

Integrated Transport and the Development Process

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1. Introduction

Whilst for many years transport has been a source of concern to representatives of commerce and industry and the public at large, a strong consensus is emerging that a major change in policy direction is needed if the current deterioration in the nation's transport system is to be checked. Traditional adversaries in the debate on how this should be done are increasingly speaking with a common voice on a growing number of key issues. That transport dependency must be moderated, that its environmental impacts must be reduced, that we are not able to solve our transport problems simply by expanding infrastructure capacity and that more use must be made of public transport, walking and cycling are principles with which few would now disagree.

As part of this stronger consensus it is now widely accepted that the disposition of land use is an important factor in shaping the demand for transport and that recent development trends have played a major role in fuelling increased passenger and freight transport activity, the growing reliance on private passenger transport and greater use of road transport for the carriage of goods.

This paper looks at:

- recent transport trends in Great Britain;
- the problems these give rise to;
- the relationship between development patterns and transport demand;
- a summary of the proposals in the recent Transport White Paper;
- an assessment of how this may help ease our transport problems with a view to understanding the likely implications of new transport policies for future development;
- ways of planning for sustainable development; and
- some implications for the roles of developers and planning authorities.

2. Recent transport trends in Great Britain

Over the past 20 years passenger transport has increased by 58 per cent from 406×10^9 passenger kilometres (pkms) to 717×10^9 pkms. Car traffic has grown rather faster however with a 95 per cent increase over this period (an extra half a billion vehicle kilometres on a normal working day). This has been accompanied by a reduction in bus and coach traffic of 24 per cent and a limited increase in the use of railways. Although only a small proportion of the total, air travel has been the fastest growing mode. Overseas air trips by United Kingdom residents increased from 7.2 million in 1976 to 29 million in 1996 and visits to the United Kingdom by foreigners increased from 6.4 million to 17.1 million.

Freight transport has increased over this 20 year period; by 62 per cent. The greatest growth however has been by the "low visibility" modes; coastal waterborne freight (110 per cent) and pipeline (130 per cent). Rail freight has fallen by 45 per cent and road freight increased by 61 per cent with much of the increase in heavy goods vehicle traffic arising from longer hauls rather than an increase in goods lifted. The number of medium and heavy goods road vehicles has actually fallen over this period.

[38]

Recent G.B. Passenger transport trends

Population up 4% and households up	25%
Passenger kilometres up	58%
Domestic air travel up	160%
Car traffic up	95%
Rail use fairly stable	—
Bus and coach travel down	24%

Recent G.B. Freight transport trends

Freight transport up	62%
Pipeline transport up	130%
Waterborne transport up	110%
Road freight up	61%
Rail freight down	45%

Real household expenditure on transport has grown by a third over the last 20 years and now amounts to £43 a week of which 85 per cent is on motoring. The cost of buying and running cars has fallen steadily whilst the cost of public transport has risen. For example bus fares have increased by 23 per cent over the last 10 years alone, national rail fares by 13 per cent and Underground fares by 34 per cent.

High levels of spending by households and firms on transport have not been matched by high levels of spending by the public sector on expanding and maintaining infrastructure. Total government expenditure on transport has been running at about £7 billion a year over the last few years of which about half is on roads capital. Investment in the national railways has been running at about £1 billion a year and in other railways at about half this level. This compares with total expenditure by users of around £100 billion a year. Compared with our European neighbours the proportion of our GDP spent in transport infrastructure investment, during the 1980s, was only 75 per cent of the rate they invested when related to respective GDPs, with United Kingdom ranking thirteenth out of the 15 Members States of the European Union.

Expenditure on transport

- About 17% of GDP
- £43/household/week—mostly on motoring
- Firms' expenditure mainly on road transport
- Public investment below European average
- Public transport subsidies also low

These low levels of investment have meant that the transport networks have not improved at anything like the rate at which traffic has grown. The motorway network grew from 2,155 km in length in 1976 to 3,226 km in 1996. This gives a provisional rate of 56 km/million people compared with a European average of 120. The length of rail network in operation has fallen by 9 per cent over the last 20 years and the proportion electrified increased by 36 per cent. Whilst there have been similar network contractions in the rest of Europe, electrification has been faster and a very high speed trunk network is appearing. Forty-three per cent of Continental Europe's rail network length is electrified compared with only 30 per cent in the United Kingdom.

Infrastructure developments

Motorways	2,155 km \Rightarrow 3,266 km (52%)
All roads	333,000 km \Rightarrow 364,000 km (9%)
Rail network	18,000 km \Rightarrow 16,700 km (-7%)
Electrified	21% \Rightarrow 31% (48%)
Generally less than other European countries and	
Road vehicles up 52%	

Energy used by transport has grown by 64 per cent over the last two decades compared with only 7 per cent overall. This means that the proportion of our energy consumed for transport has grown from 22 per cent to 33 per cent. This is reflected by CO₂ emissions from transport which now amount to 26 per cent of the United Kingdom total. Emissions of noxious materials from transport are a major source of concern and it is easy to come to the conclusion that these are growing rapidly. In truth the picture is a rather mixed one. Over the last 10 years from transport:

- nitrous oxide emissions grew by 7 per cent;
- carbon monoxide emissions have fallen by 15 per cent;
- volatile organic compound emissions have fallen by 10 per cent;
- lead emissions have fallen by 82 per cent;
- black smoke emissions have grown by 25 per cent; and
- particulate emissions grew by 8 per cent.

So, whilst transport is a major source of atmospheric pollution, the situation is not deteriorating as dramatically as some contemporary commentators portray.

Transport energy trends

Total consumption up	7%
Transport consumption up	64%
Transport's share up	22% \Rightarrow 57%
Transport's share of oil up	32% \Rightarrow 57%
Car fuel consumption down	30 mpg \Rightarrow 37 mpg

Transport activities are also a major cause of death and injury. Over the last 20 years road deaths fell from 6,570 to 3,598 and injuries from 340,000 to 320,000. However, this remains a major source of distress and economic loss and many of those killed and injured are children and pedestrians.

During this period there have been many changes in transport policy and management. We have seen most transport enterprises that were publicly owned transferred to the private sector. Regulation has been fairly light. The national motorway building programme has come to an end, although some widening of existing motorways is being undertaken. Road user taxes have been increased in real terms and there has been a trend towards public transport users paying a higher proportion of their costs. Local government has seen several reforms with the abolition of metropolitan government and a move to reducing the tiers of local government. During this process it seems that there has been increased centralisation of government power.

There have been several success stories including the privatisation of BA, BAA and NFC. There have also been some disappointments such as the deregulation of buses outside London and the deteriorating condition of much of the road network.

Over this 20-year period there have been significant changes in the pattern of development in the United Kingdom. Whilst the population has grown just over 4 per cent the number of households has increased by 25 per cent (4.7 million) and the number of dwellings by 19 per cent (3.9 million). Many of these have been at relatively low densities on greenfield sites and so well suited to being served by private car.

Non-residential developments have been more evenly distributed between the traditional urban locations and low density and out of town settings but the net effect has been a significant increase in the proportion of commercial development in locations where access by anything other than the private car and truck is very difficult. These trends were encouraged by the relatively laissez-faire policies of the 1980s which are now slowly being reversed. However much low density commercial, retail and leisure development took place during this period and has locked in a great deal of "car oriented" development which has a long life and cannot readily be served other than dominantly by car and truck.

3. Developing problems

Few would disagree that the major problem of the United Kingdom's transport system is that of road congestion. Statistics showing increased traffic volumes and worsening congestion are confirmed by the daily experience of travellers, the overwhelming majority of whom go by road and most of these by car. Data on road traffic speeds are not particularly good nationally and do not fully reflect congestion. Improvements in car performance have meant that higher speeds on free flowing sections have partly compensated for more time spent crawling and stationary. In London, where traffic speeds have been collected systematically for many years, speeds have reduced by about 10 per cent since the mid 1970s.

Although the contribution of transport to poor air quality and climate change is not as great as often portrayed, transport emissions still are a significant problem and contribute to health problems. They also (particularly nitrogen and sulphur compounds) can damage the natural environment. Present improvement programmes will reduce key emissions until 2010 after which they will start to increase again in the absence of further technological innovation. Unless action is taken the emission of CO₂ from transport is forecast to increase from 39 million tonnes annually at present to 56 million by 2020.

Noise is the greatest source of nuisance from transport activities in the United Kingdom and the noise climate is continuing to deteriorate. Increased congestion is causing more traffic to switch to the traditionally "quieter" hours when its disruptive effects will tend to be greater.

There are other environmental effects of traffic and transport: visual intrusion, problems for pedestrian movement, run-off fuels and wastes, disposal of scrap, occupation of land by transport facilities, spray, vibration, etc. Collectively these make "traffic" the most important of the complaints about the local environment in Europe.

Whilst death and injury from transport activities is reducing, it is still at too high a level. The Government's target to reduce these by a third by the end of the decade is likely to be met but should be extended. In Sweden a philosophy of zero tolerance to road deaths has been adopted and, although this may be impracticable, significant reductions in both deaths and injuries should continue to be a matter of high priority for all levels of government and the transport industry as a whole.

One of the major problems of growing car ownership is the sharp differential it creates between the mobility rich and the mobility poor. If this was simply that those who did not have car transport available were unable to enjoy the greater mobility of car users then the effect would not be so bad. However, the consequent reduction of public transport use means poorer more expensive public transport and as an important reason for not owning a car is low income, this is a double blow for those

affected in this way. Old age is also a reason for not having a car (although less so now than in the past) and poorer public transport is especially problematic for those less physically able, who need it.

Even more important is the change in land use patterns that has capitalised on increased car use, better roads and traffic management, worsening bus services, and, during the 1980s, laissez-faire planning policies. Unfortunately the change of land use patterns in the United Kingdom over recent years is poorly documented and therefore much reliance is placed on anecdotal policies. Lower density suburban and extra-urban housing developments, out of town supermarkets and larger retail complexes, multi-facility leisure developments at, and beyond, the edges of existing developed areas and close to motorway intersections, science and technology parks, etc., are clear evidence of recent changes.

Access to these developments is very difficult on foot and by public transport. Thus those without cars have great difficulty in getting to what are increasingly the *choice* locations for modern living. If this access is too difficult they have to rely on what are often inferior and sometimes more expensive facilities that they can reach by traditional transport. This differential potential results in people in households without cars making less than half as many journeys (by all forms including walking) than people in households with cars.

These developments are heavily dependent on access by cars for people and trucks for goods. They typically involve longer access journeys and consequently more energy consumed, more vehicle emissions and more exposure to risk of death and accidents. These trends are increasingly cemented by technological and life style changes which will make them difficult to redirect.

4. Relationship between transport and land use

The density and structure of land use patterns clearly affect the need to travel and therefore the demand for travel. The denser a settlement the closer points of activity will be. The more mixed the uses the less likely will be the need to travel to a more remote part of the settlement to participate in an activity. The more closely matched to the high points of accessibility are the major traffic generators the easier it will be for people to go about their business. Whilst these principles are generally understood the extent to which different land use patterns affect travel demand are less well known.

Some of the most careful studies of the effects of urban form on transport consumption are those by Kenworthy and Newman. These have found that car use in major cities can vary by almost two orders of magnitude. In the very car orientated cities of North America and Australia car use is about 15,000 person kilometres a year. Whilst this falls to about 10,000 in the more traditional New World cities it is about only 5,000 person kilometres in European cities. Whilst this is a substantially lower figure, in Asian cities it is only half as much again. The factors which lead to reduced car use were identified by Kenworthy and Newman as:

- increasing density of population and jobs in all parts of the city;
- increasing importance of the central area especially in its residential concentration but also in the proportion of metropolitan area jobs it contains;
- reduced car ownership;
- lower amounts of road space per capita;
- reduced central city parking space;
- increased congestion;
- improved public transport services.

Although it is not possible to rank these factors uniquely because of their interdependence, the list

above indicates the approximate relative importance in contributing to car use. It is noteworthy that the two leading factors are land use characteristics which are even more important, on their own, than car ownership—which is usually regarded as the most important determinant of car use.

Urban structure and transport

Car use in:

Low density U.S. cities	15,000 km/person/year
Traditional U.S. cities	10,000 km/person/year
European cities	5,000 km/person/year
Compact Asian cities	2,000 km/person/year

Looking at the United Kingdom alone we see a similar picture. In London people travel only 8,000 kilometres a year of which 66 per cent is by car. In other metropolitan areas the total rises to 8,800 and the car proportion rises to 79 per cent, despite incomes being substantially lower. Over the rest of the country, where settlements are smaller and less dense and public transport services more limited, car use is even higher with about 85 per cent of travel going by car. Moreover total travel has been on a rising trend except in London where it is fairly stable.

These increases are as a result of both more and longer car journeys and has varied by journey purpose. The increase in travel for different purposes over the last 10 years is summarised below:

	%
Escort/education	102
Holidays	44
Shopping/personal business	34
Business	28
Entertainment/sport	21
Visiting friends at home	20
Commuting/education	18
Total	24

Variations in G.B. travel

London	8,000 km/person/year—5,300 by car
Other Mets	8,900 km/person/year—7,000 by car
Non-Mets	11,200 km/person/year—9,700 by car
London stable	
25%+ growth since 1985/86 elsewhere	

The increased use of cars for both work and other purposes arises from their increased availability coupled with other factors relating to the different types of journey. Thus safety and security are widely cited as the reasons for driving children to school and this has also been exacerbated by increased parental choice of school. Neither of these is likely to be much affected by land use changes. Some other journey purposes such as shopping and personal business, which together comprise two-fifths of all car journeys, are affected by the land use changes that we have seen over recent years.

Reasons for travel growth	
Escort/Education	102%
Holidays	44%
Shopping/Personal Business	34%
Business	28%
Entertainment/Sport	21%
Visiting friends at home	20%
Commuting/Education	18%
Total	24%

Since the early 1970s there have been about 1,500 off-centre retail developments in the United Kingdom totalling over 10 million square metres of commercial space (about a hundred millennium domes' worth) and, despite recent changes in planning guidance, this process is still underway. It is estimated that there are about three-quarters of a million square metres of out of centre retail space under construction—almost four times as much as is being built in traditional town centres—and a further two million square metres with planning consents. With other proposals this amounts to over four million square metres in the development pipeline. How much parking has been provided along with these developments is not known for sure but with the largest having 10,000 or so spaces, the total must be of the order of a million.

Thus it is clear that land use patterns are a major determinant of total travel demand and the propensity to use cars rather than public transport. Lower densities and out of centre locations have been a feature of recent land use trends in the United Kingdom and these have contributed to rising traffic levels and the disorientation of public transport. These trends are starting to slow but still have significant momentum. Moreover the legacy of this era of development will be with us for many years to come.

Effects of location on access modes (leisure developments in London)			
Location	Car use	Public transport	Walk/cycle
Out of centre	75%–85%	5%–15%	3%–8%
Edge of centre	60%–65%	15%–25%	10%–15%
Town centre	25–35%	25%–40%	20%–45%

5. Integrated transport policy

The Government published its promised White Paper on transport policy in July of this year entitled "A New Deal for Transport: Better for Everyone". It strikes a note of optimism which will sound unfamiliar and, to some, unconvincing. However it marks a major change in transport policy and is a major step forward for transport policy in the United Kingdom. The approach to transport policy differs from that which went before in two key respects. First it is broadly based in giving full weight to the interrelationships between transport and the economy, the environment, land use, social considerations and other elements of public service policy. Secondly it sets its face against "predict and provide" (although many users of United Kingdom roads will find the existence of this policy hard to believe) and countenances policies to moderate the use of cars in congested situations.

The White Paper sets great store by better buses which are to be improved by more traffic priorities and

Quality Contracts between operators and local authorities. The Strategic Rail Authority is to give new purpose to the management and development of the railways in order to expand their role. The review of the trunk roads programme has subsequently been published and indicates that the Government does not see a large-scale road building programme as part of its integrated transport policy. Indeed the policy contains specific proposals for limiting traffic by way of workplace parking levies and congestion charging schemes.

Much of what is proposed in the policy is good transport practice including integrated fares and ticketing, improved interchange, more effective enforcement of traffic and parking regulations, better conditions for walking and cycling, more accessible transport and greater attention to environmental and social aspects of transport. The White Paper however is less convincing on how these changes are to be brought into effect. Considerable reliance is placed on local authorities who will have to produce local transport plans for their areas and much faith is placed in people and firms changing their behaviour to reduce reliance on cars, vans and trucks. Past experience has shown that getting people to change their travel habits, once they have become used to the freedom that individual motorised road transport has given them, is a formidable task. Nine further "daughter" White Papers are promised including that on the trunk road programme and how effective the new policies are likely to be cannot be reasonably assessed until these are all published, which is not likely to be until sometime next year.

Planning features as a key element in the new policy. New guidance will favour development accessible on foot, by cycle and on public transport. More restrictive parking provision is foreshadowed and local traffic management is to favour non-car modes. New housing will be favoured in areas accessible by public transport and all this will be influenced by a more streamlined planning process and closer control of potentially deviant plans is hinted at in the White Paper.

Overall the White Paper is to be welcomed as a good start in developing a realistic and fair transport policy for the United Kingdom. However, whilst its recognition of transport problems and how they relate to other aspects of our economic and social life is soundly based, its prescription for their amelioration is less so, with much evidence of wishful thinking. Perhaps the subsequent more specific White Papers will put this right but the first—on trunk roads—is a disappointment in this respect in offering no real alternative to deal with the often chronic congestion of the national road system. However it is clear that transport aspects of development are going to get even more attention in future and both planners and developers are going to be more creative in finding ways of reducing dependence on car and lorry use.

An underlying concept of integrated transport and the policies in the recent White Paper, is that of sustainability. The most widely used definition of sustainability is that coined by the Brundtland Report: "Sustainable development meets the needs of the present without compromising the ability of future generations to meet their own needs." Whilst this sets the context it is not sufficiently precise for any particular policy area and something more definitive is needed. For transport sustainable development a more appropriate definition might be:

"Transport sustainable development should include decent living and working conditions for all in which:

- basic daily needs for the majority can be met by travel on foot, cycle and local public transport
- most longer and less frequently made journeys should be capable of being made efficiently by public transport or other multi-occupancy vehicles.

within the economic and environmental capacities of the area, whilst paying the full external costs and respecting wider economic, social and environmental objectives."

6. Implications of prospective policy changes

Despite uncertainty about how the Government's new transport and planning policies will develop and how effective they will be in achieving their objectives their philosophy is clear. Mobility growth is to be limited particularly by the more profligate modes such as the car. This will be achieved by a mixture of "push" measures such as parking controls and charges and "pull" measures such as better bus services. It seems likely that growing congestion will also be a feature of the balance, at least on the basis of the policy measures envisaged to date. So, despite the up-beat note of the White Paper—"Better for All" and "More Choice"—for the next few years at least improvements in some aspects (*e.g.* easier cycling and greater safety) will be balanced by deterioration in others (general road traffic conditions and parking difficulties).

The picture is rather clearer, at least in principle, for development planning. The movement away from the rather laissez-faire regime of the late 1980s and early 1990s will be reinforced and land use planning controls are likely to be strengthened further. Developments which contain sets of mixed uses which facilitate local access to goods and services will be favoured and the way to achieve this is to be signalled in local transport plans.

New planning guidance notes from Government on Transport Development Plans and Housing are to be expected. The siting of larger developments at locations well served by public transport will be encouraged and the amounts of parking that can be provided will be limited to more restrictive standards than have been common in the past. Facilitating the development of features such as interchanges and public transport facilities will become an important dimension of local plans and the layout of local areas will increasingly have to make it easier to walk, cycle and use public transport.

The need for four million or so new homes over the next 25 years is perhaps the most important development challenge. Many of these are to be provided within the bounds of established urban areas and finding sufficient suitable space for these will not be easy. Many of the so-called "brownfield" sites are not well served by existing public transport services and, taking London's Docklands as a rather extreme example, the cost of providing good quality public transport access can be very high. The Transport White Paper is rather cool on the prospects for new light rail systems in the United Kingdom but it may take this type of investment to provide the accessibility needed to trigger development and redevelopment of brownfield sites for residential and mixed uses. Although these systems are not cheap this may have to be the price that has to be paid by the public sector to enable successful private development of what otherwise would not be commercially viable.

Much new housing will have to be on "greenfield" sites and finding sites for this will be contentious as the recent case of the West Sussex Plan has shown. The most attractive commercial sites will probably be around the edges of existing settlements especially where significant commercial and retail development has taken place over the last decade or so. However this is not likely to be sustainable in encouraging travel by the "slow modes" and public transport. The challenge of creating the scale of sustainable residential development on greenfield sites may therefore prove to be just as difficult as accommodating the lions' share of future housing needs on brownfield sites.

Perhaps this is the time to turn the clock back to the post-Second World War formula of planned new towns where land uses are balanced to avoid the necessity for long journeys by cars or other modes. Whilst the original objectives of a high degree of self-containment were not fully achieved in the planned new towns they developed a sense of identity and integrity not found in most other types of greenfield development. If this approach were to be followed for the next era of greenfield housing development then the urban structures of these new settlements would have to be equipped with high

quality public transport corridors (*e.g.* the Millennium Village model) and better articulated to promote public transport use. Moreover car use would have to face the full marginal social costs to avoid wasteful travel between these settlements and other parts of the region in which they are set.

Whatever the approach adopted, the planning of future development can no longer rely on the ready availability of extensive road capacity and the high levels of car and truck use that go with it. Easy alternatives to the familiar development patterns are not to hand and both a clear planning framework and supportive transport policies by local authorities will be necessary if developers are to embark on the types of development envisaged in the Transport White Paper.

7. Some implications for the role of developers and planning authorities

Planning authorities will have to review their development plans to ensure that full account is taken of the need to facilitate employee and visitor access to significant traffic generators by means other than cars. In most situations access for goods will have to continue to be by road transport but where a development is capable of being served by rail (or waterway) for some movements of materials then this should be given weight also. Obvious locations are close to railway stations and on routes well served by buses. However existing services may not be adequate and for substantial developments there may be a need to improve public transport services.

Traffic impact analyses are now an established part of the planning process and these need to be broadened to include public transport, walking and cycling—Sustainable Transport Audits. This will give both developers and planning authorities a measure of the extent to which road traffic generation can be modified by good design and location as well as an indication of the public transport services needed to ensure good access to the site. A new feature of such analyses will be the inclusion of possible workplace parking levies and congestion charging in the area. The prospects for these measures will be set out in the local transport plans to be drawn up by local authorities and so it is important that these plans give as clear a steer as possible on the degree, scope and timing of such measures.

In a few rare cases a new rail link or station may be justified and this will have to be the subject of an agreement between the developer, the planning authority and the railway providers. Part of the cost of the development could be secured from the developer through a section 106 agreement and in return it would be expected that a prescribed level of service would be guaranteed for a defined period. With the variety of players in the railway industry and the limited duration of some of the train operating franchises this will involve several parties. It is important that there is a clear lead from the railway side and the body most suited to take this will be the Strategic Rail Authority in conjunction with the PTEs in their area, and Transport for London in the case of London's local railways.

Where new development could feed directly into a high quality public transport operation such as a metropolitan or regional railway it may be appropriate to allow a “development density bonus” to enable a developer contribution to meet the cost of providing this link. There are a number of examples in North America (notably Toronto) where this has been done to the benefit of both developers and the wider community by reducing car traffic generation.

Whilst the White Paper is not very encouraging about the prospects for light rail there will be situations where new fixed route systems, or extensions to existing networks, will be appropriate. These will usually entail considerable capital cost and therefore only be justified where there is the prospect of heavy usage from existing and future development. A classic case of such a development is the Croydon Tramlink presently under construction which exhibits the following features:

- It is a feeder to a large sub-regional employment and retail centre beset by severe traffic congestion.
- It is a feeder to a major commuter rail interchange.
- It will provide a link between two rail stations on either side of the town centre.
- It provides a fast link to a very large, but somewhat isolated, housing area.
- It makes extensive use of existing rail infrastructure.
- It runs on key streets through the town centre but has exclusive rights of way over most of the rest of the network.
- It will be at the centre of an integrated system with buses, heavy rail and unified fares and ticketing.

Where such favourable circumstance do not obtain, then more modest improvement schemes will be appropriate and the Guided Busway system in Leeds shows what can be achieved with more lowly and less expensive technology. More often than not however public transport access will be mainly by bus and here the aim should be for the majority of the catchment area of any new development to be within 400 metres of a connecting bus service with appropriate frequency. Where such services exist it is important to ensure that they have sufficient peak capacity to serve the development and where they do not developers should be prepared to assist in funding support for the initial stages until demand and service requirements have stabilised. There are also a growing number of examples where certain types of development have provided their own public transport to supplement that which is provided as part of the general network. These includes workers' buses and vans provided by employers in off-centre employment parks and shoppers' buses contracted by large supermarkets.

There is much to be done in most parts of the country to make bus services a reasonably attractive means of getting about. The proposals in the White Paper to develop bus quality schemes should help put this right but it is important that progress is made quickly if developers are to be convinced that visitors to their sites will willingly travel by bus. The required features of such scheme include:

- well designed and lit bus stops;
- good passenger information;
- frequent reliable services;
- clean accessible vehicles;
- traffic measures to minimise delays and obstructions at bus stops.

These features will not come free and the money to pay for them will have to be found. Although better buses will increase fares revenue this will not always be sufficient and revenues from workplace parking levies and/or local congestion charging should be available to help meet the costs of quality bus services.

The change in climate will tend to favour development in and around established centres which are well served by public transport and are easily accessible on foot. To capitalise on this, planning authorities will have to look again at their policies for these centres. The traditional town centre footprint should not be treated as sacrosanct and the disposition of uses provided for in their plans should be reviewed. If workplace levies are to be introduced then it may be appropriate for some of the parking this releases to be made available for shoppers and visitors and it may also be necessary to look again at the highways and traffic arrangements to ensure that access to these centres by essential vehicle traffic is adequately provided for.

At a more local level, site layouts should be devised to favour access by foot, cycle and public transport. This means locating building entrances close to public transport shops/stations and at nodes in the footway system. Cycle parking should be convenient and safe. This may require some reorientation of

the public transport and pedestrian arrangements in the area which should be planned from the initial stages of the proposal.

The modal splits for developments should be considered as part of the planning process in the light of the nature of the activities on site, how these are to be managed, local transport access and measures to moderate car access. This will obviously vary widely between different uses and locations but it should no longer be assumed that access will be predominantly by car. The amount of car parking space should be designed to match the planned modal split and its location subject to giving public transport, walk and cycling access priority.

For larger developments it may be necessary for the local traffic authority to introduce a traffic management scheme in their vicinity to facilitate congestion free bus access and easy movement to and from the site by foot and cycle. Again this is a matter which needs to be considered from the outset so that the best match can be secured between the site design and the local access system. This will require a positive and proactive posture by local authorities and public transport operators—rather different from the poacher and gamekeeper stances too often seen in the past.

Larger residential developments there will usually seek to provide a mix of dwelling types which can be matched to variations in site densities. These variations should be devised to maximise the proportion of residents with ready access to public transport. Thus higher densities would be located in the vicinity of public transport stops and stations with lower densities on the remoter parts of the site. Provision for bus access into the developments should be made, recognising the space, turning and standing requirements of buses. Again the provision of parking will be an important issue and this should be graded to recognise the likelihood of car ownership being lower where public transport accessibility is high. In the higher density areas parking should not necessarily be located integrally with residential units and can be separated where this facilitates pedestrian amenities and public transport accessibility.

An integrated transport policy must contain a management plan as well as the physical facilities for travel and this should be reflected in development planning. More and more site operators are recognising the advantages of managing the way their developments are accessed. A primary requirement is clear and reliable information about public transport services in the area. This should be available at appropriate locations on site using basic printed material from the local authority and operators. Increasingly real time information is becoming available and this can be distributed through internal intranet facilities at workplace and on TV monitors at retail and leisure developments.

Green commuter plans and company travel plans are becoming increasingly common and any major new commercial development should have such a plan formulated as part of the design process. It will not always be possible to settle plans where the occupier is not known but the planning of the site should be based on best practice in this respect. The ingredients of such plans can include:

- priority parking for car sharers;
- special bus services;
- secure cycle racks and shower facilities;
- company travel tickets;
- taxi services for business journeys;
- financial assistance with public transport travel costs;
- customised public transport service information.

One feature of retailing today is the bulk and weight of many purchases which make them awkward to carry away on public transport. More accessible buses will help ease this problem but that will not be sufficient on its own. This problem can be eased by the provision of delivery services either by

individual retailers or through a joint scheme for a group of establishments. These schemes can range from a contract with a local car/van hire firm through to a dedicated service with special vehicles and staff. A number of scheme of this kind have already sprung up and are proving to be a success.

The closer working between the development community and planning authorities that this regime will require to be successful must be based on a clear understanding of the objectives for and constraints on the development process by both sets of players. For their part, planning authorities must be clearer about their expectations and be able to give greater commitment to their part in the integrated scheme whether this be on their own behalf or in respect of other parties such as public transport operators. The development community must recognise the changing context within which it operates and be prepared to enter into the partnerships that will be needed to make the new policies work effectively. Whilst this will not always be easy there are some very positive signs amongst the more progressive developers that show an understanding of the changes afoot and that, with ingenuity, they can be turned to commercial advantage.

8. Conclusions

The principal transport problem that the country faces today, and has faced for many years, is that of traffic congestion. In turn this creates difficulties for the economy, the environment and public transport. This problem has been getting slowly worse and the Integrated Transport Policy unveiled in the Government's recent White Paper sets out to reverse this. Although, as yet, the proposals in the White Paper do not add up to a comprehensive and effective set of measures, the direction of the new policy is clear.

Increased car use and more dispersed land use patterns have fed off each other for the last 30 or so years and this is leading towards an unsustainable situation. Future development must break away from this trend if congestion and environmental damage is not to worsen. This presents a formidable challenge for planning authorities and developers as the forces underpinning the trends of the last 30 years are powerful and deep-rooted.

To change these trends will require increased co-operation between developers and public sector planners. It will also require incentives to move towards more sustainable practices as well as further restrictions of unsustainable development. New development will increasingly have to be placed in locations where public transport, walking and cycling do or can be made to provide reasonable access. The other side of this coin is that local authorities and transport operators will have to improve the facilities for these types of travel to and from development and redevelopment sites. Local site planning and development design also have important roles to play in improving access by these modes of transport and this should be a feature of the design process from the outset.

Development management such as company travel plans, green commuter plans and home delivery services should be devised as part of the overall arrangements and existing and proposed schemes for workplace charging brought into the balance. There can be substantial benefits for developers through productive use of what would otherwise be parking space and the planning system can be developed to enhance these through sustainability bonuses.

It will be some time before the new transport policies foreshadowed in the White Paper start to be widely effective, but then physical developments also last a long time and today's location and design decisions need to reflect the circumstance to be faced 20 and 30 years ahead, as well as in the immediate future. Whilst short term considerations weigh heavily on commercial decisions, good planning and design should be able to provide developments which are commercially attractive in the short run and

sustainable in the long run, even if this means building in a measure of adaptability to suit changing circumstances.

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