumption here is that such growth would imply a major shift in location of much manufacturing and goods-handling (logistical) functions to large inter-modal facilities located where main rail freight corridors intersect the motorway and trunk road system, especially in the South Midlands (A14 and A45 corridors) and at points around the M25. This in turn is likely to create major pressures for growth in the A14 corridor from Daventry via Kettering to Huntingdon and Cambridge, the A45-A43 corridor from Northampton to Kettering and Corby, and the east and west sides of London adjacent to the M25.

Table 2.6: Rail freight outputs, forecast volumes and market share: 2010 baseline, Plan and illustrative constant motoring costs scenarios

Scenario/Key rail freight outputs	Forecast increase in rail freight volumes 2000-2010, and 2010 market share
Baseline • No major policy changes; revenue support at current levels • No major industry actions	• 10% increase in rail freight tonne km • 6.5% market share
Plan • Freight train speeds increase by 10kph • 2 hour reduction in terminal turnround times • Train length increases to 750m • 15% improvement in rail freight quality of service • Large increase in terminal capacity	• 80% increase in rail freight tonne km • 11% market share
Illustrative constant motoring costs scenario As Plan, plus: • Zero track access costs for marginal flows up to 400km • Further expenditure on terminals	• 120% increase in rail freight tonne km • 13% market share

2.7 Impact of the Government's 10-Year Transport Plan: Land Use Implications by Region

London

2.7.1 CTRL is completed. Commuting from Ashford to King's Cross begins. Investment in offices and homes in Docklands continues. Major development begins at Stratford. T5 at Heathrow is built and connected to an extended Heathrow Express with service to St Pancras. Thameslink 2000 is completed, with through services connecting Peterborough, King's Lynn and Cambridge with the Sussex Coast, Dartford and Ashford. The West Coast Main Line upgrade Phase 2 is completed, but there are congestion problems on the slow lines from Northampton. New rolling stock replaces all Connex slamdoor trains.

2.7.2 These improvements – Thameslink 2000, the West Coast Main Line upgrade and the improved commuter services on the Midland Mainline – encourage longer-distance commuting into London (though congestion on the upgraded West Coast Main Line proves a limitation). This is a preferred model for increasing numbers of professionals who adopt flexible work patterns, working partly from home, partly from "hot desk" offices and partly on the move. There are increasing numbers of very long-distance commuters from Oxfordshire, Northamptonshire, Cambridgeshire and Lincolnshire into London.

2.7.3 Congestion charging makes London more attractive to high-income groups who can afford the charges. These include particularly small, childless households, notably single person households. Lower-income groups and larger households (notably families) leave for the Home Counties. London becomes increasingly attractive to specialised groups: single households, including the "single never married"; affluent transient workers on short contracts from abroad; younger people. They colonise all of inner London, and substantial parts of outer London, at higher densities, stimulating widespread construction of new high-density

apartment blocks and conversions of existing older family houses into flats. They do so particularly where major rail improvements occur: at key rail interchanges between the new radial lines and the new orbital rail service.

Rest of the South East (ROSE)

2.7.4 ROSE benefits from large-scale migration from the affluent London core, especially of families. There is an acute and growing shortage of housing, especially affordable housing. This is exacerbated by the reluctance of local planning authorities to set and meet housing targets. The 60% target proves impossible to attain.

Rural Southern England (Eastern England, East Midlands, South West)

2.7.5 The resultant pressures ripple outwards into the neighbouring Eastern, East Midland and South West regions, further aided by the improvement of fast inter-city train services which bring many places in these regions within an hour's commuter journey of central London.

2.7.6 The emphasis on rail movement of freight encourages the development of intermodal transfer stations. Though two of these are on the M25 in west and east London, the most important are located on the A14 in the East Midlands, where it intersects major radial motorways (M6, M42, M1, A1M) and major rail freight links (the reopened Great Central line to Rugby and Leicester, the Midland Main Line, the Peterborough-March-Ely-Cambridge link). This in turn provides a major boost for all kinds of logistical operations in this belt, concentrated near Rugby, Kettering and Huntingdon.

2.7.7 There is likely to be a doubling of Milton Keynes and Northampton, Huntingdon, Peterborough and Grantham. Lincolnshire will become the fastest-growing country in England.

The West Midlands

2.7.8 The West Midlands continues to adapt successfully into a service region, concentrated upon central Birmingham. Its commuter belt extends farther into the rural fringes of the region, especially in Shropshire and Herefordshire, aided by improved rail services. Hence, trail improvements encourage this trend, extending Birmingham's commuter area far into Shropshire and Herefordshire.

2.7.9 The Birmingham Northern Relief Road is opened and, despite tolls, is well-used. This reduces congestion on the M45, at Spaghetti Junction and where the M5 and M6 meet. Elsewhere, management improvements – speed controls, ramp metering, better information, incident detection and removal, widening, junction improvement – just keep up with rising demand, and congestion on main motorways – the M5, M6, M42 and M54 – is stabilised or even improves somewhat.

2.7.10 Traditional goods-handling activities continue to disperse from the region's industrial heartland, especially into the East Midlands "logistics belt" along the A14 and A50 cross-regional trunk roads, where they serve "just-in-time" demands.

North West, Yorkshire-Humberside, the North

2.7.11 Road investment continues here under the Plan in the interests of regional development, encouraging dispersion to attractive rural areas up to one hour's commute time from city centres. This impacts particularly on the Peak District, North Wales, the Yorkshire Dales and Northumberland. Improvements in rail services have a similar effect along key transport corridors.

2.7.12 The Manchester Metrolink and Tyne Metro expand, and congestion increases only slowly. Light rail and guided bus extensions open up development possibilities in the middle and outer parts of the conurbations, particularly in Manchester, Leeds and Newcastle.

2.7.13 Manchester continues to thrive as the north's pre-eminent centre for advanced services. Its airport grows into one of the top ten in Europe, but there is increasing pressure to limit its growth and divert the traffic to high-speed rail links into mainland Europe. Its commuter belt, increasingly rail-based, extends deep into north-west England (including the Lake District) and North Wales.

2.7.14 Congestion pricing affects land use in the conurbations, and space-using activities migrate out to industrial estates along the national motorways: M60, M62 and M61 motorways around Manchester and Liverpool, M1 and M62 around Leeds-Bradford and A1(M) around Tyneside. Intermodal freight depots at Trafford Park and Wakefield are successful in diverting long-distance freight to rail, and attract clusters of related warehouse development.

2.7.15 There are conflicts between the local planning authorities, who are seeking to encourage inward investment, and regional/central government. Large-scale releases of greenfield land within the conurbation are resisted in the interests of inner-city regeneration, which is reinforced by investments in light rail extensions and similar local transport improvements. This is successful in meeting the demands of new socio-demographic groups, especially the cosmopolitan young, who occupy loft apartments around the city centre and in the inner ring of the city. Urban regeneration money, following the Urban White Paper, flows into the middle rings of the cities which have been most seriously impacted by out-migration. This results in further apartment building in the most attractive areas (especially along canals) and family-style medium-density housing estates in others.

2.8 Sustainable Land Use and Transport Policies

2.8.1 The DETR's ten-year transport plan posits a third variant, the *illustrative constant motoring costs scenario*. Essentially, this examines the potential impact of sustainable transport policies; in particular, the potential impact of some illustrative scenarios on future changes and policy choices:

- *constant motoring costs and additional investment scenario:* assumptions are as for the Plan, except it is assumed that motoring costs per kilometre remain constant in real terms through the Plan period, rather than falling by 20%, and that there is additional transport investment;

- *wider take-up of local charging powers:* assumptions as for Plan, except here it is assumed that by 2010 local charging is introduced in the centre of around 80 cities outside London the size of Winchester and above – congestion charging in central London and 8 other large urban areas (as for Plan), workplace parking levies elsewhere. All net revenues are recycled into transport improvements in the urban areas concerned;

- *limited inter-urban charging scenario:* in addition to the Plan assumptions, this assumes that by 2010 there are charges on the trunk road network, only at the times and places where congestion is highest. The illustrative charges assumed vary with the level of congestion, with a maximum of 10 pence per kilometre on those parts of the network where there is daily queuing; and

- *all three illustrative scenarios combined.*

2.8.2 These can be combined with land use assumptions derived from the Urban Task Force report and from the Urban White Paper (DETR 2000). This reasserts the government's determination to bring brownfield land back into use and recommits

the government to achieving a national brownfield target of 60% by 2008, with a request to each region to set out targets in Regional Guidance and Development Plans to achieve it.

2.8.3 In the constant motoring costs scenario, passenger rail demand grows by 83% (Table 2.7). The higher cost of motoring under this scenario, compared with the Plan forecast, reduces forecast car traffic growth and hence, using the rail demand model, increases passenger rail demand. But higher growth still could potentially be achieved through further fare reductions in real terms in price-sensitive markets, where new rail travel would be most likely to result in significant switching from car. This includes inter-urban markets and also London and south-east off-peak travel. This illustrative scenario assumes that further fare reductions start in 2005/06, reflecting the need for additional infrastructure capacity to be in place first. The forecasters estimate that inter-urban and London and south-east off-peak fares would have to fall by 4% per annum in real terms thereafter in order to achieve total growth of 83%.

2.8.4 The additional public support that would be required for this option is likely to be substantial. It comprises the net cost to train operating companies of lower fares in real terms, and support for the costs of further expansion of infrastructure capacity. The forecast assumes that these additional support costs would be met by Government.

2.8.5 The key points from the illustrative scenario forecasts in the table are:

- the all-areas congestion measure is reduced by an extra 6 points compared with the Plan forecast, taking it to 12% below 2000 levels. Congestion on the inter-urban trunk road network would also be reduced by an additional 6 points, taking it to 11% below 2000 levels;

- the principal impact of wider local charging would, as expected, be in urban areas. Congestion in medium and small-sized urban areas would be reduced by less than a percentage point overall compared with the Plan forecast. But the impact in the medium-sized areas introducing charges would be greater, with absolute reductions on 2000 levels being achieved;

- the limited inter-urban charging scenario reduces congestion on the inter-urban trunk road network by an additional 15 points compared with the Plan forecast, 9 points more than the constant motoring costs scenario. Diversion would be limited because charges are targeted at congested sections of the network; this ensures that the congestion reductions on trunk roads are not offset by increases elsewhere; and

- under the combined scenario the outcomes on all road/area categories would be improved compared to the constant motoring costs scenario, with the reduction on 2000 congestion levels on the inter-urban trunk road network rising to 25%, a 20-point improvement over the Plan. The all-areas congestion index would be reduced by 9 points, taking this index to 15% below 2000.

- Even on the combined scenario, congestion in 2010 in London is nearly three times as bad as in other urban areas and seven times as bad as in the rest of the country. The conurbations and other large urban areas are 1.8 times as congested as other urban areas, and nearly five times as congested as the rest of the country. In non-urban areas there is slightly reduced congestion as compared with the Baseline projection.

2.8.6 For freight the illustrative constant motoring costs scenario takes into account the model's prediction of the additional growth in rail freight demand that will be generated by the higher costs of motoring, relative to Plan assumptions, under this scenario. It also assumes that the Government would provide additional resources

for rail freight investment and revenue support to promote further rail freight growth.

Table 2.7: Passenger rail demand growth forecasts 2000/1 – 2010/11 (passenger km, Great Britain) and key outputs and assumptions

Scenario	Passenger Rail Demand Growth	Key Outputs and Assumptions		
		Car Traffic Growth in England	Regulated Fares	Inter-Urban Fares – Unregulated
Baseline	23%	21%	RPI-1	RPI
Plan	51%	17%	RPI-1	RPI
Illustrative constant motoring costs scenario	83%	12%	RPI-1/ RPI-4	RPI-1/ RPI-4

2.9 The Land Use Implications of the Sustainable Scenarios

2.9.1 Clearly, by themselves and even more in combination, the sustainable combinations represent a stronger form of the impacts of the Plan scenario. Major reductions in congestion in London, now also reproduced in other urban areas, are likely to make living in them more attractive for higher-income groups. But equally, combined with big reductions in congestion on inter-urban roads, they could make it more attractive to commute over longer distances. Cheaper and better rail services, leading to big increases in rail commuting, could have the same effects. Higher-income households, able and willing to pay the charges in order to save time, are likely to be the major beneficiaries in both cases, but increased transport expenditures would be coupled with a pressure on housing expenses at a time when larger greenfield houses are rising in price because of land use restrictions on greenfield development.

2.9.2 The main impacts of Scenario 3 are to be found in the cities:

- more road user charging – more revenue to spend on more investment in bus services and trams;
- more investment in roads. This seems likely;
- more investment in traffic calming, re-paving, street lights, trees and other local environmental improvements, to achieve an urban renaissance;
- easier access to city centres by bus and car – to encourage more office, retail and leisure investment in city centre;
- more car pooling;
- better quality solo commuting for those who can pay;
- more Tesco Metros and other local shops;
- more local living:

  (a) more delivery services come on stream
  (b) stimulus to internet living

But also:

- Dispersal to locations where no road charges apply;
- Reduced use of cars for leisure by those with lower incomes (as already noticed in Norway, where road pricing has applied to the three leading cities since the early 1990s).

Interurban travel

2.9.3 Tolls seem most likely to be applied on the M25, eastern sections of the M3 and M4, the M4/M5 around Bristol, M6 between Birmingham and Manchester, and the M60 Manchester Orbital. The likely effects will be:

a. Reduced congestion and unreliability on motorways enables distribution to be more centralised, leading to increased HGV mileage;

b. Reduced motorway congestion enables more high income commuters to buy country houses remote from cities; commuting long-distance on either a daily or a weekly basis;

c. Volume house builders will seek locations close to towns and cities, well-related to bus, tram and rail services;

d. Volume house builders will move towards mixed-use developments so that they can market their homes as designed to minimise the need for car travel.

Railways

2.9.3 Improved but busier commuter railways will prompt middle-income commuters to move to locations close to and within cities so as to avoid travelling (but high-income commuters may choose to buy first-class commuter tickets).

2.9.4 High-income commuters will either travel from further away by rail (east Kent and CTRL for London, Lake District for Manchester, Gloucestershire and Lincoln for London) or switch to driving and pay tolls but obtain easier driving conditions. Many may choose to live in two homes: a city-centre apartment in the week and a large weekend house in the country.

2.9.5 Railways will work with volume house-builders and housing associations to promote developments near existing and, perhaps, new stations.

2.9.6 There may be increased pressure for the Chancellor to allow commuter costs by rail, as in other European countries; this could reinforce the above effects.

Rural Districts and Small Country Towns

2.9.7 Boom conditions will be experienced in these places, as more people and jobs move to them (or are self-generated by existing residents) because of absence of road user charges and improved long-distance rail connections. House prices move further upwards.

2.10 The Sustainable Scenarios: Regional Land Use Implications

London

2.10.1 The effects here may not be very different from the Plan scenario, since congestion charges are common to both. Higher investment in transport, particularly new long-distance Regional Metro lines, could help redistribute some employment out of central London into new transport interchanges in the suburbs.

Rest of the South East (ROSE)

2.10.2 The South East will be affected by tolls on M25, by extension of congestion charging to many medium-sized towns, and by additional investment in new rail links, including the Wimbledon-Hackney line. There will be increased pressure for privately-built (or PPP-built) new communities along the main transport corridors out of London.

Rural Southern England (Eastern England, East Midlands, South West)

2.10.3 Further rail investment, coupled with extensive inter-urban road charging, will make long-distance travel easier for higher-income groups, leading to widespread dispersal. But there will be a reconcentration effect along main rail corridors,

where new communities and town extensions are likely to occur up to 100 miles from London, right to the edge of the South East region and beyond, into the Eastern, East Midland and South West regions.

2.10.4 The precise geography is likely to depend on the pattern of investment in improved rail links and, to some extent, road links. One main beneficiary is likely to be the Great Western main line from London to Bristol and its Exeter branch. Long-distance commuting and second-home ownership is likely to extend widely into Gloucestershire, Wiltshire, Somerset and Devon. Redeployment of freight from the Great Eastern and Midland Mainlines may allow the development of commuter services deep into the East Midlands, notably Northamptonshire and Lincolnshire, even as far as York.

2.10.5 Improvements to the highway system will further fortify the locations of the region's major cross-highways (the A14 and A50) as preferred locations for one-day logistical distribution.

West Midlands

2.10.6 Birmingham may benefit from extension of the Eurostar system, competing directly with Birmingham International Airport, but this could represent the northern limit of effective rail competition to air for European destinations.

2.10.7 There is likely to be extensive development of the Metro system, especially to serve Merry Hill, Walsall and Coventry. This will particularly assist the regeneration of parts of the Black Country, where attractive urban environments can be created along the canal system.

2.10.8 Here too there is likely to be further development of long-distance commuting, particularly along rail lines closed in the Beeching era but now reopened. Mid-Wales and the Marches could be a particular beneficiary.

North West, Yorkshire-Humberside, the North

2.10.9 The North receives a major boost from high-speed rail services along the upgraded East and West Coast lines. The Vale of York becomes a London commuter area; in North Cheshire, Mancunian commuters face an invasion of southerners who try to move here because of northern family ties. Further electrification allows development of commuter services from the Lake District into Manchester and Liverpool.

2.10.10 Extended congestion charging, and inter-urban motorway tolls, help transfer traffic to the railways but further assist long-distance commuting on uncongested highways. Second-home ownership in attractive scenic areas becomes extremely common and the Monday and Friday rush hours become more pronounced. There is intense pressure for new dispersed development in National Parks and Areas of Outstanding Natural Beauty.

2.10.11 There are some further extensions to the Manchester Metrolink and extensive development of the Leeds Light Rail network. These assist inner-and middle-ring regeneration, but may also extend the influence of the major city over medium-sized cities in the hinterland. There is again strong population growth in the major commercial cities (Manchester, Leeds, Newcastle), both of young single professionals ("loft living" along urban canals) and of families attracted to to-quality city schools (King Edward schools in Birmingham, Manchester Grammar). The position in the second-order places (Liverpool, Bradford) and the many medium-sized industrial towns, which do not receive such intensive investment, remains more problematic.

2.10.12 The main problem areas are the former council estates, especially the less attractive ones where right-to-buy has proved unsuccessful. Better-off tenants have moved to new private estates, leaving benefit ghettos full of dysfunctional

families. Some of these are redeveloped as higher-density areas in order to reach the government's 60 per cent brownfield target.

2.10.13 Further highway development and extensions of congestion charging will cause some industries to move to accessible locations near motorway interchanges, where they can operate at minimum logistical cost. There may be further development of intermodal interchanges serving dedicated rail freight routes to the South East and mainland Europe.

2.10.14 Air traffic will continue to grow but will be funnelled into a few hub airports, plus some low-cost alternatives (Liverpool Speke versus Manchester Ringway). The major airports will be served by extensive regional rail links and will become activity centres in their own right.

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