Guide for the Design, Management and Delivery of Pilots and Trials on the Highways Agency Network

D002 Literature Review

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Executive Summary

This literature review summarises the current information available on the assessment of innovations in transport areas, especially within intelligent transport systems.

It includes the relevant standards or guides which should be considered in design, management and delivery of the pilot schemes. And it lists some example reports from the previous pilot schemes, such as M25 Controlled Motorway, Ramp Metering, M1 HOV lanes. It is complementary to the ‘GDMDPT Process - Guide for the Design, Management and Delivery of Pilots and Trials on the Highways Agency Network – GDMDPT Process’ under development.

The 'literature' identified includes hardcopy and www based information sources.

To be consistent with the GDMDPT Process, literatures are grouped into the following six stages of the GDMDPT process:

♦ Stage 0 Feasibility study. Examples of feasibility studies are listed. These demonstrate the processes adopted, their content and results identified;
♦ Stage 1 Aim and objectives. The literature identified how to analyse user (client) needs, determine the aims and objectives of the pilot or trial systems;
♦ Stage 2 Innovation and assessment requirement. Examples of requirement specifications and test methodology documents are identified including suggestions for the development of performance indicators;
♦ Stage 3 Implementation. Literature on site selection criteria are listed and research on the development of scheme plans and scheme management are also included in this section;
♦ Stage 4 Commission and assessment. Principles on project management, assessment methodology, and evaluation presentations have been identified and summarised;
♦ Stage 5 Completion and promotion. Papers and presentations published on journals and conferences are used for the promotions.

It should be noted that some documents are applicable to a number of stages in the overall GDMDPT process. A short abstract is provided for each 'literature' identified.
1. Introduction

A literature search of previous studies and investigations providing guidance on the design, development and management of pilots and trials has been carried out as part of the ‘Guide for the Design, Management and Delivery of Pilots and Trials on the HA Network’ (GDMDPT) project.

The search of hardcopy and electronically published materials has identified a number of references and systems ranging from the initial feasibility consideration of innovations through to the final assessment, evaluation and potential decommissioning of pilot investigations. The guide that will result from the GDMDPT project will cover all these aspects of pilots and trials.

To be consistent with the GDMDPT Process, the literatures relevant to the strategic overview are presented first. Then the literature identified through the search has been collated and presented in this document into six identifiable stages of the development of pilots and trials:

0. Feasibility;
1. Aims and Objectives;
2. Innovation and Assessment Requirements;
3. Implementation;
4. Commission and Assessment;
5. Completion and Promotion.

Where identified literature is applicable to a number of these stages the references have been duplicated.

The search identifies state-of-art research on the assessment and evaluation of the pilot and trial schemes particularly but not limited, within the Intelligent Transport Systems (ITS) area. The standard, guide, principles from the literature have been used to develop the Guide for the Design, Management and Delivery of Pilots and Trials on the HA Network. Reports of the previous pilot schemes, such as Ramp Metering, M25 Controlled Motorway, M1 HOV lanes, are listed as sample reference for the future pilot practitioners. And this literature is not intent to list all the reports generated from the previous pilots.
2. Strategic Overview

2.1 Highways Agency (2000) Guidance for the delivery of Highways Projects within the HA. Doc No. HI-CH1

This document provides guidance for individuals who are involved in the delivery of projects for the Highways Agency.

It defines the project, list the components of it, and the process to successfully deliver a Highways project.


http://www.ogc.gov.uk/index.asp?id=377

Acquisition programmes and procurement projects in central civil government are subject to OGC Gateway reviews.

The OGC Gateway Process examines a programme or project at critical stages in its lifecycle to provide assurance that it can progress successfully to the next stage; the process is based on well-proven techniques that lead to more effective delivery of benefits together with more predictable costs and outcomes. It is designed to be applied to delivery programmes and procurement projects, including those that procure services, property and construction, IT-enabled business change and procurements using framework contracts.

2.3 Highways Agency (2006) Procurement Strategy


This document sets out a new procurement strategy for the Highways Agency (HA). It has been developed in support of the HA's Corporate Plan which provides a strategic framework to modernise the HA over the next three to five years to deliver its role as the operator of England's network of motorway and trunk roads.

It also provides the procurement framework to deliver the spending plans and the outcomes included in Transport 2010: the 10 Year Plan which was published by the Government in 2000. It applies to all areas of procurement carried out by the HA but it focuses mainly on the purchase of roads related activities as this covers the bulk of the HA's expenditure.


http://www.highways.gov.uk/aboutus/1496.aspx

This Risk Management framework pulls together the existing Risk Management arrangements and turns them into a comprehensive framework, which combines...
strategic arrangements at the top of the organisation and embeds Risk Management behaviour into the day to day decision making of all colleagues at every level.
3. Guide Stage to Literature Cross Reference

This section provides a cross-reference tabulation between the various papers identified through the literature search against the various stages in the development of a pilot or trial.

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Table 3.1 – Guide Stage to Literature Cross Reference
4. Stage 0 Feasibility

This section outlines literature identified which has considered the initial feasibility aspects of innovation developments.


http://www.itstoolkit.co.uk/

This toolkit complements the resource pack 'New Technology in Transport - Improving Network Management' (published 3 December 2003) and the Department's Guidance on Transport Analysis (WebTAG). It gives user-friendly and helpful information on how to select ITS tools to meet policy objectives and how to measure the benefits and costs of ITS deployment. The case studies and a flexible way of testing ideas in the toolkit are helpful for decision makers to assess the business case for investment in ITS.


ITS Radar provides 'ITS Intelligence' for the Highways Agency (HA) and is part of the "Traffic and Travel Systems Group" portfolio of projects for the "Safety, Standards and Research" Directorate.

It summarises key information for decision makers and practitioners alike regarding innovative pilot projects worldwide and emerging ITS technologies. ITS innovations are scored according to pre-defined criteria including relevance to the HA. It also considers technologies deployed in other arenas and look at their applicability in the world of transport.

A Review of Guidance on the Implementation of Pilot Projects is a note produced by the ITS Radar. This note provides a short summary of some of the key guidance on implementation of pilot projects. Critical to all approaches is:

- identification of user need;
- development of functional and then technical requirements;
- ex-ante appraisal and experimental design (inc monitoring requirements);
- Implementation;
- ex-post evaluation of the results.

Advice differs dependent on national goals for the assessments. Several levels of assessment should be considered:

- Technical;
- Impact; and
User acceptance.

Under the technical assessment there may be specific requirements for testing prior to any on road trials e.g. Bench tests or off road trials dependent on the nature of the application or technology to be piloted. When developing pilot studies, existing national objectives should be used in the ex ante appraisal if possible, to ensure that the outturn observations of the pilot study can be used for future deployment justification.

4.3 **DfT (2006) WebTAG.**


This website is to provide detailed guidance on the appraisal of transport projects and wider advice on scoping and carrying out transport studies.

The guidance is a requirement for all projects/studies that require government approval. For projects/studies that do not require government approval TAG can serve as a best practice guide. This guide brought together the Department’s existing documents, *The Guidance on the Methodology for Multi-Modal Studies (GOMMMS)* and associated supplements and errata, *Applying the Multi-Modal Approach to Appraisal to Highway Schemes* (The Bridging Document) and *Major Scheme Appraisal in Local Transport Plans*. The material on this site supersedes all those documents.


The PAR is used to appraise all Highways Agency improvement projects not in the targeted programme of improvements. It is the key summary document in which the need for the project, its costs and benefits (including those that cannot be quantified in money terms) are brought together to aid the decision maker in judging the worth and priority of the project. The document allows the benefits to be assessed against all of the Government’s five objectives for transport (environment, safety, economy, accessibility and integration).


This report reviews the previous work undertaken on implementing innovative lane, speed and incident management strategies. The following are included:

♦ Lane and access control: Ramp metering, HOV lane, HGV lane, hardshoulder running;
♦ Speed control schemes: variable speed limit systems;
♦ Incident management: incident detection, warning and response;
♦ Special event management.
It is proposed to implement several operational regimes in ATM; the order of implementation is important. This review can assist in determining potential combinations of operational regimes and suitable combination orders, where appropriate.

4.6 DfT (2004) Feasibility Study of Road Pricing in the UK

http://www.dft.gov.uk/stellent/groups/dft_roads/documents/page/dft_roads_029787.hcsp

This is a report into the feasibility of road pricing in the UK. It is concerned with whether and how road pricing might work.

The work includes analysis of modelling undertaken mainly using the DfT's National Transport Model and models from certain multi-modal studies of geographic areas which were available:

- a review of existing schemes around the world;
- a review of existing technologies and an assessment of the direction and pace of technological development;
- a review of attitudes to road pricing around the world some original qualitative and quantitative research into attitudes studies into the potential impacts of road pricing on different social groups and on the environment;
- an assessment of the legislative and devolution issues to which road pricing would give rise;
- an exploration of the potential costs of implementing a range of road pricing schemes.

To address whether and how road pricing might work, this report assesses, in turn:

- feasibility in terms of the degree of public acceptance pricing might have and the determinants of public opinion;
- 'why?' - the wider transport context, the trends in traffic and congestion that are forecast without pricing and the drivers of congestion in terms of the travel choices people make;
- 'how?' - the technological practicalities of applying road pricing, based on an assessment of the way technology is developing, how pricing might work and
the modelled impact it might have and identifies the factors that would need to be taken into account in scheme design.


The study looked at the possibility of introducing motorway High Occupancy Vehicle (HOV) lanes on four sections of motorway stipulated by the HA. The purpose of the study was to determine if such lanes would be feasible and to rank those sites which were found to be feasible. Enforcement issues were not within the scope of this study. Given the feasibility nature of this study, a number of factors and issues have been identified but have not been assessed to date. These would be addressed by more detailed follow-up studies.

In this report, Site visits and short term vehicle occupancy counts were carried out for each section of motorway under investigation.

Possible engineering solutions were investigated in terms of constraints, safety, costs and operation. Off-side lane, near-side lane and hard shoulder HOV lane options were all considered, as was the question of whether or not to segregate the lanes.

Knowledge of HOV lanes in the USA and Australia are used to enhance these investigations.

The preferred engineering solution for each location was assessed using an outline traffic and economic assessment.

The conclusion was that introduction of an HOV lane would be feasible at each of the four locations being investigated.

4.8 TRL (2005) Literature Review of HOV Lane Schemes, Unpublished Project Report UPR/T/002/05

This report reviews existing HOV Lane schemes, both within the UK and overseas. The objective of the review is to identify areas where previous experience could be relevant to the design, operation and monitoring of the M1 HOV scheme, including:

- Design of scheme;
- Safety;
- Evaluation;
- Enforcement.
Marketing and Public Perception
5. **Stage 1 Aims and Objectives**

This section identifies literature appropriate for consideration and development of pilot and trial aims and objectives. The measures to which an innovation under investigation will subsequently be compared with and assessed against.

5.1 **Highways Agency (2006) Tackling Congestion by Influencing Travel Behaviour**

http://www.highways.gov.uk/knowledge/9561.aspx

In this report, the target of making journeys more reliable on the strategic road network by 2007-08 is set. In meeting this target, the HA are focussing their efforts on improving the efficiency of the existing network. Innovative equipment and management techniques will be used to keep traffic flowing smoothly.

HA aim to deliver a high quality service to all users by:

- making journeys more reliable through better network management;
- providing information to road users; and
- improving road safety.

5.2 **Highways Agency (2006) M1 Junctions 6A-10 Improvement Works - Proposed Pilot HOV Lane.**

This report presents the results of further analysis of an M1 HOV lane between Junctions 6a and 10. It includes:

- Options for HOV Lanes on the M1 J6A-10.
- Identification of problem(s) in terms of safety, movement of motor vehicles, environment and others as appropriate.
- Preliminary drawings of feasible options.
- Cost estimates for each option considered with initial spend profiles.
- A preliminary assessment of the benefits and disbenefits in terms of safety, traffic, environment, others. Review existing data and make recommendations (including cost and programme implications).
- A programme showing how the HOV Lane could be built as part of the M1 J6A-10 widening scheme with minimum disruption. This programme should set out proposals for management of the study as well as providing monthly expenditure profiles.
- Proposal for developing a full Safety Case.
- Recommendations (including recommendations for how to improve the scheme).
This report also prepares a preliminary design of an HOV lane on the M1 between J6a and J10.


This is the second version of a guidebook for User Needs Analysis in different applications within the Transport Sector (road, rail, air, waterborne, multi-modal, etc.) of the European Commission Telematics Applications Programme.

Through the use of a framework and checklist, this Guidebook ensures that the essential elements of a user needs analysis are covered. Definitions, principles, guidelines and methods for user needs analysis are provided, supplemented by case studies relating to various Transport Telematics Applications.

The aim of this guidebook is to support user needs analysis activities from the outset of projects and to ensure consistency across them. By so doing, it will also help project developers and managers to prepare a plan of user needs analysis in their respective projects.


http://www.cordis.lu/telematics/tap_transport/library/converge_d2-3-1.html

This guidebook is intended to give more general guidance and recommendations regarding the assessment or validation process. This includes:

♦ determination of user needs;

♦ formulation of assessment objectives;

♦ classification and description of telematics applications;

♦ pre-assessment of expected impacts;

♦ choice of assessment methods;

♦ methods available for data analysis; and

♦ reporting of results.

The final section discusses the need for assessment at the programme level and therefore for projects to collaborate in their assessment activities.


This report develops the Validation Quality Support provided by the CONVERGE Project within the 4th Framework Transport Telematics Applications Programme and by the ANIMATE Project in the 4th Framework Environment Telematics Applications Programme. This updated checklist is complementary to the CONVERGE ‘Guidebook for Assessment of Transport Telematics Applications’, which was also updated in 1998.

The updated checklist provides detailed advice on how to produce draft and final validation plans, whilst the Guidebook is intended to give more general guidance and recommendations regarding the assessment or validation process.

Firstly, it summarises the Validation/Evaluation Process as used in Transport-TAP Projects. It discusses the validation process, why it is important and the role of the validation plan in that process. Then the approach is presented as recommended by the CONVERGE Project to validation planning and evaluation of validation results.

It provides guidance on the preparation of the draft validation plan and explains the basis on which the CONVERGE Project reviews draft validation plans for the Commission. The guide also provides guidance on the preparation of the final validation plan and discusses the work involved in the presentation and evaluation of validation results. The report gives some examples, such as, a ‘Model Validation Plan’ provided by the TRACAR Project TR 1059. Two further examples of elements of model validation plans are described. In Appendix A, a template is provided for a draft/final validation plan for all RTD&D (Research, Technological Development and Demonstration) projects to use. Appendix B comprises the template for the feedback report which CONVERGE provides to the Commission and to a project after review of its validation plan.
6. Stage 2 Innovation and Assessment Requirements


http://www.cordis.lu/transport/src/maestro.htm

MAESTRO aimed to develop a standard framework and methodology for the selection, design and evaluation of transport pilot and demonstration projects.

The key output from MAESTRO is the MAESTRO Guidelines. The Guidelines are designed to appeal to a wide range of end users. Within the Guidelines, four key groups are identified, which reflect the role of the user in the pilot or demonstration project process and the type of information they require in order to carry out their role more effectively. In addition to being aimed at specific users, the Guidelines are also intended to be read from a more general perspective.

The Guidelines divide the process of conducting p/d projects into 3 parts:

♦ Before the project begins, when users define their specific transport problem and decide whether a p/d project is the most appropriate way to try to solve the problem;

♦ During the project, when users apply the MAESTRO Methodology to address the issues associated with setting up and conducting the project;

♦ After the project, when users consider how best to use the project results and whether to proceed to full-scale implementation.

The core of the Guidelines is the MAESTRO Methodology, which consists of seven interrelated parts:

♦ Definition of Objectives;

♦ Site Selection and Pre-Design;

♦ Expected Impacts (Initial Evaluation);

♦ Design Stage;

♦ Ex Ante (Before) Evaluation;

♦ Implementation of the Demonstration;

This Advice Note gives guidance on the study, design and evaluation of designated lanes on the motorway and trunk road network.


http://www.ops.fhwa.dot.gov/its_arch_imp/docs/functional_requirements.doc

This document explains how to develop functional requirements as a basis for ITS projects. It examines the USA National ITS Architecture, which contains representative functional requirements for ITS systems, as a tool for identifying the types of requirements that is used to guide ITS project development and system implementation. Then it discusses the definition of functional requirements and how to develop good functional requirements.


This specification defines the function of the ramp metering system. It explains the components of the ramp metering system. Then the functional requirement, algorithm requirements, communication requirement and physical requirements are defined.


http://www.odpm.gov.uk/index.asp?id=1136118

This document contains the Government and the Audit Commission performance indicators for local services. The selection of performance indicators by both the Government and the Audit Commission has been determined on the basis that the two sets of indicators are complementary and present a coherent whole. The BVPIs focus on key national interest issues, whilst the ACPIs reflect other areas of interest to the public or information that provides a context for the BVPIs.

It sets out the performance indicators for the different categories of local services, together with their definitions.

The guidance details which indicators should be collected by which authority. The PIs contained in this document draw on the experience of the Audit Commission in developing performance indicators over the last seven years, and that of best value and pilot authorities and latterly through the formal consultation process.


Each year since 1993, the Commission has produced a guide for the statutory performance indicators (PIs). This document provides technical guidance on the definitions of the indicators.

In this guide, definitions of the transport best value performance indicators are defined which are used by local authorities for audits. For example, the best value PI includes condition of the principal road and non-principal road, road accident casualties, etc.

6.7 Oscar Faber (2001) UTMC 5a: Performance criteria for UTMC systems handbook

http://www.utmc.gov.uk/utmc05a/pdf/utmc05a-hb-v8.pdf

This Handbook was developed as a part of a project, UTMC05a undertaken on behalf of the Department of Environment Transport and the Regions (DETR), to study performance criteria for Urban Traffic Management and Control (UTMC) systems.

This document provides a short guide to the processes involved in developing appropriate performance evaluation procedures to optimise system performance and demonstrate the benefits of operation.


http://europa.eu.int/comm/budget/evaluation/pdf/pub_eval_activities_full_en.PDF

This document provides guidance on all kinds of evaluations whether ex ante, interim or ex post evaluation and whether they concern expenditure programmes or policies.

This guide provides an introduction to evaluation – what it is, what it is not and how it is understood and practiced in the Commission. Those readers, who want to have a deeper look into evaluation, should see a recent and comprehensive guide on evaluation in the Commission, which provides and overview of the Commission’s rules and good practices concerning evaluation of its activities.

The aim of this guide is to help the practitioners of evaluation, who need to have quick and easily understandable information on evaluation concepts and the use of evaluation in the Commission.

The first chapter provide information on the nature of and the obligation to do evaluations in the Commission. Together with the last chapter on using evaluation findings, it can be of particular interest to those responsible for planning, organising
and co-ordinating evaluations. Chapters 2-4, which address the evaluation process (design, conduct and reporting) should be interesting for all those who have to carry-out and utilise evaluations (such as desk officers in the operational units).

6.9 TRL (2005) Assessment strategy for the M1 HOV pilot

The report details the assessment options for the scheme. Possible methods of assessing the objectives of the scheme have been listed and rated according to cost and the feasibility of measuring changes. The lists provide options for assessment; these options have been used to recommend an assessment strategy, which could be used to establish the impacts of the scheme and to optimise the operation of the scheme.

6.10 TRL (2005) Monitoring Requirements for the M1 HOV Pilot

This report produces a draft specification describing the recommended monitoring requirements.

The aims of the monitoring are described and the data that is recommended to be collected is defined, together with the suggested extent and accuracy of the data. The monitoring requirements have been recommended based on the outputs required from the monitoring (e.g. to assess the impacts of the scheme).

The timescales for the analysis and presentation of results have also been defined.


The report details the assessment options for each of the Candidate Operational REgimes (COREs) that comprise ATM. The detailed objectives of ATM have been identified and possible methods of assessing these objectives have been listed.

The objectives have been rated according to importance, in terms of benefits to the user and the expected impact of ATM in achieving the objectives. The assessment methods have been rated according to cost and the feasibility of measuring changes. These lists provide options for assessment; following discussions and approval by the HA in consultation with TAME and ITEA, these options have been used to determine a potential assessment strategy that could be used to establish the cost benefits of ATM and to optimise the operation of ATM.


This report contains both the methodology and also results of the economic assessment of the 10 RM sites which are due to be implemented in 2006.

This report sets out the approach and parameters for valuing road user benefits of roadside Intelligent Transport Systems (ITS) for use in economic appraisals of those proposed initiatives.

This document represents a step in the ongoing process of defining performance indicators appropriate for estimating road user benefits associated with roadside ITS initiatives.

The report is aimed at analysts undertaking economic appraisals of ITS roadside initiatives and requiring assistance in determining the types and magnitude of road user benefits that should be used. The report’s objectives are to achieve:

♦ Consistency of approach and methodology across agencies;

♦ Transparency of methodology;

♦ Robustness of evaluations.

6.14 Finnish Ministry of Transport and Communications (1008) Guidelines for the evaluation of the ITS projects

This report contains the guidelines for the evaluation of ITS projects for the purpose of comparing the ITS projects to one another and to other transport projects with regard to their impacts and economic feasibility. The guidelines deal with both pre- and post-evaluations. The guidelines present a systematic method for evaluating the projects so that all essential factors for decision making are investigated.

The guidelines present extensive checklists of the possible impacts of ITS systems on the transport systems and its users as well as all the actors linked to logistics systems. Lists of primary and secondary indicators cover seven different impact categories: transport network and its costs, fleet and its costs, accessibility, time and predictability, safety, noise, emissions and energy, and evaluations and comfort.

The guidelines for the evaluation for logistics projects emphasis the main objective of these projects which is to enhance the competitiveness of the industry and commerce. The Du Pont model applied acts as a checklist for the impacts while producing an estimate of magnitude of the impacts at the same time.

The economic feasibility analyses can build on a cost benefit analysis or a profitability calculation. In addition, multi-criteria and verbal assessments should be used. For studying the feasibility of the implementation of the projects, the guidelines present checklist for market assessment, technological, technical, financial, legal and organisational aspects.

In this report, the aim and objective of the evaluation is introduced. Then the trial are defined, including the parameter for collection, equipment installation, site preparation, test procedure, data collection and data analysis method.

The overall assessment framework would be defined to assess the potential benefits of the system. All the indicators would be reviewed to assure that they can reflect the performance of the system. If needed, they would be modified. The subsequent step would be to estimate the anticipated benefits of the system for the decision maker. The final step of this stream is to determine the cost of the evaluation assessment. This cost would include for example the data collection equipment purchase, data collection and analysis cost.

6.16 Highways Agency (2005) Advice regarding the Assessment of Sites for Ramp Metering

This interim advice note provides advice upon the circumstances where ramp metering may be of benefit in improving the flow of traffic on the main line carriageway of a motorway, in the vicinity of an entry merge from a slip road or interchange link at grade separated junctions.

In this note, the site selection criterion is defined. The process of the site selection is then explained with a chart. The recommendation for the next step is drawn for the future work.

Other site selection reports for the major projects, such as ATM, HOV lanes, can be found in Highways Agency internally.

6.17 Highways Agency (2005) Road Trial of a Detector System for the Automatic Monitoring of the Hard Shoulder Lane for ATM Site Selection Report

The report details the site selection process for an image vehicle detector system evaluation project. It includes the requirements of the availability, accessibility, traffic situation, and health and safety issues of the site.

6.18 Cross Reference


7. **Stage 3 Implementation**

7.1 **PRINCE2 (2006) key skills in programme management**

http://www.prince2.com/p2download20102005.asp

This document gives a brief description of project management. It covers the definition of the project management, the process, financial control, benefit analysis, resource allocation, etc.

Within HA, MAP, a trimmed version of the PRINCE2 principles is applied to manage projects.

7.2 **Highways Agency (2003) Road Safety Audit. Design Manual for Roads and Bridges, V5, Chapter 2, HD 19/03**

This document updates the requirements for Road Safety Audits which are mandatory for all trunk road Highway Improvement Schemes including motorways. It describes the stages at which audits shall be carried out, the procedures to be followed and the requirement for monitoring of Highway Improvement Schemes after opening.

In summary there are four stages of audit:

- Stage 1 Road Safety Audits should be undertaken at the completion of preliminary design before publication of draft Orders and for development-led Highway Improvement Schemes before planning consent where possible.
- Stage 2 audit should be undertaken at the completion of the detailed design.
- Stage 3 audit should be undertaken when the Highway Improvement Scheme is substantially complete and preferably before the works are opened to road users.
- Stage 4 Accident monitoring of audited Highway Improvement Schemes.

In this standard, the detailed audit requirements are listed. Also in the standard are guidance on the suitable training, skills and experience recommended for Audit Teams, guidance on the relationship between Road Safety Audit and Health and Safety Legislation, the requirement for the accident monitoring of completed Highway Improvement Schemes in the form of a Stage 4 Audit.

7.3 **Highways Agency/TRL (2001) Traffic Conditions at Potential Active Traffic Management Sites**

In this report, traffic conditions have been assessed at eight potential ATM pilot locations. Flows, projected signal activity and current levels of flow breakdown have been calculated for each carriageway separately. The main advantages and disadvantages of traffic conditions at each location are listed to show how suitable each location would be as an ATM pilot site. It summarises the general traffic conditions at the original (longer) locations and describes the shorter Capital Modernisation Fund (CMF) locations and also lists the main Performance Indicators for each CMF location, broken down by direction.
It also proposed the possible future work, including: assessing potential benefits; identifying specific congestion point; collecting detailed traffic data; etc.


To monitor the effects of introducing the HOV lane, comprehensive data must be collected before the scheme is implemented, to provide a comparison with the “after” data.

In this report the method to collect the “before” data is presented. The data from MIDAS loops are collected. Several TRADS and ANPR sites have been identified on the M1 HOV pilot site and on the surrounding network. STATS 19 and incident data are also collected.

Moreover, the M1 has been surveyed during January 2005 and March 2005 in order to obtain vehicle occupancy, vehicle type and lane usage information. It is recommended that further surveys should be carried out during the “before” monitoring year.


To help inform decisions on the design of the HOV scheme, information is required on current traffic patterns on the M1. To assist with this information, traffic surveys were conducted on the M1 for one morning and one afternoon peak period in January 2005 and the same in March 2005.

Information was collected on classified vehicle counts, vehicle occupancy, types of buses and slip road counts.


This document is intended to introduce the topic of systems engineering to managers and staff working on transportation systems projects, with particular emphasis on Intelligent Transportation Systems (ITS) projects.

This document provides a useful introduction to systems engineering. It considers a multi stage approach to project design and implementation as follows:

♦ Conception;
♦ Requirements Analysis;
♦ Design;
♦ Implementation;
♦ Testing;
♦ System Acceptance;
♦ Operation and Maintenance.

This is supported by a guide on developing functional requirements of ITS.


This study on System Architecture focuses on the identification of the threats which can slow down the deployment of a Transport Telematics European Framework Architecture and which are related to the deployment of ITS in general.

It explains the risk analysis of the ITS implementation and propose an action plan for the mitigation.
8. Stage 4 Commission and Assessment


This guideline is for the monitoring and evaluation of pilot projects. It covers consideration of the purpose of the pilot. Also it explains monitoring and evaluation in greater detail.

It allows a rigorous approach to the monitoring and evaluation of all pilot projects. This can help to ensure that relevant and good quality information is obtained from pilots so as to gain confidence about the subsequent application of the techniques to similar projects.


This is the Traffic and Safety Summary report identifying the impacts following the opening of the M6 Toll motorway. It provides the key findings of the study, particularly those of greatest interest to the stakeholders and public. The report considers traffic volume changes on key routes in the area, as well as changes in journey times, congestion and accidents.


This report describes the monitoring of the Controlled Motorway Pilot Section, which extends from Junction 10 to Junction 15 in the south-west quadrant of the M25. Gantry signs are located along this section to display mandatory 60 or 50 mph speed limits when traffic flows are high. The periods covered are 5 months ‘before’ switch-on, from April to August 1995, and the first 7 months ‘during’ the Trial period up to March 1996.


This report describes how the performance of the M25 Controlled Motorways Pilot scheme was monitored and the results of that monitoring. It covers the 12 month period of operation from August 1995 to August 1996 and makes comparisons with the 5 month period immediately before the system was switched on.


This report covers the extension of monitoring from September 1996 to February 1997, up to the time of switch-on of the speed-and-flow-based control algorithm.
Monitoring reports include a number of regularly collected Performance Indicators (PIs). Overall, the demand and throughput PIs show consistent seasonal trends, with a year-to-year increase of 3% on each carriageway. The journey time, flow breakdown and lane utilisation PIs vary considerably from month to month. This is likely to be a result of variable weather and lighting conditions, with the increased demand making the flow breakdowns more severe.


This report describes the continuation of the monitoring work for the period between March 1997 and March 1998 inclusive. As well as describing and summarizing the performance indicators and the behaviour of the system, the report presents a variety of traffic behaviour and trends and gives examples of monitoring on a motorway other than the M25.


This report describes the analysis of the effect that the signal trials of M25 controlled motorway may have on the accidents.


In this study the whole of M25, excepting the links in the trial section, has been used as the ‘comparison set’. Three models have been derived for three time periods – ‘24-hour’, ‘Peak’ and ‘Off-peak’. The ‘peak’ period was defined as the weekday morning and afternoon peak periods combined with the Saturday and Sunday peak periods. The remaining time of the day was defined as ‘Off-peak’. (A parallel set of models was also derived from a slightly smaller database consisting of periods when no roadwork was involved. These ‘non-roadwork’ based models were slightly inferior in quality, even though they produced similar results.)


This report presents an overview of the monitoring work undertaken by TRL Limited for the Highways Agency between 1995 and 2002. As well as describing the history of the project, the report presents key results for performance indicators, a variety of traffic behaviour and trends and a number of specific studies carried out alongside regular monitoring work.


This report describes the monitoring work for the period between July 2000 and June 2002 including the following activities:
TRL has continued to monitor the Performance Indicators (PIs) for the M25, providing a sixth and seventh year of observations of traffic trends and behaviour using the predefined measurements used in previous years.

The Motorway Traffic Viewer (MTV) program has been used to display the traffic and signal data graphically to provide overviews or in-detail views of the performance system, as required by the Highway Agency.

Trends in traffic behaviour on the M25 have been studied. These studies included an investigation into the sources of flow breakdown on the Controlled Motorways section, analyses of speed compliance and headway distributions under various traffic conditions, an examination of shockwave characteristics and an analysis of peak spreading.


This report evaluates the performance of a range laser vehicle detector. It starts with a brief description of the test method. Followed by is the data collection and analysis. At the end it draws conclusions and gives recommendations for the future.


This Framework is a proposal on how to handle the safety issues of any possible current and future UTMC systems. It discusses type approval of equipment and safety issues within intelligent transport systems design. This is of interest with regards to UK pilot study design, and type approval testing issues.


../\02_Document_Incoming_Register\incident_detection_evaluation.pdf

This document compiles, compares, ranks and recommend incident detection strategies in the USA.

8.14 Cross Reference


9. Stage 5 Completion and Promotion


This report draws together the conclusions of the Highways Agency pilot of Ramp Metering and presents a summary of the key findings. Its purpose is to draw attention to the results of the Ramp Metering evaluations which were used in the development of guidance notes to help route managers determine the suitability and benefits of Ramp Metering. It also gives an overview of the technical methodologies and Ramp Metering control algorithms that need to be considered for national deployment.


This report describes the work that has been undertaken to establish the business case for Controlled Motorways. Since the introduction of the Controlled Motorways on the M25 in 1995, the Highways Agency (HA) has commissioned a number of studies to optimise system performance and to quantify the impact of the system with the aim of establishing the business case for implementation and developing guidelines for future roll-out. The scope of this particular document is to provide a summary of the work undertaken and the key results from the various Controlled Motorways studies.


Ramp metering is a direct and efficient means to avoid or reduce the space-time extent of motorway congestion and sensibly to improve the merging conditions. Regardless of the ramp metering algorithm employed, the metering signals may be operated in various ways based on the ramp metering policy adopted. Ramp metering policies include traffic signal cycle, 2- or n-cars per green and discrete release rates. In the latter policy, a number of discrete release rates are pre-specified, each implemented with a specific cycle and green phase. This approach allows for short green phases (small platoon releases) whenever possible but also for high ramp flows when necessary. We address the problem of determining the lowest required number of release rates that will not affect ramp metering operation compared with the theoretical case of any (even decimal) release rate. Results from investigations using the ALINEA (Asservissement Line`aire d’Entre`e et d’Autoroutie`re) ramp metering algorithm and the METANET (Mode`le d’Ecoulement du Trafic Autoroutier: NETwork) macroscopic traffic simulator are reported and discussed in detail. Finally, recommendations are provided concerning the lowest required number of release rates and the discretisation scheme to be used.