SUMMARY

This report draws together the results of five recent case studies undertaken by MTRU within the context of the public inquiry process. Two use existing projects to supply case study information, one undertaken for local authorities at a Highway Inquiry (A406, outer London), the other for local residents at a Planning Inquiry (Norwich). The other case studies were undertaken specifically for this report. First are the two "Round Table" Conferences, at Hereford and Bodmin, which have been promoted by the Department of Transport as an experiment which could speed up Highway Inquiry procedures. The final one (Ilkley) involves a scheme which has been through public consultation, and is awaiting its inquiry.

Overall four main issues arise from the case studies:

i) a changing and somewhat confusing context in which schemes are considered, due at least in part to a poorly co-ordinated series of actual and proposed changes to the inquiry process, the DoT command structure and national policymaking;

ii) ambiguity and misunderstanding over the role of inquiries and of the DoT representatives, and in particular the way in which scheme promoters are treated as though they are impartial sources of factual information;

iii) the obscuring of major economic and environmental issues at public inquiries by the overly complex and inaccessible presentation of the technical case which objectors (and some inspectors) cannot follow; and

iv) the exporting of problems from urban areas, where car based development and road building is now seen as difficult both in political terms and in land costs, to the countryside.

i) How do Policies relate to Schemes?

During the course of this project (which started at the end of 1993), there have been a series of important policy statements, consultations and initiatives which are relevant. These are as follows:

* The holding of two "Round Table" pre-inquiry Conferences (October 1993 to February 1994)

* A programme to make substantial changes to the National Traffic Forecasts and the way they are used, including setting up an Advisory Group (announced December 1993, first meeting March 1994).

* Recognition of the importance of demand management and the new role for local authorities set out in the Transport Chapter of "Sustainable Development: the UK Strategy" (January 1994)

* Formal Consultation on Highway Public Inquiry Procedures (February 1994)

* Publication of PPG13 giving guidance on transport provision and land use planning (March 1994)

* The UK Trunk Road Roads Review (March 30th 1994)

* The "Citizen's Charter" for those affected by road proposals (March 31st 1994)

* Establishment of the Highways Agency to take over the operational functions of the Department in relation to road building (April 1994)

* Report by the Standing Advisory Committee on Trunk Road Assessment **(SACTRA)** on whether roads generate traffic, submitted to Ministers but as yet (July 1994) unpublished.

All of these appear to be proceeding in isolation from each other, despite the fact that there are obvious links between them. For example, the "Round Table" conferences may lead to changes in the Inquiry proceedings and scope. However, these are already the subject of a separate consultation which makes no reference to them, despite important changes in that consultation document affecting the Pre-Inquiry process. In addition, the Charter for those affected by road schemes could be changed significantly both by the results of changes to Highway procedures and the use of Conferences.

Another example is the fact that the "Roads Review" has been carried out without referring to the problems and inadequacies of the current National Road Traffic Forecasts and their use for individual schemes, although these are now fully recognised internally by the Department of Transport. One of the schemes which has been subject to a Round Table Conference (Hereford), and which had previously been rejected by an Inquiry Inspector, has been included as a "Priority 2" scheme in the Roads Review. This is despite the fact that the Conference is supposed to assist the Secretary of State in deciding whether to proceed with a revised scheme or abandon it altogether.

Finally, the setting up of the Highways Agency may alter the status of policy statements at inquiries, and the way in which policy witnesses attend and are cross examined. Little thought appears to have been given to the potential for confusion. This can only undermine the Government's desire to make inquiries more efficient.

ii) Partial or Impartial?

The second and third problems identified above are closely related. First there is the widespread misunderstanding over what inquiries are. They are not intended to be impartial, but to advise Ministers. In this sense they are not tribunals, although they exhibit some of their characteristics. The problem arises because the level of bias which is acceptable in such inquiries has never been properly or publicly defined. This is a separate problem from whether or not the merits of Government's national policy should be discussed at local inquiries (this is of course beyond their scope). One of the key findings from the case studies in this report is that the level of partiality is now probably limiting the value of advice to Ministers and in addition has

lowered the degree of public acceptability. In particular for the Countryside Commission, this is limiting the vigorous representation of the interests of the countryside in an adversarial system where strength of representation is a key, if not the key, factor in decision making.

These problems are not new, indeed the Franks Committee in 1957 emphasised the need for openness and fairness at public inquiries, even though they could not limit a Minister's decision making in the same way as an independent tribunal. While not removing such discretion from Ministers, it should still be possible to improve the inquiry process, and better achieve the Commission's aims to protect and enhance the countryside.

iii) Technical Imbalance

One of the key areas where the situation could be improved is the lack of even handed technical advice which could assist inquiries in general and the inspector (and thus the Secretaries of State) in particular. This is probably clearest at Highway Inquiries, where the Department of Transport acts both as promoter (this is its main function) and ever present legal and technical arbiter (this is less well understood).

Previous concerns have been expressed because the advice given to the Secretary of State on whether to accept an inspector's findings is from the same Government Department which has promoted the scheme. As seen under ii) above, some inclination by the Minister towards his own scheme is to be expected. This need not prevent objectors having what the courts have called "an active, intelligent and informed part in the decision making process" (Nicholson v Secretary of State for Energy 1977).

This promoter/arbiter relationship will be somewhat altered by the creation of the Highway's Agency, theoretically separated out from the Department itself. It is too early to say whether this separation will remain theoretical. However, this obvious source of public unease is paralleled by a more subtle imbalance at inquiries themselves.

At inquiries, the Department (or now the Highways Agency) has permanent legal representation, and permanent technical representation. Offices and facilities are usually provided for these numerous support staff. At planning inquiries, a level of administrative support is also provided for objectors, but this is less common at highway inquiries. The impact of a full technical team with full equipment and expertise means that in practise they try to offer advice to inspectors which would be better provided by an independent source. Individual inspectors react differently, with some taking a robust line, and some more acquiescent. Judgement, however, is frequently exercised by the highway promoting authority and yet is presented as the objective supply of information. Whether correct or not, the Department has great influence because it provides the only permanent legal and professional representatives at the vast majority of road inquiries.

This whole issue was very clearly illustrated at both Norwich and North Circular inquiries, with two inspectors highly conscious of the need to stay independent,

and going out of their way to treat experts on both sides as professionals, and not give automatic credence to the technical case of one side. This contrasted strongly with the round table conferences, where the highway promoting agency was treated as though it were an impartial research body.

iv) The Greenfield Option

The final key issue is the question of how the traffic problems of towns are effectively exported to the countryside, and how its interests can be better represented in the inquiry and pre-inquiry processes.

The problem can occur in several ways. For example, the proposing of a ring road through an urban area is almost bound to cause strong feelings of opposition from those affected. Building a so-called "bypass" through the surrounding countryside will avoid most of the residential opposition. This was extremely well illustrated at Hereford by a series of events which actually took place during the course of the round table conference. These are described in full in Chapter 1.

A second problem under this heading is that substantial new development is often planned alongside a green field road scheme. This is presented as relieving pressure on the town centre, and at the same time gains support from local land owners who stand to make substantial windfall profits. It can also appeal to local authorities who stand to benefit from specific planning gain agreements with developers, as well as believing that new road based sites will generally expand their local economy. This latter position is not altogether consistent: either this new development will have to be attracted from elsewhere (in which case why should central government rather than local authorities or the developer fund the road which attracts it?), or closer to home, existing town centres will have to decline, or at least stop growing, to supply the customers for the retail or business parks on the new ring road.

This issue was well illustrated at Norwich, where there was an underlying assumption of traffic growth to and from destinations in the surrounding countryside, particularly during peak hours, which far exceeded growth in the city's existing built up area (by about three times). It is consistent with earlier Commission research on traffic growth in the countryside undertaken by Oxford Transport Studies Unit.

In Norwich, the implication was that shopping and business development would take place on green field sites, and indeed this is still being used to justify another road building scheme around Norwich (the Northern Distributor). Significantly, this is outside the existing urban area, and would create a semi-circle of development opportunities to the North of the city, outside the existing city centre. This was also the case at Hereford, although less detailed information on the traffic growth assumptions was available.

MAIN CONCLUSIONS

Although there are many detailed conclusions to be drawn from the case studies, there are two overall themes which emerge from the project as a whole.

Who Assesses the Assessors?

The first is that there are structural weaknesses in the inquiry process which are not being directly addressed by any of the Government's diverse reports, reforms, experiments or consultations. These mainly relate to the way in which judgement and fact become confused, and this is made hard to challenge because of technical obscurity. Unless a well funded, strongly motivated local authority takes up a critical role, the road proposal's technical case stays virtually untested. When it is tested, it may be found to have serious technical weaknesses, but in any case it is almost always shown to be based on assumptions which are a matter of judgement. This alone puts the traffic benefit case into a different, more realistic perspective.

One major reason for this imbalance is that most road schemes are designed to deal with problems which are predicted for the future, rather than considering problems today. This is not in itself illogical, what is so misleading is the belief that the future can be predicted, and human behaviour represented in a traffic model, with sufficient precision to produce money returns over a thirty year period. The modelling is always at the heart of the inquiry, because it generates the numerical side of the scheme evaluation, including the cost benefit analysis.

The first problem with models is that all forecasting and transport modelling is data hungry. This means that cost inevitably limits what is surveyed, in what detail, and for how long. Surveys from different years are mixed together, older, more detailed surveys are updated by simple counts, and there are many methods to make these amalgamations as accurate as possible. However, even in the matter of source data, much judgement has often already been exercised, and should be closely examined.

Secondly, the computer models which use these data are not usually able to reproduce the present day traffic patterns without extensive manual adjustments. A detailed example is given in Chapter 9, where the model could either reproduce the correct present day traffic flows, or the correct present day journey times, but not both.

Thirdly, many (and in the Government's latest analysis, most) forecasts for local schemes based on national figures turn out to be wrong when counts are undertaken after the schemes have been built. When all the schemes are added together the national forecast may not be too inaccurate, because the pluses and minuses of individual schemes cancel each other out. However, at the local level, the application of NRTF must be undertaken with extreme care. In many cases the Department itself will not use it (again see Chapter 9). Challenging the application of NRTF at local level is well within the scope of inquiries, and indeed is essential to properly advising the Secretary of State.

On this issue, the final point is that forecasts can be varied according to

effects such as traffic generation, transfers to and from other modes (including walking) and such approaches even have their own sections in the Government's manuals (TAM and COBA). It is a matter of judgement whether they are used, but at inquiries the impression is frequently given that it is against Government policy to do so.

All these involve extensive value judgements. However, there is nothing intrinsically wrong with the use of judgement providing it is seen as such, and, where there are properly justified judgements which point to another solution, equal resources are given to explore and present that alternative case.

Frequently, the position is that damage to the environment, and substantial changes to the land use pattern, both of which arise from road building, are overridden by what is presented as absolute economic benefits measured in pounds. The former are even referred to as "intangibles". The truth is that the real intangible at most road inquiries is the traffic forecast, it is only its method of presentation (precise monetary valuation) which makes it appear so secure and reliable.

In this situation, how can the situation where the promoters act in part as assessors (and visa versa) be put right? There are two answers. First there must be a complete review of the inquiry system. This is likely to mean an eventual speeding up, but the prime objectives should be accuracy and fairness, not administrative convenience. In the short term, and probably even when the system is overhauled, there must be active agencies, with proper resources, to test the veracity of claims made by the promoters of schemes within central or local government, or the private sector. As the move towards executive agencies, less directly controlled by Parliament, is increased, this balance of argument becomes even more important both for the public, and for the Secretaries of State who are advised by the inquiry system.

Who Protects the Countryside?

These structural problems with the highway planning and inquiry system are not only matters of academic interest or abstract principle. They lead to the building of schemes which may actively damage the countryside, and which may not have the traffic benefits which are claimed. In fact, the balance of road building has been shifting away from urban schemes, which are now seen as politically troublesome, costly, and technically difficult. This makes the road building process of greater importance to the rural environment than ever before.

As well as this current project, MTRU has experience of working with other bodies, statutory and voluntary, who have had to deal with the impact of road schemes on the countryside. In all cases there is a conflict between the allocation of limited resources to a specific scheme, and the protection and promotion of the underlying principles which protect and enhance the non-urban environment. The diversity of this environment, from suburban fringe through green belts to the most remote natural areas of Britain, in itself creates problems when national countryside organisations are considering whether they can become involved in local road schemes and public inquiries.

Fortunately, this is not a completely irresolvable conflict. There are recurring problems which can be addressed both by central research, and by the use

of case studies. The latter can, and in our view should, sometimes take the form of participation in public inquiries. This would be in cases where a common problem is clearly exemplified, and the work which is undertaken could be applied on other occasions.

Without specifying the form which such work could take, there are several clear problems, particularly relevant to rural areas, which have been identified in this report. These are:

* the Government's own sustainability objectives are not applied directly to local schemes;

* alternatives to road building, including a sensible "do minimum" or demand management options (either slowing growth, stabilising or reducing demand), are not properly developed or fairly assessed;

* inappropriate forecasts are used which suggest that the provision of more road space will not lead to additional traffic;

* forecasts which assume far greater traffic growth and associated land use developments in the countryside than in existing town centres go unnoticed or unchallenged;

* unsuitable traffic modelling is undertaken, for example using urban based models for bypasses which cannot assess the impact over wider areas;

* the use of the "soft option" alignment of roads with a specific urban function into the countryside;

* the way in which road building encourages retail and business parks on green field sites is not taken into account for trunk road schemes;

* some local authorities use road building as a spur to green field development to expand their employment base and obtain planning gain agreements from developers;

* the environmental impact of such development is not considered together with, and at the same time, as that of the road scheme.

RECOMMENDATIONS

For the Countryside Commission

1 That in evolving and presenting its policies the Commission recognises that protection of the countryside cannot be viewed in isolation from other issues of principle and practise relevant to highway inquiries.

2 That the Commission, recognising the criticisms of the inquiry and pre-inquiry processes identified by the consultants, with the co-operation of other bodies representing the interests of the countryside, and after discussion with central Government Departments and their agencies, carries out case studies to explore the pre-inquiry reforms suggested in this report.

3 That the Commission considers further, in the light of its published planning policies, how best the interests of the countryside for which it is responsible can be protected and represented at road inquiries, particularly because such interests involve the wider population rather than people more directly and personally affected, as in the case of most urban road proposals. Again this may involve case study work on specific highway schemes.

4 Separately from these issues, that the Commission should also recognise the positive value of selective case studies which apply national policies in a practical local context, both to ensure that they fulfil the remit of protecting and enhancing the countryside, and to provide good practise examples.

5 That the Commission works closely with the relevant planning and highway authorities in undertaking the case studies which have been recommended above.

6 That the Commission invites central Government to consider with it the further recommendations set out below.

For Central Government

That the process of road inquiries is reviewed with the objective of increasing transparency and impartiality, and that this review should include consideration of the following:

i) a more investigative, independent role for inspectors;

ii) greater openness during the DoT's preparation and assessment of schemes;

iii) access for objectors to independent technical advice;

iv) the difficulties caused by the DoT's acting both as promoter, and as

independent adviser or arbiter;

v) new pre-inquiry proceedings which are themselves more accessible and investigative and which take place much earlier than at present before any full inquiry opens; and

vi) whether it is possible to moderate at least some of the court room style of the inquiry process, and issue guidelines to curb any excessive use of inappropriate legal tactics.

5 DEMAND MANAGEMENT IN THE NORWICH AREA: BACKGROUND

Introduction: The Ring Road (IRR) Planning Inquiry

5.1 In 1992, MTRU was contacted by a group of local Norwich residents, who were facing a Planning Inquiry into a major orbital road scheme, proposed by the County in the context of a wider strategy encompassing both urban and rural environments. This strategy was based on the "Norwich Area Transport Study", known as NATS. Funding for MTRU's work was available as part of a long term research project ("All Change": IPPR and Transport 2000 Trust), from local residents and from MTRU's internal research budget.

5.2 An updated traffic model was available at the County, who had in-house expertise to operate it. Elements of management and restraint such as park and ride, restricting through traffic in central Norwich and data on private and public parking, were already included in the model. This meant that the basic information and planning tools for a case study exercise were readily available.

5.3 Everyone (including Norfolk) agreed that the road scheme was environmentally damaging. The differences arose because the County considered that a ring road was essential to relieve the centre. This would then be protected by a "Ring and Loop" system to discourage through traffic.

5.4 Norwich City Council was also objecting at the Inquiry. They proposed an alternative, smaller road enlargement further from the City centre. The residents had formed an umbrella organisation (the "Norwich Road Action Group" - NRAG) and they wished to explore a non-road building alternative.

MTRU's Role

5.5 In this context, MTRU worked to prepare a restraint scheme which could be tested using the same traffic model, surveys and forecast as the road proposal. In this case there would be no road building. The County's officers, working with MTRU, ran the restraint scheme through the model and the results were presented to the IR Inquiry as part of MTRU's evidence.

5.6 As well as the general applicability of non-road based solutions to both congestion and environmental problems, the Inquiry work revealed that the County was already planning for major traffic growth in the countryside surrounding Norwich, two to three times as great as the growth predicted for the existing urban area. This was not made explicit in any of the Inquiry documents, or by the County's consultants in their NATS work. It is particularly relevant to this report, and the problems of "exporting" congestion from urban areas to the countryside through car based development on green field sites rather than in existing town centres. The Planning Inquiry started in Autumn 1992, and finished in 1993.

Inquiry Result

5.7 In April 1994 the Inquiry Inspector's report, and the Secretary of State's decision letter were published.

5.8 The Inspector rejected both the Inner Ring Road proposal and the City's smaller scale alternative. The Secretary of State agreed, drawing particular attention to the fact that demand management measures would be needed in any case quite soon after either road scheme was completed.

5.9 As regards the MTRU option, this was reported in very positive terms, although it was recognised that additional work was required. Key quotations from the Inspector's report and the decision letter are reproduced below.

5.10 As the Inspector himself remarked, this decision points the way to future town centre strategies based on demand management. It also marks the end of an era for the old style packages based on meeting demand by road building.

Extracts from the Inspector's Conclusions:

Para 38.4 -

"By failing to effect an overall improvement of the local environment, I consider that IR III fails to meet the aim expressed in the White Paper" (This Common Inheritance)

Para 38.5 -

"The City Council also referred to para 5.31 of PPG12. The guidance states that in the case of local authority road schemes of a strategic nature shown in the structure plan, consideration in the local plan process should normally be limited to detailed alignment, because the need will have already been examined. In view of the scale of objections to IR III, I think it right to examine the principle not just the detail of the scheme"

"As the planning policy guidance indicates, if detailed consideration of the scheme reveals it would cause unacceptable damage to the environment, consideration should be given to its deletion or relocation. It follows that deletion of a scheme shown as a specific proposal in an approved development plan may be the appropriate course"

Para 38.148 -

"The NRAG traffic restraint option was offered as a non-road building alternative to traffic congestion in the city centre. It was an interesting, low capital cost alternative to the highway and local authorities solutions to improving conditions in the city centre"

"Apart from the restraint option's obvious merit of low initial cost, it may be pointing the way to a form of future methods for tackling city centre congestion"

Para 38.158 -

"The Road Action Group's traffic restraint option is in it's infancy, but it was not an

option favoured by either the County or City Councils, the bodies most responsible for determining future strategy. But increased restraint of vehicular traffic in the city centre appears inevitable and desirable"

Extract from the Secretary of State's Decision Letter:

Para 10 -

"However, the Secretary of State shares the Inspector's concern that the traffic projections put forward by the Council appear to point to the need for additional measures by 2006 if unacceptable congestion is not to occur"

"The provision of additional road capacity through these proposals is expected to be limited in the benefits provided to a relatively short timescale"

6 THE NORWICH DEMAND MANAGEMENT SCHEME: STAGE ONE

The Private Parkers

6.1 While planners are now beginning to control the number of parking spaces in new developments in order to reduce traffic demand, the problem of the existing private non-residential (PNR) car parking, such as that found underneath office blocks, is rarely considered. In Norwich this parking pool is bigger than all the parking in public car parks and at parking meters put together. There is some national variation, and figures are not always collected, but the following table summarises the position for a sample of 17 urban areas in Britain.

Table

PNR as a Proportion of Total Car Parking

	PNR	**Public On Street**	**Public Off Street**	**All Types**
Total Number of Spaces	105,626	30,451	109,499	245,576
Average Number of Spaces	6,213	1,791	6,441	14,446
Percentage of Total	43.0%	12.5%	44.5%	100%

Urban Areas: Aberdeen, Bradford, Bristol, Cardiff, Coventry, Dundee, Edinburgh, Glasgow, Hull, Leeds, Leicester, Liverpool, Newcastle, Norwich, Nottingham, Sheffield, Southampton.

Sources: Lothian Regional Council, Department of Transport, MTRU

6.2 The implications of the above table are that any efforts to reduce or control on street parking, or public car parks, will only be affecting part of the potential. Thus PNR parking is an obvious target for any restraint scheme.

6.3 In addition, many public parking spaces are already subjected to time limits, or to high costs for long stays. When this is taken into account, it is clear that new parking controls aimed at commuting, which do not include PNR, will be largely ineffective.

6.4 The problem is that there are no direct powers applying to the control of existing PNR parking. A scheme was therefore devised for Norwich which was within existing legislation and which would include a strong element of PNR restraint. The

basic structure was identified by MTRU as part of its 1991 review of traffic restraint (Five Cities - Five Solutions, 1991, 1994). The Norwich scheme was the first practical test of such an approach.

Demand Management without Price

6.5 For these reasons, MTRU's proposal took the form of a rush hour car ban in the city centre. All residents in the area were to be automatically exempted. The whole of the centre of Norwich will soon be included in controlled parking zones, so a small design modification to the existing permits would make them easily identified in the car windscreen.

6.6 Having exempted residents in the area, the second part of the proposal is that existing companies are issued with permits according to their floor area, exactly as they would be if applying for planning permission today. This would put them on a more equal footing with new developments. In view of the established level of parking, this should be phased in over a number of years by allowing a generous allocation of permits in the first instance.

6.7 The final exemptions to be made were for emergency vehicles and public transport.

6.8 The scheme effectively limits the use of PNR parking for longer distance journeys to work, the form of city car commuting which is most damaging to the surrounding countryside. Extensions could be considered to control off peak use if required. A more detailed description is given in Appendix C.

6.9 It should be noted that a similar scheme in Milan, which had the effect of removing through traffic and controlling PNR parking, started during the am peak, amidst strong retail opposition, and rapidly became so popular that it was extended throughout the day. The Milan experience is described in more detail in Appendix D.

Overall Impact of the Stage 1 Scheme

6.10 The Table below gives summary results for the road building and non-road building options put to the Inquiry. The County's traffic model covered a wide area around Norwich, and the results for traffic congestion and air pollution are for the area as a whole. This is illustrated by the average speed figures, which are much higher (about double) than those experienced in the City centre. The total vehicle hours figure also shows the impact of congestion: when there is less congestion there are fewer hours required for people to make their journeys.

6.11 The fuel used figures are therefore also a guide to air pollution over the area as a whole. The traffic model used increases fuel consumption when vehicles are stuck in traffic jams. The latter are measured in the Table by the final queue numbers. These are given in passenger car units (pcus). Cars represent one unit, and in fact the only variation is that heavy vehicles have a value of two units.

6.12 It must also be noted that the model only covers the morning peak hour.

Table 6.1

Summary Economic Data MTRU and County Scheme Tests

AM Peak: 2006

	County: Do Least	Interim	IR	MTRU: Do Least	+Loops
Final Queue (pcus)	4829	6584	4881	2102	3677
Ave Speed (kph)	41.6	39.7	40.95	44.5	43.0
Fuel used	45865	48002	47136	38890	40516
Vehicle hours	23784	25679	24527	19813	21101
Total trips	60332			53404	

6.13 The first two options above (County "Do Least" and "Interim") do not include a new road. The Interim includes a "Ring and Loop" traffic management scheme to exclude through traffic from the area within the existing Inner Ring Road. The "IR" option contains both Ring and Loop and a new Southern section to the Inner Ring Road. MTRU "Do Least" has no Ring and Loop and no new IR, the MTRU "+Loops" has the Ring and Loop scheme and no new IR.

6.14 Although there are fewer trips in the MTRU option (11%) there are still more than the present day. Growth has effectively been slowed down. There are bound to be fewer vehicle hours and less fuel used because there is less traffic, but the reduction in congestion also contributes to an overall drop in exhaust emissions. For example, MTRU +Loops has 18% less fuel used than the Interim, and 14% less than the IR. It should be noted that this is an absolute improvement in environmental terms.

6.15 On the economic side, as regards cost per journey, the average speed figures provide the relevant information. These show marked improvement between MTRU options and the County proposals, including the IR. This led to MTRU's conclusion that the restraint scheme outperformed the new road. Needless to say, this was not accepted by the County!

6.16 The raw traffic model data supplied by the County was also translated by MTRU into comparative flow information for roads in the City centre. This is shown in bar chart form in Figures 6.1 and 6.2.

6.17 These figures are not the precise equivalent of vehicle kilometres in the area, but give a good representation of how flows would be affected on the ground.

Overall the County's IR scheme produces 23% more traffic in the city centre than the restraint proposal.

6.18 Even on the Ring Road itself, comparing the old ring road flows under the MTRU scheme with the flows remaining on that route (plus the new IR link), there would be 17% more traffic with the County Preferred Option.

6.19 Overall there seems little doubt that the Stage 1 proposal substantially outperformed the road scheme before the Inquiry, both in reducing congestion and achieving substantial environmental benefits. All the figures were based on data supplied by the County and their consultants, and the County, supplied with MTRU forecasts of parking restraint, ran the traffic model themselves. A straightforward description of how the MTRU options were translated into the traffic model is given in Appendix E.

6.20 In fact, although there was considerable dispute over the results of COBA based estimates for the MTRU options, in particular any additional cost to those commuters diverted from cars, the main arguments put forward were on whether the MTRU scheme was or was not within existing legislation, its impact on business, and its practicality. The legal questions appeared to be dropped as the inquiry proceeded. The inspector did not accept these criticisms, apart from the need to study further the impact on individual Norwich businesses.

6.21 The next section explores further the various reactions which people might have to such a restraint scheme. It should be noted that another innovative feature of the MTRU approach is that it begins by restraining traffic, and then estimating where demand will transfer, rather the conventional approach of improving alternatives (such as public transport) and then seeing if this restrains traffic.

Personal Responses to Vehicle Demand Management

6.22 For the purposes of assessment it was not necessary to predict all the various reactions to demand management which may occur. There were several proposals put forward in earlier County work, such as the Norwich Area Transport Study (NATS) and elsewhere which could accommodate more person trips into the City. Within the City itself, cycling and walking could provide opportunities for transfer. This would improve the value for money of City and County proposals for cycle networks and pedestrian networks. The removal of car traffic provides a quality and time incentive, particularly for shorter distance journeys by foot. No transfer of car journeys to cycle or foot was assumed in NATS as a result of improved conditions.

6.23 It must be noted that the number of car journeys into two areas of the City was restrained by the MTRU option, but the number of person trips was assumed to grow in line with the County's forecast. In this sense **accessibility** was maintained, but by the adoption of different travel modes.

6.24 Public transport would be another obvious recipient of passenger demand, and this would clearly be more relevant for longer journeys. The control would be

applied to those trips which are most likely to transfer: peak hour journeys to the centre. If improved services were run to meet demand, a proportion of the trips unaffected by the restraint mechanism could be attracted to public transport. There should also be an allowance for car trip making avoided because employees do not have a car available at the workplace.

6.25 An important effect which would be expected, but which had no reliable prediction method available, was the transfer from car driver to car passenger. This can be done by making one journey serve several purposes (see PPG12 6.14 iii)) or by car pooling arrangements. The latter are common in the "travel management agreements" implemented in the United States, and lead to the implementation of high occupancy vehicle lanes (**HOV**s). These reward the car sharers by allocating them their own lanes, although it can generate some passengers riding to make up the numbers.

6.26 Car pooling has been encouraged by Government for some period of time, but has never had the direct form of incentive which would follow from the business permit arrangements proposed here. Car occupancy in the Norwich study area was 1.35 in 1989, and is predicted as 1.34 for 2006. There is clearly great potential, and this could become a positive source of co-operation between companies and the local authorities, as it has in the US and in Holland.

6.27 Although this proposal is limited to the central area, a useful perspective is provided by the fact that all the growth in personal travel predicted by the County throughout the study area would be accommodated in the same number of car trips if occupancy rose from 1.35 to 2.11. For the purposes of this study, occupancy to central destinations would have to grow to over 3 persons per car by 2006 (including driver) if all the restrained car driver demand were converted to car passengers. It is thus not impossible to accommodate all commuters through car sharing, although a variety of responses is far more likely. However, this does serve to put the relatively modest scale of the scheme in context. Even without the impetus of the restraint option, the County's consultants thought that 2,000 peak hour trips were suitable for car pooling.

7 OTHER OPTIONS TO RESTRAIN DEMAND

Voluntary Demand Management

7.1 The method of restraint tested in Norwich Version 1 could be supplemented by improvements for cycling, walking, and public transport. In addition, the modelled impact of the rush hour car control scheme could be achieved entirely by agreement between businesses and the local authorities. The latter could encourage agreement by offering fast track permission to redevelop car parking spaces.

7.2 Such agreements seem unlikely at present, but may change in the light of a commitment by the local authority to implement a mandatory scheme unless voluntary agreements are in place. One unfortunate outcome of the Public Inquiry context was that businesses were canvassed by the County to oppose the MTRU proposal, and most refused to be interviewed on their attitude to demand management agreements. Experience both from other countries and in some UK boroughs suggests that such partnership arrangements can have a very positive outcome.

7.3 Even with voluntary demand management, the question of through traffic would then have to be considered separately. The City centre itself would be protected by a revised "Ring and Loop" system. However, some form of additional routeing deterrent may be required within that part of the City outside the centre. It should be noted that a new outer bypass running parallel to the proposed IR extension was opened just prior to the Public Inquiry. Relatively small scale calming could encourage traffic to use this route.

7.4 Such a package would be likely to match the performance of the MTRU Option One (+Loops) and a separate test was therefore not appropriate. However, it would be possible, in view of the additional use predicted for walk and cycle, to simulate new crossing facilities at key junctions on the existing inner ring road. This would be done by creating all red phases at existing Ring Road junctions which already had traffic signals. After discussions with local residents, cyclists and County officers, three sites were chosen and these were then available for the MTRU Option Two test carried out subsequently.

7.5 Since the Norwich case study, MTRU has begun a new project working with Nottingham City Council to implement a voluntary demand management package for commuters. Local businesses have already agreed to participate.

High Occupancy Vehicle Priority

7.6 It is also apparent that some form of vehicle occupancy scheme could be used to manage demand. In the US many traffic lanes are set aside for cars with a prescribed number of passengers. These are known as HOV (High Occupancy Vehicle) lanes.

7.7 In an urban area such as Norwich, there are not the same number of lanes available as on US highways, but the scheme could simply apply to an area instead. A high occupancy scheme would limit vehicles during congested periods to those containing 2 or 3 people. This could be applied throughout the City, and not just in the centre. The most likely application would be for vehicles entering the City at a cordon or cordons, but it could be applied in the form of a ban on cars driving on any street in the area unless carrying the prescribed number of people.

7.8 As with any scheme there would have to be clear and simple exceptions. The main drawback would be if such a scheme attracted people from walking, cycling or public transport as well as cars. However, the impact would be very substantial, and well in excess of the restraint scheme tested here. It is effectively a very strong incentive for car pooling and sharing. It seems odd that no-one has proposed such a scheme as an alternative to more complex approaches such as road pricing.

7.9 Nevertheless, this approach has no obvious precedent or parallel, and would have been slightly more complex to model. Given the time constraints of the Inquiry, it was not considered in detail in the case study. It should be taken as another example of how a positive approach to demand management offers great potential.

Freight Controls

7.10 Although an earlier study (NATS) had undertaken a desk top study of freight transport, no work was available on rationalising deliveries, for example through a transhipment depot. The only account taken of heavy vehicles in the County traffic model was that all their journeys were simply doubled, in order to represent their greater road space requirements (two passenger car units rather than one, see paragraph 6.11 above).

7.11 Resources did not allow MTRU to undertake a full freight study for Norwich. However, it was clear from an initial examination of the survey data that a rush hour ban on HGVs, diverting them to less congested periods of the day, would bring some relief. This would still permit all HGVs based in the area to drive to destinations outside the controlled zone. Such a control which covered the City area (including that beyond the Inner Ring) would reduce pcu trips by 1,984 during the am peak. This would enhance the impact of the MTRU proposal by almost 30%.

7.12 Such a scheme was extremely easy to represent in the model, by simply removing the HGVs which were driven to City centre destinations from the peak hour traffic. These vehicles could then be reallocated into the off peak. The latter was not modelled directly by the County, but the percentage increase in traffic caused by adding HGVs to the off peak period was insignificant (about a quarter of one per cent). A rush hour HGV control was therefore brought forward for testing in Restraint Option Two.

7.13 A more detailed study of freight movement which considered the scope for increased efficiency, and the use of smaller vehicles would have to be undertaken if the Norwich transport studies were to be complete. MTRU considers that the lack of a proper freight study was a serious omission in the County's work for NATS. The

greater environmental impact of such vehicles in terms of noise and pollution is widely accepted, but less well known is the importance of these vehicles in relation to fatal accidents. Figure 7.1 shows how they are four to eight times more likely to be involved in fatal accidents than cars.

Pricing

7.14 The final group of schemes which are worthy of consideration are based on charging people for road use. This would require new legislation, although not necessarily as complicated as the "pay when you are caught in a traffic jam" system proposed for the City of Cambridge. Much simpler methods can be very effective, for example the "pay and display" system in Singapore (MTRU 1991, 1993). The effectiveness of this scheme, now planned to go electronic in 1996, is shown in Figure 7.2.

7.15 Even with the new inner ring road, traffic growth would soon begin to cause severe congestion beyond 2006, although the County did not present a long term forecast. Road pricing was included in the County Inquiry Proof as a long term solution. One of the questions asked was why, if pricing was seen as the preferred option for solving congestion in the medium term, it could not be brought forward and avoid the need for the road.

Conclusions and Recommendations: Restraint Scheme Stage One

7.16 The tests showed that the first restraint scheme tested was very worthwhile. The scheme, combined with further encouragement to public transport, walking and cycling, should still achieve superior road traffic and environmental conditions to the Inner Ring Road.

7.17 The recommendation to the Inquiry was that effort should therefore be concentrated on a demand management approach rather than the Inner Ring Road proposal. The "Ring and Loop" scheme, suitably revised, could be implemented without waiting for the IR.

7.18 In addition, because the Inquiry adjourned in order to model an alternative road proposal, there was just sufficient time to undertake further testing of restraint options. MTRU therefore prepared a model run which included three new pedestrian/cycle crossings on the existing inner ring road, a rush hour ban on HGVs, and a slightly more generous allowance in the number of permits to existing businesses for rush hour car use. This also represented a sensitivity test to allow for lack of compliance with the original scheme.

7.19 Finally, an additional forecast was requested for 2011. The County would not supply their own estimate of traffic growth. Together with the revised restraint option, this formed Stage Two of the demand management work at Norwich.

7.20 MTRU identified two approaches to producing a longer range forecast.

7.21 The first was to assume a uniform growth in line with growth from the present day to 2006. Trips between one area and another would simply be increased by the same percentage.

7.22 The second approach would take into account the differences between the City centre, the rest of the City's urban area, and the surrounding countryside. Three factors were produced by MTRU and supplied to the County to be used for a further model run. It is this exercise which has particular implications for this Report.

7.23 The production of these growth factors in itself produced an additional insight into the plans for the future of Norwich as a regional centre, and into the planning assumptions built in to the traffic model. Traffic growth in the countryside outside the City, in the morning peak, was three times that for the existing urban area. This must have represented a huge investment in green field employment sites and shopping centres. The results of this forecast are discussed further in the following section.

8 THE NORWICH DEMAND MANAGEMENT SCHEME: VERSION TWO

8.1 One of the main functions of traffic modelling is to assist in the design and assessment of transport options. It is always more reliable for comparative purposes rather than as an absolute prediction of the future. Testing different options and packages is integral to the whole process of finding the preferred solution, and this was MTRU's approach for the Norwich case study.

8.2 In the context of developing options, the two additional model runs prepared by MTRU had two functions:

i) to test a new package, which reduced the restraint effect of the peak hour commuter control, added a heavy vehicle peak hour restriction, and introduced three improved crossings of the existing ring road to benefit pedestrians and cyclists, and

ii) to test how far congestion would increase between 2006 and 2016 by continuing traffic growth in the same way assumed prior to 2006.

Restraint Scheme Stage Two

8.3 To test the package set out in i) above, heavy vehicle trips which had a destination in the City during the morning peak were excluded from the traffic model. In the same model run, the number of commuter permits issued to businesses was increased by 50%, to allow further use to be made of existing private parking spaces. Revised growth forecasts for each traffic zone were produced and supplied to the County.

8.4 Bearing in mind the problems which might arise from generated traffic and the release of suppressed demand, the aim was to achieve improved environmental conditions, enhance facilities for pedestrians and cyclists, and hold congestion to comparable levels to the County's road scheme. Thus additional all red traffic signal phases were introduced into the modelled network at three IR junctions, to represent new pedestrian and cycle facilities.

Option Two Modelling Results

8.5 In fact, the impact of the goods vehicle control was greater than envisaged. The package thus reduced congestion even further than the first MTRU option, rather than weakening it.

8.6 Although performance is only marginally better than the previous MTRU Option, it is substantially better in road traffic terms than County Options. Queued traffic is about half that for the County's base run (the Interim), and thirty per cent less than the County's IR scheme. This is shown in more detail in the revised table comparing County and MTRU schemes (Table 6.2).

Table 6.2

Summary Economic Data MTRU and County Scheme Tests

AM Peak: 2006

County:	Interim	IR	MTRU 1:	MTRU 2:
Final Queue (pcus)	6584	4881	3677	3374
Ave Speed (kph)	39.7	40.95	43.0	43.5
Fuel used	48002	47136	40516	39511
Vehicle hours	25679	24527	21101	20713
Total trips	60332		53404	52117

Notes:
Both County and MTRU Options include Ring & Loop.
The improvement in fuel saved comparing MTRU 2 to MTRU 1 is due to the rescheduling of goods vehicles and thus off peak fuel use would rise very slightly. There will still be substantially less fuel used overall than the County options.

8.7 MTRU 2 reduces traffic in the town centre as did MTRU 1, but some traffic is attracted on to the existing inner ring road because congestion has been reduced even further. It must be noted that this is not generated traffic, it is diverted from other routes.

8.8 In one sense this computer modelling run was disappointing because it did not show the full extent to which new facilities for walking and cycling could be introduced within a set congestion level. This would have deterred some traffic and produced an additional environmental benefit to the centre over and above that from Ring and Loop.

8.9 Additional crossing points, or bus priority at junctions (for example through transponder recognition) would have absorbed some more of the capacity released by the MTRU scheme, and this in turn would have sent traffic back out to the routes which they would otherwise use.

8.10 In another sense the run is extremely interesting because it suggests that the heavy vehicle control, together with traffic stabilisation rather than restraint, would on their own provide benefits close to that offered by the Ring Road.

8.11 Of course the question of how traffic would be stabilised needs to be considered, and it may be advisable to implement a control scheme for other reasons, for example if the level of congestion in the County's "Preferred" future were considered to be too high, or more road space were required for pedestrian, cycle or bus facilities.

In this case the level of restriction could be much lower than in either MTRU test so far.

Conclusions on MTRU's Stage Two Option Development

8.12 It is clear that a range of management measures are available which would achieve similar road congestion performance to the Norwich Inner Ring Road. Neither restrictions on the peak hour use of private non-residential parking (in this case via the ban plus permit system) or peak hour heavy vehicle traffic (specifically exempted from requiring a public inquiry) were tested by the County.

8.13 For this reason, comparing the Inner Ring Road scheme with the "Interim" scenario to produce a high economic return is profoundly misleading. The true comparison is with a restraint and management option.

8.14 It is possible that the building of the Inner Ring Road, together with restraint, may give higher traffic and environmental than restraint alone. However, if the additional road capacity released traffic demand, these are unlikely to occur. Even with no such effect, the benefits would be very considerably less because the unrealistic congestion levels of the "Interim" scenario would not be the base for economic comparisons. It must be very doubtful that there would be sufficient benefit to justify the construction cost of the IR.

8.15 The County already have a strong commitment to park and ride. This was welcomed by participants at the Inquiry, including MTRU. One scheme has now opened, and been even more successful than predicted.

8.16 However, this is only part of the restraint picture. Using other techniques for traffic management and restraint, including parking levels in new developments, the County could achieve their environmental, and motorist time saving, objectives without the Inner Ring Road.

2016 Traffic Forecasts: the Congested Countryside

8.17 During the Inquiry the question of whether some form of restraint would be required in the future was discussed. No indication of conditions after 2006 (about ten years after the IR would open) was supplied by the County or its consultants. In this context, MTRU requested a model run to indicate how congestion would grow by 2016.

8.18 Because the County's consultants refused to undertake a detailed forecast, MTRU had to extrapolate from previous trends. The simplest way to undertake this would have been to factor up all trips in line with predictions up to 2006, and then re-run the model. However, this was considered somewhat inaccurate, since the current policies for park and ride and location of new development lead to differential growth in the City centre, the built up area, and the outer area beyond the Norwich boundary.

8.19 Separate growth factors up to 2006 were obtained for the three separate areas, and these were continued for a further ten years. The growth rates are shown in Figure 8.1, and the traffic model results are shown in Table 8.3. The detailed factors were disputed, but the general level of increase was not.

Table 8.3: 2006 and 2016 Summary

	IR 2006	Int 2006	IR 2016	Int 2016
Final Queue	4881	6584	9586	11916
Ave Speed	40.95	39.7	38.5	36.5
Fuel used	47136	48002	57877	58571
Total trips	60332		70672	

8.20 As would be expected, it is clear from such projections that traffic conditions by this date would have deteriorated to such an extent that travel times would be extremely unstable, as well as far longer than today. The 1996 forecast (itself worse than the present day) is for a final queue of 1,943. For the Inner Ring Road scheme in 2006, the model predicts a queue of 4,881. By 2016 this will lengthen to 9,586. This is five times worse than the 1996 prediction. Fourteen per cent of all traffic which should complete its journey in the morning peak hour would be stuck in a jam at the end of that hour.

8.21 It is also clear that environmental conditions will severely worsen. Between 2006 and 2016, even with the IR built, fuel used (and thus air pollution produced) will rise by 23%. It should be noted that some improvement will arise from catalytic converters, but the impact is uncertain. A 23% worsening between 2006 and 2016 remains a correct comparison because the effects of catalytic converters, whatever they are, will have peaked by 2006.

8.22 However, these results are, like all the summaries given at the Inquiry, based on a single peak hour. In fact, the Norwich peak period lasts for two hours of almost uniform demand. The peak hour is assumed to carry just below 50% of the two hour peak period.

8.23 In these circumstances the queued traffic at the end of the peak period should be at least double the figure in the Table for the single hour. In fact, it is likely to be far higher even than this. It is simply not credible that drivers would tolerate such a deterioration, particularly those driving into the City during the morning peak. The County's future traffic predictions simply would not occur.

8.24 The County and their consultants were unable to provide speed information for the three key areas: central, inner and outer. This was in itself a matter of comment. The speeds shown in the comparative Tables 1, 2 and 3 above are

averages across the whole modelled area.

8.25 This is indicated by the fact that the speeds given in the County's consultant's Proof were considerably lower than those in the County's Proof. However, they were higher than the figures produced in the original NATS Report. This was also submitted to the Inquiry. The differences are shown in Table 8.4 below. The explanation is that the modelled area for the IR was larger, and because it included relatively uncongested roads outside the City, the average speed was higher.

Table 8.4: Comparative Speeds NATS and IR (Km/hour)

Morning Peak Hour 2006: Ring and Loop Implemented

	IR Built	**Without IR**
NATS: Urban Area only	19.3	
NATS: Total Simulation Area	30.7	29.1
IR Modelled Area	41.0	39.7

8.26 Given this situation in 2006, the speeds in central Norwich by 2016 will be extremely low, and the road network will be effectively over capacity.

8.27 For this reason, the adoption of an organised method of traffic restraint, or the acceptance of rescheduling and restraint by extreme congestion, would appear to be the only long term options for the City. Either would have to take effect within the design life of the Inner Ring Road.

8.28 The conclusion drawn by MTRU was that if restraint was to be necessary even with the IR soon after 2006 (this was not challenged by the County's consultants), why not proceed with a gradually tightening demand package at once?

Car Based Development Outside the City

8.29 In Paragraph 4.22 above, attention was drawn to the far higher growth in car based trips to places outside the City's existing built up area (both central and inner Norwich). This is shown on Figure 8. These policy assumptions on the extent of new development and the level of permitted parking seem to be at odds with most recent Government advice, for example on structure plans (PPG 12) and for transport (PPG13). In addition, the most recent statement on how Britain is to meet the environmental targets agreed in Rio (Sustainable Development: The UK Strategy, 1994) is clear that demand must be managed.

8.30 All of these stress that the local planning authorities influence traffic demand. Most obviously they control where development is permitted, and crucially,

how much parking is permitted. Planning guidance seeks to encourage new developments to where they can be served by public transport. The County is clearly committed to accepting rapid growth in car based developments outside the existing urban area.

8.31 Thus the County can influence the very nature of the so-called "given" facts which have in turn given rise to the traffic forecast used to assess their road scheme. At the Inquiry, MTRU argued that it was wrong for the County to accept as fixed the following:

i) that future patterns of development will be dispersed, concentrated in the countryside, and car based, and thus cannot be served by public transport, walking or cycling,

ii) that this type of development and its associated levels of parking is inevitable and will cause traffic congestion which in turn justifies road building, and

iii) that restricting car traffic will lead to additional development outside the existing built up area.

This was because the County themselves were the agents for permitting a significant shift in car based development away from the existing centre and into the countryside.

8.32 This led to a further conclusion which was added to those in earlier submissions to the Inquiry. It is that consideration should be given to controlling levels of parking in developments outside the City centre, as well as trying to maintain growth in the City rather than on green field sites. This would appear to be fully in line with PPG 12.

8.33 Any control over parking levels for major developments in the surrounding countryside would not necessarily prohibit new development. What it would do is limit the traffic growth caused by such development, and thus produce economic and environmental benefits above and beyond the MTRU City-based restraint scheme. In this context there is little reason for car parking standards on green field sites to exceed City centre levels by very much. The density of development would then depend on the provision of other transport facilities, for example by new services to raise its public transport accessibility.

8.34 This last policy proposal is particularly important in the context of this study. Controlling parking in green field developments appears to be just as important as controlling it in urban centres. What was required was a more targetted and structured approach leading to a full demand management package. This in turn required the problems of town and country to be considered together.