ITEM CA7 - ANNEX 1

Oxfordshire County Council's

Travel and Information Management (TIM)

Policy document

OXFORDSHIRE COUNTY COUNCIL
www.oxfordshire.gov.uk

Document prepared by Oxfordshire County Council in association with Halcrow

Halcrow

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Traffic Management and Control Policy Document Contents

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0	Initial draft document	Jul 07	PRF
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1 - Introduction

The policy document sets out a vision for Travel and Information Management, focussing on how the County Council can make best use of technology to help manage its roads, and provide meaningful, up-to-date information to the public. It sets out the policy aims, and identifies the principles and good working practices to achieve them.

Congestion has been identified as a significant problem by the County Council; and in the last Mori survey undertaken, congestion was identified as the issue of most concern to the residents of the County. Traffic growth is continually increasing, and with the additional impact of key developments and the South East Plan housing allocations, the County Council needs to adapt in order to manage this growth. There is little scope to introduce a significant amount of new infrastructure, and as such, the County Council needs to increase the capacity of the existing network, and intelligently influence and manage the way that people travel about that network.

Travel and Information Management sits alongside, and compliments other strategic County Council projects, helping to deliver the Local Transport Plan, such as the Central Oxfordshire Transport Strategy, Access to Oxford and the Network Management Plan.

In 2004 the Government introduced the Traffic Management Act. The Act introduced a major new duty, the Network Management Duty (NMD) on Local Traffic Authorities (LTAs). It applies to all Local Traffic Authorities and encourages them to reduce and manage congestion, manage works on the highway, and have contingency plans.

Travel and Information Management can assist the Traffic Manager in fulfilling the Network Management Duty by collecting data on current traffic conditions; identifying the location and nature of incidents on the network; providing route and car park guidance information for road users; and highlighting the proximity of planned highway works or scheduled events. This, in turn, enables the definition and implementation of appropriate management strategies. It is possible to apply or adapt pre-defined strategies that draw on historical information, which is held in the common database, on traffic volumes, speeds and the effect of incidents on specific roads and junctions.

Alongside the policy document, a Travel and Information Management implementation strategy is being developed to provide more detail on how the policy and vision can be delivered. It will include how existing systems should be enhanced to maximise their usability, and how they can be integrated to provide more efficient management of the highway network. It also sets out the requirements for a traffic management and control database system to intelligently manage the huge amount of data that is available, and instigate suitable actions on the network and provide information to the public.

2 - Vision

Oxfordshire County Council (OCC) has a vision to actively manage the County's network through a Travel and Information Management centre, similar to that at Kent County Council, shown below:

This will mean committing to utilising advances in technology and software, to understand, and manage, the transport network more effectively. Such a centre is key to achieving this.

The establishment of a formal Travel and Information Management centre will not only provide benefits to operation staff, but will also show that the Council is dedicated, and taking seriously, the need to manage the network and tackle congestion, due to the increasing pressure on its roads.

Current investments in Intelligent Transport Systems (ITS), made by the County Council, have the potential to be developed further, and integrated better, to provide one comprehensive picture of the network. This will be achieved by passing data to, and receiving information from, a traffic management and control common database. The aim is to have full real-time data coverage for the Priority Network with visual coverage of critical areas through the use of traffic cameras. This data can then be used within the traffic management and control common database to enable the definition, and application of suitable strategies; and in turn determining the messages to be displayed on roadside Variable Message Signs (VMS), alterations to traffic signal timings, targeted enforcement, and rapid response to incidents on the highway network, etc.

Travel and Information Management will enable a more proactive approach to managing the County's network, and providing the public and business, with up-to-date real time travel information, through mediums such as variable message signs on the highway and through a website.

Examples of such websites are detailed below; they are interactive and so only a link has been shown;

- http://www.travelbristol.info/
- http://www.leedstravel.info/cdmf-webserver/jsp/leeds.jsp
- http://www.citytransport.org.uk/

Valuable information will be provided to prospective travellers to enable them to make more informed choices about their route and mode of travel. Live network information will provide a better choice to travellers by; providing pre-trip information on travel time, road-works, incidences and events and en-route information on recent incidences, diversions, car park occupancy, and journey times.

The key aims of Travel and Information Management are:

- To enable more efficient use of available road space;
- To manage congestion along key bus, cycle and traffic routes
- To gain a better understanding of the operation and limitations of the network and the impacts that planned and unplanned events have on that network;
- To inform decision-making in respect of capital and maintenance expenditure;
- To assist regeneration and permit future development supporting Oxford's NGP status, the Central Oxfordshire Diamond for Growth and Oxford's role as a regional hub;
- To complement the Access to Oxford Project in delivering a comprehensive package of effective traffic management;
- To provide better network information to Bus Operators for efficient operation.

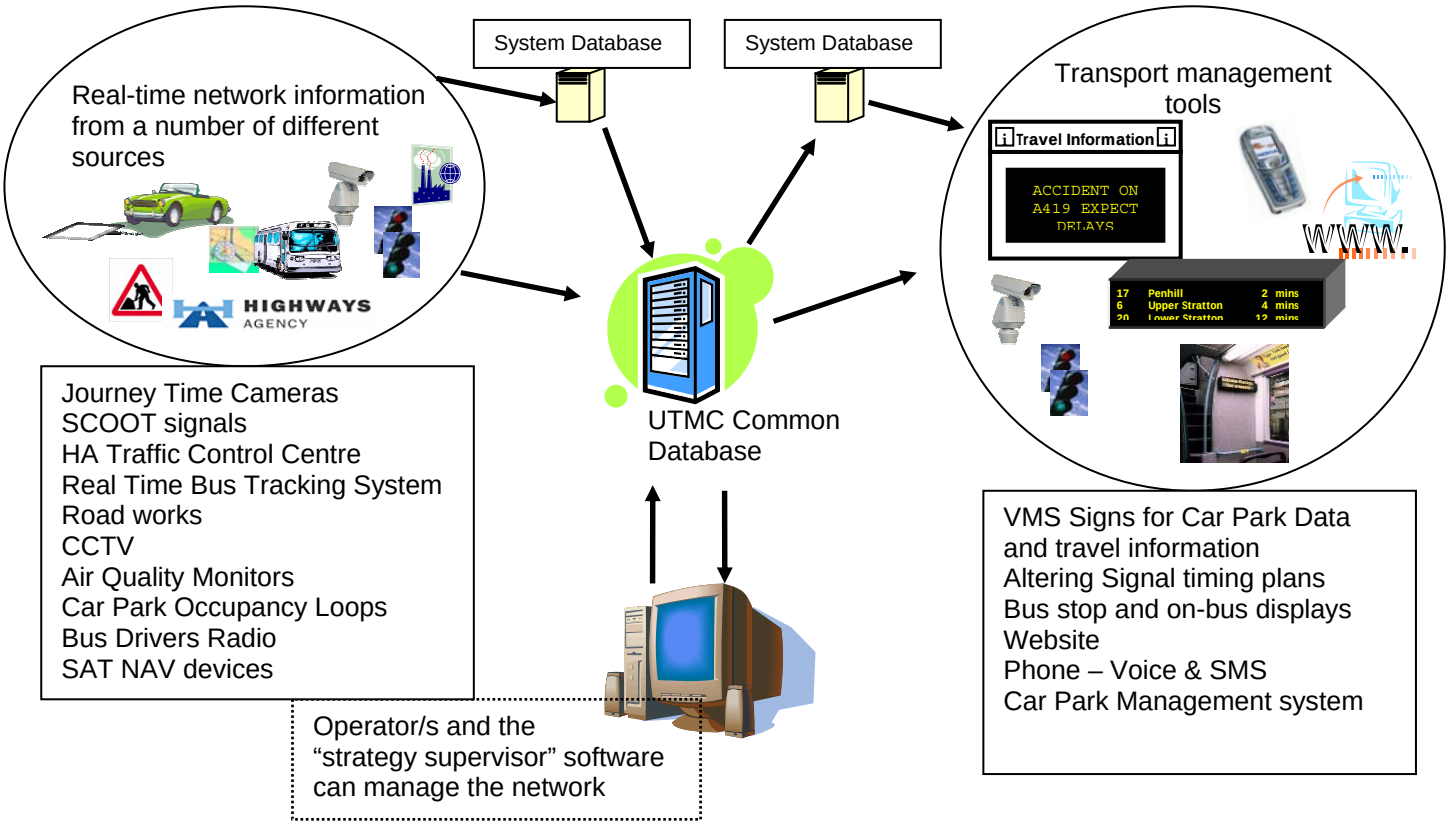
The objectives for the Traffic Management and Control system are:

- To provide OCC with a detailed knowledge of the impact of incidents, congestion, and facilitate emergency diversion strategies;
- To enable OCC to respond appropriately and rapidly to incidents (including highway obstructions);
- To maximise the availability of information about the transport network and current conditions, encouraging informed decision-making;
- To promote the reliable and efficient operation of public transport services.

The County Council already has a significant number of real-time network data gathering systems in place, which either gather information, or control the way people move about, such as; Real Time Passenger Information, Traffic Signal Systems (SCOOT), Journey time reliability cameras, and traffic cameras. However, further development of these systems is required to enable the Council to fully realise its vision. The data currently collected is not being utilised to its full potential, and by pulling this data into one place the County Council can fully utilise all this data, to build up one picture of what is happening on the County's network, and providing accurate real-time travel information, and making fully informed decisions when managing the network.

Appendix 2 outlines in more detail specific approaches for different parts of the County.

The diagram below gives a simplistic view of how a Traffic Management and Control common database works.



The County Councils vision will need to evolve over time and will be introduced in stages.

How the Oxfordshire transport network will be improved through traffic and information management:

Network benefits/Planning for the Future:

- The system will enable the identification, from real-time and historic data, of nodes and links where specific constraints impact upon network capacity and performance. This will inform the development of management strategies, enabling better targeting of investment, to allow for growth in traffic volumes associated with new development and regeneration.

Public Transport:

- Provision of information, on comparative journey times for private and public transport modes, will encourage people to consider whether the bus and/or train is quicker, and more convenient for a specific journey; helping to achieve modal shift.
- Prospective travellers can check the current real time status of their Premium Route bus service, establish its likely departure time, and confirm details of

appropriate interchanges – thus reducing uncertainty and increasing confidence for would-be public transport users.

- Bus operators can schedule their services more effectively, and would further benefit from intelligent priority measures at signal controlled junctions, realising benefits for bus users in terms of improved journey time reliability and punctuality.

Air Quality:

- A car driver approaching Oxford City centre, or another urban area, on a key arterial road can be advised, through VMS signs of alternative mode options, such as Park and Ride, that are available to them to complete their journey into the urban area;
- Deployment of Car Park Guidance VMS, displaying the number of available parking spaces in specific car parks and/or park and rides. This would be complemented by directional information to assist drivers to find the nearest suitable car park (or park and ride) with spaces, thus reducing unnecessary circulating traffic and associated emissions.

Car Users:

- A Saturday shopper choosing to use the Westgate car park can sometimes find it is full, which results in the need to either drive around trying to find a space, or potentially having to drive back to the Park and Ride site. With the new infrastructure in place they would be informed on the approach to Oxford that the Westgate car park was full, and would be advised to use the Park and Ride service. This would at worst, reduce wasted trips on the network trying to find spaces in full car parks, and at best stops them waiting in a queue of traffic to get into the car park, possibly blocking back onto a main Oxford bus route causing dislocation of services.

- A driver approaching Oxford on the A4260, intending to board the Park and Ride service at Pear Tree is informed via VMS signs that the car park there is full, and direct them to the Water Eaton Park and Ride site where spaces are available.

- A distribution lorry leaves a business premises on Watlington Road. The driver is intending to use the southern and western sections of the Oxford Ring Road on his journey north. The journey time monitoring component of TIM identifies congestion on the western part of the ring road. This activates a message on a VMS sited close to Cowley Interchange, warning of congestion on the A34 western ring road, and enabling the lorry driver to make a choice to avoid the congestion and use the A40 eastern bypass instead, reducing overall journey time and preventing the lorry from adding to the congestion on the A34.

- An incident occurs on the Oxford Ring Road, leaving debris in the road and creating a safety hazard. The location of the incident is identified from live CCTV feeds, enabling advance warning messages and advisory speed limits to be shown on roadside VMS, making it safer for road users approaching and passing the scene of the incident.

3 - Rationale for implementing a Transport Management and Control system in Oxfordshire

3.1 Compliance with the Traffic Management Act 2004

Part 2 of the Traffic Management Act 2004 places a Network Management Duty on local transport authorities. This element of the legislation, which came into force in January 2005, obliges OCC and its neighbours to ensure free-flowing movement of vehicles on the highway network and to co-operate with other organisations, such as the Highways Agency, to achieve this objective across a wider area.

3.2 South East Housing Plan

The South East Plan housing allocations brings additional impact to the County's Network, and the County Council needs to adapt in order to effectively manage this growth. One initiative will be to use advances in technology to increase the capacity of the existing network, and intelligently influence the way that people travel about that network, which is the purpose of focussed Travel and Information Management.

3.3 Attaining Local Transport Plan objectives

In the Central Oxfordshire sub-region chapter of the current Local Transport Plan (LTP2), it identifies the need for traffic management, and for wider and more comprehensive use of intelligent traffic management and information measures.

The LTP2 also has transport objectives, which the County Council is working towards achieving through various strategies and schemes. Having a clear policy on Travel and Information Management will assist the County Council in achieving the objectives.

These objectives reflect the shared priorities for transport agreed by the Government and local authorities on a national basis. They contribute to delivering OCC's overarching vision to "improve the quality of life of all people living in Oxfordshire" and make an all-inclusive society a reality.

The concept has the potential to complement other conventional measures in addressing these objectives. It can offer efficiencies in transport network management, reducing delays and journey times, increasing productivity, improving quality of life for residents and enhancing the reputation of OCC.

Details of how the LTP objectives are met are shown below;

- **Tackling Congestion** by improving network management and improving congested public transport routes;
- **Delivering Accessibility** (social inclusion) by managing the network in an efficient way may enable expansion of commercial bus services;
- **Improving road safety** by advising travellers of incidents on route, enhancing hazard awareness and reducing frustration;
- **Enhancing air quality** indirectly by making more sustainable modes such as bus services, cycling and walking more attractive as alternatives to the car, through the display of comparative journey times, by delivering public transport

service status information in “real-time” and by identifying and informing people of specific air quality issues;

- **Improving the street environment** indirectly by increasing the availability of information about and improving the reliability of, public transport services, reducing the volume of private vehicle movements on key arterial routes.

3.3 Developing the business case

It is important when considering ITS systems, such as are proposed for TIM, that the objectives of the systems are aimed at either reducing current delays or preventing an increase in network demand and thus reducing the potential for further traffic to create further delays. When calculating the benefits you have to consider which of these effects proposed systems will have to calculate the benefits. Delay reducing measures will have delay calculated by improving the efficiency of the network, whilst demand reductions reduce traffic from the network either by encouraging modal shift onto public transport or non vehicular modes. Once these benefits have been quantified these can then be compared with the cost of implementing the systems.

A business case using Oxford as the study area has been developed and a report by Halcrow has been produced “Traffic Management and Control Business case and Costing”

3.3.1 Business Case Report Summary and Conclusion:

Summary:
The business case outlined in this report demonstrates that the individual element that provides the greatest return is the implementation of adaptive traffic control for all of the key junctions, however the implementation of traffic cameras, and Journey time cameras and VMS are also critical in managing the network and preventing network chaos especially during incidents. These measures implemented in a joined up manner will provide significant benefits yet without a centralised control room the maximum potential is unlikely to be realised. The presence of dedicated staff to coordinate and update plans and information will ensure the full potential of the systems deployed provides maximum benefits for the investment required.

It has to be accepted that the implementation of these systems will require a significant level of investment both in terms of capital and in the ongoing revenue required for the communications and maintenance of the increased volume of equipment on street. However, this will be more than repaid by the reduction in delay and the continued viability of the strategic highway network which would other wise be likely to suffer from ever increasing levels of congestion.

Conclusions:
It is recommended that a detailed strategy is produced to ensuring the realisation and delivery of this project. Current and future ITS programmes should continue to be implemented centred around the core common data base which will ensure that the required systems can be adequately

controlled and appropriate strategies developed to enable the network adapt to incidents and events. A formal deployment plan should also be prepared detailing the implementation programme.

Care should be taken to ensure that the maximum use of all available funding sources is made and that all appropriate projects ensure compliance with the TIM policy document as this will be likely to reduce delivery timescales.

There is little doubt that the systems proposed will be of significant advantage in ensuring the potential of the highway network is maximised and that further developments can be easily integrated into the robust framework proposed by the TIM project.

4 – Principles of Travel and Information Management

4.1 System Management

In order to actively manage the network, dedicated staff resource will be required at appropriate times, to ensure this equipment is fully utilised, and the Council's aspiration for actively managing the network is realised.

The newly formed Congestion Management group, in the Network Management team, will be responsible for the day-to-day operation of travel and information management. The Travel and Information Management policy has been developed to ensure that they have the tools and equipment to do this effectively. The policy also covers wider strategic aims to ensure that the network is managed in line with wider transport strategies.

Any project which impacts on the operation of the network must have the approval of the Network Manager, or nominee. An officer form the Congestion Management group should be part of the project team.

The key to this system fully achieving its aims and objectives is to ensure that it is well maintained, and actively managed, by dedicated operation staff, and these will be new posts within the Congestion Management Group.

The various elements of ITS equipment must be fully operational, and have an effective regular maintenance regime to ensure this. Additionally, the information being fed into the system from on street devices must be accurate with regular safety checks being put in place, to ensure the real-time data being fed into the system reflects the actual situation on the network.

The system will require constant management. The most important areas are:

- Compilation and review of system Strategies in place;
- Ensuring all the system elements are running the latest versions of software and utilising the most appropriate hardware;
- Expansion of system to encompass appropriate enhancements.

4.1.1 Upgrades to latest version releases:

In order to ensure that the County Council is able to manage their network effectively, by utilising the latest techniques available, it is also important to ensure that systems are kept up to date by purchasing suitable upgrades when available. To ensure that this takes place, suitable revenue funding needs to be allocated and maintenance agreements written include upgrading of software.

Technology in this field is moving very quickly; the life of traffic management elements is going to be limited, and they will need regular replacement. In general the life expectancy of ITS equipment is only about 10 years. Adequate revenue funding must be allocated to enable a rolling replacement programme for elements of the system.

4.1.2 Future proofing equipment/systems:

It is very hard to future proof equipment/systems in this area of work as technology advancement is very fast, and it is difficult to predict the nature of equipment that will be become available in the future.

In specifying the system, careful consideration should be given to the desired functionality to meet present and foreseeable future network management requirements – covering a realistic look-ahead period of circa 5 years, it is beneficial to purchase the optimum specification to meet the defined requirements, as opposed to investing money in over-specified products whose functionality will not be used.

4.1.3 Communications

At present there are many systems using many different communication techniques. There is potentially an opportunity to minimise revenue costs through combining communication systems. At present due to the speed and diversity of developments in this area there is no standard or common direction which other local authorities are taking. Therefore it is proposed to build up the ITS infrastructure to a suitable and stable level using the most cost effective current technology and then carry out an assessment of the communications in use. It is hoped that by this time there will be a proven common standard or standards that OCC can adopt. Any ITS equipment installed under the TIM programme will be Internet Protocol (IP) compliant to facilitate communication upgrades.

4.2 Network Information

4.2.1 Real-Time Passenger Information at bus stops

Oxfordshire currently has a Real Time Information system for all Oxford Bus Company routes including services to/from Abingdon & Didcot plus Brookes-bus and other Stagecoach services within Oxford. Real Time Information in Oxfordshire can be accessed through on-street displays, the www.oxontime website, and an SMS service.

It is the intention to be able to provide real-time stop information via the web and SMS at all premium routes. However, this is constrained by the investment made by the operators along those routes.

Real-time on street displays should be predominately provided on Premium bus routes throughout Oxfordshire and must be provided at all interchange locations. Again this is constrained by the investment made by the operators along those routes.

New developments which have or propose RTI equipped buses to run through the development should provide suitable RTI on street equipment.

4.2.2 Static Public Transport Information and journey planning

Information on public transport is currently available through a variety of media:

- the traveline telephone and internet service offers journey planning incorporating bus, rail and walking options
- National Rail Enquiries offers both journey planning and real-time predictions
- Transport Direct offers journey planning for bus, rail and car

Neither traveline nor Transport Direct offers real-time predictions, although the technology already exists to link “timetabled” information to real-time systems.

The major bus operators also offer web-sites, and several offer telephone enquiry services. Timetables for services subsidised by the council are available on the OCC web-site, which also provides links to the three journey planning sites. It is hoped that these timetables will soon be indexed by parish, allowing someone to download and print timetables for buses running near their home.

In addition, the council expects bus operators to display a printed timetable at every marked bus stop in the county, and to make available timetable leaflets for all their services.

However, these sources can only be accessed while “on the move” by those using computers or mobile phones, so their ability to influence modal shift during a journey is limited.

4.2.3 Variable Message Signs

VMS should be positioned at a point of choice, whether that be a choice of direction or a choice of mode to travel. The VMS sign should be designed to allow the displaying of varying forms of information on each sign and therefore adhere to OCC’s de-cluttering policy.

VMS should be designated as “Travel information” signs similar to those successfully introduced in Bristol, Leicester, Reading and Southampton. These signs will be used to provide information to the public such as:

- When a car park (city centre or park and ride) becomes full
- Promotion of park & ride and other bus services,
- Incident information relayed from OCC, HA or neighbouring counties’ ITS via the Common Database;
- Planned events & road works,

- Subject to the definition of an appropriate message set, comparative Journey time information for car and bus services when the bus journey time is quicker.

As well as the roadside VMS adjacent to the OCC highway network, an agreement between the HA and OCC is being drawn up to allow shared access, for both parties, to be able to display on each others signs.

4.2.4 Static Signs

Static signs play an important part in traffic management, and careful consideration needs to be given to the impact on the network of new and existing signs.

A strategy for both static and Variable signs will be covered in the Travel and Information Strategy document.

Additional / re-worded static signs may need to be installed to complement the VMS in some applications to enable drivers to follow the instruction on the VMS sign.

For example if someone heading for the Redbridge P&R is presented with a VMS message stating "*Redbridge P&R full Use Thornhill",* directions to Thornhill P&R will need to be signed.

4.2.5 Web site

This will be used to display detailed information on the transport network such as; journey time, car park status, incidents, congestion, bus and rail information, etc. It will also be possible to view CCTV images showing current network conditions at key locations.

Existing real-time information, which is currently spread across several locations on the website, should be integrated into one network information website. As new real-time public information becomes available, then this will be required to be integrated in to this website.

4.2.6 Radio

The Radio stations will be encouraged to use the website as their initial and primary source of information about the network status. For those drivers already on the transport network radio represents a vital method of disseminating information as it is available at all points of the journey.

4.2.7 Mobile phone – SMS / WAP

SMS (and WAP and web-based) enquiry mechanisms such as the established Mobile Oxontime service allow would-be travellers to check current network and public transport service status, and departure times at their convenience in any location where their mobile phone network affords coverage or where it is possible to access the World Wide Web.

Transport information including details of roadworks, congestion, car park occupancy and comparative journey times can be made more accessible via

mobile devices, which are widely available and in widespread use, allowing informed choices to be made. Availability of public transport information, on the move, can make use of more sustainable modes a viable and attractive proposition and help to secure modal shift.

4.2.8 Car Satellite Navigation:

Roadside and en route systems need to be configured to interface with in-car technologies, notably the next generation of satellite navigation equipment, contributing congestion information to the in-vehicle visual and audio devices. This will further the concept of the informed traveller, enabling and encouraging drivers to make appropriate route choices to avoid congestion, improve road safety and reduce impacts on air quality. As with in-car systems, roadside and en route systems need to adapt more intelligently to reflect changing conditions and variations in driver familiarity. Care needs to be taken to ensure that control over system diversion recommendations from these systems fall in line with the diversionary strategies of the county. Failure to achieve this could result in vehicles being diverted down unsuitable roads.

4.3 Oxfordshire's Network

4.3.1 Priority Network

This network has been identified as the focus for Traffic Management and Control.

Network strategies for both planned and unplanned events will need to be developed primarily for this network. Planned events cover disruption such as road works, concerts, etc. Unplanned events cover road accidents, abnormal congestion caused by an obstruction or unexpected high traffic volume, etc.

The priority network is the combination of the findings of the Transport Networks Review, freight network, and the Premium Routes bus network identified in the Local Transport Plan

4.3.2 Critical Network Nodes

Oxfordshire's network has many critical nodes; these are junctions, signalled or give-way, that operating at or near capacity; constraining network operation in the area. These junctions are the priority for ITS infrastructure as they are the key to managing the network effectively.

4.3.3 Critical Network Links

Oxfordshire also has many critical links on the highway network; these are stretches of road that restrict the flow of traffic and cause congestion along a route. These can consist of features such bridges where one way working of traffic is in force, sudden road narrowing's and roads narrowed by regular incidences of parking or loading etc. Where these locations are on the priority network they should ideally be monitored in real-time, using live camera feeds.

The Priority Network with the critical nodes and links is shown in Appendix 1.

4.3.4 Diversionary Routes

Diversionary routes play an important part in managing the network. There are two types of diversionary route: those that are permanently signed and those that are reactive. The Highways Agency has signed diversionary routes are shown in Appendix 4.

If any permanently-signed diversionary routes do not follow the designated priority network then it may be necessary to apply the priority network principles at key locations along this route, in order for management to take place when diversions are active.

Oxfordshire County Council also has some permanently signed diversion routes although strategies in this area need developing particularly in relation to any future Variable Message Signs.

4.4 New Development

It is recognised that the City and districts have their own local framework for collection of contributions.

4.4.1 Connections to the Priority Network:

Any development which creates a new junction or modifies one on a key part of the Counties network should, unless there is a valid reason not to which has been agreed with the County Council:

- If signalised operate either SCOOT or MOVA unless there is a valid reason not to which has been agreed with the County Council.
- Provide a Traffic Camera to OCCs specification
- Contribute towards general TIM initiatives which will benefit the residents of the new development such as Variable Message Signing and RTPI,
- Substantial developments must provide monitoring equipment for OCC to monitor the impact of the development and provide network information to the Traffic Management database. Dependant on location this will either be real-time loops or Journey time cameras.

Any large developments which would render the current Central Oxfordshire model invalid should fund the necessary updates to that model.

4.4.2 Within new developments

Any new roads which are a significant main route through the new development along with any new significant junctions should have the priority network principals applied as detailed above.

Any new public car parks or alterations to existing car parks should be provided with equipment to enable real-time occupancy data to be sent to the Traffic Management Database.

4.5 Network Events

4.5.1 Development of Network Strategies

Network Strategies need to be developed for both planned and unplanned events. This will be an ongoing process of producing strategies and refining them through dummy runs and real life events.

These strategies are likely to utilise what is know as the "strategy supervisor" within the common database, to automatically action a pre-planned reaction to an event. An example of such a strategy is given below:

If Abingdon Rd and Botley Rd are shut:
Open up High St to all vehicles, run common database strategy A (increase green at Carfax Pelican crossing to 35 seconds, increase green time for O/B vehicles at Longwall St to 45 seconds, activate VMS signs 2 & 4 to display "Abingdon & Botley Rd Shut, High St open") and implement temporary parking restrictions on Iffley Rd.

If the car park at Seacourt Park and Ride is approaching capacity (90+% full):
Run common database strategy B (activate VMS on A420 eastbound and on A34 southbound approaching of Botley Interchange and on A34 northbound approaching Hinksey Hill interchange to display 'Seacourt P&R Full – Use Redbridge')

If there are pre-planned roadworks taking place on A423 Southern Ring Road between Heyford Hill and Redbridge Interchanges:
Run common database strategy C (Two weeks prior to start of works, activate VMS on A423 south of Heyford Hill Interchange, on A4074 approaching Heyford Hill Interchange and on B480 approaching Cowley Interchange to show 'Roadworks on A423 Southern Ring Rd [start date]-[end date]'. Immediately prior to commencement of works activate VMS on A423 south of Heyford Hill Interchange to show graphic indicating one lane closed, activate VMS on A4074 approaching Heyford Hill Interchange and VMS on B480 approaching Cowley Interchange to display 'A423 Roadworks - Delays Likely - Thro Traffic Use A4142')

If there is a pre-planned special event at Blenheim Palace:
Run common database strategy D (One week prior to event, activate VMS on A34 and A44 approaching Pear Tree Interchange to display 'Event at Blenheim Palace [date] – Delays Likely on A44')

4.5.2 The "Strategy Supervisor" function

The Strategy Supervisor is a piece of software within the common database which can be programmed to help manage and utilise all the different real-time information coming into the system, identify, and initiate appropriate action.

A significant amount of staff resource will be required to set up strategies for different network plans. Once the strategies are in place, and have been proven to be effective, then this will enable efficient management of the whole network without requiring many operators to manually observe the network and make manual changes.

A strategy can be set either to flag up problems, prompt an operator to except actions, or complete actions automatically. A strategy is derived by configuring the system so that on pre-set conditions it activates an alert, or performs one or more actions such as;

When the Westgate car park is 90% full activate VMS signs 1, 2 & 3 to display "City Centre CP full use P&R"

When Redbridge Car Park 97% full activate VMS sign 2 to display "Redbridge Full use Thornhill JT-15 mins"

When outbound congestion on Abingdon Rd reaches a predefined level, change the signal timings plan at the Donnington Bridge junction to Plan 3 to allow more green to be given to Abingdon Rd outbound, providing the exit to the junction is clear.

When the average bus journey time along London Rd is less than the Car Journey time, Activate VMS sign 1 to display journeys times - "City Centre Journey time Bus 20mins, Car 30mins"

In summary the "Strategy Supervisor" software is a powerful tool but it does require a lot of resource at the initial outset and then an ongoing review of the strategies in place in the system, strategies can be either determined manually or by the running of appropriate modelling software to predict network events.

4.5.3 Event Planning

4.5.3.1 Planned Events

A significant proportion of congestion is caused by planned events. The Network Management team should use the traffic management system to assist in complying with the requirements of the Traffic Management Act.

The system will have the ability to assist by re-timing signalled junctions, disseminating information about the event early and continuously, mitigating the effects of these planned works on other areas of the network. This would minimise the impact of events as well as allowing remote monitoring of the network through CCTV, and providing robust real-time information to network operations staff.

4.5.3.2 Unplanned events

Unplanned events can be caused by a variety of factors. The unexpected nature of such incidents means that their effects on the road network are unpredictable and thus difficult to deal with.

The system will allow OCC to identify the occurrence and consequences quickly, respond to them promptly and efficiently, and inform the police, neighboring authorities and Highways Agency as required.

Information on these unplanned events can quickly be disseminated to the general public to assist them in making their journey choices.

Reasonable contingency plans need to be developed for regular unplanned events to enable a quick response with the likely known impacts.

4.6 Equipment required to manage the network

This sections covers equipment on the highway, and it should be noted that when any equipment is placed on the highway, then the County Council De-Cluttering Policy should be adhered to. Particular attention should also be paid to the overall street scene when in urban and historic areas.

4.6.1 Traffic Signalled Junctions

All new or significantly altered traffic signal junctions on the Priority Network or along key routes within new development sites should either operate SCOOT (Split Cycle Offset Optimisation Technique) or MOVA (Microprocessor Optimised Vehicle Actuation) unless there is a valid reason not to that has been agreed with the Network Management Board.

MOVA and SCOOT are sophisticated operation systems and have the ability to adapt to changing traffic conditions. The appropriate system will need to be determined according to location and scheme objectives.

If the junction is a critical node then consideration should be given to configuring special stages, for use in special circumstances, which would allow additional functionality; for example running only one particular movement at a time. This will allow full control of the junction if required.

If MOVA is implemented at a critical node then UTC should also be configured and a line provided to allow for control in special circumstances.

All traffic signal timings on the priority network should be regularly monitored and fully reviewed at least every 5 years or when there is a fundamental change in traffic flow in line with the Department for Transport guidelines.

4.6.2 Non-signalled Junctions

Newly proposed or significantly altered junctions which are shown to impact on the Priority Network should be agreed by the Network Management Board.

4.6.3 Traffic Cameras

Cameras should be installed as a matter of course when constructing, or significantly altering, any new junction on the priority network particularly at known areas of congestion identified as critical network nodes or links.

This will enable the operators to monitor what is happening and which will enable them to take appropriate action and observe changes.
Thought should also be given to installation of cameras at locations near busy bus stops as another way to identify potential problems on the network. If the number of waiting passengers gets excessive then measures may need to be taken to relieve the situation.

4.6.4 Signalled Crossings

If a crossing is to be installed within or near a SCOOT area then it should be agreed with the Traffic Signal team whether or not that crossing should also operate on SCOOT.

4.6.5 Traffic Light Priority for Buses

All traffic signal junctions which are on, or going to be on, a Premium bus route should have Traffic Light Priority provided at the junction to enable the buses to take priority over other traffic movement at that junction, regardless of whether or not there is a bus lane on the approach to the junction.

Where a signalled crossing has been identified as causing a significant delay to bus passengers then introducing priority for buses, through the use of the inhibit facility, should be considered. However, the effects to the pedestrians waiting to cross must be carefully assessed and suitable limits to the length of the inhibit period imposed.

The use of signalled crossings to assist buses out of side roads by the creation of gaps should be considered, along with other measures (including appropriate signing), where significant delay to the bus service is experienced.

4.6.6 Highways Agency Traffic Control Centre

In order for OCC to have a greater understanding of network conditions within Oxfordshire it is important to achieve an effective two way interface with the HA National Traffic Control Centre. All of OCC's ITS equipment which can provide real-time information will be connected to the NTCC unless there is a valid reason not to.

In order for the HA to have a wider appreciation of the network conditions, in particular when they are using our road for their diversion routes, we will supply the data in the common database to their Traffic Control Centre.

A partnership agreement will be drawn up to clearly identify data exchange and shared use of CCTV and Variable message signs.

4.6.7 Street Works Register

All road works, external or internal, must be entered into Oxfordshire's street-works register database; disruptive works are exported to a national web-based GIS database as part of the Electronic Local Government Information Network (ELGIN) (http://www.elgin.gov.uk).

Road work information must be accurate as the information will be provided to the common database for two main reasons:

1) so that operators have full information about the highway and the affect of various contingency strategies can be fully appreciated; and
2) so that road-works information can be displayed on VMS signs if appropriate.

4.6.8 Enforcement cameras

Cameras for enforcement purposes will be to enforcement standard and in a location agreed with the enforcement team.

Where powers allow Enforcement Cameras should be used to regulate bus lanes where violation causes disruption to the bus services or safety concerns.

At present Bus Lane enforcement is achieved via a bespoke manually observed CCTV system using fibre-optic communications. It is hoped a wider range of equipment will be permitted in the future under the DfT type approval process for such equipment.

When the Traffic Management Act allows it is anticipated that OCC will be able to use automatic enforcement cameras to address parking offences where it is possible to use technology, in particular those within the Park & Ride car parks.

The enforcement of other parking and moving traffic offences, when permitted under the Traffic Management Act is likely to involve manually operated CCTV complemented by enforcement officers on the street.

4.6.9 Rising Bollards/Barriers

Where camera enforcement is not an option then a physical barrier is required to restrict access, such as into pedestrian areas or through bus gates, then a rising bollard or other suitable barrier should be installed. If so a balance needs to be struck between front line prevention and secondary fines before finalizing the view. The maintenance burden / costs of a physical barrier will also need to be taken into account. Nevertheless in certain circumstances rising bollards are likely to be the preferred device even if camera options do exist in a Special Parking Area environment.

4.7 Network Monitoring:

4.7.1 Journey time Cameras:

Journey time cameras are able to provide comprehensive journey time data for these main reasons:

- to assess the current journey time patterns
- to assess the impact of road works
- to assess the impact of new schemes
- to provide real-time information to the Transport Management System

The cameras should be positioned along strategic corridors and sited at frequent intervals to enable tracking of vehicles within Oxford or Oxfordshire's towns.

If a significant highway scheme, or new development, is proposed in Oxford or Towns then the cameras should be installed as part of the scheme, in order to monitor the scheme impacts and increase the density of Oxfordshire's network coverage.

It is important from a planning perspective to understand the origin and destination of traffic movements. The cameras can help achieve this as well as determining comparative journey times. ANPR Journey time cameras are

currently being installed on various approaches to Oxford. These should be rolled out to all other ITS towns within the County once the initial project in Oxford has been completed.

4.7.2 Traffic Monitoring Loops:

OCC has around 400 permanent continuous traffic loops to monitor the speed and/or volume of traffic. This assists in monitoring the road network and providing information required for developing new schemes.

The majority of these loops at present are not capable of reporting in real-time so data is collected from the sites on a periodic basis.

These loops are vital to provide real-time network data in the inter-urban and rural locations throughout Oxfordshire.

All new or replacement traffic monitoring loops should be specified with real-time capability to expand the real-time coverage. The priority for these type of loops is on the priority network where no other form of real-time traffic data is available.

4.7.3 HA traffic monitoring loops:

The Highways Agency has a number of different types of traffic monitoring loops which provide information to the *National Traffic Control Centre*.

OCCs TMS will receive information feeds from the HA *National Traffic Control Centre* to augment data from loops sited on the network maintained by the County Council.

If gaps in real-time data gathering equipment on the HA network are identified then negotiations will be held with a view to securing the installation of appropriate equipment to complete the network information.

4.8 Network Modelling

Suitable models will be used by the TMS system to help set up appropriate strategies and test scenarios. Also, the real-time information from the TMS system could be fed in to the model to test the impact of incidents or diversion routes.

4.8.1 Strategic Modelling

OCC is developing a central Oxfordshire SATURN model. This will be extremely beneficial and will be very useful for a number of applications:

- Testing the effects of proposed development sites
- Testing the effects of new transport strategies
- Assessing the impact of long-term road works
- Assessing the effects of road closures due to incidences and establishing appropriate diversion route/s

In order for this model to remain useful it MUST be kept up to date and no part of the model should be allowed to be more than 5 years old, as per current Department for Transport Guidelines. This will require an on going monitoring of traffic and travel surveys to ensure the trip matrix reflects changing travel patterns and land use developments.

Implementation of the traffic management system, with data being received from on-street ITS equipment, managed stored and analysed within a Common Database will make it easier to ensure that the model is kept up to date.

Any substantial new developments within the model area will require the model to be updated at the developers cost.

4.8.2 Detailed Modelling

Junction/s should be modelled using the most appropriate software for that purpose and junction layout. If the junction is an existing part of the network, then a calibrated model must be produced as a base for comparison with the amended version incorporating the proposals for a revised proposal.

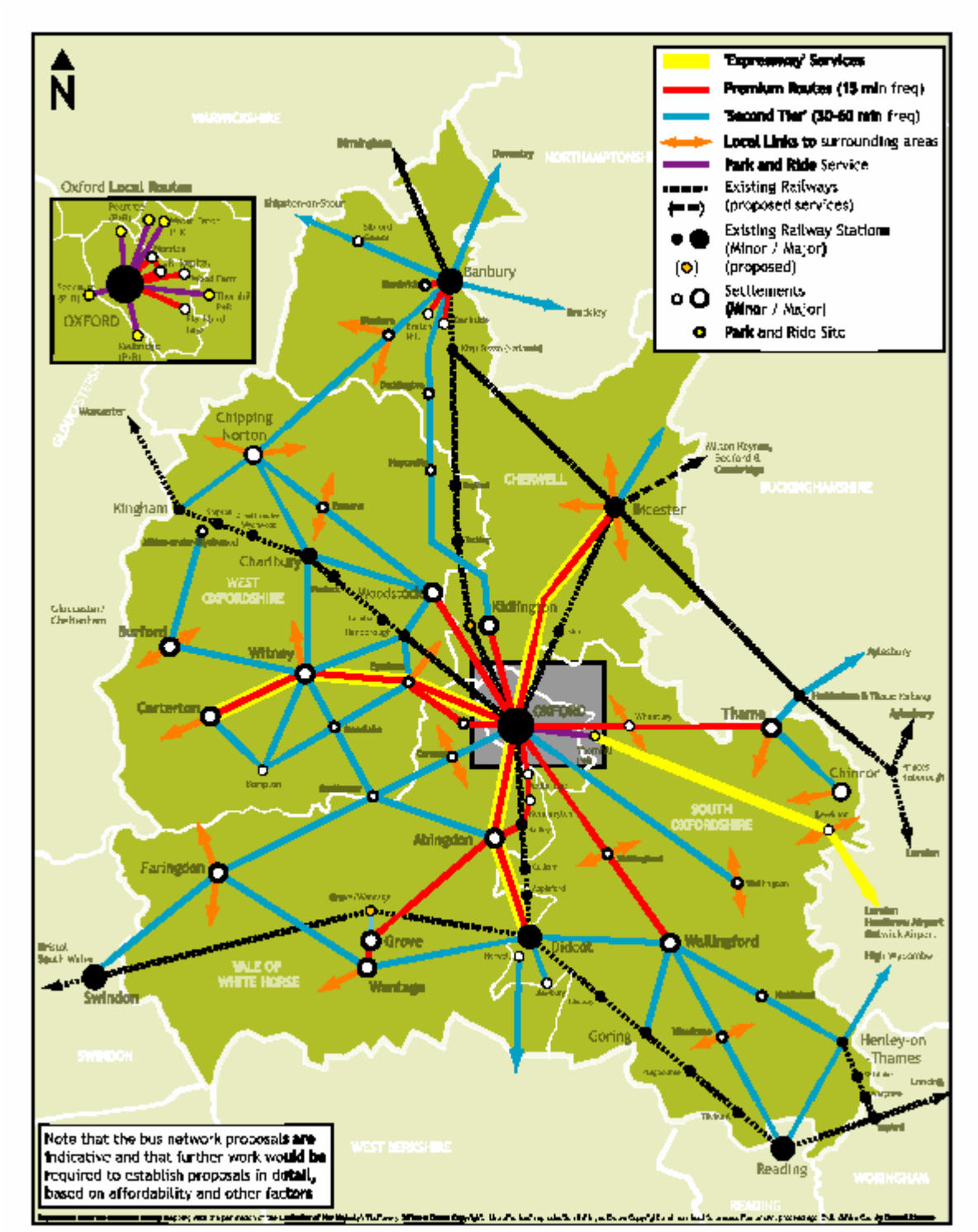
All junctions should be appropriately modelled and clearly state any assumptions and constraints or limitations of the model.

Proposed junctions which are shown to be operating at or near capacity should be brought to the attention of the Network Management Board.

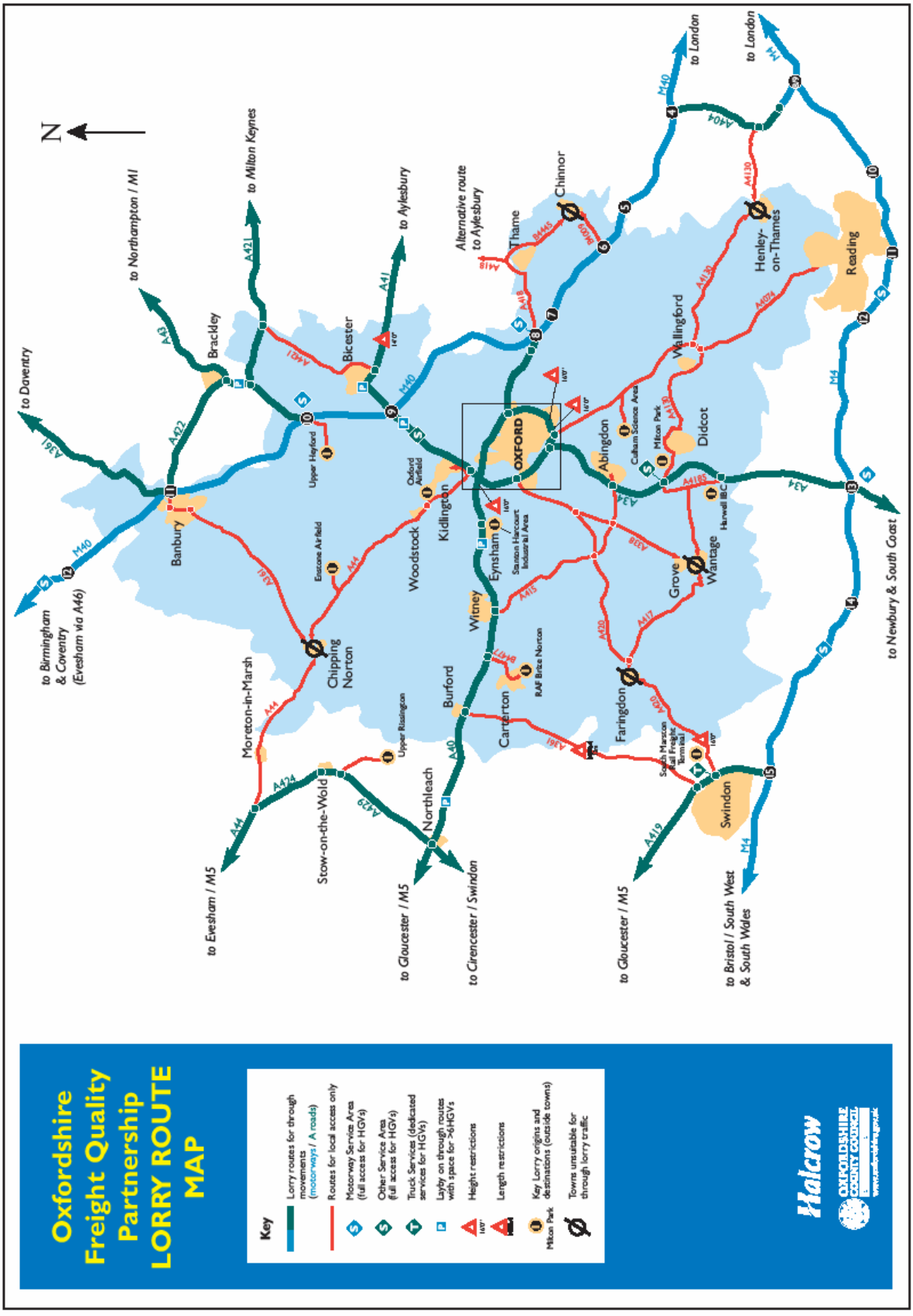
Appendix 1 – The priority network with key links and nodes

As previously mentioned this is drawing on existing network diagrams from the Local Transport Plan. This will be continually monitored and updated as Traffic and Information management advances.

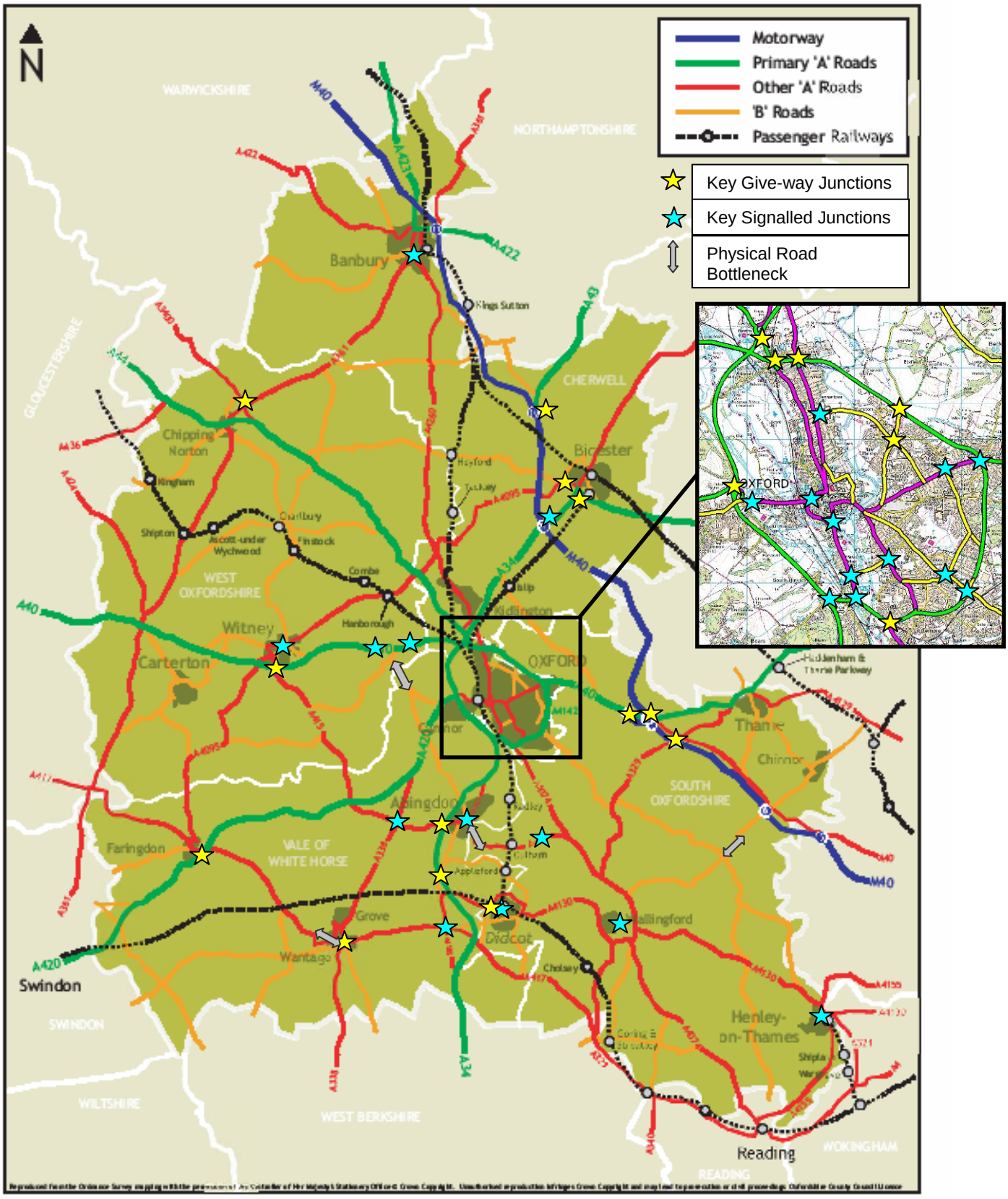
Bus Network:



Lorry Route Map:



OxfordshireTransport Networks:



Appendix 2 – Vision for Travel and Information Management

This gives an overview of the Councils vision for traffic Management and control. The strategy document will detail how the council plans to programme and fund these ITS's and the strategy for management and use of them.

General:

- Full connectivity between the traffic management common database and all the detailed systems.
- Good Team working between the various teams who are responsible for managing the Network.
- Development of the Website to have all network information in one place which is very user friendly.
- Formation of a Travel and Information Management centre at Oxfordshire County Council.

Oxford:

- Enough journey time traffic monitoring cameras to accurately provide real-time journey time data and Origin and Destination data.
- All Junctions on the Priority Network to be running SCOOT or MOVA and to have a traffic monitoring camera at the site.
- Variable Message sign network to provide network information to the public and help influence their journey on the network both into and out of Oxford.
- Bus lane enforcement cameras at locations where delays to the bus services are caused because of violation of bus lane.
- Targeted/directed parking enforcement to tackle cases of highway obstruction.
- Real-time passenger information at all key bus stops.

Towns:

- ANPR cameras to get real-time journey time data and continuous Origin and Destination data.
- Real time speed data from loops at key points in the road
- All Junctions on the Priority Network to be running SCOOT or MOVA and to have a traffic monitoring camera at the site.
- Real-time passenger information at all key bus stops.

Rural to Urban connections:

- All Junctions on the Priority Network to be running SCOOT or MOVA and to have a traffic monitoring camera at the site.
- Strategic VMS signs at some diversion locations.
- Real-time passenger information at all key bus stops.

Appendix 3 – ITS initiatives

This appendix gives a brief idea of the current ITS initiatives that the County Council currently invests and along with the anticipated future ones.

This list highlights that we are not starting from scratch with regard to a Transport Management systems. We need to co-ordinate our current systems into one system and then expand and build on this.

Current ITS initiatives are:

- Intelligent Traffic Signals (SCOOT)
- Real-time bus stop information (ACIS bus tracking)
- Intelligent bus priority (ACIS Traffic Light Priority)
- Real-time speed traffic counters (C+A equipment)
- Bus Gate/Lane enforcement cameras
- Street-works Register
- Rising bollards

Anticipated future ITS initiatives:

- Car park guidance (displayed through VMS signing, web & SMS; Driven via Common database, info from loop or ANPR camera system)
- Real-time Network information (displayed through VMS signing, web & SMS (Driven via common database, info from ACIS, SCOOT,& ANPR systems)
- Car park enforcement (ANPR camera system)
- Automatic Bus gate/lane enforcement (ANPR camera system)
- Other moving traffic offences available as part of new legislation.
- Internet portal development.
- Live micro simulation models of the network

Appendix 4 – Signed Diversion routes - HA and OCC

HA signed Diversion Routes:

ROUTE	**DIVERSION**
A34 from Marcham Interchange to Botley Interchange	A415 through Marcham, A338, A420 through Cumnor.
A34 from Peartree roundabout to M40J9	Through Wolvercoate & Cutterslow out on A40, along M40 to M40J9
A34 Milton interchange to Marcham interchange	Along A417 to Wantage, through Wantage, Grove, East Hanney, Marcham
A34 Speen to Milton Interchange	Along B4000, A338 to Wantage, A417, A4130
A34 Chiltern to Milton Interchange	Along A4185

OCC Diversion Routes:

Appendix 5 – Complementary Government Policies and Guidance

It is the intention that this appendix lists guidance or legislation which is associated with the areas mentioned within this Policy document. This should not be treated as an exhaustive list.

Regional policy documents:

- South East Plan

OCC policy documents:

- Oxfordshire Structure Plan 2016
- Oxfordshire Local Transport Plan 2006-2011 (including inter-related Bus Strategy and Information Strategy)
- Highway Management Policy

DfT Guidance:

- TAL 01/06 General principles of traffic control by light signals
- TAL ITS 2/03 What ITS can deliver: the benefits of investing in ITS www.dft.gov.uk/pgr/roads/tpm/tal/its/whatcanitsdeliverthebenefits4094
- Traffic Advisory Leaflet ITS 3/03 Integrated systems – a generic approach www.dft.gov.uk/pgr/roads/tpm/tal/its/integratedsystemsagenericapp4088
- Traffic Advisory Leaflet ITS 4/03 Parking Guidance and Information www.dft.gov.uk/pgr/roads/tpm/tal/its/parkingguidanceandinformation
- Traffic Advisory Leaflet ITS 5/03 Public Transport Priority www.dft.gov.uk/pgr/roads/tpm/tal/its/publictransportpriority
- Traffic Advisory Leaflet ITS 6/03 Access Control www.dft.gov.uk/pgr/roads/tpm/tal/its/accesscontrol
- Traffic Advisory Leaflet ITS 7/03 Public Transport Information www.dft.gov.uk/pgr/roads/tpm/tal/its/publictransportinformation
- Traffic Advisory Leaflet ITS 8/03 Traffic and Traveller Information Services www.dft.gov.uk/pgr/roads/tpm/tal/its/trafficandtravellerinformati4092
- ITS Toolkit www.itstoolkit.co.uk
- Design Manual for Roads and Bridges www.standardsforhighways.co.uk/dmrb/index.htm
- Transport White Paper: The Future of Transport (2004) www.dft.gov.uk/about/strategy/whitepapers/fot/
- Transport 2010 Meeting The Local Transport Challenge www.dft.gov.uk/pgr/regional/policy/transport2010

Legislation:

- Road Safety Act 2006
- Traffic Management Act 2004 http://www.dft.gov.uk/pgr/roads/tpm/tma2004/trafficmanagementact2004netw4143
- Transport Act 2000
- New Roads and Street Works Act 1991

Supporting Strategies:

- Highways Agency Route Management Strategies
- Regional Economic Strategy for the South East
- Economic Development Strategy for Oxfordshire
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Appendix 6 – (Urban) Traffic Management & Control system Diagram

Proposed structure of Oxfordshire's (U)TMC system