

FINAL REPORT

**Compendium of
SRA-commissioned
research**

**Sally Cairns
University College London**

**with substantial advice and assistance
from Steve Atkins (SRA Planning),
Daniel Varey (SRA Freight) and
Caroline Hughes (SRA Planning)**

29th April 2005

Acknowledgements*

Grateful thanks to Steve Atkins, Dan Varey and Caroline Hughes, who were closely involved in undertaking this work, and also to Jenny King (DfT) and Jim Steer for providing strategic input.

Grateful thanks for help with specific studies, or for clarifying that there were no available studies in a particular area, to:

Lyndon Adolphus (I-F1)
Steve Atkins (C1, C4, C5, F7, F8, F9, F10, G11, H15, I-A2)
Chris Austen (E6-E8)
Elliott Ball (B5, G7, G9, H18)
Gary Backler
Alistair Barclay (I-F1)
Patrick Bateson (H14)
Claire Bloom, *Frontier Economics* (H4)
David Bradshaw, *Jacobs* (E1, E2, H3, H10)
Paul Burrell (F7, F8)
Derek Chapman (D7)
Matthew Chivers, *ATOC* (H7, H12)
Andrew Cook, *Westminster* (F2, G2)
Clare Costello (E6-E8)
Paula Crofts (B2, B3, I-B3, I-B4)
Richard Davies (D1, E1, E2, E3, I-B2)
Preetum Domah (B4, B6, G10, H2, I-A1)
Phillip O'Donnell (D1)
Duncan Edmondson, *MVA* (G3, H1, H13)
Jonathan Ellis (C1, C3, C6, C7, D2, D5, D6)
Ceri Evans (A2-A6),
Neil Fleming (F4, H7, J-A6)
Michael Hayes (G8)
David Hibbs (E8)
Charles Hodgson (H12)
Kevin Houlton (H19)
Caroline Hughes (C2, C4, G11, H13, I-D1, J-B1, J-B3, J-C1)
Mervyn Humphries (I-E1, I-E2)
Tabitha Jay (B2, B5, I-C1, I-C2, I-C3)
Peter Jones, *Westminster* (F2, G2)
Malcolm Knight (F9)
John Larkinson (D1, D3, D4, E3, I-A3)
Daniel Livingstone (J-A5)
Matthew Lodge (H11)
James Lough (F7, F8)
Paul Le Masurier, *MVA* (A1)
Douglas Medrisch (B6, E4, I-D3, I-D4)
James Millington, *AEAT* (G11)
Chris Nash, *ITS Leeds* (E4)
John O'Neill (G4, G5, G6, G12-G15)
Andrew Nock (D3, D4)
Peter Northfield (H9)
John Polak, *Imperial* (G2)
Jonathan Pugh
Jim Richards (H12)
Carol Smales (E1, E2, F1, F3, H5, H6, H8, I-B1)
Ian Stockman, *Cranfield* (G11)
Iryna Terlecky
Peter Thompson (E5, F5)
Daniel Varey (all J reports)
Mark Wardman, *ITS Leeds* (F4)
Stephen Wolstenholme (I-F1)

Grateful thanks for administrative help to Joanna Watson, Yasmeen Muhammed, Virginia Schoeman, Melanie Beederman, Janet Cater, Una Purnell, Kate Hayward, Liisa Dufton, Colette Lowe (*Jacobs*), Dora Wheeler (*Westminster*), Julie Whitham (*ITS Leeds*), Serena Gulyvasz (*MVA*) and Samina Masood (*AEAT*).

* Unless otherwise specified, all those listed worked for the SRA at the time that they helped with this audit.

Report structure

	Pages
1. Introduction.....	4
2. Research list.....	10
3. Topic summaries	
A. Public attitudes to the railway.....	16
B. Fares and fare regulation.....	22
C. Environmental and sustainability issues.....	26
D. Engineering work, possessions and technical strategy.....	33
E. Lightly used routes and community rail partnerships.....	37
F. Station and train facilities, station access and station land.....	43
G. Performance, punctuality and reliability.....	54
H. Demand, capacity and crowding.....	66
I. Policy, financing and appraisal issues.....	78
J. Freight.....	89

1. Introduction

1.1 Overview

1.1.1 This report outlines the results of an audit of all the research studies commissioned by the Strategic Rail Authority (SRA) during its existence, for the period February 2001 to April 2005. It also includes any studies that were commissioned by its predecessors, OPRAF and the shadow SRA (sSRA), where this material was available. This audit has been undertaken for the Department for Transport (DfT), as required in the DfT's Directions and Guidance relating to the transfer of rail functions from the SRA to the DfT.

1.1.2 As such, *it is not an audit of the entire knowledge base of the SRA*. In particular, it does not cover the range of information and understanding gleaned from its diverse range of regular data collection activities, modelling work, internal assessments, policy discussion and strategy formulation.

1.2 Methodology

1.2.1 The work consisted of a number of stages:

-) Collating all relevant studies, including obtaining both electronic and hard copies (where possible), and clarifying the 'confidentiality' status of each study (as discussed further in section 1.4). Decisions about what constituted 'relevant' studies are discussed further below (1.2.2-1.2.4)
-) Deciding which studies had produced results which were of sufficient generic interest to be relevant to future policy makers (such that a summary of the report could be of value).
-) Obtaining a significant amount of standardised information about each of the studies identified in b), namely: the cost of each study; the start and end dates of each project; the study contractor; the relevant contact person at the SRA who dealt with the study and/or is currently dealing with it; the outputs of the study; and details of what followed from it.
-) Summarising each study, including details of the main objective of the work, any primary research undertaken, the main results, and any implications or conclusions to be drawn from the work (as either highlighted in the final report, or emerging subsequently). In each case, some attempt has been made to put each study into context, based on information from those at the SRA who were most closely involved with it.

1.2.2 In undertaking this review, a number of decisions had to be made about whether reports should be considered 'in scope' for inclusion within a long list of SRA research. In general, reports were only included where they represented *studies done by external contractors, which were primarily commissioned by the SRA*. As such, studies primarily commissioned by other bodies (such as the Department for Transport or the Rail Safety and Standards Board) were excluded. Internal reports and strategy documents produced by the SRA itself were also excluded.

1.2.3 As defined in b), there was then a need to distinguish between those studies which could usefully be summarised for the purposes of this audit, and those which could not. In general,

studies which were primarily about *modelling procedures* have not been summarised since it is assumed that the transfer of modelling expertise will occur in conjunction with the transfer of modelling practice. Studies relating to *geographically specific issues or individual companies* have not been summarised since it is assumed that the transfer of this information will also take place through other mechanisms. In addition, both of these types of study are difficult to summarise in a meaningful way, since the details are often the most valuable part of the documents. *Student projects* have not been summarised since they do not represent core SRA work. In a small minority of cases, there were also reports which have not been summarised because those involved felt that there were *serious flaws* with the content. However, in most cases, studies have not been excluded on quality grounds. Instead, concerns about results have been highlighted in the sections on 'Discussion and future research' in the summaries.

1.2.4 Inevitably, despite setting criteria, there was a need to make study-specific judgements in a number of cases.

1.2.5 In general, it should be noted that the section entitled 'Discussion and future research' of each report summary is often not taken directly from the research study, but includes comments and interpretation of results, made in a broader context.

1.3 Nature of the final output

1.3.1 In the vast majority of cases, a hard copy version of the final report from each study has been obtained, and, where possible, an electronic version. In a few situations, it was not possible to obtain a report copy - for example, where the report was considered highly sensitive, or where the report was simply unavailable because people had left and an old copy could not be retrieved from either the SRA's or the consultant's files. These reports have been retained in the list of studies for completeness, and on the presumption that this list can act as a useful 'road-map' for any SRA studies that are encountered in other contexts. A higher priority was given to obtaining copies of the reports that were summarised during the audit.

1.3.2 In some cases, there were a number of final reports from a study. It appears to be relatively common for the final output of a study to be labelled 'draft final report' when this was actually the final output. In many cases, there were a number of interim, or topic specific reports which fed into the main study, and, in many cases, the SRA holds the relevant spreadsheets and datasets for the work. These have not been compiled for the audit, although the study summaries include details of their existence, where known. Inevitably, for older studies, it was often harder to obtain an electronic copy of any reports.

1.4 Confidentiality and freedom of information

1.4.1 Concerns about confidentiality

1.4.1.1 All those who contributed reports were asked whether they considered the report to be 'confidential', in terms of: "if the DfT wanted to put the report in a publicly accessible library or on a publicly accessible website, would this be OK ?" People varied in their responses to this question.

1.4.1.2 Some studies (including, obviously, all those which had been published), were clearly not confidential.

1.4.1.3 Other studies were clearly considered to be confidential, largely because they contained data relating to the pricing or fares or expenditure or income of private organisations, who had contributed data to the project on the understanding that it would be kept confidential. In some cases, these reports could be made public if a key table or graphic were removed.

1.4.1.4 There were a number of other studies, where the material was not intrinsically confidential, but it was felt that it might be unwise to make it publicly available. In some cases, this was because the sample sizes involved were relatively small, or contextual factors had changed, such that assuming the results could be generalised would be inappropriate. In others, it was because the issue was relatively sensitive, and results could be misinterpreted as being future SRA or DfT policy intentions, or quoted out of context by the media, leading to undesirable outcomes.

1.4.1.5 Where possible, details of confidentiality have been included throughout this report.

1.4.2 Endorsement

1.4.2.1 In general, most of studies commissioned by the SRA have never been published.

1.4.2.2 There are various reasons why the research has never been published. Partly, this is because the work was primarily undertaken for internal purposes. However, it is also the case that the SRA would have been reluctant to publish material that they could not endorse, for fear it would be misinterpreted as the SRA's viewpoint. Even making the decision about whether to endorse material would have constituted a non-trivial amount of work, and/or major rewriting of each study. Undertaking this activity was often not seen as a priority. Hence, it should be noted that:

1.4.2.3 None of the study results or conclusions reported in this audit necessarily represent the views of the SRA. These studies were commissioned as independent pieces of work, and responsibility for their content rests with those who undertook them

1.4.3 Freedom of information and future public release

1.4.3.1 The Freedom of Information Act implies that information can only be withheld where there are clear public interest reasons to do so. Moreover, since most of studies commissioned by the SRA have never been published, a rich research base is being wasted, which could enhance the decision making of all relevant stakeholders. Without making this research public in some form, it is likely that relatively similar studies will be commissioned, leading to unnecessary 're-inventing the wheel'.

1.4.3.2 However, this desire to publish needs to be balanced against concerns about releasing unendorsed material (as described in section 1.4.2), and material which is in some way sensitive, capable of misinterpretation or commercially confidential (as discussed in section 1.4.1).

1.4.3.3 It is a matter for Department for Transport judgement as to what material from this audit should become public.

1.5 Structure of the report

1.5.1 Section 1.6 outlines the main lessons about research management that emerge from the audit. The next part of the report then gives a complete listing of all studies identified during the audit process. These have been grouped into a number of themes. Inevitably, defining themes and categorising work is not straightforward – since studies often fall under different headings. It should be noted that the themes given here often do not directly map onto the current structure of the SRA – which has typically been organised by type of work rather than by policy area. For example, work commissioned by the Strategy, Economics and Appraisal team has been relevant to the majority of themes.

1.5.2 Whilst recognising the difficulties of classification, the final themes chosen were as follows:

- A. Public attitudes to the railway
- B. Fares and fare regulation
- C. Environmental and sustainability issues
- D. Engineering work, possessions and technical strategy
- E. Lightly used routes and community rail partnerships
- F. Station and train facilities, station access and station land
- G. Performance, punctuality and reliability
- H. Demand, capacity and crowding
- I. Policy, financing and appraisal issues
- J. Freight

1.5.3 Following the full list of research studies, summaries of relevant studies are given, in the order of the research study list. Each study summary is usually limited to a page, although, in exceptional cases, additional material is also included on supporting pages.

1.6 Lessons for a future research strategy

1.6.0.1 In completing the research audit, various lessons have emerged about the best ways of managing a research strategy, within an organisation. These lessons are outlined below.

1.6.1 The need for a central filing system and dissemination strategy for research projects

1.6.1.1 It is clear that an organisation like the SRA can generate a substantial amount of research, and that the dissemination and management of this knowledge base is unlikely to be successfully conducted by individuals. For example, if everyone in the SRA responsible for commissioning studies had sent a circular email to the whole organisation every time a piece of research work was completed, this would have generated an unproductive amount of junk mail for disinterested people, and, possibly, an unreasonable number of requests for further information from the sender.

1.6.1.2 Instead, research work needs central management. First, this requires a central repository for research reports. Ideally, this would include:

- a) an intranet site for electronic copies
- b) a library for hard copies
- c) a mechanism for logging projects at the point of commissioning (presumably as part of the intranet site)

- d) the opportunity for those commissioning the work to provide a brief summary of the work, including commentary on the main points, the context and generic relevance of the work (or, alternatively, details of the time and place specific nature of the work).
-) an opportunity to show links between related projects

1.6.1.3 As part of developing a central repository, *all those commissioning reports should be encouraged to get hold of final copies of reports*. (As discussed in section 1.3.2, currently it is common for those involved in commissioning work to be most concerned with receiving the draft final report – which contains the conclusions they have been waiting for – and overlook the ‘tidying up’ activity of making sure that they have the absolute final version).

1.6.1.4 To minimise the work of the sponsoring organisation, activity d) could mainly be completed by the consultant, as part of their project responsibilities. Devising a generic template for this activity would be useful.

1.6.1.5 If a central repository were put in place, this would also enable centralised dissemination of information about research. For example, a monthly email newsletter listing commissioned and completed projects could be circulated.

1.6.2 A mechanism enabling the sponsoring organisation to release studies without needing to endorse the findings

1.6.2.1 As described in section 1.4.2, much research work will never be released if the commissioning organisation feels that they need to endorse the findings, since providing such endorsement is likely to be a non-trivial task, often requiring major reworking of the material, and this will often not be seen as a priority.

1.6.2.2 To overcome this, one solution would be to develop 2 levels of publication – one of which is defined as being ‘official’ publications, and the other of which is clearly identified as non-endorsed by the client. The amount of money spent on research provides a strong justification for ensuring that the results are publicised as widely as possible.

1.6.2.3 Often those involved in commissioning research are unclear whether companies are sensitive about the information they have provided, as it appears in the final form in the report. *All those commissioning research should be encouraged to clarify whether reports contain information which is considered to be commercially confidential*.

1.6.3 A regular ‘audit’ style activity

1.6.3.1 As outlined in section 1.5.1, any attempt to categorise reports (as undertaken in this audit) highlights links between work taking place in ostensibly different areas. Identifying links between different areas of work would provide one justification for carrying out an audit of research work within any organisation on a regular basis – for example, every two years. Inevitably, those working in particular areas may not be aware of synergies with work taking place in other departments. Only some kind of centralised audit process is likely to uncover these. In addition, any system put in place will only ever get updated on a piecemeal and partial basis anyway, and therefore something like a two-yearly check and request for updating would help to ensure that records are properly kept.

1.6.4 Appropriate mechanisms for ensuring that research is accessible

1.6.4.1 In undertaking this audit, it has become clear that identifying research work is not always straightforward. *Consultant name is often the least ambiguous way of identifying a*

study (e.g. the LEK report or the MVA report). Inevitably, there is usually more than one study undertaken by the same consultant – however, consultant name and topic area is usually more helpful than report name in providing precise identification of a piece of work. This is partly because report titles change over the course of the project, or because, internally, the study becomes known by a short name, which never actually appears in the title of the tender documents or final report. Hence, any central database should place emphasis on the name of the consultant, some keywords describing the study, and ideally, enable the inclusion of more than one description in the title field, where this would be helpful.

1.6.4.2 Rail seems to be particularly afflicted by an excess of acronyms – to the extent that reports can be written about an entire subject without the subject acronym ever being spelt out. Examples include the PDFH (Passenger Demand Forecasting Handbook); TSR (Temporary Speed Restrictions); PPM (a rail performance measure); MSCR (a rail spending scenario); etc.. Even though those commissioning the studies may be fully familiar with the terms at the time the work is undertaken, the effort involved in defining these terms is minimal and should be made a requirement for all studies. *i.e. All acronyms used in a report should be defined within the report.* This could be done in the executive summary, introduction or glossary section of a report, or the first time they are used. It is extremely bad practice not to do so. This is partly because acronyms go in and out of vogue, meaning that older acronyms may become impenetrable. It is also because the use of such acronyms (without any explanation) makes the use of such reports impossible by anyone other than those ‘in the know’. Indirectly, this contributes to commentary and consideration of rail remaining the preserve of a small group of rail experts, whilst those involved in consideration of broader transport issues are excluded. Inevitably, this cannot contribute to the aims of ‘integrated transport’.

1.6.5 Sufficient resources for proper research management

1.6.5.1 Proper management of research requires a non trivial amount of time and effort, and is likely to require dedicated staff for its coordination. Hence, any centralised research activity needs to be properly resourced. In addition, those commissioning research should be encouraged to plan for a ‘post research’ phase, which involves ensuring that final reports are properly dealt with.

2. Full list of research studies by theme

The following table lists all studies commissioned by the SRA during its existence, organised by theme.

A	Public attitudes to the railway		
A1	Non passenger survey	MVA	Jan-00
A2	Message development and testing	The Opinion Research Business	Oct-02
A3	Public attitudes towards the railways	The Opinion Research Business / 8hwe	Feb-03
A4	Rail non-users research	The Opinion Research Business	Aug-03
A5	Public attitudes towards the West Coast Mainline upgrade	The Opinion Research Business	Jun-03
A6	Attitudes towards proposed rail strikes amongst British public	The Opinion Research Business	Feb-03
B	Fares and fare regulation		
B1	Modelling fares competition in the passenger railway: feasibility study and three working papers	ITS Leeds and Gibb Transport Planning	Feb-98
B2	Rail fares policy: an evaluation	NERA	May-02
B3	SRA strategic fares model	Jacobs	Feb-03
B4	Research on long term fares elasticities	NERA	Nov-03
B5	Evaluating policy fares regulation options	ITS Leeds	Feb-05
B6	National railcard research	MVA	Mar-05
C	Environmental and sustainability issues		
C1	SRA's environmental agenda	AEA Technology	Aug-01
C2	Rail emissions model	AEA Technology	Nov-01
C3	Sustainable development: The SRA's role in the UK rail industry	Arthur D Little Ltd	Oct-03
C4	Railways and atmospheric pollution – fuel duty and related issues	IEEP	Feb-04
C5	Environmental performance of rail	AEA Technology Environment	Apr-04
C6	Developing a sustainable development strategy for the UK rail industry	Arthur D Little Ltd	Apr-05
C7	Railways and the environment: Towards a strategy for 2005 and beyond	IEEP, IRCG and Open University	May-05
D	Engineering work, possessions and technical strategy		
D1	A stream of work undertaken in collaboration with DfT, including the 'Ariel' project', involving consultancy support on defining the nature of the successor body to Railtrack, and due diligence support for considering the Network Rail bid.	Mercers, KPMG, BAH, Lazard, Linklakers and Jacobs	2002
D2	Interoperability: phase 1 'Conventional interoperability strategy project report' and phase 2 'Guide to conventional interoperability'	LEK	Mar-03

D3	Radical possession strategies	LEK	Jun-03
D4	Demand effects of changed possession patterns	SDG	Mar-04
D5	Process map for upgrade projects. Phase 1 report on signal repositioning and Phase 2 report on generic issues	Lloyds register	Feb-04
D6	A technical strategy for the rail industry	AEAT	May-04
D7	Studies undertaken in relation to ERTMS primarily led by RSSB		
E	Lightly used routes and community rail partnerships		
E1	Options for lightly used routes	Jacobs consultancy	Apr-03
E2	Analysis of strategic scenarios	Jacobs consultancy	Aug-04
E3	Stream of work about network economics and modelling / 'national savings' / service levels	Mercers	2004
E4	Assessing indirect and non-use values from rail transport	ITS Leeds	
E5	Profile of passengers on regional rail routes in England	SRA / Mott McDonald / Accent	Aut.03
E6	Differentiated standards for rural railways	RMS Consulting	Aug-03
E7	Community rail development strategy: Funding strategy pp20-23	Transport Regeneration Ltd	Nov-04
E8	Tunnel profiling survey and route assessment – Ryde Esplanade tunnel	Laser Rail	Mar-05
F	Station and train facilities, station access and station land		
F1	Rolling stock quality improvements and user willingness to pay	ITS Leeds and Oscar Faber	May-97
F2	Evaluating station facilities	Westminster University	Jan-96
F3	Rail passenger quality of service valuations	SDG	Aug-00
F4	Interchange and integration	ITS Leeds	Feb-01
F5	Passenger satisfaction with station infrastructure enhancements	n/a	Ongoing
F6	Bus links	SDG	May-98
F7	Station car parking phase I - scoping	Scott Wilson	Jun-02
F8	Station car parking phase Iia – planning issues	Scott Wilson	Jan-03
F9	London area travel survey (LATS)	MVA / Count On Us	Mar-04
F10	Planning for passenger growth – station development	Sheffield Hallam University	May-02
G	Performance, punctuality and reliability		
G1	A review of British evidence on the valuations of time and service quality	ITS Leeds	Apr-98
G2	The investigation of punctuality and reliability	University of Westminster	Jun-98
G3	Valuation of reliability and punctuality improvements on rail services	MVA	Aug-00
G4	Review of performance regimes	AEAT & Frontier Economics	Sep-99

G5	RADAR project: final report, tables, technical appendix and supplementary report	AEAT	Dec-02
G6	RADAR 2: series of 8 reports	AEAT	Mar-04
G7	Establishing the cost and implications of performance improvement measures - a scoping study	Jacobs consultancy	Nov-03
G8	Performance models review	Mott McDonald	May-04
G9	Performance forecasting	Frontier Economics	n/a
G10	Passenger rail services and economic performance	OXERA/ Motts	Oct-03
G11	Travel reliability and variability by different modes	AEA Technology et al	Mar-04
G12	Analysing the root causes of train delay	Student - K-C Ip, LSE	Sep-02
G13	Weather impacts on railway operations	Student - SMS Leung, LSE	Sep-03
G14	What would be the impact on railway performance if there were no performance improvement schemes ?	Student – K-M Ng, LSE	Sep-03
G15	Growing pains: the relationship between traffic growth, capacity and the average delay of trains	Student - JM Noordewier, Cranfield	1999
H	Demand, capacity and crowding		
H1	Valuation of crowding improvements on rail services	MVA	Jun-00
H2	Review of the crowding policy	OXERA	May-03
H3	Capacity overview	Jacobs consultancy	Aug 04
H4	The SRA's overcrowding policy	Frontier Economics	Jul-04
H5	Passenger demand forecasts and network capacity	WS Atkins	Jun-98
H6	Analysis of passenger rail demand	NERA	Jul-99
H7	Generalised journey time reformulation	ITS Leeds	Nov-03
H8	How do rail passengers respond to change ?	OXERA	Feb-05
H9	Capacity utilisation appraisal guidance	NERA	Feb-03
H10	Capacity utilisation analysis: Development of modelling tools and appraisal guidance (Feb 03) and Model user guide (Mar 03)	Jacobs consultancy	Mar-03
H11	Factors influencing trip mode choice.	TRL	Oct-02
H12	The effects of road congestion on rail demand - phase 1 and 2 studies	SDG	Jul-04
H13	Airport surface access	MVA	1998
H14	High speed line study	Atkins	Feb-03
H15	Commuter flows in London and the wider South East 2001 to 2016/21	Cambridge Econometrics with WSP	Mar-05
H16	London East-West study	sSRA	Nov-00
H17	West Midlands rail capacity review	BAH	Nov-02
H18	Regional Eurostar	BAH	Dec-04
H19	EU 3rd railway package - Passenger liberalisation proposal	LEK	Oct-04

I	Policy, financing and appraisal issues		
IA	Economic framework for rail		
I-A1	Regeneration effects of rail services	NERA/ Simmonds	Mar-03
I-A2	Economic arguments for rail subsidy	UCL	May-04
I-A3	Review of government support for the rail industry	LEK	May-04
IB	Franchise design and TOC competition		
I-B1	Franchise design: research topics	Europe Economics and TSU, Oxford	Mar-99
I-B2	Overview of TOC financial performance	KPMG	Jul-03
I-B3	An analysis of on-track competition between London and Gatwick	ITS Leeds	Apr-98
I-B4	PRAISE reports: Model development (phase 1); application to Hull (phase 2); user notes; inclusion of crowding (phase 3)	ITS Leeds	Jul-03
IC	Rolling stock		
I-C1	Rolling stock leasing and financing options	Europe Economics	Sep-03
I-C2	Indicators of excessive pricing	NERA	Jan-04
I-C3	An analysis of bundling in ex-BR rolling stock	NERA	Jan-04
ID	Appraisal issues		
I-D1	Appraisal methodology for responses to the 1999 assessment of the level of service the network should provide.	MVA and Jacobs	1999
I-D2	Planning criteria: Research requirements	ITS Leeds	Mar-99
I-D3	Distributional analysis in appraisal	ITS Leeds	Apr-04
I-D4	The appraisal of alternative financing/procurement options	NERA	May-04
IE	Employment and staffing		
I-E1	Employment in the rail industry	Warwick University	Sep-02
I-E2	Rail employment survey 2002	RITC Ltd	2003
IF	Disability and accessibility		
I-F1	Study of the disabled person's reporting system	BPRI	May-04
J	Freight		
JA	Appraisal and public benefits of rail freight		
J-A1	The public interest benefits of freight by rail: Report to the Shadow Strategic Rail Authority	Europe Economics	Nov-99
J-A2	Rail freight appraisal methodology development: Initial report and pilot study	Arup	Jan-02
J-A3	Economic case for rail freight and SRA proposals on SLMs	LEK	Jun-02
J-A4	SLM methodology: Research review (phase 1 report) and Revaluation of the marginal cost and revenue impacts of transferring freight from road to rail (phase 2 report)	Arup	Dec-02
J-A5	Use of a capacity constrained highway model to forecast the external effects of rail freight schemes	WSP	Aug-03
J-A6	Methodology for determining freight user benefits	BAH/ITS	Mar-04

JB	Regulation, operating costs and rail freight grants		
J-B1	Freightliner Limited TAG and FFG applications	PWC	Apr-00
J-B2	Freight track access charges	NERA	Summer 01
J-B3	Track access grant policy evaluation	LEK	Mar 02
J-B4	Freight train operating cost audit	Symonds	Mar-04
J-B5	Rail freight grant regime review - Consultation results	Arup	Jan-01
J-B6	Company neutral revenue support (reports on development and review)	MDS + Mouchel	Feb-03
J-B7	Cost of capital for freight grant applications	LEK	Apr-03
J-B8	Freight performance regimes (Phase 1 review)	LEK	May-02
J-B9	Independent validation of SRA use of KPIs for rail freight	Faber Maunsell	Sep-03
JC	International issues for rail freight		
J-C1	Channel tunnel rail link	MDS Transmodal	Jun-01
J-C2	The London International Freight Exchange - Volumes 1, 2 and 3	Nathaniel Litchfield & Partners	Mar-03
J-C3	Channel Tunnel Rail Freight business review : Volumes (I), (II) and (III)	SDG	Oct-03
J-C4	Review of international rail freight	LEK	Apr-04
J-C5	Channel tunnel rail freight: the addressable market	MDS	Nov-04
J-C6	Central railway and the European freight market	Faber Maunsell	Nov-03
JD	Market development for rail freight		
J-D1	sSRA & HA Phase II interchange study	sSRA	Jan-01
J-D2	Freight interchange need study - final report for Phase 1	SDG	Mar-03
J-D3	Innovative solutions in rail based logistics' competition		Oct-02
J-D4	Rail freight value proposition studies (1,2 and 3)	LCP	May-04
JE	Market analysis and demand forecasting for rail freight		
J-E1	sSRA modelling consultation	Radical/Exel	Jun-00
J-E2	GB freight model	MDS Transmodal	Dec-00
J-E3	Freight demand model outputs	SKM	Jan-03
J-E4	Forecast of maritime containers by rail	MDS Transmodal	Feb-03
J-E5	Market studies (see below)		
J-E51	Waste market study	Symonds	Feb-04
J-E52	Iron ore, steel and other metals market study	Symonds	Mar-04
J-E53	Coal market study (phase 1 and 2 reports)	Arup	Mar-04
J-E54	General freight market study - Scoping study and phase 2 report	SDG	Apr-04
J-E55	Petroleum and petroleum products study	Arup	Apr-04
J-E56	Regional aggregate and related product flows (Phase 1, 2 and 3 reports)	Atkins	Jun-04
J-E57	Automotive market study	Symonds	Aug-04
JF	Geographically-specific rail freight reports		
J-F1	London freight routing study	The Railway Consultancy Ltd	May-00
J-F2	Transpennine market assessment	MDS	Dec-00

J-F3	Willesden - Gospel Oak - Barking, W9 & W10 gauge enhancement feasibility report	Network rail	May-03
J-F4	Willesden - Gospel Oak - Barking, timetabling and operational planning report	Network rail	May-03
J-F5	Regional freight strategies, London and the South East	Atkins	Jun-03
J-F6	An analysis of rail freight, London and the South East	SRA data report	n/a
J-F7	Appraisal of Shell Haven - timetable analysis report	Network Rail	Aug-03
J-F8	London Gateway Port - technical study final report	Nichols Group	Jul-04
J-F9	Performance impact analysis: Joan Croft Junction to Hambleton Junction	Mike Scott (transport consultant)	Nov-04

A1. Non passenger survey	
Status	Not confidential
SRA contact	Rebecca Davies, Strategy, Economics and Appraisal.
Contractor	MVA
Project start date	October 1999
Project completion	January 2000
Cost	n/a
Publications	Unpublished final report, 32pp plus appendices. Hard and soft copy obtained.
Follow-up	n/a
<p><i>Objectives:</i> The study aimed to assess and quantify car users’ perceptions of the railway, their reasons for non-use and their priorities for improvements. It was designed to complement the National Passenger Survey.</p> <p><i>Description and main results:</i> The study involved 2074 interviews with car drivers and passengers, undertaken at motorway service stations and town centre car parks. The study found:</p> <ul style="list-style-type: none"> • Only 7% of those interviewed actively considered rail when planning their journey. • 43% of all respondents believed that they could have made their trip by rail. 19% of car travellers felt that nothing would persuade them to travel by train. The remainder felt that services were impractical or infeasible. • Aspects referred to as requiring most attention were: improvements in interchanging and more direct trains (14%); the need for more convenient and better stations (14%) and cheaper fares (12%). • In general, car travellers perceived the quality of rail to be worse than existing rail passengers perceived it to be. • The most significant factors which would encourage more people to travel by train were: cheaper fares (ranked in the top 3 by 77% of the sample); better connections (48%), more reliable and punctual services (44%) and more frequent services (43%). Other factors mentioned included better on-board comfort and cleanliness, improved train safety, better information, improved personal safety and more local stations. <p><i>Discussion and future research:</i> The researchers highlighted that less than 1 in 10 car users currently considered rail when planning journeys made by car, even though rail was considered possible for nearly half of those journeys. Moreover, they argued that addressing the priorities of non-passengers could be instrumental in encouraging many more people to travel by rail.</p>	

A2. Message development and testing	
Status	Not confidential
SRA contact	Ceri Evans, Communications.
Contractor	Johnny Head, The Opinion Research Business
Project start date	October 2002
Project completion	October 2002
Cost	£28,500 exc. VAT
Publications	SRA formatted powerpoint presentation – 16 slides. Hard and soft copy obtained.
Follow-up	This work was used as the basis for the quantitative ‘public attitudes towards the railways’ study (c.f. A3).
<p>Objectives: This research aimed to provide general insights into the attitudes of rail users, using qualitative techniques.</p> <p>Description and main results: Ten focus groups of rail users were undertaken in Croydon, Birmingham, Edinburgh, Newcastle and Winchester in October 2002, (i.e. 2 in each location). The study found that the public were generally fairly tolerant towards the railways. They had low expectations of improvement, but high aspirations in terms of what they would like to see. New rolling stock was seen as the clearest indication that ‘things are getting better’. Key concerns related to unreliability, cleanliness, safety, personal security, infrequency of trains, overcrowding (and a lack of seats) and poor communications (in terms of platform switches, cancellations and staff attitudes). There was a sense of feeling used, because of being a captive audience, and of wanting to be ‘treated as a customer’. The public were not interested in who owned the railways, but there were concerns about lack of accountability – in particular, the industry was seen as fragmented and failing to acknowledge that there were problems to be addressed. It was felt that it could still become more ‘business-like’ in terms of efficiency and quality. In general, customers wanted small measurable improvements, rather than grand promises, such as cleaner trains, an extra carriage on a commuter train, new rolling stock, manned stations, better communications, courteous staff etc.. The majority accepted that the industry should be allowed to make money, providing the profits were put back into the industry and a good service was provided. This finding was confirmed in a quantitative survey of 1,000 UK-representative adults. The presentation also reported on findings of a Weekend Omnibus survey, also undertaken in October 2002, in which only 28% of adults reported that they had heard about franchising in the previous week.</p> <p>Discussion and future research: The next stages of work were seen as being - to quantify findings; to segment users into different groups; to define users as one of four groups as part of applying the ‘Ratchet’ assessment technique; and to track changes in attitudes over time. This led on to the larger, quantitative study of ‘Public attitudes towards the railways’, (described in reference A3).</p>	

A3. Public attitudes towards the railways	
Status	Not confidential
SRA contact	Ceri Evans, Communications.
Contractor	Johnny Head, Opinion Research Business & Justin McLaren, 8hwe
Project start date	January 2003
Project completion	February 2003
Cost	£65,000 exc. VAT
Publications	SRA formatted powerpoint presentation – 68 slides. Hard and soft copy obtained.
Follow-up	The study provided insights which helped to inform communications strategy, franchising specifications and rolling stock procurement.
<p>Objectives: The study aimed to assess the attitudes of rail users to the railways, and to provide a benchmark for future assessments. In particular, 7 key passenger groups were identified, to help highlight particular concerns, and to enable application of the ‘Ratchet’ approach – a way of measuring change.</p> <p>Description and main results: The study involved 2,007 face-to-face interviews with British rail users in January 2003. Key issues raised were:</p> <ul style="list-style-type: none"> • Reliability: Unreliability was the top reason given by those who thought the railways had got worse; (75% mentioned it). Meanwhile, better punctuality was the top reason given for thinking things had improved. • Getting a seat: 37% of those getting a seat had a positive opinion of the railways, compared with 25% of those who only sometimes/rarely did, and 64% agreed that if they got a seat, their trip was usually comfortable. • Price: After reliability, fares were seen as the most importance issue for the railways to address (rated the ‘top’ issue by 33% of respondents). • Cleanliness: After punctuality, cleanliness was seen as the second most important indicator of improvement by those who felt trains had improved. • Safety: Safety was seen as the third priority area to address. <p>Overall, about half of respondents felt the railways had stayed the same in the past 5 years, with roughly similar proportions feeling it had got better or worse. A third felt that they were treated better in the supermarket than on the trains.</p> <p>Factor analysis was then used to identify groups of responses. Three major factors emerged as determining passengers’ views. These were: their experiences of rail, their evaluation of the industry, and their opinions about proposed changes. Cluster analysis was used to identify 7 distinct market segments. Two groups were identified as being potential ‘quick wins’: Designer Label Neutrals (younger passengers from the SE with a positive attitude to life who would appreciate newer trains) and Delia Advocates (middle-class, play-it-safe passengers likely to be impressed by cleaner trains and improved rail industry accountability). 2 other groups were identified as being important not to overlook in the longer term.</p> <p>Discussion and future research: The findings were originally intended to feed into a local media campaign. The study also defined a shorter questionnaire that could be used to track changes in attitudes in the future.</p>	

A4. Rail non-users research	
Status	Not confidential
SRA contact	Ceri Evans, Communications.
Contractor	Johnny Head, The Opinion Research Business
Project start date	August 2003
Project completion	August 2003
Cost	£24,750 exc. VAT
Publications	SRA formatted powerpoint presentation – 13 slides. Hard and soft copy obtained.
Follow-up	The results fed into an 8 week public information campaign about the railways, run in 10 local newspapers across the country in Autumn 03.

Objectives: This study examined the importance of railways as an election issue to voters who did not use them; the perceptions of this group about the railway and the ways in which railways could be marketed to them.

Description and main results: The research involved 3 pairs of focus groups, undertaken in Chester, Oxford and Winchester, 19-21 August 2003, divided by participant’s level of interest in ‘the state of public transport today’. All respondents had voted in the last election and taken a maximum of 1 train journey in the previous year.

Health and education were seen as the biggest issues, with the perception that, in the last 5 years, education had marginally improved, whilst the health service had got worse (partly due to excessive bureaucracy). The debate on asylum was also raised. For transport, the groups were particularly concerned about speed cameras and the price of fuel. The main railway issue was seen as being an over-concentration of commuters on badly-run trains in the SE. The researchers concluded that rail issues would largely be irrelevant to the voting of non-users. Few people believed the railway to be a national asset (unlike the NHS), but nor was it seen as a disgrace. Key issues of concern were: price (compared to petrol costs and a dislike of having to book in advance to get cheaper fares); lack of reliability/difficulty of making connections; cleanliness; personal safety and the lack of a guaranteed seat. People were unclear whether responsibility for the state of the railways rested with the Government or the TOCs. Negative people often made comparisons with positive European experiences. Meanwhile, probing highlighted that those who had used UK trains (reluctantly) admitted that they had taken a journey at some point that was ‘actually rather good’. In terms of railway advertising, many people felt that it was irrelevant to them. Making historical comparisons was also seen as irrelevant. Being informed that “£10.5m of taxpayers money per day is invested in the railways” led to shock (rather than a positive response about the amount of investment). Instead, people wanted to know about cleanliness; security; prices; how to get reliable information about fares; information about action on leaves on the line; and details of year-on-year improvements. Dismissing the idea that European trains are better, and regionalising text were also recommended for future advertising.

Discussion and future research: The study recommended approx. 15 possible advertising statements which might be expected to influence non-users.

A4. continued: Rail non-users research

Recommended advertising messages

- Each day we have *xx* engineers working on the railways.
- Comparisons with European trains - frequency, punctuality, cost?
- In the last 5 years, we have installed *xx* CCTV cameras on trains in a bid to tackle anti-social behaviour.
- 97% of pre-booked train tickets guarantee a seat.
- It does not cost anything to guarantee a seat on a train if you book in advance.
- The average length of time it takes to drive from *x* to *x* is ----- . The average journey on a train is -----.
- Our new rolling stock is cleaner, better lit and air conditioned so you feel safer and more comfortable.
- For every £ of taxpayers money that is invested in the railways, £*xx* of private investment takes place.
- In Germany, 9,000 passenger trains run per day. 18,000 run a day in Britain.
- Book in advance and train journeys are up to 70% cheaper.
- Last year, the investment in freight will mean that 1.6million lorry journeys will be removed from our roads.
- 513 new trains entered service between 1st April 2002 and 28 February 2003.
- Since privatisation, more than 4,200 new vehicles have been ordered.

A5. Public attitudes towards the WCML upgrade	
Status	Not confidential
SRA contact	Ceri Evans, Communications.
Contractor	Johnny Head, The Opinion Research Business
Project start date	June 2003
Project completion	June 2003
Cost	£14,500 exc. VAT
Publications	SRA formatted powerpoint presentation – 17 slides. Hard and soft copy obtained.
Follow-up	None
<p>Objectives: The study aimed to assess public attitudes to the closure of part of the West Coast Main Line for upgrading work, in order to inform SRA and Network Rail about the attitudes of tax payers and other stakeholders to the project.</p> <p>Description and main results: 1003 members of the public were selected randomly from the Stoke-on-Trent and Macclesfield areas, and interviewed 11-15th June 2003. Of these, relatively few (5-6%) <i>often</i> used the train, with slightly more <i>occasional</i> usage of the local trains than the Inter-City network (38% vs 29%). However, about 70% were aware of the rail work taking place, and 47% specifically knew that the line was closed. The most frequently mentioned information source was the local press (52% mentioned), followed by television (38%), radio (38%) and friends/family discussion (37%). 53% reported that they felt quite or very well informed about the project. Support for the work was generally high. In particular:</p> <ul style="list-style-type: none"> • Only 17% thought there would be no benefit – with the majority expecting faster journeys, newer trains, better reliability or more frequent services. • At least 69% thought there would be benefits for all groups, inc. Inter-City users, local rail users, the train operating companies and local businesses. • Only 16% felt that the project was a waste of money. 85% felt that ‘the extra hassle involved will be worth it in the long run’. • Overall, 81% said that they supported the project and the way it was being handled, with only 8% opposing. <p>75% of respondents felt unaffected by the closure and at least 78% felt that the project would make no difference to their future behaviour. However, 21% thought that they would use the local rail network more, and 18% felt that they would use the Inter-City network more. Of those affected by the closure, 11% were now driving and 11% were still using railway options. Of the latter, 47% reported that it was working out better than hoped, whilst 26% felt it was worse. Those who felt better informed were more positive about their current journey.</p> <p>Discussion and future research: The findings indicated high levels of public support for upgrading the rail network. Better information is likely to increase the tolerance of existing rail users to disruption. Knowing that upgrading has taken place may not be enough to stimulate the majority to use the railways more, and additional measures may be needed to capitalise on the benefits of infrastructure improvements.</p>	

B2. Rail fares policy: an evaluation	
Status	Main report confidential given the inclusion of company specific information. The summary was published (see below)
SRA contacts	Paula Crofts and Tabitha Jay, Policy
Contractor	NERA
Project start date	November 2001
Project completion	May 2002
Cost	£80,000
Publications	Main report confidential, 97pp. Executive summary printed as Appendix D of the SRA's consultation on 'Future fares policy'. Hard copy only obtained.
Follow-up	The study led onto the development of a Strategic Fares Model, culminating in the Fares Review consultation and revised Fares Policy (June 2003). For regulated fares, increases of RPI+1% were then permitted from January 2004.

Objectives: The study aimed to review rail fares policy since privatisation.

Description and main results: At privatisation, fare regulation was put in place for: a basket of fares on London, Edinburgh and Cardiff commuting services; all standard weekly season tickets; and, on other services, all saver tickets, or standard return fares where there were no saver tickets in place. These fares were required to increase initially at, and then below, the Retail Price Index (RPI). This regime was integrated with the London Travelcard regime, which required fares to rise at or above the RPI. For London services, the Fare Incentive Adjustment Payment (FIAP) also applied.

Overall, the study argued that regulation had been socially desirable - preventing fare rises and thereby helping to boost rail growth. A counterfactual scenario without such regulation suggested that the TOCs would otherwise have increased fares, reducing the required public subsidy but resulting in substantial increases in road congestion. However, several problems were identified:

- Lack of Intercity fares regulation had resulted in real increases in standard fares of about 16% in the 5 years after privatisation. Contrary to expectations, price increases had not been moderated by competition. The report argued that, to address concerns about fare levels, current legislation was inadequate and only further regulation would be effective.
- Regulation of saver tickets had limited the ability of TOCs to use fares to address overcrowding issues on some evening and weekend services.
- The different regime for London Travelcards was resulting in undesirable price distortions on services run by TOCs which served London.
- The FIAP was not proving to be an effective mechanism for compensating passengers receiving a poor service.

It was also noted that the new 1998 White Paper put considerable emphasis on developing a clearer, more comprehensible national fare structure.

Discussion and future research: The results implied that some regulation should remain and that greater regulation of Intercity fares could be desirable. They also suggested that altering Saver ticket regulation should be considered, albeit with the recognition that this regulation was currently the only mechanism constraining Intercity fares.

B4. Research on long term fare elasticities	
Status	Not confidential
SRA contact	Preetum Domah, Strategy, Economics and Appraisal
Contractor	NERA
Project start date	July 2003
Project completion	November 2003
Cost	£100,000 inc. VAT
Publications	Final unpublished report, 73pp + appendices. NERA have submitted a paper on the results to the Journal of Transport Economics and Policy. Hard and soft copy obtained.
Follow-up	The study fed into the 2004 updating of the PDFH, undertaken by ITS, Leeds. The new version of the PDFH is still being finalised. The study also led to new research by the PDF Council (inc. the SRA) on lagged demand responses to changes in fares and other travel attributes.
<p>Objectives: The study aimed to derive an independent set of long-term passenger rail fare elasticities, in order to assess the robustness of those given in Passenger Demand Forecasting Handbook (PDFH), and to clarify whether PDFH values represented adjustments occurring within one year (as claimed).</p> <p>Description and main results: The CAPRI database provided the main input data, which needed substantial cleaning before use. The study found that 92-99% of demand changes in response to new fares occurred within the first year. The study argued that, for financial planning, values for shorter time periods would be useful. Study values compared with PDFH values as follows.</p> <ul style="list-style-type: none"> • Long distance travel inc. the London Travelcard Area: -0.64 vs -0.9 to -1.0 • Non-London long distance travel: -0.82 vs -0.92 to -0.98 • London Travelcard Area and the South East: -0.62 vs -0.3 to -0.72 • Non-London short distance travel: -0.95 vs -0.35 to -1.0 <p>There was considered to be significant discrepancy between values for the first category and, to a lesser extent, the second category. Specifically, the study found that long distance travel was <i>less</i> sensitive to fare changes than the PDFH assumed. The study also looked at elasticities for different ticket types. These disaggregate values were considered to be less reliable, but indicated some potentially important discrepancies with the PDFH, as follows:</p> <ul style="list-style-type: none"> • For non-London long distance travel, demand for First and Standard class tickets was considerably more sensitive to fare changes than demand for reduced/restricted tickets. The PDFH did not include this distinction. • For short distance travel in London and the South East, demand for season tickets was more sensitive to fare changes than demand for other types of tickets. The PDFH assumed the opposite. <p>Finally, with the exception of adding the new distinction suggested above, it was argued that a number of the PDFH disaggregations should be simplified.</p> <p>Discussion and future research: The study made a number of recommendations for changes to the PDFH. It also argued that the purpose of the PDFH needed reviewing; and that, if it was still considered to be useful, a regular updating procedure should be introduced.</p>	

B5. Evaluating policy fares regulation options	
Status	Main report confidential.
SRA contact	Elliott Ball and Tabitha Jay, Policy
Contractor	Gerard Whelan et al, ITS Leeds
Project start date	March 2004
Project completion	February 2005
Cost	£110,000
Publications	Unpublished final report. Hard and soft copy obtained.
Follow-up	The study is feeding in to the 2006 fares review. It follows on from previous work by NERA in 2002.
<p>Objectives: The aim of the study was to assess the impact of changing fares regulation, and to provide an economic framework for fares setting.</p> <p>Description and main results: The study consisted of a review of price setting in other contexts; 4 interviews with industry representatives; 5 focus groups with train passengers; and a revealed and stated preference questionnaire survey of 2238 passengers across 14 different rail flows.</p> <p>The study found that industries were subject to different degrees of regulation. For price setting, the telecoms industry was notable for developing multi-part pricing regimes and the air industry was notable for developing booking and yield management systems. In the rail industry, most train operating companies wanted more freedom to set their own fares, partly in order to manage overcrowding at key times. Train passengers were particularly concerned about restrictions on the return leg of a journey, and crowding (especially on shorter journeys). They were generally positive about smartcard technology. Unsurprisingly, business travellers were the least flexible and leisure travellers were the most flexible in terms of their travel arrangements.</p> <p>The data from the study were input to a model, leading to the conclusions that:</p> <ul style="list-style-type: none"> • For short distance fares, there was no economic gain from increasing fares, the most efficient regulatory mechanism was a basket of fares (defined as widely as possible), and less regulation would lead to a simpler system, with 1 peak and 1 off-peak product, but a greater price difference between the two. However, it was noted that big increases in peak period tickets would represent a failure to protect commuters, and could increase road traffic. • For long distance fares, it was argued that the most efficient regulatory mechanism was also a basket of fares, that regulation was desirable, and that fare increases should be capped at +2%. The model results suggested that, without regulation, tickets would also be simplified to 2 ticket types - cheaper Saver tickets and more expensive Standard Open tickets. <p>Discussion and future research: The report includes its own concerns about the validity of the results, since the long distance fares changes suggested by the model could be implemented now (but have not been). The conclusion that, without regulation, Saver fares would reduce is also inconsistent with previous work (c.f. study B2) suggesting that many operators would like to increase saver fares.</p>	

B6. National railcard research	
Status	Not confidential
SRA contacts	Preetum Domah / Douglas Medrisch, Strategy, Economics and Appraisal.
Contractor	MVA
Project start date	August 2004
Project completion	March 2005
Cost	£70,000
Publications	Unpublished report (37pp). Hard and soft copy obtained.
Follow-up	The study resulted from a commitment to explore the issue made in the 2003 Fares Review. It is feeding in to the May 2005 Fares Review.
<p>Objectives: The study aimed to assess the viability of introducing a national railcard, and the form that such a card might take.</p> <p>Description and main results: The study involved 2,690 interviews with passengers on trains to assess their typical frequency of rail travel, with 737 passengers identified as being eligible for a national railcard. These 737 were asked about the attraction of a 30% card costing £50. 57 follow-up interviews further explored passenger opinions on different types of railcard and likely increases in travel as a result. Notably, 36% of the 737 eligible passengers reported that they made other off-peak trips that could have been made by rail – for 70% of these, price had acted as the main deterrent to choosing rail. Subsequent assessment was based on a modelling approach, where the likelihood of buying a railcard was based upon whether passengers would benefit financially, given their current trip behaviour; and trip generation was based on fare elasticities derived from the interview work (with the inclusion of a trip suppression factor to allow for overcrowding). The model examined a series of scenarios, involving different railcard prices, levels of discount and types of railcard restriction, calculating increases/decreases in revenue for the industry and the financial costs/savings for the consumer (counting 50% of fare savings on newly generated travel as being ‘savings’). The study found that consumers benefited most where discounts offered were higher, and the restrictions were less. Conversely, the industry benefited more where there were more restrictions. The study concluded that the most favourable option might be a £25 card offering a 20% discount, that was only valid for fares costing more than £20 (excluding morning peak and APEX tickets) <i>or</i> that was only valid on off-peak fares (excluding APEX tickets). Both of these options were predicted to increase industry revenues by at least £7 million, and consumer benefits by at least £14 million. Meanwhile, the researchers highlighted that their analysis was dependent on a number of assumptions, and that changing those assumptions could alter the conclusions. In particular, the elasticities used were relatively conservative, and using higher elasticity values would make a wider range of railcard options attractive.</p> <p>Discussion and future research: The study recommended that further research should be undertaken, targeted at the specific railcard proposed.</p>	

C1. SRA’s environmental agenda	
Status	Not confidential (but not released previously)
SRA contact	Jane Cornthwaite, later Steve Atkins, Planning
Contractor	Paul Watkiss and Rick Jones, AEA Technology Environment
Project start date	Early 2001
Project completion	December 2001
Cost	unknown
Publications	Final unpublished report (69pp) plus appendices. Hard copy only obtained.
Follow-up	A number of subsequent studies were commissioned – specifically studies C2-C5.
<p>Objectives: The study aimed to set out the scope the SRA’s environmental agenda, in terms of evaluating the current environmental performance of rail; comparing the performance of rail with that of other modes; assessing the environmental implications of the 10 year plan targets; and identifying how the SRA could help improve rail’s environmental performance.</p> <p>Description and main results: The study identified the main environmental issues for rail as being climate change, local air quality, noise and a historic legacy of contaminated land. Other relevant issues included water and land pollution, land-take, bio-diversity, landscape and townscape, although these were found to be well controlled via existing legislation and good practice. The study found that rail had environmental advantages over road passenger and freight transport, but that these advantages were diminishing over time. Moreover, technology improvements could eventually result in road transport ‘leapfrogging’ rail, given the relatively long service times of rail vehicles compared with road vehicles, if environmental considerations were not built into purchasing practice soon. The 10 year plan targets for increases in rail use were estimated to increase the environmental impacts of the rail industry, and the study argued that noise problems could eventually act as a constraint on expansion (given national and international commitments). It was noted that the SRA’s responsibility for addressing environmental problems was unclear, but that they were in a unique position to take action. Some of the ‘top level’ actions identified for consideration were as follows:</p> <ul style="list-style-type: none"> • The SRA should develop an environmental policy, in the context of its sustainability agenda. • The rail industry should be encouraged to increase its environmental reporting (which was less well-developed than in other sectors) • The ‘environmental cost’ values developed in the study comparing road and rail should be used more widely, to help drive take-up of specific measures. <p>The report also identified a series of specific measures that should be considered further in order to directly reduce rail environmental impacts.</p> <p>Discussion and future research: The study informed the SRA position on environmental and sustainability issues, and contributed to engagement with the Railway Forum’s Sustainable Development group. Arguably, there is still a need to develop national strategy on environmental and sustainability issues for the rail industry, and this could be usefully pursued in the future.</p>	

C3. Sustainable development: The SRA's role in the UK rail industry	
Status	In the Appendix 1 table of the main report, the 'Allocation' column contains commercially confidential information. If this was removed, the report could be made public.
SRA contact	Jonathan Ellis, Technical
Contractor	Arthur D Little
Project start date	Spring 2003
Project completion	October 2003
Cost	£25,000
Publications	Unpublished 21pp report plus 16pp Appendix. Hard and soft copy obtained.
Follow-up	The report led to a paper on environmental issues being submitted to the Board by the Technical and Planning teams, resulting in a small allocation of staff time to environmental issues. It also led to further research (c.f. studies C4 and C5)
<p>Objectives: The study aimed to identify how the SRA could best provide leadership to enable the industry to achieve more sustainable development.</p> <p>Description and main results: The study concluded both that rail has environmental advantages which it should capitalise on, and, also, that there were a number of measures that the industry could and should be taking in relation to the environment. Whilst some companies (including Network Rail, Carillion and EWS) were identified as having undertaken some environmental initiatives, the overall conclusion was that there was insufficient investment taking place to meet forthcoming costs. For example, it was highlighted that:</p> <ul style="list-style-type: none"> • Compliance with the EU Noise Directive could cost the industry >£1billion over the next 10 years. • Oil Storage Regulations had already cost Network Rail £98 million. • The EU Directive on 'Diesel Emissions from Non-Road Mobile Machinery' could cost the industry £100million-£1billion in the next 10 years. • National Express Group had estimated that the Climate Change Levy would add £3million p.a. to their costs if applied to traction energy. <p>The study also noted that it was rare for the rail industry to publish annual environmental reports, although >50% of the top 250 FTSE companies do so.</p> <p>Discussion and future research: It was recommended that the SRA should develop an Environmental Action Plan, in order to:</p> <ul style="list-style-type: none"> • Monitor forthcoming legislation, solicit stakeholder views (inc. discussing costs with DEFRA and the Treasury) and lobby in the UK and Europe. • Develop an industry view on investment for meeting forthcoming requirements and developing more environmentally friendly technologies. • Embed environmental requirements into franchise agreements. • Support research on the impacts of rail and new technologies, and how rail compares with other modes in terms of environmental performance. • Promote the design and application of Group Environmental Standards. • Develop a long term vision for rail environmental management. 	

C4. Railways and atmospheric pollution: Fuel duty and related issues	
Status	Not confidential
SRA contact	Stephen Atkins and Caroline Hughes, Planning
Contractor	IIEP
Project start date	December 2003
Project completion	March 2004
Cost	£11,315.25 (inc. VAT)
Publications	Draft paper produced for experts seminar in January 2004, leading to a final, 22pp discussion paper in February 2004. This was used as background briefing for the rail industry diesel working group, and a 'Technical Summit' on low sulphur diesel held in May 2004. Hard and soft copy of the final paper obtained.
Follow-up	No follow up work commissioned, but the report listed a number of issues for further investigation. Forthcoming work on fuel cells by National Express was highlighted as being of particular interest.
<p>Objectives: The paper provided a background briefing on reducing atmospheric pollution from the rail industry. It was partly prompted by concerns about rail's environmental credentials which might undermine its credibility in the future, (with particular worries about high emissions of NO_x, SO₂ and particulates around rail termini on diesel lines). It also followed a recent increase in red diesel taxation, costing the rail industry around £10 million, which the Treasury defended on the basis that it was part of a long term strategy to encourage the use of lower sulphur diesel.</p> <p>Description and main results: The paper highlighted that the best way to reduce rail emissions would be to replace diesel with electric engines, but that this was considered too expensive. Fuel cells could also deliver major reductions and, although it could be a number of years before they become feasible, they need early consideration given the longevity of rolling stock. Meanwhile, emissions from diesel engines would potentially be conditioned by: 2008 EU legislation reducing the acceptable sulphur content of diesel fuel; EU legislation on emission levels from new rail vehicles (coming into force between 2005 and 2010); and future taxation of rail fuel. In this context, the report reviewed a number of different ways of reducing emissions from diesel engines. It concluded that most measures to reduce emissions would be expensive, and require significant financial incentives for the rail industry to introduce them. In particular, in relation to fuel duty, it concluded that the differential cost of different fuels needed to be substantial to generate investment in alternative technology, and until this investment took place, duty increases would simply increase the costs of rail operations.</p> <p>Discussion and future research: The future inclusion of rail in a UK or EU carbon emissions trading scheme might provide new incentives and funding to reduce emissions. Logically, rail environmental performance should also be compared with air transport, not simply road transport, and Treasury policy should treat the modes consistently.</p>	

C4. continued

Railways and atmospheric pollution: Fuel duty and related issues

Technical solutions:

The report identified various technical solutions which might help to reduce atmospheric pollution from diesel engines, as well as identifying a number of uncertainties about their viability and importance. These were as follows:

- Remove the most environmentally damaging vehicles from the vehicle fleet
- Encourage the early development of new, lower emission vehicles (in advance of EU legislation)
- Improve repair and maintenance for existing engines
- Fit particulate traps to existing engines
- Encourage take-up of lower sulphur fuels, with the expectation that technical problems will be less than expected (c.f. Swedish experience)
- Monitor and assess fuel consumption (to reduce waste)
- Undertake driver training (to encourage more efficient driving styles)
- Introduce hybrid engines for shunters and some other specialist vehicles (c.f. Canadian experience)
- Encourage consideration of fuel cells as part of future planning

It argued that there were unlikely to be major emissions benefits from upgrading to the current generation of 'new' diesel trains (since these tend to be heavier and use more on-board power); or from encouraging the use of hybrid engines for all vehicles; or from the use of biodiesel and other alternative fuels.

Approaches to encourage change:

The report argued that, strategically, it might make sense to await the arrival of fuel cells, since this could bring about a 'step change' in environmental performance. However, the uncertainties associated with fuel cells, and the longevity of rolling stock, make this a relatively unattractive option. Other potential methods of encouraging change were as follows:

- Differential fuel duties – but only if the duty rebate on lower sulphur diesel was at least 2.5p/litre. (Arguably, a lower initial rebate might still act as a signal for future changes, although, in the short term, it would simply increase the cost of running the railways).
- Grants for retrofitting and maintaining existing stock (possibly via an extension of the remit of the Energy Savings Trust).
- Creating a register of equipment that meets current and forthcoming emissions standards (possibly to be managed by the Energy Savings Trust).
- Reform of the Freight Facilities Grant, so that meeting environmental requirements would become one condition for receiving certain types of funding.
- Differential track access charges depending on engine performance.
- A 'selective scrappage' programme to remove the worst polluters.
- Extension of Enhanced Capital Allowances to include 'greener' trains.
- The development of 'soft measures' like driver training (possibly as an extension of the Energy Savings Trust programme for road vehicles).
- The introduction of rail vehicle 'MOT's (as under consideration by the EU).

The report argued that environmental labelling of locomotives (as required by EU legislation) was unlikely to make much difference to industry investment decisions.

C4. continued

Railways and atmospheric pollution: Fuel duty and related issues

Data issues:

The report identified a number of issues as being worthy of further investigation (including drawing from overseas experience). These included:

- Measurement of emissions from vehicles whilst in use, and how these vary during the course of a journey
- Clarification about whether new EU fuel standards would apply to rail diesel.
- Clarification about how new vehicles would be tested for compliance with new EU standards.
- How levels of maintenance of rail vehicles affect emissions.
- Experience of introducing lower sulphur diesel in rail (particularly in relation to concerns about reduced lubricity or shrinkage of oil seals).
- Cost-benefit analysis of different technical options for reducing emissions.
- How subsidies in the road sector, including Enhanced Capital Allowances for lower emission vehicles, could be transferred to the rail industry.
- Whether the Freight Facilities Grant, or track charges, could be altered in favour of vehicles with lower emissions.
- The potential for soft measures to improve environmental performance
- EU thinking about rail vehicle 'MOT's.

C6. Developing a sustainable development strategy for the UK rail industry	
Status	Not confidential.
SRA contact	Jonathan Ellis, Technical
Contractor	Arthur D Little
Project start date	Spring 2005
Project completion	April 2005
Cost	n/a
Publications	Unpublished 45pp report including 8pp appendix. Hard and soft copy obtained.
Follow-up	The report is a heritage document intended to assist DfT Rail in developing its sustainable development strategy.
<p>Objectives: The study aimed to provide suggestions on how the new Department for Transport Rail group (DfT Rail) could best develop a sustainable development strategy for the rail industry.</p> <p>Description and main results: The study built on previous work completed for the SRA (c.f. study C3). It set out ideas on how DfT Rail should set about developing a sustainable development (SD) strategy for the rail industry. Steps recommended include:</p> <ul style="list-style-type: none"> • Establishing a cross-industry working group. • Drafting a UK SD rail policy. • Consulting key stakeholders about UK SD rail policy • Publishing a draft of the UK SD rail policy for widespread consultation • Establishing a management process for implementing the UK SD rail policy, incorporating regional action plans • Reviewing the implementation and reporting progress on the UK SD rail policy. <p>Discussion: The report drew heavily on previous ADL Report (C3). It identified environmental stewardship issues on emissions, pollution, noise, vibration, biodiversity, etc.. Identified social responsibility issues included safety, security, social inclusion, congestion and urban regeneration. Identified economic prosperity issues included subsidy, investment, regional economic development, logistics and employment. Proposals relating to environmental issues are considered in considerably more depth in study C7.</p>	

C7. Railways and the environment: Towards a strategy for 2005 and beyond	
Status	Not confidential
SRA contacts	Jonathan Ellis, Technical
Contractor	Institute for European Environmental Policy, together with Independent Rail Consultancy Group and Open University
Project start date	Early 2005
Project completion	May 2005
Cost	n/a
Publications	Final report, 60pp. Hard and soft copy obtained.
Follow-up	The report effectively constitutes a legacy document, to enable environmental policy to be taken forward by DfT Rail.
<p>Objectives: The report was commissioned to set out the priorities for a future environmental policy for rail. This was seen as important, given that the new Department for Transport Rail group (DfT Rail) is expected to have increased resources for addressing the environmental issues of the rail industry.</p> <p>Description and main results: The study included expert input from the research team, literature review, interviews and discussion with the SRA. It looked at a number of environmental issues in turn, namely emissions of regulated pollutants; emissions of climate impacting gases; noise and vibration; waste and resource use (including litter, landfill and aggregates extraction); habitats and biodiversity; contaminated land and hazardous substances (PCBs, fuel storage); water pollution; light pollution; and electromagnetic pollution. The study also examined a number of wider issues, including – ways of funding environmental issues; the importance of the EU Directive on strategic environmental assessment; and the potential impacts of road user charging. Third, it highlighted some strategic policy issues for consideration, including – different forms of power supply (including electrification, renewable electricity and fuel cells); the role of rail within an integrated transport system (and key issues for ensuring that modal shift leads to maximised benefits); and issues relating to creating more capacity on the railways. Finally, the report focused some key issues as part of practically encouraging better environmental practice, as outlined below.</p> <p>Discussion and future research: As part of trying to improve environmental practice, the report recommended:</p> <ul style="list-style-type: none"> • Greater training about environmental matters for relevant staff. • Encouraging all relevant organisations to commit to an environmental management system, with a direct reporting line to top management. • Introducing updated environmental guidance, with appropriate benchmarks. • Ensuring that rail assessment is put on a par with assessment of other modes • Including environmental criteria within franchise agreements • Developing more research and working groups on environmental issues. • Examining the environmental importance of the structural arrangements of the rail industry. 	

D3. Radical possessions strategies	
Status	The main report is confidential, since it contains company specific data, supplied in confidence.
SRA Contact	Andrew Nock and John Larkinson, Regulation.
Contractor	LEK Consulting
Project start date	n/a
Project completion	June 2003
Cost	n/a
Publications	Unpublished report, 43pp plus appendices. Hard copy only obtained.
Follow-up	The study led to the SRA commissioning the SDG work to quantify the revenue effects of introducing the proposed strategy (c.f. D4). The results were shared with the Office of the Rail Regulator.

Objectives: The study examined the efficiency benefits that could result from Network Rail adopting more radical possession strategies (as opposed to the existing situation, where Network Rail were only taking possession of track for maintenance and renewal work at night time or weekends).

Description and main results: The study involved a series of desk-top assessments, validated via consultation with the industry, including an assessment of the viability of proposals in relation to the Great Western region . It argued that a new possessions strategy should be more cost-effective because:

- Short possessions were unable to make full use of standard 8-hour labour shifts.
- Fewer possessions should result in lower fixed costs.
- Weekday labour rates are cheaper than night time or weekend rates.
- Consolidating activities should reduce overall disruption (although there would be a need to avoid conflict between engineering activities).
- Avoiding concentrating work in ‘peaks’ should enable more continuous and therefore efficient use of labour and plant resources.
- Working in daylight should lead to faster, higher quality work.
- Fewer, longer possessions should mean fewer opportunities for over-run, reduced contingency funds, and more time for catching up after early snags.

The study concluded that undertaking engineering work could be about 24% cheaper if it could be done in longer blocks, including midweek work to renew track. This would represent a saving of £660 million on the forecast costs for 2003/4 (although these savings could not be achieved by 2003/4). It set out specific details of an alternative possessions strategy, and a series of stages to be completed in order to implement this strategy.

Discussion and future research: The proposals have become known as the ‘Efficient Engineering Access Strategy’ (EEAS), and are being taken forward by the SRA, ORR and Network Rail. LEK noted that their conclusions were based on the assumptions that planned work must still be delivered in the current year and that Network Rail’s contractors’ current output norms would stay constant. They argued that, in reality, it should be possible to increase contractor output, with further efficiency gains.

D4. Demand effects of changed possession patterns	
Status	The main report is probably confidential – it would be necessary to check with East Anglia and Great Western about whether they were happy for the report to be publicly released given the inclusion of company specific information.
SRA contacts	Andrew Nock, Richard Davies and John Larkinson.
Contractor	SDG
Project start date	August 2003
Project completion	June 2004
Cost	n/a
Publications	Unpublished final report, 69pp plus appendices, with a number of supporting documents leading up to the final report. Hard and soft copy obtained.
Follow-up	The Office of the Rail Regulator is currently reviewing Network Rail’s possession policies.
<p>Objectives: Following on from LEK work, which proposed an ‘Efficient Engineering Access Strategy’ (EEAS), this study aimed to assess the effects of such a strategy on passenger demand and associated revenue.</p> <p>Description and main results: To assess the issue, the study involved analysing the effects of previous engineering work (using CAPRI data); looking at a case in East Anglia, where 3 part-Sundays of work were consolidated into a single 27-hour ‘possession’ (i.e. period when the track was unavailable to the train operating companies); and examining the likely effects of reorganising the Great Western region’s planned work in the second half of 2005 along EEAS principles. As part of the work, 2500 interviews were undertaken on train and replacement bus services in East Anglia, and 800 stated preference interviews were undertaken on trains in the Great Western region. The study concluded:</p> <ul style="list-style-type: none"> • In the past, engineering work has had a significant impact on revenue, although this has varied with circumstance. For example, in some locations, there are more opportunities to use substitute stations than in others. • There is a significant passenger response to any engineering work (e.g. passengers choosing not to travel, to travel in a different way etc.). The details of the substitute services offered are relatively unimportant. • Even when well publicised, there are a significant proportion of passengers who are unaware of planned work until they arrive at the station. In East Anglia, the proportion was 46% for passengers travelling <20 miles and 26-29% for those travelling >75 miles. • In East Anglia, modelling suggests that about 30% of affected revenue was lost due to the engineering work – but this was less than predicted losses if the work had taken place in several stages. • In the Great Western forecasts, EEAS reorganisation had little impact on revenue, because bigger midweek losses were offset by fewer possessions. • Overall, in the Great Western modelling, revenue losses were estimated to be about half of Schedule 4 costs. <p>Discussion and future research: The study results imply that an EEAS could be beneficial. Further analysis using LENNON data was recommended.</p>	

D5. Process map for upgrade projects	
Status	Not confidential
SRA contact	Jonathan Ellis, Technical
Contractor	Lloyds Register MHA Ltd (1) and Lloyds Register Rail Ltd (2)
Project start date	September 2003
Project completion	February 2004
Cost	£45,000
Publications	Unpublished reports of two phases of the study. The first report clarified processes for signal repositioning (30pp) whilst the second, final report gave generic conclusions about process (68pp). Both reports have been circulated to the industry. Hard and soft copy of both reports obtained.
Follow-up	The recommendation to: “introduce a ‘standards freeze’ after the design and development phase of a project” has been implemented. The other advice for industry has been disseminated.
<p>Objectives: The aim of the study was to recommend improvements to the management of rail infrastructure upgrade projects.</p> <p>Description and main results: The project involved developing a diagrammatic representation (‘process map’) of the different stages of a project. Key tasks were listed sequentially across the top, key players were listed down the side, and, in the resulting grid, ‘blobs’ were used to indicate which players were involved in each task, with a different colour used for players with key responsibility. Arrows indicated movement through the project. Initially, a process map was developed for the simple situation of repositioning a signal. This approach was then used to develop a generic process map for infrastructure upgrade projects, with the addition of a safety approval process. It was found that all projects have 6 relatively distinct phases: feasibility; design development; detailed design; construction; test and commission; and handback. Specific maps for each of these stages were developed. 21 recommendations were then made for improving the infrastructure upgrade process. These were assessed in terms of the potential cost and time savings that could result, and the ease of implementing them.</p> <p>Discussion and future research: The following recommendations were perceived to be the ‘quick wins’:</p> <ul style="list-style-type: none"> • Introducing a ‘standards freeze’ at the end of the design development phase. • Bringing forward decisions on signal sighting to the design development phase. • Appointing a ‘design authority’ for the project, to avoid unnecessary changes at the detailed design phase. • Starting safety engineering processes earlier. • Combining the roles of the ‘Notified Body’ and Independent Safety Assessor, to avoid duplication of effort and the number of review cycles. <p>Other recommendations were seen as providing significant potential benefits but being more complex to implement.</p>	

D6. A technical strategy for the rail industry	
Status	Not confidential
SRA contact	Jonathan Ellis, Technical
Contractor	AEAT
Project start date	December 2003 / January 2004
Project completion	May 2004
Cost	£150,000
Publications	Unpublished final report (52pp). Hard and soft copy obtained.
Follow-up	The report was disseminated to industry groups and the DfT..
<p>Objectives: The study aimed to produce a draft document for internal use, setting out the SRA's view on a technical strategy for the rail industry.</p> <p>Description and main results: The study argued that the long term vision for the railways should be based on competitiveness; sustainability, simplified infrastructure; integrated systems; optimised interfaces; standardisation and built-in performance. To achieve this, the study recommended the following.</p> <p>To improve performance and reduce costs:</p> <ul style="list-style-type: none"> • Develop railway performance standards. • Ensure that future railway enhancements make better use of existing assets. • Develop a ticketing strategy which is more efficient. • Ensure that procurement processes focus on proven, off-the-shelf technology. <p>To encourage better use of standards:</p> <ul style="list-style-type: none"> • Encourage the UK rail industry to become involved in pro-active management of the relationship between UK and EU standards. • Develop an industry-wide vision, strategy and hierarchy of standards. • Use a single, simplified acceptance/approvals process (by a Notified Body). <p>To encourage system integration:</p> <ul style="list-style-type: none"> • Give leadership to empowered System Interface Committees. • Determine the potential benefits of instituting Design Authorities. • Develop railway system specifications. • Introduce a RAMS (reliability, availability, maintenance and safety throughout the lifecycle) case regime to the procurement of new or replacement assets, to replace the current safety analysis required. <p>To promote sustainability:</p> <ul style="list-style-type: none"> • Engage with the professional institutions and academia. • Spread managerial and engineering best practice across the industry. • Develop an innovation strategy. <p>Discussion and future research: Implementation of the recommendations would be a significant task, and it is unclear how far this has been done / is scheduled to be done in the future, given the changes to the SRA. This study potentially sets the agenda for a more detailed programme of work, to be taken forward by DfT Rail's new 'Technical and Professional' directorate.</p>	

E4. Assessing indirect and non-use values from rail transport	
Status	Not confidential
SRA contact	Hadi Zamani / Douglas Medrisch, Strategy, Economics + Appraisal
Contractor	RM Humphries and AS Fowkes, ITS Leeds. The work was completed as a component of doctoral research.
Project start date	n/a
Project completion	January 2003
Cost	SRA contribution to project costs, value not known.
Publications	Unpublished report, 91pp. Hard and soft copy obtained.
Follow-up	The study helped to inform SRA thinking about lightly used rail routes.
<p>Objectives: For rail services, the study aimed to estimate the scale of indirect values (i.e. values placed on services because they are useful to other people) or non-use values (i.e. option values, placed because services may be useful to the respondent in the future, and existence values, placed because services may be useful to other people in the future).</p> <p>Description and main results: The study began with a literature review, and identified three relevant studies.</p> <ul style="list-style-type: none"> • Work by Bristow et al (1991) showed that non-use values for bus services were £22p.a. for bus users and £39p.a. for non-bus users (in 1991 prices), and represented 23-28% of the total valuation of services by users and 58-70% of that by non-users. • Work by Crockett (1992) calculated that non-use values for the Settle-Carlisle railway were £43p.a. for users and £24p.a. for non-users (in 1992 prices) • Work by Rosen (2001) reported on a study in northern Italy, showing that residents would pay increased tax for the option of more frequent buses. <p>The work reported here used a combination of expressed preference techniques, stated preference and contingent valuation to assess the scale of indirect and non-use values placed on the Edinburgh-North Berwick train service. 198 people were surveyed, living at varying distances from the line. The study found that the most significant component of indirect and non-use values was the option value component. The results suggested that option values were £167p.a. for users and £206p.a. for non-users. In terms of the total values that people placed on the service, option values were estimated to be 45% of the total for users and 55% for non-users. In turn, users total values were estimated to be 250% greater than the average fare paid.</p> <p>Discussion and future research: The study argued that appraisal work should reflect the fact that people value transport over and above the direct fares that they pay. Specifically, the empirical work suggested that non-use values typically represent 23-45% of the total value placed on services by users and 55-70% of the total value placed on services by non-users.</p>	

E5. Profile of passengers on regional rail routes in England	
Status	Not confidential
SRA contact	Peter Thompson, Planning, SRA
Contractor	SRA summary of survey work by Mott McDonald and Accent
Project start date	Late 2002/early 2003.
Project completion	Survey work reporting completed by July 2003
Cost	Approx £50,000
Publications	Unpublished 20pp summary report produced by the SRA. The SRA holds a database of 2,722 interview responses, plus tabulations of the data. Hard and soft copy of the summary report obtained.
Follow-up	The work informed the SRA's 'Everyone's Railway' document. The Community Rail Development Strategy takes this work forward.
<p>Objectives: The project aimed to collect information about passengers using regional rail routes, given that little is known about these, compared with available information about Inter City (IC) lines and the London South East (LSE) network. The findings have been used to assess the claim that local train services contribute to social inclusion.</p> <p>Description and main results: Passenger interviews from 5 regional lines were compared with interviews conducted on an IC and an LSE line, involving 2,722 people in total. The study showed marked differences in passenger profiles. It supported the claim that regional lines are often contributing to social inclusion, by providing a service for those traditionally under-represented on the rail network, the majority of whom (82%) saw their journey as important. For example, it showed that:</p> <ul style="list-style-type: none"> • 35% of users were aged 17-25 (vs 24% LSE and 17% IC) • 7% of users were aged 65+ (vs 3% LSE and 7% IC) • 47% of users were not in full time work (vs 26% LSE and 28% IC) • 66% were earning less than £1000 a month (vs 32% LSE and 29% IC) • 28% were receiving state benefits (vs 15% LSE and 20% IC) • 44% did not have a driving licence (vs 26% LSE and 17% IC) • 37% did not have a car available or were unable to drive (vs 20% LSE and 15% IC) • 40% would have abandoned or postponed their journey if the train had not been available (inc. >60% of the unemployed and >50% of the elderly) • 21% were travelling for education or shopping (vs 3% LSE and 4% IC) <p>The study also revealed differences between users of IC and LSE lines, and between users of different regional lines.</p> <p>Discussion and future research: The study showed that regional rail lines provided an important form of transport for many who might otherwise have had difficulty travelling. Decisions about rail investment need to find a way of taking this into account, as well as focusing on passenger numbers.</p>	

E5 continued: Profile of passengers on regional rail routes in England

Definitions used

1999 interviews were conducted on weekdays and Saturdays in February 2003 across 5 lines (Carlisle to Barrow, Barnstaple to Exeter, Norwich to Great Yarmouth/ Lowestoft, Manchester to Buxton and Nottingham to Lincoln). Survey responses were weighted to reflect the relative usage of the 5 lines. Responses were compared with those from 347 interviews carried out on the LSE line between London Victoria and Brighton, and 376 interviews carried out on an IC Great North Eastern line between the south and north of England, going as far as Scotland.

Comparisons between different types of line:

The picture that emerged was that the different types of line had different user profiles:

Regional passengers: compared to other train passengers, less likely to be in employment, and more likely to be students, young, unemployed, retired, on benefits etc.. More likely to be using trains for education or shopping or visiting friends and relatives. Often lack access to a car and many would have needed to abandon or postpone their journey if the train were not available.

NSE passengers: compared to other train passengers, more likely to be relatively young, male, well paid, in employment and using the train for commuting or leisure. Mainly used the train for speed/convenience, particularly compared to ‘hassle factors’ of car use. Would often have abandoned their journey if the train were not available.

IC passengers: Probably two main types of passengers – employees on business trips and retired people visiting friends/relatives. Most likely to drive, go by air or postpone journey if the train were not available.

Table 1: Comparing regional lines with LSE and IC lines

Issue	Regional	LSE	IC
<i>Gender</i>	48% male	56% male	56% male
<i>Age</i>	Over-representation of 17-24 and 65+.	Most users 17-44.	Most users 17-54, but older age groups well represented.
<i>Income</i>	High proportion of lower income groups: 40% took home <£500 a month.	High proportion of higher income groups 69% took home over £1000 a month.	High proportion of highest income level group: 36% took home over £2,000 a month.
<i>Employment</i>	Only 53% in full time work. More students, retired people and unemployed than LSE.	74% in full time work.	72% in full time work.

E5 continued: Profile of passengers on regional rail routes in England

Table 1 continued: Comparing regional lines with LSE and IC lines

<i>Benefits</i>	28% in receipt of benefits – including Jobseekers allowance, disability and housing benefit, child credits, student loans and state pensions.	15% receiving benefits – compared to IC, more Jobseekers, unemployment benefit and student grants.	20% receiving benefits – compared to LSE, considerably more state pensions.
<i>Driving licence</i>	56% had full licence	74% had full licence	82% had full licence
<i>If train were not available</i>	25% would abandon journey; 25% drive; 22% use bus/coach; 15% postpone. >60% of unemployed and >50% elderly would abandon or postpone.	42% would abandon journey – otherwise mostly drive, use bus/coach or postpone.	30% would postpone, 27% drive, 19% go by air and 14% would abandon journey.
<i>Most common reasons for using rail</i>	Speed, no car available, can't drive.	Speed, convenience, only option, traffic/parking problems.	Convenience, speed, 'other'.
<i>Journey Purpose</i>	Above average use for education, shopping and visiting friends/relatives compared to LSE & IC.	Particularly high levels of commuting and leisure trips.	Particularly high use for business and a significant amount of visiting friends/relatives.
<i>Importance of journey</i>	82% quite/very important.	80% quite/very important.	90% quite/very important.

Comparisons between different regional lines:

A comparison of the different regional lines showed that they were often appealing to different types of people and providing different functions in different areas. The following table gives some indication of the different profiles.

Table 2: Comparing different regional lines

Line	Of the five lines, highest levels of...
Nottingham – Lincoln	Students (35%), education trips (12%), visiting friends/relatives (35%)
Manchester – Buxton	Full time workers (65%), commuting trips (32%)
Norwich – Lowestoft /Gt Yarmouth	Men (54%), unemployed (15%), personal business trips (9%)
Barnstaple - Exeter	Women (57%), business trips (6%) – also high levels of visiting friends/relatives (34%)
Barrow - Carlisle	Retired people (15%), shopping trips (18%)

E6. Differentiated standards for rural railways	
Status	Not confidential
SRA contact	Chris Austin / Clare Costello, Community Rail Development
Contractor	John Hummel, RMS Consulting
Project start date	n/a
Project completion	August 2003
Cost	n/a
Publications	Unpublished report (54pp). Ideas fed into a consultation document and the SRA's published 'Community Rail Development Strategy'. Hard and soft copy obtained.
Follow-up	The Community Rail Development Strategy is being implemented.
<p>Objectives: This study aimed to identify opportunities for cost savings from the application of differentiated standards to rural railways.</p> <p>Description and main results: The study argued that differentiated standards could be justified on the basis that many rural lines are 'lower risk', in terms of having less traffic and less complex physical and operational characteristics. It provided criteria for judging whether lines could be considered 'lower risk'. It also argued that there were two key types of 'lower risk' line:</p> <ul style="list-style-type: none"> • 'rural heavy rail', where savings could be made on infrastructure but not on operations or rolling stock due to interaction with the core network, higher speeds, the mix or density of traffic, and • 'rural light rail', where savings could also be made on rolling stock due to low speeds, few interfaces and relative segregation from the core network <p>The report then set out an alternative approach to managing infrastructure costs on these parts of the network, based on the setting up of specific maintenance teams to look after them. It also looked at the balance between maintenance and renewals of infrastructure and potential savings in the latter by increasing efforts on the former. It included some calculations of indicative cost savings, based on experience from the Dartmoor Railway.</p> <p>Discussion and future research: The (provisional) figures calculated for costs under the regime described were considerably more than initial estimates produced by the main network operator, leading to some concerns about their reliability. However, there were issues about the way that the network operator allocated overhead costs and the strict comparability of the numbers.</p> <p>Meanwhile, the Community Rail Development Strategy is being taken forward in 6 pilot projects covering 7 routes. One of the key objectives across each of the pilot projects is to establish the current costs of operation and maintenance, in order to look at reducing those costs through the application of standards based on risk assessment of local circumstances. Network Rail has appointed an Account Director for Community Rail who is working very closely with all of the pilot projects.</p>	

E7. Community rail development funding strategy	
Status	Not confidential
SRA contact	Chris Austin/ Clare Costello, Community Rail Development
Contractor	John and Jo French, Transport Regeneration Ltd
Project start date	July 2004
Project completion	November 2004
Cost	£5936.20
Publications	Output from the work became pp20-23 of the SRA's published 'Community Rail Development Strategy'. Hard and soft copy obtained
Follow-up	The Community Rail Development Strategy is being implemented.
<p>Objectives: This study aimed to identify potential funding sources for community rail development, and to give examples of different funding sources that had been used by existing community rail partnerships.</p> <p>Description and main results: The following funding was identified.</p> <ul style="list-style-type: none"> • European funding – at the time of the study, the European Regional Development Funding was providing 'Structure Funds' for areas in relative decline; the 'Interreg' programme, available for developing common approaches to problems across Europe; and the URBAN programme, for addressing issues of sustainable development. Typically, it was noted that European funding requires 50% matched funding from a bid. Trans-national links, and including the community rail partnership within an established partnership programme were noted to help with success. • National funding – DfT Local Transport Plan (LTP) funding was seen as probably being the most single important funding source for community rail development. It was noted that community rail development was well placed to contribute to the four shared-priority areas identified in latest guidance on LTPs, namely congestion, road safety, accessibility and air quality. Other sources of national funding included: DfT challenge funding (for example, if a new cycle fund were to be introduced); regeneration funding; major investment schemes, such as the West Coast Route Modernisation (where the case for the importance of feeder routes could be made); Network Rail maintenance and security schemes; and funding from national voluntary bodies, such as the Heritage Lottery Fund, Railway Heritage Trust, Esmee Fairburn Foundation and the Glass-House Trust. • Local funding - As well as LTP and regeneration funding, other local funding sources could include Crime and Disorder Partnerships, developer contributions (via planning agreements); tourism partnerships; local trusts; and local businesses. <p>It was noted that volunteer time can often be considered as an 'in-kind' contribution, used to match other financial sources when bidding for funding.</p> <p>Discussion and future research: The Community Rail Development Strategy is being taken forward in 6 pilot projects, covering 7 routes. The basic rail service continues to be supported via the franchise agreement but, in each case, additional funding is being sought for issues like promotion, marketing and enhancements to meet local objectives.</p>	

F1. Rolling stock quality improvements and user willingness to pay	
Status	Not confidential
SRA Contact	Brian Titley / Carol Smales, Strategy, Economics and Appraisal team
Contractor	ITS Leeds and Oscar Faber
Project start date	July 1996
Project completion	May 1997
Cost	£58,500 + VAT
Publications	Unpublished final overview report, 43pp. Hard copy only obtained. 4 working papers were prepared during the study, which fed into the final report, including 'Review of literature' (Nov 96), 'Qualitative research' (Nov 96), 'Recommendations from phase 1' (Dec 96) and 'Quantitative analysis' (May 97).
Follow-up	The study fed into OPRAF thinking about whether the benefits to passengers of improved rolling stock were sufficient to warrant fare increases in order to pay for them.
<p>Objectives: The study aimed to estimate passengers' valuations of different types of rolling stock, and different rolling stock attributes – specifically, seating comfort, seating layout, ride quality, ambience, ventilation and noise.</p> <p>Description and main results: The study involved a literature review; 992 qualitative interviews; a revealed preference survey of 3555 passengers who faced a choice between different rolling stock types (typically a choice between a fast journey in poor rolling stock and a slower journey in better stock); and a stated preference survey with 783 passengers. The qualitative research suggested that 'getting a seat' was most important (although many passengers were willing to stand for up to 20 mins). Some were prepared to pay for larger, more comfortable seats, although many balked at the price difference between First and Standard class. In general, there was willingness to pay for a package of upgrades (including improved punctuality and reliability), but not for specific rolling stock attributes. Comparing different stock types suggested that the maximum difference in valuation was 39.3 pence per single trip, equivalent to 4.3% of the average fare. This valuation was considerably lower than those given in the literature (typically around 10% of the average fare). The study highlighted that lower figures seemed to more in keeping with ticket sales data, which had typically shown only small effects after the introduction of new rolling stock. In terms of the relative importance of different attributes, seat comfort, ride quality and ambience were seen as more important than seating layout, ventilation and noise.</p> <p>Discussion and future research: The literature review highlighted cleanliness, toilets and information provision as other key aspects for passengers, which were not explored in the study. Study A3 suggests that rolling stock quality may play a significant role in customer satisfaction with rail services, even if it does not affect willingness to pay.</p>	

F2. Evaluating station facilities	
Status	Not confidential
SRA contact	Brian Titley, Strategy, Economics and Appraisal team. Work managed by Martin Haigh, Rail Operational Research.
Contractor	Westminster University
Project start date	1995
Project completion	February 1997
Cost	£22,110 + VAT contribution to TCI Operational Research.
Publications	Final report, 99pp plus appendices. Hard copy only obtained.
Follow-up	The study examined some of the same topics as those examined in studies F3 and F4, but on a more conceptual basis.
<p>Objectives: The study looked at the issue of evaluating station facilities.</p> <p>Description and main results: The study involved a literature review of about 9 previous studies, and new analysis of the data they contained. It also involved 2 focus groups, in King's Lynn and Sutton Coldfield. It proposed a number of concepts that could be useful for evaluating station facility provision. These included developing 'profiles' of the facilities that travellers would expect to find at different types of station, and how such profiles varied with station function and the types of user attracted. It also involved defining different standards for individual service provision, including 'minimum tolerable', 'minimum acceptable', 'fully satisfactory' and 'superfluous provision'. The focus group work highlighted the importance of the quality/fitness for purpose of individual facilities, and that facilities provided at stations together fulfil a range of more generic functions, such as the need for information or personal security, such that different combinations of individual facilities can successfully provide these generic functions. Consequently, the researchers proposed a process for specific station evaluation which would comprise:</p> <ol style="list-style-type: none"> a) A physical audit of facilities (i.e. assessing whether facilities were working as intended, and assessing the general appearance of facilities and the contribution that they were making to the overall image of station quality and upkeep) b) An assessment of the functional requirements for that station (varying according to station function albeit based around the key needs of: security and safety; accessibility; travel information; ticketing; and passenger comfort.) c) A functional audit of levels of passenger satisfaction (i.e. an assessment of how well passengers perceived their needs were met, according to the functional requirements identified in b), and d) A matching of functional requirements against facility provision. <p>Discussion and future research: Finally, the study emphasized the need to recognise that from the passenger's viewpoint, the rail service is only as good as the weakest link in the chain.</p>	

F3. Rail passenger quality of service valuations				
Status	Not confidential			
SRA contact	Rebecca Davies / Carol Smales, Strategy, Economics and Appraisal team			
Contractor	SDG			
Project start date	December 1999			
Project completion	August 2000			
Cost	n/a			
Publications	Unpublished final report, 47pp + appendices. Hard copy obtained.			
Follow-up	The study fed into developing the National Passenger Survey			
<p>Objectives: The study aimed to define passengers' valuations of a range and quality of facilities and services on stations and trains.</p> <p>Description and main results: The study involved 1400 stated preference interviews at sites around the country. Passengers were initially asked to value different attributes. Findings were then scaled, in line with the overall maximum that passengers were prepared to pay for improvements. A selection of the final results is shown below.</p>				
The introduction of...	SE commuters	First Class InterCity	Standard InterCity business	Standard Intercity other
Electronic displays at station	6.2	67.8	39.6	28.0
Office staff giving info.	5.8	36.2	34.4	17.4
Station announcements	2.6	18.1	29.5	18.0
Security cameras	5.1	46.9	27.0	32.5
Good lighting + visibility	8.7	60.6	48.7	37.9
Security staff patrolling	13.2	66.7	62.4	43.0
Enclosed + heated shelter	4.7	46.1	34.8	28.7
Old but maintained, clean and graffiti free station	13.9	71.8	36.6	29.8
Toilets	8.7	37.7	50.2	37.1
Car park	8.0	62.0	44.4	32.4
Queues of only 1 minute	3.4	24.1	18.7	29.1
Lifts and escalators	0	21.7	23.0	21.2
New rolling stock	11.7	55.8	81.6	46.7
Reasonable quiet ride and temperature control	5.0	77.2	52.5	16.4
Electronic on-train display of next and final station.	7.4	44.1	32.3	30.5
Ticket collector on train	3.4	28.7	25.0	18.3
(Values in pence, scaled to reflect overall willingness to pay)				
<p>Discussion and future research: In general, the study showed that passengers were prepared to pay the equivalent of 26-39% of their fare price for improvements to station and train facilities.</p>				

F4. Interchange and integration	
Status	Not confidential
SRA contact	Neil Fleming, Strategy, Economics and Appraisal team
Contractor	Mark Wardman and Jeremy Shires, ITS Leeds University
Project start date	December 1999
Project completion	February 2001
Cost	£44,400
Publications	Unpublished report (43pp). Hard and soft copy obtained.
Follow-up	This study fed into SRA appraisal processes.
<p>Objectives: The study aimed to estimate the values that passengers place on: avoiding interchange and associated transfer/waiting times; the values placed on improved conditions for interchange at stations; and the values placed on improvements in station access.</p> <p>Description and main results: The study involved gathering data from 4,663 people, using more than 19 routes in different parts of the UK. 29,822 stated preference responses and 2,678 observations giving revealed preferences were obtained, relating to different aspects of the issue. Key findings included the following:</p> <ul style="list-style-type: none"> • Interchange time is valued at $7.2Int^{0.7} + 0.07 Int^{0.7}$ times the value of train time outside the South East and $5.9Int^{0.7} + 0.05Int^{0.7}$ times the value within the South East, (where 'Int' is the time of interchange) • Wait time is valued at 20% more than train time. • Walk time is valued at 1.7 times train time if it does not involve crossing to another platform via a bridge or subway, and 2.7 times, if it does. • A guaranteed connection reduces the interchange penalty by 4 minutes. • The interchange penalty is increased by $0.13Int^{0.7}$ minutes for every minute of expecting waiting time, and $0.12Int^{0.7}$ minutes for every minute of expected standing time on the connecting service. • Earlier or later departure time shifts (to avoid having to interchange) are valued at around half the value of train time. • Time spent standing on trains is valued 38% higher than normal train time. <p>The study also derived valuations for – a) a number of station facilities (including an intercom to the control centre; mini supermarket; real time information; escalators instead of stairways; additional staff; CCTV; heated and refurbished waiting room; clear departure information; plenty of platform seats; better lighting; and more printed timetable information), and b) station access characteristics (including the nature of parking facilities; combined train and bus/taxi tickets; journey planner information; better local buses and/or better taxi services). The study also examined how all of the derived values varied with socio-economic and trip characteristics.</p> <p>Discussion and future research: The study generated a series of interchange penalties that could be used in the Passenger Demand Forecasting Handbook, if the generalised time elasticity given there was re-estimated.</p>	

F5. Passenger’s awareness of, and satisfaction with, specific station facilities improvements	
Status	Not confidential
SRA contact	Peter Thompson, Planning and John Smith at MFAS
Contractor	To be confirmed
Project start date	May 2005
Project completion	Study expected to be approximately 4 months in length
Cost	n/a
Publications	A final report will be produced on study completion.
Follow-up	The study will inform the current programme of upgrading facilities at medium size British stations.
<p>Objectives: The study aims to assess passenger satisfaction following the installation of new station facilities, in order to inform an ongoing SRA programme of rolling out station improvements to medium size stations in GB. The study is expected to focus on passengers using stations in the North West, East Anglia and the Midlands where new or improved waiting rooms, CCTV or customer information systems have been installed.</p> <p>Description and main results: Specifically, the work is intended to identify:</p> <ul style="list-style-type: none"> • whether passengers are aware of new facilities; • key priorities for new facilities which have not been met; • levels of use of facilities, and the reasons for these levels; • overall customer satisfaction with facilities and whether customers feel that the standard of facility provision is appropriate; • whether the facilities have altered the attractiveness of travelling by train. <p>The study brief notes that those undertaking surveys will need to take into account that passenger views vary with journey purpose, and will need to undertake some survey work at evenings and weekends, as usage is likely to be different to usage during weekdays.</p> <p>The brief proposes that the study should involve 400 face-to-face interviews or 400 self completion questionnaires.</p> <p>Discussion and future research: n/a</p>	

F6. Bus links	
Status	Not confidential
SRA contact	Martin Haigh, TCI Operational Research and Brian Titley, Strategy, Economics and Appraisal team
Contractor	Tony Duckenfield, SDG
Project start date	October 1997
Project completion	May 1998
Cost	n/a – OPRAF contribution to a shared study.
Publications	Unpublished report, 38pp plus appendices. Hard copy obtained.
Follow-up	n/a
<p>Objectives: The study aimed to identify and classify the nature of existing bus links provided to rail stations, and to assess the factors that make those services successful.</p> <p>Description and main results: In discussions with TOC representatives, about 30 relevant bus services were identified. More detailed interviews and surveys were then undertaken on 5 services in Ware, High Wycombe, Ipswich, Dunstable to Luton and Corby to Kettering. The study concluded:</p> <ul style="list-style-type: none"> • All services had the potential to attract more people. • In Corby and Dunstable, the majority of residents who were making trips that could be made by rail, and who were not outright rejectors of rail, thought that the provision of a bus link was a good idea. • A major reason for low use of services was that the target audience was unaware of them. For example, only about a third of those in the catchment for services in Ware and Dunstable were aware that the bus link existed. In comparison, 74% were ‘aware’ in Corby, and bus use was much higher. • Clear branding of vehicles and bus stops should be a cost-effective method of awareness raising, and some form of branding should be possible even when services are not dedicated to the station route. • The key to ticketing is probably simplicity. Combined/through ticketing may be helpful in some situations, although consumer preference may be for a flat fare (partly to avoid further complexity, given the already complicated rail fares system). The most important attributes linking bus and rail services were seen as being timetable integration, and linkage via common branding on stations, bus stops, publicity materials and signs. • On-bus surveys in Ware and Corby suggested that about 30% of bus link users were encouraged to start travelling by train by the provision of the service. There was also evidence that bus links can provide a viable alternative to the car, increase awareness of the train operator’s brand and promote positive attitudes towards that brand. <p>Discussion and future research: The study provided a checklist of attributes to consider when setting up a bus link, in order to maximise the success of a service. It argued that one option for future research would be a financial appraisal of the costs and benefits of providing bus links.</p>	

F7. Station parking study – scoping report	
Status	Not confidential
SRA contact	James Lough, Planning
Contractor	Scott Wilson
Project start date	January 2002
Project completion	June 2002
Cost	£10,000 + VAT
Publications	Final report 39pp plus appendices (which include an 8 page policy review and an 18 page literature reviews). Hard copy only obtained.
Follow-up	Phase II study on planning issues commissioned
<p>Objectives: The study was commissioned to help develop SRA policy on car parking at rail stations. Such parking could help boost rail use, but there are concerns about unintended effects, such as extracting demand from other stations, creating congestion around stations, undermining pedestrian and cycle access and using land otherwise available for sustainable development. These issues often hamper the gaining of planning consent.</p> <p>Description and main results: The report highlighted that for most issues, there were positive and negative arguments, and their resolution could depend on local circumstances. It focused on the 5 categories of impacts used in the New Approach to Transport Appraisal (NATA), namely:</p> <ul style="list-style-type: none"> • environment (impacts on greenbelt land; rural landscapes; local and national air quality; noise and light pollution; water environment; social inclusion; fitness and health; journey experience) • safety (impacts on accidents; station security) • economy (impacts on car driver costs; congestion; attractiveness of public transport; train crowding; rail passenger distances travelled; rail journey times; local and regional employment; housing; regional growth) • accessibility (impacts on severance of stations from communities, feeder mode choices and rail access points) • integration (impacts on access facilities for other modes; local regeneration; availability of land for railway use; access for rail engineering work) <p>Relatively little empirical evidence was reported to be available. European research was quoted on typical distances travelled by different feeder modes, together with a methodology for classifying station catchments. Bus-based park and ride research was quoted, with the conclusion that that the location and user costs of rail parking could be central to its desirability. Regional research was quoted about the proportion of people using new rail parking who would otherwise have driven for all of their journey (22% according to Greater Manchester PTE; 18% West Midlands; 17% Strathclyde PTE; >15% Warwick Parkway). 70% of trips at Warwick Parkway were reported to have previously been made by rail from more local stations.</p> <p>Discussion and future research: The report recommended that future work should comprise a number of case studies, examining the main issues relating to station parking arising at public inquiries, and how these were resolved. 5 station types were identified for assessment – parkway; inter-urban; peripheral; local urban and local rural.</p>	

F8. Station parking study stage IIa – Identification of research priorities	
Status	Not confidential
SRA contact	James Lough, Planning
Contractor	Scott Wilson
Project start date	August 2002
Project completion	January 2003
Cost	£10,900 + VAT
Publications	Final report 50pp plus appendices. Hard copy only obtained
Follow-up	'New stations: A guide for promoters' (60pp) was produced in Sept. 2004. A draft project brief for potential future research was subsequently drawn up within the SRA, as detailed on the next page.
<p>Objectives: The study was a follow-on to a scoping exercise aimed at helping to develop SRA policy on car parking. Planning applications and/or appeal decisions for 12 case studies of station car parking were examined.</p> <p>Description and main results: In reaching decisions on station parking, the report highlighted 8 issues that inspectors were most concerned with. Factors leading to station parking approval included:</p> <ul style="list-style-type: none"> • Significant amounts of high quality, conclusive data to address issues • Demonstrated demand for new parking • Positive/minimised-negative traffic and economic impacts • Positive/minimised-negative impacts on other stations • Compatibility with national and local policy • Commitment from the train operating company, local authority and other relevant local bodies • Rigorous consideration of alternatives to increasing parking • Good design to minimise visual impacts (especially in greenbelt land) <p>In reality, only 3 of the proposals presented significant quantitative evidence about traffic impacts, (and after monitoring at Warwick Parkway indicated that their forecasts were wrong – only 15% of new trips were previously made by car compared to a prediction of 75%). Consideration of alternatives was also limited. Only Chiltern Railways were quoted as promoting innovative alternatives for accessing stations.</p> <p>Discussion and future research: The study recommended further work including detailed analysis of parking provision at 2 case study stations, (one inter-urban; one peripheral), where the balance between park and ride and completing the entire journey by train is finely balanced. Further thinking within the SRA indicates that understanding could be taken forward in a variety of different ways, including assessing the value of providing station parking; identifying 'ideal' levels of parking provision for different types of catchment; reviewing regulatory and funding mechanisms for parking provision; developing guidance on station design; and assessing the potential for managing station parking as part of wider local transport strategy.</p>	

F8. Continued

Future directions for station parking research

The following outlines were produced as potential future work packages in this area.

Work packages aimed at establishing the criteria and mechanisms for expanding station car parking

To address the inhibitors to providing additional station parking, the following set of work packages has been proposed:

- A. Macro benefits to rail from providing parking:** This package would aim to quantify the ‘value’ of providing parking for different times, and different types of station environment.
- B. Defining ideal amounts of parking:** This package would aim to identify the amount of parking required for ‘typical’ catchment areas, including an exploration about how this would vary with rail service levels and frequencies; alternative access modes; rail fares; parking tariffs; and different journey types.
- C. Delivering parking spaces in practice:** This package would aim to review regulatory and funding mechanisms for rail parking, drawing on best practice examples to illustrate how the process could be improved, and recommending where processes could be beneficially altered. It might include advice on securing developer contributions to parking at linked stations and reconciling parking needs with property development pressures.
- D. Guidance on building new car parks:** This package would aim to produce a guidance note which would set a framework for development consent on new car park planning applications. It would cover issues such as station security; minimising visual impacts via lighting, landscaping, surfacing and boundary treatments; and access requirements for pedestrians, cyclists, motor vehicles and the disabled.

It is envisaged that these workpackages would interact, but constitute separate, subcontracted modules managed by a central consultant.

Work package aimed at managing station parking as part of overall transport policy

The report highlighted that there was little existing good practice of managing station parking as part of overall transport policy. While many local authorities seemed aware of the issues, few had directly attempted to:

- make walking and cycling to stations more attractive
- provide feeder buses or minibuses or promote car sharing
- share new parking across a number of local stations to reduce rail heading
- develop station parking pricing policies that maximised parking benefits
- allocate station parking on the basis of need – e.g. using residents permits as a way of allocating spaces or deciding entitlement to different parking rates.

Existing good practice appeared to be limited, suggesting that both research and pilot work in this area could be worth commissioning.

F9. London Area Travel Survey – rail survey	
Status	Not confidential
SRA contact	Malcolm Knight, Planning
Contractor	MVA (Management) / Count on us (Surveys) Surveys across all modes co-ordinated by Transport for London.
Project start date	n/a
Project completion	ongoing
Cost	c. £1 million
Publications	Summary report giving headline findings, approx 17pp plus appendix. Hard and soft copy obtained. Data set held by the SRA.
Follow-up	Survey typically undertaken every 10 years; TfL moving to continuous survey approach.

Objectives: The 2001 London Area Travel Survey (LATS) was the fifth in a series of surveys aimed at improving understanding of travel in London and the South East. LATS Rail, the rail component commissioned by the SRA, forms an essential input to SRA analytical work on RUSs, franchise specifications, bid evaluations, infrastructure projects, model updates, statistical briefings etc.

Description and main results: Over 300,000 questionnaires were returned from approximately 900 stations. Station counts and other weighting factors enabled data to be scaled up, to represent 1,748,582 journeys. Weekend travel was excluded. Key findings were:

- London was the destination for 65% of rail journeys starting in the area.
- 72% of travel occurred during peak periods.
- Commuting and education accounted for 68% of journeys, with 20% made for ‘leisure’ and 12% made for business.
- 50% of journeys to or from stations were made on foot. Tube/DLR was the second most common access/egress mode, whilst cars accounted for only 14% of trips. The average access trip was 4.4km, (including 2km for journeys made on foot and approximately 8km for car journeys).
- 20% of passengers did not have access to a car, whilst 35% were in households with 2 or more cars.
- London termini were playing different roles – e.g. Charing Cross was serving suburban routes, whilst St Pancras was serving long distance routes.
- Catchment analysis showed that different stations had different characteristics. For example, far fewer passengers living close to Reading station were driving to it, compared with the situation in Maidenhead.

Discussion and future research: The findings enable essential analysis of options for rail services and infrastructure in London and the South East Commuting Area, as well as informing a range of national debates – for example, the potential to ease rail congestion by encouraging peak spreading; the importance of catering for pedestrian access/egress; the role of rail in increasing mobility for those without access to car transport and its ability to compete effectively when cars are available etc.. Detailed catchment analyses can help to highlight opportunities for encouraging more sustainable travel in relation to individual stations.

F10. Planning for passenger growth	
Status	Not confidential
SRA contact	Steve Atkins, Planning
Contractor	Sheffield Hallam University
Project start date	Spring 2001
Project completion	May 2002
Cost	Approx £20,000
Publications	Report published by the Centre for Regional Economic and Social Research, Sheffield Hallam University, 70pp plus appendices. Hard copy only obtained.
Follow-up	The work fed into the SRA Land Use Planning Statement.
<p>Objectives: The research aimed to investigate the issues associated with developing land at and close to stations in order to maximise the value of rail.</p> <p>Description and main results: The work involved 6 in-depth case studies (York, Manchester Victoria, Warwick Parkway, Horwich Parkway, Stevenage and Chafford Hundred), including interviews with local authorities, train operators, Railtrack, PTEs, RDAs, developers and other interested parties. It identified a number of barriers to station land development including the wide range of players, the different objectives of different parties and the complex contractual, planning and legal context. Recommendations were as follows.</p> <ul style="list-style-type: none"> • In any area, a robust and coherent policy platform for the development of station land needs to be developed, and built into all the relevant planning documentation (of both area authorities and rail stakeholders). • Designating areas around stations as ‘Transport Development Areas’ may help to focus thinking. In some cases, TDAs may help to justify asking for developer contributions; in others, they may help to justify public subsidy. • The different railway interests need to work together to present a unified view to third parties, and, where several stations serve a strategic centre, the SRA/PTA/PTEs should consider developing a permanent railway policy group in the area. • The SRA should work increasingly closely with regeneration bodies, particularly Regional Development Agencies. • Some additional stations should be returned to the track provider’s control. • TOCs should be adequately resourced and incentivised to engage in medium and long term strategies for station land development. • The SRA should clarify where additional resources are likely to be made available for off-railway developments. • Public sector players should potentially make greater use of compulsory purchase orders to assemble rail-accessible developable sites. • Good practice guidance on the layout and design of major developments would be helpful. <p>Discussion and future research: The study fed into the SRA Land Use Planning Statement, which laid out the principles of the SRA’s engagement in planning debates, and ultimately led on to the Regional Planning Assessments.</p>	

G1. A review of British evidence on the valuations of time and service quality	
Status	Not confidential
SRA contact	Brian Tittley, Strategy, Economics and Appraisal team. Study prepared for the Department of Environment, Transport and the Regions, OPRAF and the Passenger Demand Forecasting Subscription Service.
Contractor	Mark Wardman, ITS Leeds
Project start date	September 1997
Project completion	April 1998
Cost	£14,716
Publications	Unpublished draft final report (74pp). Hard copy only obtained.
Follow-up	This study was part of the ongoing process of assessing the Passenger Demand Forecasting Handbook
<p>Objectives: This study built upon previous work by Mark Wardman estimating passengers' valuation of in-vehicle time. It extended this work to evaluate other aspects of service quality. It was based on British evidence, and looked at evidence relating to users of all modes.</p> <p>Description and main results: The study involved a review of 110 previous studies, which contained a total of 1180 valuations for different aspects of transport, based on both revealed preference and stated preference work. The aspects considered in the study were: walking time, access time, waiting time, search time, late time, departure time adjustments, congested travel time, public transport headway and public transport interchange. Conclusions included that:</p> <ul style="list-style-type: none"> • Business and first class travellers tended to place the highest valuations on different travel aspects. • Commuters tended to have higher valuations than leisure travellers. • There were strong 'mode' effects on the valuations. • There was a good correspondence between stated preference and revealed preference values for in-vehicle time, but this was not necessarily the case for other attributes. • Walk and wait times were only valued at 1.5 times the value of in-vehicle time. • Walk and wait times had similar values, as did earlier and later departure time shifts. • The valuation of interchange was strongly related to distance. <p>Discussion and future research: Compared to previous work, the main issue of controversy to arise from the study was that walk and wait times should be valued at only 150% of in-vehicle time, compared with the existing convention, which usually valued them at double the value of in-vehicle time.</p>	

G2. Punctuality and reliability	
Status	Not confidential
SRA contact	n/a. SRA involvement via Rail Operational Research.
Contractor	University of Westminster
Project start date	October 1997
Project completion	February 2000
Cost	n/a
Publications	Final report, 139pp including appendices. Hard and soft copy obtained. Results summarised in Bates JJ, Polak JW, Jones PM and Cook AJ (2000), 'The valuation of reliability', Transportation Research E, 37, pp.191-229
Follow-up	The study forms part of a suite of reports aiming to put values on reliability and punctuality, c.f. studies G1 and G3.
<p>Objectives: The study aimed to explore the public's perception of punctuality and reliability.</p> <p>Description and main results: Data collection in the study involved:</p> <p>a) a preparatory phase, comprising 2 group discussions with rail passengers in Manchester/Stockport and Greenwich; 20 semi-structured interviews including some non-rail travellers and about 200 returned self-completion questionnaires, distributed at Hayes and Manchester to customers boarding London-bound trains.</p> <p>b) 451 face-to-face stated preference interviews, carried out between February and September 1999 on 5 routes across the UK.</p> <p>The study found:</p> <ul style="list-style-type: none"> • The impact of delay could be represented by the average delay relative to timetable (ADT) <i>plus</i> a measure relating to the time constraints of the traveller (termed 'expected schedule delay' – 'ESD'). • Average delay relative to timetable was the most important component and valuing it at 2.5 times the value of in-vehicle time was justified. However, actual valuations varied, within a general range of 1-5 times the value of in-vehicle time. • Longer distance Intercity service users and those on work trips placed higher values on ADT, whilst non-London shorter-distance non-work users placed lower values on ADT. • ESD values were highest where service frequencies were high. The main reason seemed to be that, with high service frequencies, the average inconvenience due to the schedule was low but only as long as the service was reliable. With lower frequencies, there was an unavoidable base level of inconvenience, and the impact of irregularity was, in relative terms, of less importance. There were also differences in ESD values between travellers. <p>Discussion and future research: The study concluded by noting that calculations were based on the assumption that travellers were reasonably informed about the pattern of delays they were likely to encounter, and that the inconvenience would be greater if this were not the case.</p>	

G3. Valuation of reliability and punctuality improvements on rail services																			
Status	Not confidential																		
SRA contact	Rebecca Davies, Strategy, Economics and Appraisal team																		
Contractor	MVA (Duncan Edmondson)																		
Project start date	December 1999																		
Project completion	August 2000																		
Cost	Approx £45,000																		
Publications	Unpublished final report (40pp plus appendices) Hard and soft copy obtained.																		
Follow-up	This study formed part of a suite of work evaluating different aspects of rail services (c.f. studies F4, F5 and H1)																		
<p>Objectives: This study aimed to put a valuation on the benefits to rail customers of improving levels of punctuality and reliability on services to and from London.</p> <p>Description and main results: The work involved 10 qualitative interviews with passengers, leading on to a stated preference survey of 1073 passengers travelling to and from London, on a range of different services. Key findings were as follows:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 40%;">Service type</th> <th style="width: 30%;">Average delay (pence/min)</th> <th style="width: 30%;">Standard deviation of delay (pence/min)</th> </tr> </thead> <tbody> <tr> <td>Inner suburban</td> <td style="text-align: center;">67.9</td> <td style="text-align: center;">16.1</td> </tr> <tr> <td>Outer suburban</td> <td style="text-align: center;">68.0</td> <td style="text-align: center;">10.9</td> </tr> <tr> <td>Intercity standard non-business</td> <td style="text-align: center;">61.7</td> <td style="text-align: center;">37.2</td> </tr> <tr> <td>Intercity standard business</td> <td style="text-align: center;">386.3</td> <td style="text-align: center;">161.8</td> </tr> <tr> <td>Intercity 1st class</td> <td style="text-align: center;">373.2</td> <td style="text-align: center;">165.3</td> </tr> </tbody> </table> <p>The study showed that the delay values for suburban passengers were roughly similar, regardless of suburban service. Standard intercity passengers valued delay similarly, but were around 3 times as sensitive to delay variability. Business passengers were clearly more sensitive to delay per se – although the values given to delay by all segments equated to about 6-7 times the values of their in-vehicle time.</p> <p>Most respondents reported that they were satisfied with current levels of delay, although about 20% were either neutral or dissatisfied.</p> <p>Discussion and future research: The study finding – that delay time was valued at 6-7 times the value of in-vehicle time – was considerably different to the recommendation given in the Passenger Demand Forecasting Handbook – which recommended that delay time should be valued at 2.5 times the value of in-vehicle time.</p> <p>The work was intended to be used in conjunction with the investment appraisal framework outlined in Planning Criteria: A Guide to the Appraisal of Support for Passenger Rail Services.</p>		Service type	Average delay (pence/min)	Standard deviation of delay (pence/min)	Inner suburban	67.9	16.1	Outer suburban	68.0	10.9	Intercity standard non-business	61.7	37.2	Intercity standard business	386.3	161.8	Intercity 1 st class	373.2	165.3
Service type	Average delay (pence/min)	Standard deviation of delay (pence/min)																	
Inner suburban	67.9	16.1																	
Outer suburban	68.0	10.9																	
Intercity standard non-business	61.7	37.2																	
Intercity standard business	386.3	161.8																	
Intercity 1 st class	373.2	165.3																	

G4. Review of performance regimes	
Status	Not confidential
SRA contact	John O’Neill, Operations
Contractor	AEA Technology and London Economics
Project start date	March 1999
Project completion	September 1999
Cost	£300,000+
Publications	Unpublished final report, 139pp. Hard and soft copy obtained.
Follow-up	This study fed into the Regulator’s 2000 review of track access charges; changes to the template franchise agreement; and the scrapping of the Fare Incentive Adjustment Payment (FIAP).
<p>Objectives: The study aimed to explore the effectiveness of existing performance incentive regimes, and the potential role for new measures.</p> <p>Description and main results: The study included an assessment of performance and performance regimes; spreadsheet modelling of Schedule 7 and 8 incentives; surveys and interviews with 30 stakeholders; econometric analysis and an evaluation of future policy options. At the time, the main performance measures in place were as follows.</p> <p>The Passengers’ Charter - requiring operators to discount season tickets when reliability or punctuality falls below given standards.</p> <p>Franchise agreements with the Train Operating Companies (4 elements) -</p> <ul style="list-style-type: none"> • operators were required to comply with the quantity and quality of services standards set down in their ‘Passenger Service Requirement’, with failure to do so leading to fines and, potentially, franchise removal. • Schedule 7 set out Performance Incentive Payments (payments or fines for performance against given benchmarks), Timetable Change Incentive Payments (fines for negative timetable changes) and Short Formation Incentive Payments (fines for running shorter trains than scheduled). • Schedule 5 regulated fares, where permitted increases were related to performance in the preceding 2 years. • Schedule 6 included the Fare incentive adjustment payment (FIAP), aimed at ensuring that fixed franchise payments were moderated where performance improvements had enabled the TOC to increase revenue. <p>Track Access Agreement (2 elements) – Schedule 8 compensated TOCs for disruption to services caused by Railtrack or other TOCs, whilst Schedule 4 compensated the TOCs for lost revenue arising from possessions.</p> <p>The study concluded that the existing incentive regimes were essentially well designed, and provided strong incentives to avoid poor performance. However, they were unlikely to drive continuous improvement and had some elements of unnecessary complexity and perversity that could be eliminated.</p> <p>Discussion and future research: The study significantly influenced changes to regimes made in the Regulator’s Review of Access Charges, 2001. Additionally, the study provided the basis for scrapping the FIAP, although this did not actually take place until later, when performance was more stable.</p>	

G5. RADAR Project	
Status	Sensitive/controversial conclusions, as outlined in the final paragraph
SRA contact	John O’Neill, Operations
Contractor	AEA Technology Rail
Project start date	Mid 2002
Project completion	December 2002
Cost	Approx £250,000 (inc. VAT)
Publications	Unpublished reports: Final report, 50pp (Dec 02); Appendix of supporting tables, 41pp (Sept 02); Technical Appendix, 23pp (Oct 02); Supplementary report, approx 20pp (Dec 02). Three of four of the reports obtained in hard and soft copy. Where not obtained for the audit, copies of all reports should be available from AEAT.
Follow-up	The report was shared with the industry and other franchise bidders. It helped to prioritise delay issues and prompt debate about causes. It led onto RADAR 2 and fed into the rail performance National Task Force.

Objectives: The study aimed to investigate why the withdrawal of the severe network restrictions imposed immediately post Hatfield had not resulted in train performance returning to pre Hatfield levels, using the East Coast Main Line (ECML) and the South Central network (SCN) as case studies.

Description and main results: The study compared data from May 99-April 00 with May 01-April 02 (i.e. pre and post Hatfield). Over that period, there was a step-change drop in passenger train service performance (measured using the ‘PPM’ measure). Between the two years, PPM fell by 12.5% on long distance services (excluding Gatwick Express) and 8.1% on London and South East Services. The study identified the following factors as the main causes (figures in brackets estimate the extent of their contribution to the problem):

- Temporary speed restrictions (69% on ECML, 0% on SCN)
- Professional (or defensive) driving when approaching station stops or non-green signals (10% on ECML, 50% on SCN)
- Delays on trains newly fitted with Train Protection and Warning Systems (1% on ECML, 13% on SCN)
- More, and longer lasting, incidents (13% on ECML, 16% on SCN)
- Changing to a less robust timetable (0% on ECML, 12% on SCN)
- Longer stopping times due to more passengers (0% on ECML, 5% on SCN)

Reductions in experience amongst key groups of staff, including signallers, drivers and operations managers, were seen as contributing to these problems. The study found that the step-change in performance could *not* be attributed to network congestion; more major incidents; tighter programming of rolling stock and train crew; deterioration in rolling stock reliability; more possessions or possession overruns (i.e. track maintenance); changes to operating rules and protocols; or failure to manage inter-train-operator delays.

Discussion and future research: The final report’s conclusion that changes in driving style were a key contributor to delay was controversial, and not accepted by parts of the industry. It led to the supplementary report, which highlighted that some of the evidence about this was contradictory.

G6. RADAR 2	
Status	Not confidential, although note the sensitivities reported in relation to the original RADAR work (c.f. study G5)
SRA contact	John O'Neill, Operations
Contractor	AEA Technology Rail
Project start date	May 2003
Project completion	March 2004
Cost	£205,000 + VAT
Publications	<p>Unpublished reports for 5 stages of work:</p> <p>Applying the RADAR methodology to different parts of the UK: <i>South West Routes:</i> Interim report (of tables), 41pp (Jun 03); Supplementary tables, 10pp (Jul 03); Final report, 41pp (Sep 03). <i>South East Routes:</i> Interim report (of tables), 40pp (Aug 03); Final report, 53pp (Nov 03).</p> <p>Assessing the performance impacts of Mark 1 replacement: <i>South West Routes:</i> final report, approx 10pp (Sep 03) <i>South East Routes:</i> final report, 15pp (Dec 03) <i>South Central Routes:</i> final report, 18pp (Mar 04)</p> <p>Hard copies of 4 reports and soft copies of 2 reports have been obtained for the audit. Where not obtained, copies of all reports should be available from Stephen Draper at AEAT.</p>
Follow-up	All RADAR studies were shared with the industry. First Great Western commissioned their own RADAR study from AEAT for their part of the network. The Mark 1 replacement studies helped to inform the industry about the potential implications of the transition, and were used in the South West trains franchise negotiation.
<p>Objectives: Given the significant differences in the two case study areas identified in the original RADAR study, RADAR 2 aimed to apply the RADAR methodology to other parts of the rail network (specifically the south east and south west). The data from these, and the original RADAR work, were then used to forecast the impacts on rail performance of replacing the Mark 1 stock.</p> <p>Description and main results: Comparing 1999/00 with 2002/03, performance was estimated to have declined by about 5% in the South East and 11% in the South West. In both cases, professional or 'defensive' driving policies were identified as one major cause (estimated to account for 28% of the decline in the SE and 34% in the SW). Data from the existing RADAR studies were then used to forecast the potential impacts of replacing the Mark 1 trains with new Electrostars. Model results were compared with historical data about Electrostar performance during the first few months of introduction, as a cross check on validity. In general, the studies suggested that the impacts on performance were likely to be minor (including predictions of a 0.1% reduction in PPM on South Central services and a 0.4-0.6% reduction in PPM on South East routes).</p> <p>Discussion and future research: The impact of differing driving styles on performance seems worthy of further research, given its potential importance, and the lack of industry consensus about its effects.</p>	

G7. Establishing the cost and implications of performance improvement measures – a scoping study	
Status	Main report considered confidential.
SRA contact	Elliott Ball, Policy
Contractor	Jacobs consultancy
Project start date	n/a
Project completion	November 2003
Cost	£57,000
Publications	Unpublished report. Hard copy only obtained.
Follow-up	The report was circulated to the DfT. It has led on to the ‘performance forecasting’ study (G9).
<p>Objectives: The aim of the study was to assess the causes of train delay, and the costs involved in achieving performance improvements.</p> <p>Description and main results: The study involved an analysis of the ‘TRUST’ data, which contains details of all delays of 3 minutes or more, and a categorisation of their causes.</p> <p>The study found that train delay had increased by 5% p.a. between April 1997 and March 2000, but, post-Hatfield, had grown by 64%, with only a small subsequent decline. In 2002-03, delays were split about 90% passenger and 10% freight by victim, and 60% Network Rail and 40% TOC by perpetrator. 30% of all delays were caused by ‘TOC on self’ (i.e. internal train operator problems). 26% were caused by infrastructure failures. The nature of infrastructure failures had changed significantly, with gauge corner cracking becoming much less significant, and broken rails/track fault problems becoming much more important.</p> <p>The main body of the report then examined a wide range of potential ways to reduce train delay, and the costs of implementing each measure. It was notable that potential costs ranged from over £250m p.a. (for enhanced inspection and maintenance of the most troublesome point types) through to ‘no-cost’ issues such as better management of external contractors.</p> <p>Using these figures, and a breakdown of the causes of delay, the study team estimated that reducing delays by 10% would cost £1,578 million in capital expenditure and £210 million p.a. in operating expenditure. For a 20% reduction, the costs would be £3,806m in capital and £509m p.a. in revenue. For a 30% reduction, the costs would be £6,959m in capital and £926m p.a. in revenue. It was noted that these estimates were based on introducing ‘hard’ remedial measures, whereas ‘softer’ options, such as improved procedures and exchange of knowledge, might be very cost-effective in comparison.</p> <p>Discussion and future research: The study should be considered in parallel with the RADAR studies (G5 and 6), which included significant amounts of analysis about the relative causes of delay. The report included a specification for a further study, which would involve a more detailed assessment of remedial measures, together with their costs, impacts and timescales.</p>	

G9. Performance forecasting	
Status	Status cannot be determined until completion of the final report.
SRA contact	Elliott Ball or Tabitha Jay, Policy
Contractor	Frontier Economics
Project start date	March 2005
Project completion	n/a
Cost	Up to £75,000 + VAT
Publications	Not yet available
Follow-up	The study has led on from previous work by Jacobs consultancy. The DfT is involved in the study.
<p>Objectives: The study aims to establish the key drivers of train performance and to quantify the relationships between drivers and performance. It also aims to explore whether/how statistical techniques can be used to model such relationships.</p> <p>Description and main results: The study is only just starting. Those involved see train performance as being dependent on:</p> <ul style="list-style-type: none"> • an initial incident (i.e. infrastructure failure, rolling stock problems, driver absence or delay, overcrowding, weather or vandalism), • the reaction to the initial incident (relating to the speed and quality of staff reactions; appropriate management structures; network constraints; rolling stock availability and timetabling issues); and • secondary impacts (depending on factors such as timetabling and network congestion, differential train speeds on the same track and the degree of industry wide co-ordination and contingency planning). <p>The study aims to collect information on all factors of interest, and to subject them to statistical analysis.</p> <p>Discussion and future research: It should be noted that this study follows on from a large amount of previous work on performance, including the RADAR studies (G5 and G6) and the Jacobs report on the costs and implications of performance improvement measures (G7).</p>	

G10. Passenger rail services and economic performance	
Status	Not confidential.
SRA contact	Preetum Domah, Strategy, Economics and Appraisal
Contractor	OXERA / Mott MacDonald in association with John Bates
Project start date	July 2003
Project completion	October 2003
Cost	£66,687 inc. VAT
Publications	Report published on SRA website, 44pp plus appendices. Hard and soft copy obtained.
Follow-up	The study contributed to the 2004 spending review and the 'Case for Rail' report.
<p>Objectives: The project aimed to quantify the impact of poor rail performance on the economy, evaluating the magnitude of impacts omitted or underestimated in conventional appraisal.</p> <p>Description and main results: The study included literature review and surveys (although low response rates limited survey findings). A model was developed based on the assumption that travellers have a preferred arrival time (PAT), that journey time saved by arriving early should be valued at half the value of travel time saved (VTTS) and journey time incurred by arriving late should be valued at double the VTTS. Four categories of economic disutility arising from rail unreliability were identified and, where possible, quantified:</p> <p>Direct harm to business: Business travellers were incurring at least £1 billion p.a. (£6.80 per trip) of disutility due to rail problems. Secondary effects on non-travellers or from cancelled meetings would increase this cost.</p> <p>Indirect harm to business: Stressful journeys reduce productivity at work by 13-18%, and unreliable journey times have been linked to low job satisfaction, higher sickness and absence rates. Commuters arriving late often make up delay by working late, reducing productivity loss but increasing personal disutility.</p> <p>Harm to commuters: Unreliable travelling conditions can double stress levels. Commuters were incurring at least £500 million p.a. (£1.18 per trip) of disutility due to rail unreliability.</p> <p>Harm to tourism: Leisure travellers were incurring at least £650 million p.a. (£1.68 per trip) of disutility due to rail unreliability. In the year after Hatfield, unreliability was estimated to cost English Tourist Board areas £11.2 million, although this money may have remained within the UK economy.</p> <p>Quoted figures assume that travellers had adapted their travel behaviour to minimise problems. Without such adaptation, disutility estimates are higher. Overall, disutility savings could be £900m p.a. if each TOC returned to its best year of performance, or £2.2 billion p.a. if the railway ran with no delays (equivalent to about two-thirds of the total annual ticket sales of the railways).</p> <p>Discussion and future research: The study argued that improvements in rail reliability had a significant value not fully included in existing project appraisal. This study should be considered in parallel with the travel time variability study (G11), which showed that rail is as reliable as other modes. However, rail passengers may be more sensitive to unreliability than other mode users.</p>	

G11. Travel reliability and variability by different modes	
Status	Not confidential
SRA contact	Stephen Atkins and Caroline Hughes, Planning
Contractor	AEAT Technology Rail, Imperial College, Cranfield University
Project start date	1 st December 2003
Project completion	June 2004
Cost	£40,000 inc. VAT (+£5,000 for iTIS data).
Publications	Final unpublished report, 49pp plus three appendices. Contains study findings and graphs giving profiles of reliability of different modes on selected routes. The full data from the project are also held as a data set by the SRA. Hard and soft copy of final report obtained.
Follow-up	No follow up work commissioned.
<p>Objectives: The project aimed to compare the reliability of rail with road and air transport, partly to assess the validity of claims that ‘rail is unreliable’.</p> <p>Description and main results: The final inter-modal comparison concentrated on all scheduled rail, air and coach services travelling in both directions between London and Manchester, between winter 2002 and autumn 2003 (excluding Sunday services). The analysis showed that, in terms of reliability, on average, rail was better than road, and comparable with air. It was only in unusual circumstances, like the summer heatwave of 2003, that rail performed worse than other modes. The study also highlighted the importance of ‘padding’ – where published journey times were longer than the operator expected them to be – as a key way in which some rail and air operators had sought to increase ‘reliability’ in recent years. It also showed seasonal variability in performance, and differences in service reliability depending on the direction of travel. Generating data in comparable formats was a major task of the project. Delays to air services were obtained from the CAA; a sophisticated measure of rail delay was developed based on BIFS data; and the reliability of road travel was assessed by merging iTIS data on actual coach services with published timetables for services.</p> <p>Discussion and future research: Arguably, the rail industry needs to address perceptions of unreliability, which, according to this study, are not justified by actual performance. Possibly, these perceptions may be generated by extreme events, which cause reliability to drop substantially below average, (or possibly by delays on Sunday services, which were excluded from the study). Alternatively, it may be that public tolerance for ‘unreliability’ is different for rail, compared to road (where traffic jams are ‘normal’), or air (where infrequent usage leads to greater tolerance). The role for padding as a positive tool to address the issue possibly needs further investigation. Analysis of ‘door-to-door’ journey times for customers, compared with analysis of scheduled routes might also be favourable for rail, given, for example, the amount of time wasted waiting in airports.</p>	

G11. continued: Travel reliability and variability by different modes

Definitions used

For all three modes, analysis was completed for morning peak, evening peak and off peak periods on weekdays, and Saturday travel.

Rail: Using BIFS data, train delays were calculated as the lateness of passengers rather than trains – i.e. delay was defined to equal the difference between the expected time of arrival of the intended train and the fastest arrival time of the train options occurring after the scheduled departure time of the intended train. Data were obtained for 13 journey flows, which were chosen to represent a cross section of UK journey patterns.

Air: Actual journey times were compared to scheduled times according to data supplied by the CAA. These data did not include delays to aircraft once they had landed (i.e. whilst taxiing from the runway to the stand). Data were obtained for 3 of the rail journey flows.

Road: Actual journey times were compared to scheduled times for National Express coach services, by merging iTIS vehicle data with timetables (with a variable degree of success). Data were cleaned to remove anomalies. Data were obtained for 6 of the rail journey flows.

Key findings from comparing rail and air:

As shown in table 1, on average, the reliability of rail and air travel was roughly comparable. However, these figures were influenced by the summer heatwave of 2003, when rail was considerably less reliable than air (with some ‘knock-on’ effects for Manchester to London services in Autumn 2003). In ‘normal’ circumstances, rail was more reliable than air.

Table 1: Comparing rail and air service reliability

	% services arriving within 15 minutes		% services delayed by 31 minutes +	
	Rail	Air	Rail	Air
<i>Manchester to London</i>				
Winter 02/03	75.2	70	15.4	15
Spring 03	83.6	80	7.9	8
Summer 03	63.0	75	23.7	10
Autumn 03	67.8	70	16.3	14
<i>London to Manchester</i>				
Winter 02/03	77.5	71	11.2	14
Spring 03	83.3	80	6.5	7
Summer 03	70.5	74	18.9	11
Autumn 03	75.9	67	10.3	14
Average for all	74.6	73	13.8	12

Grey shading indicates where rail performed worse than air

G11. continued: Travel reliability and variability by different modes

Key findings from comparing rail and road:

As shown in table 2, on average, rail was more reliable than road travel. For example, in Autumn 2003, only 10% of rail passengers travelling from London to Manchester were delayed by over 30 minutes, compared to nearly a quarter of those travelling by coach. However, rail services were considerably less reliable than road travel during the summer heatwave of 2003.

Table 2: Comparing rail and road service reliability

	% services arriving within 10 minutes		% services delayed by 31 minutes +	
	Rail	Road	Rail	Road
<i>Manchester to London</i>				
Winter 02/03	66.8	59.5	15.4	22.4
Spring 03	78.0	66.1	7.9	20.9
Summer 03	56.4	67.1	23.7	14.7
Autumn 03	58.8	56.0	16.3	20.0
<i>London to Manchester</i>				
Winter 02/03	72.0	66.8	11.2	15.2
Spring 03	77.3	69.8	6.5	18.1
Summer 03	65.9	71.4	18.9	12.1
Autumn 03	68.0	66.7	10.3	24.4
<i>Average for all</i>	<i>67.9</i>	<i>65.4</i>	<i>13.8</i>	<i>18.5</i>

Grey shading indicates where rail performed worse than road.

H1. Valuation of crowding improvements on rail services

Status	Not confidential
SRA contact	Rebecca Davies, Strategy, Economics and Appraisal
Contractor	Duncan Edmondson, MVA
Project start date	December 1999
Project completion	June 2000
Cost	Approx £45,000
Publications	Unpublished final report (approx 50pp). Hard and soft copy obtained.
Follow-up	Further work on crowding has been undertaken , as reported in studies H2 – H4

Objectives: The study aimed to put a value on the benefits to rail customers of relieving crowding on services to and from London.

Description and main results: The study involved stated preference surveys with 2141 passengers, on a range of different services into London. These were preceded by 10 qualitative interviews which showed that outer-suburban and Intercity passengers believed that a ticket entitled you to a seat, and would be unhappy about the concept of paying more to avoid crowding. In general, the study showed that time spent standing was often valued at over 3 times time spent sitting. Specific values calculated were as follows:

		Load factor	Value of time (p/min)	Ratio to base value of time
Inner suburban services	Seated	90%	7.7	1.0
	Seated	120-160%	11.1	1.4
	Standing	120%	24.8	3.2
Outer suburban services	Seated	80-100%	9.9	1.0
	Seated	120%	9.9	1.0
	Standing	100-120%	26.9	2.7
Intercity standard leisure passengers	Seated	50-80%	10.8	1.0
	Seated	110%	10.8	1.0
	Standing	110%	39.4	3.6
Intercity standard business passengers	Seated	50-80%	n/a	1.0
	Seated	110%	n/a	1.0
	Standing	110%	n/a	3.4
First class passengers	Seated	50-80%	n/a	1.0
	Seated	110%	n/a	2.3
	Standing	110%	n/a	n/a

(All data Q1 2000 prices)

Discussion and future research: The study suggested that passengers were more sensitive to standing, and less sensitive to overcrowding than the figures in Passenger Demand Forecasting Handbook (PDFH) suggest. It proved impossible to validate or invalidate the results using revealed preference data.

H2. Review of the crowding policy	
Status	Tables 5.3 and 5.4 and figure 5.9 are confidential given the inclusion of commercial information. The report could be made publicly available if these were removed or GNER gave permission for use.
SRA contact	Preetum Domah, Strategy, Economics and Appraisal
Contractor	OXERA
Project start date	January 2003
Project completion	May 2003
Cost	£59,220 exc. VAT
Publications	Final unpublished report, 65pp plus separate appendices. Hard and soft copy obtained.
Follow-up	This study led on to work by the Policy team (c.f. studies H3 and H4)
<p>Objectives: The aim of the study was to evaluate the SRA policy on crowding, originally put in place by OPRAF when British Rail was privatised.</p> <p>Description and main results: The study found that overcrowding reduces customer satisfaction, and could have wider impacts, such as reducing train reliability. Crowding was being evaluated using the ‘PIXC’ measure (passengers in excess of capacity), where capacity was defined as the number of train seats, plus, if the train had stopped within 20 minutes, a certain allowance for standing passengers. The London and Edinburgh commuter TOCs were required to undertake passenger counts every autumn in order to calculate PIXC, and to stay within certain PIXC limits. Elsewhere, TOCs were simply required to use ‘reasonable’ endeavours to address overcrowding. Since 1995, crowding problems had increased.</p> <p>The study found that all the TOCs had attempted to alleviate overcrowding, and that regulation was relatively unimportant compared with commercial and reputational pressures to do so. However, the PTEs felt that TOCs outside London had been less good at addressing the issue. The report argued that this was because the PIXC requirements meant that regulated TOCs had more information about crowding (rather than because of the regulation acting as a ‘stick’). Infrastructure and rolling stock constraints, rather than TOC motivation, were seen as the main problem for reducing overcrowding. There were also some issues with fare differentials, leading to unnecessary crowding on pre- and post- peak services.</p> <p>Discussion and future research: The report recommended:</p> <ul style="list-style-type: none"> • Data collection about crowding should increase, to consolidate existing information and to extend information collection across a wider area. • Information about crowding on individual services was more useful than aggregated information about TOC performance. • Information should be shared with other members of the rail industry and the general public, to enable Network Rail to focus on areas of concern and to enable passengers to choose less crowded trains. • The PIXC measure should simply measure capacity as 0.45m² per passenger (enabling operators to optimally balance standing and seating space). • A more readily understandable measure of overcrowding should be developed for passenger information purposes. 	

H3. Capacity overview	
Status	Main report confidential given the inclusion of company specific information.
SRA contact	Paula Crofts, Policy
Contractor	Jacobs consultancy
Project start date	n/a
Project completion	August 2004
Cost	n/a
Publications	Unpublished final report, 45pp. Hard and soft copy obtained.
Follow-up	The report fed into study H4 – which set out the principles of a potential consultation document about crowding strategy.
<p>Objectives: This study examined the potential to alleviate crowding on a number of specific rail routes, via capacity enhancement measures.</p> <p>Description and main results: In the initial phase of the study, 26 routes were identified as suffering from overcrowding, according to the PIXC measure (defined in study H2). The study then examined the potential to alleviate the problems on these routes by:</p> <ol style="list-style-type: none"> a) adding extra carriages to trains b) undertaking some platform lengthening in order to add extra carriages c) running extra trains in the peak <p>For the 26 routes examined, the study concluded:</p> <ul style="list-style-type: none"> • There was scope to lengthen existing trains using existing platforms on about two-thirds (18) of the routes. • There was scope to add capacity by lengthening platforms on 7 routes. • There were only 3 routes where the existing infrastructure would permit the running of additional trains in the peak. • There were 6 corridors where none of the proposed solutions were viable <p>28 specific enhancement proposals were then subjected to cost benefit analysis, using a model developed by Jacobs in previous work for the SRA, c.f. study E2. Crowding costs were taken from the Passenger Demand Forecasting Handbook, demand growth assumptions consistent with Planet Matrices 2016 were used and train loading data by calling point was taken from the MOIRA model. Proposals were appraised over 40 years using a 3.5% discount rate. The study concluded that only 5 of the proposals showed positive economic potential.</p> <p>Discussion and future research: As outlined in study H4, the results of the study were interpreted as showing that alleviating overcrowding would require significant public investment, since the economic case for train operators to invest in capacity enhancing measures was often likely to be weak, and, in a number of situations, more substantial measures to increase capacity would be required than those examined in this study.</p> <p>It should be noted that this study seems to have been undertaken in isolation from the ongoing ‘Route Utilisation Strategies’ being undertaken by the Planning team, which have examined the issue of capacity enhancements in considerably more depth (c.f. study H9).</p>	

H4. The SRA's overcrowding policy	
Status	The study was only written to inform internal opinion, and covers sensitive political issues.
SRA contact	Tabitha Jay, Policy
Contractor	Claire Bloom, Frontier Economics
Project start date	July 2004
Project completion	January 2005
Cost	Approx £15-20,000
Publications	Final unpublished report (55pp). Hard and soft copy obtained.
Follow-up	The study was originally intended to be developed into a consultation document. It will now be up to DfT to take this work forward.
<p>Objectives: The study aimed to develop a policy framework for addressing crowding, and to define future data collection requirements in order to implement this.</p> <p>Description and main results: The study highlighted that 4 operators had consistently breached crowding targets, however it was unclear how reasonable those targets were, and it was difficult to assess whether operators were using enough of their own powers to address the problem. The study proposed the concept of 'efficient crowding', where money spent on crowding should equate to the value that passengers would put on crowding reduction. It suggested using a hierarchy of measures to reduce crowding (ordered according to cost), including fares policy, lengthening trains, adding new services, lengthening platforms and increasing network capacity. It highlighted that train operators, and the Route Utilisation Strategies, could take forward some of the cheaper options, but that capacity expansion could be needed in the longer term. It also highlighted that capacity expansion would require government intervention, given that franchise agreements were typically too short to encourage operators to invest in longer term capacity expansion measures.</p> <p>To encourage operators to address crowding, the study recommended setting a TOC-specific 'crowding level' within the Service Level Commitment (SLC) for each franchise, (i.e. effectively a crowding target), which could be reviewed when the SLC was reviewed.</p> <p>In terms of measuring crowding, the study recommended that:</p> <ul style="list-style-type: none"> • For operators in London and the South East, automatic passenger counters should be rolled out on 25% of new rolling stock by 2008, in order to conduct 4 passenger counts over a 40 day period each year. • All operators should submit at least one annual passenger count. • Capacity should be defined as a fixed space per passenger (0.45m²) for trains stopping within 20 minutes of the point of highest loading. Otherwise, capacity should be defined as the number of train seats. <p>Discussion and future research: The study drew on earlier work (including studies H2 and H3). In developing future crowding strategy, passenger valuations of crowding (as given in study H1 and the Passenger Demand Forecasting Handbook) could be usefully considered.</p>	

H5. Passenger demand forecasts and network capacity	
Status	The main report contains company specific information.
SRA Contact	Brian Titley / Carol Smales, Strategy, Economics and Appraisal
Contractor	WS Atkins
Project start date	March 1998
Project completion	June 1998
Cost	£15,355 + VAT
Publications	Unpublished final report, approx 40pp Hard copy only obtained
Follow-up	This study formed part of OPRAF's wider review of Railtrack's 1998 Network Management Statement.

Objectives: This study aimed to give an independent view about the likely growth in rail passenger demand in the future.

Description and main results: The study involved calculating the likely growth in passenger rail demand using the industry standard forecasting relationships from the Passenger Demand Forecasting Handbook. These projections were compared with the traffic growth assumptions contained within the passenger rail franchise bids, and with Railtrack's own forecasts. In the 1998 Network Management Statement (NMS), Railtrack's published central estimate was for 15% growth in passenger demand over 10 years. However, Railtrack also supplied OPRAF with an unpublished 'base case' scenario forecast of 35% over 10 years.

Final comparisons were as follows:

<i>Cumulative growth</i>	<i>Franchise bids</i>	<i>PDFH forecasts</i>			<i>Railtrack base</i>	<i>Railtrack 15%</i>
		<i>Low</i>	<i>Central</i>	<i>High</i>		
<i>1998-2003</i>	19.5%	3.5%	11.4%	19.7%	13.6%	5.9%
<i>1998-2010</i>	n/a	9.0%	29.6%	65.1%	45.8%	18.3%

The central PDFH forecast was that passenger miles would increase from 21.2bn passenger miles p.a. in 1998 to 23.6bn in 2003 and 27.5bn in 2010, equivalent to a growth rate of 2.2% p.a.. Compared to the independent results, this suggested that:

- The franchise bid forecasts represented a very optimistic view of potential future demand.
- The unpublished Railtrack base case forecasts represented an optimistic view of potential future demand.
- The published 15% NMS assumption represented a pessimistic view of potential future demand.

Discussion and future research: Latest data from National Rail Trends shows that passenger rail travel grew from 21.6bn miles in 1997/98 to 24.7bn miles in 2002/03, a total growth of 14.4%. (Between 1998/99 and 2003/4, cumulative growth was 12.7%). These figures are slightly higher than the central PDFH forecasts, and closest to Railtrack's unpublished base case scenario. They indicate that PDFH forecasting gives results which are the right order of magnitude, but may be slightly pessimistic. This is particularly notable given the negative effects on demand of the October 2000 Hatfield crash and subsequent speed restrictions.

H6. Analysis of passenger rail demand	
Status	Main report confidential given the inclusion of company specific data.
SRA Contact	Carol Smales, Strategy, Economics and Appraisal team
Contractor	NERA
Project start date	February 1999
Project completion	July 1999
Cost	£53,735 exc. VAT
Publications	Unpublished final report, 73pp. Hard and soft copy obtained.
Follow-up	The model developed in the study was handed over to OPRAF.

Objectives: The study involved a review of passenger demand forecasting techniques, and the development of a new model.

Description and main results: The study involved a literature review and econometric analysis, applying both time series and panel data techniques to investigate the impact of external economic variables and fares on demand. In particular, PDFH recommendations were scrutinised. The biggest area of concern was perceived to be how rail demand was responding to a long term trend of rising GDP. Traditionally, growing wealth was assumed to be linked with falling rail demand. However, the study highlighted that this had not been the case since the mid-1990s, and that factors such as road congestion, parking difficulties and higher petrol prices could be fundamentally changing this relationship, and therefore needed inclusion in future work. Some of the other study findings were:

- Use of regional (rather than national) GDP figures could help increase forecasting accuracy.
- The evidence on aggregate fares elasticities was convincing, but there was much less evidence about the impact of differential fares movements or the introduction of dedicated (e.g. APEX) tickets.
- Evidence about the overall elasticity in relation to ‘generalised journey time’ (GJT) was good, although the detailed breakdowns in the PDFH were based on the results of a single study, and the evidence for converting changes in service frequency, interchanges and reliability into GJT values was questionable.
- The fares elasticities for London-based Intercity flows were lower than assumed in the PDFH, and those for Network South East were higher.
- Evidence about the determinants of regional railways traffic was weak.

Discussion and future research: The study generated forecasts of passenger rail travel for every year between 1997/98 and 2014/15, broken down by TOC. Overall, it predicted that passenger mileage would have risen from 21.4bn miles in 1997/98 to 26.8bn miles in 2003/4, a growth of about 25%. In contrast, PDFH forecasts suggested a growth of about 15%, and TCI Operational Research coefficients suggested a growth of about 19%. Data from National Rail Trends (2004/5) suggests that growth over that period was, in fact, about 18%. However, it should be noted that this 18% growth occurred over a period which included the Hatfield train crash, subsequent speed restrictions and consequent performance degradation – whose effects would not have been included in the forecasts.

H8. How do rail passengers respond to change ?	
Status	Not confidential
Client / SRA Contact	Work undertaken for the Passenger Demand Forecasting Council (PDFC). SRA contacts: Preetum Domah / Carol Smales, Strategy, Economics and Appraisal.
Contractor	OXERA with Joyce Dargay, Phil Goodwin, John Preston and Mark Wardman.
Project start date	October 2004
Project completion	February 2005
Cost	n/a
Publications	Unpublished final report, 58pp. Hard and soft copy obtained.
Follow-up	This study has fed into the ongoing revision of the Passenger Demand Forecasting Handbook.
<p>Objectives: At the time of the study, the PDFH assumed that the effects of changes in fares, generalised journey times (GJT) and delays were fully incorporated into passenger behaviour within one year. This study aimed to assess the importance of longer-term changes in behaviour.</p> <p>Description and main results: The study included a review of relevant literature; an extension of an existing meta-analysis of fare elasticities; new econometric analysis estimating long and short run elasticities of demand to changing conditions for 5 market segments; and work on ‘ramp effects’ (i.e. the time it takes for demand for new stations or routes to build up to the expected equilibrium level). The study concluded that the time taken for the effects of changes in fares, GJT or delays to work through could be up to 5 years. It also found some evidence of asymmetric responses to short-run changes in fares, and of ramp effects lasting up to 4 years. It recommended that long-run fare and GJT elasticities were in the range of -1.2 to -1.5, and that the one year elasticity was typically 60% of the long-run elasticity. Potential reasons given for relatively long term responses were:</p> <ul style="list-style-type: none"> • The slow spread of information amongst potential users • Change occurring at the speed of changes to where people live or work. • Changes in land use over time. • Initial switching costs (e.g. people waiting until a season ticket needs renewing before changing their behaviour) • Initial teething problems with new services, resulting in short-term negative impacts which are subsequently corrected. <p>Discussion and future research: Separate work on appropriate ways of assessing the long term impacts of delays was being submitted to the PDFC by the study team. Notably, the findings of this study were very different to those of other studies for the SRA – in particular, previous work by NERA looking at long term fare elasticities (ref. B4).</p>	

H9. Capacity utilisation appraisal guidance	
Status	Not confidential
SRA contact	Peter Northfield, Planning
Contractor	NERA and Jacobs Consultancy
Project start date	n/a
Project completion	February 2003
Cost	n/a
Publications	Unpublished report (34pp). Hard and soft copy obtained.
Follow-up	This work provided the generic principles used for undertaking the route utilisation strategies.
<p>Objectives: This study set out the broad principles for appraising different capacity utilisation options, using the PLANET model. It was accompanied by a ‘model development report’ and associated ‘user guide’. It was intended for internal use by SRA staff, and was consistent with published SRA appraisal guidance.</p> <p>Description and main results: The study defined ‘capacity utilisation options’ as ‘those not requiring major capital investment’. It argued that all options should be compared to a base case scenario. The base case scenario was assumed to include committed changes (i.e. those resulting from already committed infrastructure upgrades, achieving required standards and statutory requirements) and was also assumed to include assumptions about passenger and freight growth over time. The study recommended that options involving significant train timetable changes should be appraised over 3-5 years or longer, and that all options for the same route should be appraised over the same timescale, to enable comparability.</p> <p>In terms of benefits, the study recommended the need to consider impacts on passengers (measured in units of generalised time, including costs relating to in-vehicle time, waiting time, crowding and delay); impacts on freight customers (where impacts were often harder to quantify); the costs and revenue to the industry (including costs and revenue for Network Rail, TOCs, and FOCs); transfer payments that would be made within the rail industry; external benefits (in terms of impacts on road traffic) and indirect tax implications. The study argued that impacts should be calculated on an annual basis and expressed using the same base price year, with discounting of costs and benefits according to Treasury rules. Some kind of sensitivity analysis should also be undertaken, the scale of which should match the scale of the proposed scheme. Economic efficiency should then be calculated in terms of net present values.</p> <p>Discussion and future research: The study concluded that the findings from the work described above should be presented in the business case for each route utilisation strategy. Each business case should include background information, the modelling approach adopted, the results (including a specified ‘Transport Economy and Efficiency’ summary table) and the recommended option to emerge from each study. In general, this option should be affordable, deliverable, value for money and in keeping with general strategy.</p>	

H11. Factors influencing trip mode choice	
Status	Not confidential
Client/ SRA contact	Matthew Lodge, Planning and the Highways Agency
Contractor	RJ Balcombe, IO York and DC Webster, TRL.
Project start date	February 2001
Project completion	December 2002
Cost	Approx £530,000 in total (SRA contribution <£100,000)
Publications	Main report (61pp) published by TRL, ref. PR/T/112/02, plus unpublished supplementary reports. Only hard copies of the main report and one of the supplementary reports obtained.
Follow-up	The study was used to inform SRA thinking
<p>Objectives: The study aimed to establish what would encourage people to switch from car to public transport, for any journey of over 15 miles, and regular journeys of over 5 miles made at least 3 times a week. In particular, it focused on travellers who could have travelled by rail, but chose not to.</p> <p>Description and main results: Survey work was undertaken in Birmingham, Bromley, Burnley, Chelmsford, Plymouth, Reading and Trafford. It included interviews with 2800 travellers about factors affecting a journey they had already made, either by car or by public transport. A follow-up stated preference/transfer value survey focused on 595 of the car travellers who could have travelled by rail but chose not to, asking about the impacts of public transport improvements on their choices. The study highlighted that time and cost seemed to explain most of people's choices, although reliability, service times and interchange were identified as being important for a minority of travellers/journeys. Study findings included:</p> <ul style="list-style-type: none"> • >70% of respondents knew that there were public transport alternatives to their car journey, but had inaccurate information about costs/times. • Public transport was perceived as unreliable – most estimated that services ran on time for <80% journeys. • The value of time for rail users was consistently £5-6 / hour. <p>Modelling work then suggested that the proportion of car travellers who might switch to public transport was:</p> <ul style="list-style-type: none"> • 12% of long-distance travellers and 6% of regular travellers, if they were fully confident of adherence to service schedules. • 11% of long-distance travellers and 3% of regular travellers, if fares were 50% less • 6% of all travellers, if public transport journey times were 20% less. • 2% of travellers, if long distance journeys could be limited to 1 interchange and regular journeys could be achieved with no interchange • 2% of travellers, if better quality public transport information was available. • 1% of travellers if services were increased to 4 per hour. <p>Discussion and future research: The findings of the study were intended to highlight the relative value of different improvement packages. Interestingly, some of the findings conflict with previous work – e.g. study A1 suggested that service frequency was relatively important in mode choice.</p>	

H12. The effects of road congestion on rail demand	
Status	Access to the main report is the responsibility of the PDFC.
Client / SRA contact	Report commissioned by the PDFC, contact Matthew Chivers at ATOC. SRA contact: Jim Richards, Strategy, Economics + Appraisal
Contractor	SDG and John Bates Services (phase 1); SDG (phase 2)
Project start date	January 2003
Project completion	Phase 1 – July 2003; phase 2 - July 2004
Cost	n/a
Publications	Final unpublished reports – phase 1 (74pp) and phase 2 (48pp). Hard and soft copies obtained.
Follow-up	The study has fed into the latest revision of the Passenger Demand Forecasting Handbook (PDFH).

Objectives: The study aimed to provide recommendations for forecasting the effects of road congestion on the demand for rail.

Description and main results: The first phase involved 150 qualitative interviews about how people perceive congestion; developing a methodology for assessing the impacts of congestion; and evaluating existing data sources for making such as assessment. Trafficmaster data seemed the most appropriate but proved to be inadequate for this purpose. This led to the second phase of work, which involved a stated preference study. 600 interviews were conducted in Bristol, Manchester, Brighton and Luton in Jan/Feb. 2004. Interviewees were car-drivers who had made an inter-urban journey of 25+ miles, for which they considered rail to have been a realistic alternative. Key empirical results were:

- In terms of choosing between road and rail, 46% would always choose car and 4% would always choose rail. Varying conditions would result in the following proportion of the total sample choosing rail instead of road: 17% if fares were 50% cheaper; 10% if drive times were 40% longer; 6% if congestion on the road was ‘high’; and 3% if rail journeys were 80% faster. As congestion becomes increasingly worse, drivers perceive that drive times are longer than they actually are. On average, people who are more spontaneous/less time-constrained are more sensitive to congestion.
- When driving, if offered a choice between a short, congested route, and a longer, less congested route, 3% would always choose the short route and 17% would always choose the longer option. If the shorter, more congested route was 20% quicker, 12% would choose it (increasing to 56% if it was 100% faster). The greater the difference in conditions between the routes, the greater the number of people who are likely to choose the longer route.
- When driving, if offered the choice between a shorter, less reliable route and a longer, more reliable route, 4% would always take the shorter option and 31% would always take the longer route. If the shorter route were 20 minutes quicker, 36% would choose it. As the potential delay that they could encounter increases, more people would choose the longer route.

Discussion and future research: The study gave suggested text for the PDFH for taking the results into account. In general, the study showed that both congestion and fare levels could significantly affect the demand for rail.

H14. High speed line study	
Status	Summary report not confidential. Main reports confidential as inappropriate use could lead to unnecessary planning blight.
SRA contact	Patrick Bateson, Planning
Contractor	Atkins
Project start date	August 2001
Project completion	February 2003
Cost	£1.4 million
Publications	Main study - 15 volumes plus appendices. Summary report published on the DfT website. Hard and soft copy of the summary obtained.
Follow-up	The study led on to joint DfT/SRA work on strategic capacity (2005)
<p>Objectives: The study aimed to assess the feasibility of building a new high speed line (HSL) running from London to the north.</p> <p>Description and main results: The study encompassed a wide range of activities, and was undertaken by a consortium of 6 partners. It concluded that, on balance, there was a business case for building a HSL from London to the north. The main advantages were seen as being:</p> <ul style="list-style-type: none"> • To relieve forecast overcrowding problems on the strategic rail network, freeing up some of the existing rail lines for ‘classic’ rail services, and potentially encouraging some shift from road and air transport. (In this context, it was noted that the relative balance of air fares and HSL fares could be critical to the degree of transfer that occurred). • To increase the accessibility of London for those living in the north (with potential economic benefits for the connected regions, potentially reducing the overheating of the south-east, but, at the same time, with London likely to be the greatest beneficiary of all). • To improve safety (partly because of moving high speed trains to segregated tracks; partly because of potential reductions in road traffic accidents) • To help with city regeneration (but only if new stations were located in city centres rather than out-of-town parkway locations) <p>The main disadvantages were seen as being the cost – between £21 and £34 million per kilometre, (albeit with the recognition that the business case suggested net benefits), and negative environmental impacts. The study also noted that the case for the HSL would be undermined if: estimated journey time improvements were not achieved; or customers did not perceive HSL as an inherently attractive premium product; or growth in passenger demand was less than expected; or fares policy was not optimised. An addendum highlighted that new Treasury rules, changes to planned upgrades on the East Coast Mainline and road user charging all enhanced the business case for the HSL.</p> <p>Discussion and future research: It should be noted that the study was based on the DfT forecasts for travel associated with the 10 Year Plan for Transport, and DfT values for time savings, which, in other contexts, have received significant criticism. It could be interesting to compare the HSL case with a case for funding alternative infrastructure (e.g. an east-west spine link to underpin the regeneration work of the Northern way).</p>	

H15. Commuter flows in London and the Wider South East 2001 to 2016/21	
Status	Not confidential
Client / SRA contact	Study led by Corporation of London, involving SRA (Steve Atkins), GLA, LDA, ALG, TfL, SEERA, SEEDA, EERA and EEDA.
Contractor	Cambridge Econometrics and WSP
Project start date	Consultant engaged March 2004
Project completion	April 2005
Cost	SRA contribution: £12,000 + VAT
Publications	Unpublished report, 98pp + appendices. Hard and soft copy obtained.
Follow-up	n/a
<p>Objectives: For London, the South East and the East of England, the research aimed to assemble data relevant to commuter flows, and to develop a model to investigate the travel impacts of various population and employment scenarios.</p> <p>Description and main results: The study primarily involved detailed analysis of census data from 1991 and 2001, together with National Travel Survey data, to establish changes in commuting habits in the last 10 years. The study found:</p> <ul style="list-style-type: none"> • On average, people commute further if they are male, in full-time employment (vs. part-time), on higher incomes, in relatively specialised occupations and in occupations concentrated in only a few locations. • Journey distances increase as residential densities decline. Low residential densities are also associated with low levels of bus use and walking. • The balance of residents:jobs affects commuting distances. Essex residents commute further than those in Berkshire, due to a relative lack of jobs. • Between 1991 and 2001, there was a decline in the proportion of London residents commuting by car, whilst rail and underground use increased. This was not the case for those living outside Greater London. • Between 1998 and 2003, average commuting distances increased by 39%, helped by an 18% increase in average travel speeds. Longer journeys are disproportionately made by car. <p>A model was then developed, to assess the impacts of various future employment scenarios on travel behaviour.</p> <p>Discussion and future research: Although not spelt out in the report, the study has a number of transport policy implications. It implies that road improvements may primarily have contributed to urban sprawl, encouraging longer journey distances by car. Concentrating more jobs in London, whilst improving transport links with the wider south east, is likely to increase travel distances further, exacerbating long term problems. Instead, one strategy could be to encourage more employment in the larger urban centres of the wider south east, particularly in regions with jobs deficits, and to improve rail access to these centres from their immediate catchments, to make them more attractive locations for business and to try to replicate London’s experience in terms of achieving a modal shift away from the car.</p>	

I-A1. Regeneration effects of rail services	
Status	Not confidential
SRA contact	Preetum Domah, Strategy, Economics and Appraisal
Contractor	NERA / David Simmonds Consultancy
Project start date	January 2003
Project completion	March 2003
Cost	£43,000
Publications	Final unpublished report, 101pp, plus appendix and bibliography. Hard and soft copy obtained.
Follow-up	Initially, the intention was that the study would quantify the wider economic benefits of rail, which could feed into the ‘Case for Rail’ document. Instead, it highlighted the complexity of economic impacts and the importance of assessing schemes on an individual basis. DfT has undertaken further analysis of the specific benefits of Crossrail.

Objectives: The aim of the report was to review evidence and methodology for evaluating the wide economic impacts of rail services.

Description and main results: The research reviewed various existing guidance on evaluating the economic impacts of investment decisions. It found that revised ‘Green Book’ guidance from the Treasury emphasized the distributional impacts of investment; that SACTRA’s report on ‘Transport and the Economy’ provided a good general framework for considering the impacts of specific *transport* investment; and that forthcoming DfT guidance would require new ‘Economic Impact Reports’ for all projects of over £5million taking place in regeneration areas.

The report also reviewed evidence about the previous impacts of rail investment, which, it concluded, was limited, and showed that rail investment impacts had been patchy. For example, the French TGV network had only benefited some cities – in particular, those with pre-existing buoyant economies which could exploit its benefits. The study also highlighted that rail typically benefits higher income users, rather than the socially excluded, although it flagged up forthcoming SRA research showing that some rail services are vital for those on lower incomes, (c.f. E5).

As part of the research, a land-use/transport interaction (DELTA) model was developed and various scenarios were tested. These suggested that the main effect of introducing a new, inter-regional rail line would be to benefit the connected regions at the expense of others; and that the main effect of introducing an intra-urban rail line from a suburban area to a city centre would be to encourage migration of higher-income households into the suburban area.

Discussion and future research: The study made a number of recommendations. Subsequently, the SRA decided the findings implied that the best way to consider the wider economic impacts of rail was in relation to specific schemes (rather than investing in generic modelling).

The modelling work intriguingly implied that the best way of achieving a more even distribution of national wealth would be to improve transport links between deprived regions. This particular issue could be investigated further.

I-A2. Economic arguments for rail subsidies	
Status	Not confidential
SRA contact	Stephen Atkins, Planning
Contractor	Prof Phil Goodwin, UCL
Project start date	February 2004
Project completion	March 2004
Cost	£3000
Publications	15 page paper (unpublished). Hard and soft copy obtained.
Follow-up	No follow up work commissioned.
<p>Objectives: It has been argued that future developments, such as cleaner cars and road pricing, could negate the rationale for rail ‘subsidy’. This paper examined the economic arguments in relation to this claim.</p> <p>Description and main results: The paper concludes that the introduction of a pricing framework for road transport which includes full costs of use is unlikely in the foreseeable future. Consequently, rail investment can be justified on the basis that it helps to redress an in-balance in pricing between the two modes. It also highlights that public expenditure on both road and rail can be justified where the benefits that result from their existence are wider than those experienced by their users. In support of these conclusions, the paper argues:</p> <ul style="list-style-type: none"> • The costs of transport include capital and running costs. Arguably, left to current market forces, rail users would directly pay some capital costs whilst road users would not. Hence, some taxation of road users, and subsidy of rail users is justified to redress the balance. • Transport can generate external costs – relating to congestion, health and safety, loss of amenity, environment degradation, inefficient land-use and opportunity loss – which are rarely paid by the user. Where the unpaid external costs of road use are greater than those for rail (which is probably the usual situation), public investment is justified to correct the market. • Public investment can be justified to pay the transition costs involved in creating a ‘level playing field’ between modes (for example, for rail versus road freight). • Public investment can be justified where it is necessary to compensate for income inequality in order to meet a broader economic goal (e.g. investment in rural rail lines to enable those on lower incomes to commute to work). • Public investment is justified where there are social benefits from a service other than direct user benefits. For rail, in certain situations, these could include increasing land values, economic growth or local area regeneration. <p>Discussion and future research: Arguably, if road users paid the full costs of use, demand for rail would increase. This would require new investment to increase capacity, which markets should be prepared to pay, (if there was confidence in the stability of the new cost framework). However, increases in road costs and rail investment would take place in a ‘lumpy’ way over time, so public investment could still be justified to facilitate the transition.</p>	

I-B1. Franchise design: Research topics	
Status	Main report considered to be confidential.
SRA contact	Carol Smales, Strategy, Economics and Appraisal team
Contractor	Europe Economics and the Transport Studies Unit, Oxford
Project start date	December 1998
Project completion	March 1999
Cost	£52,500 exc. VAT.
Publications	Unpublished final report, 135pp. Hard copy only obtained.
Follow-up	This study fed into SRA thinking about franchise design.
<p>Objectives: This study aimed to advise the SRA on franchising issues such as franchise size, length and risk sharing.</p> <p>Description and main results: The study involved literature review, assessment of the experience of other industries, analysis of OPRAF data and discussions with OPRAF staff. Industry participants or interested parties were not consulted in order to retain objectivity. Key conclusions were as follows:</p> <ul style="list-style-type: none"> • Small franchises can be efficient, and may be desirable, since they allow for subsequent merging by franchisees, to generate larger organisations where those involved see efficiency benefits from doing so. However, this conclusion presumes: a) effective arrangements for national co-ordination of timetables and the provision of network-wide information and ticketing; and b) open markets for rolling stock, qualified staff and track access. • Vertical integration between the TOCs and Railtrack should be discouraged as it would make it difficult for different TOCs to compete fairly on shared tracks. Direct subsidy of Railtrack or the ROSCOs should be discouraged, on the grounds that Railtrack or the ROSCOs would become too powerful in comparison to the TOCs. • In awarding future franchises, OPRAF should model its procedures on more standard contract award procedures, to reduce legal and financial advice fees • Franchises should be let for 4-7 years, and concerns that this deters investment should be addressed by promising payment for assets handed over at the end of a franchise. • Franchises should not be extended or renegotiated – rewards for good service quality should come from incentive regimes not contract extension. • Greater diversity in franchise length would be helpful. • Risk sharing between TOCs and OPRAF should not occur. <p>Discussion and future research: A key conclusion from the study was that all franchises do not need to be the same. For example, barriers to market entry for a new franchisee could be reduced by ensuring that the simpler parts of the network are not unnecessarily subjected to technical rules. The study team also noted that many of the conclusions above were based on judgement, as the literature and data analysis did not provide direct answers.</p>	

I-C1 Rolling stock leasing and financing issues	
Status	Not confidential
SRA contact	Tabitha Jay, Policy
Contractor	Europe Economics
Project start date	August 2003
Project completion	September 2003
Cost	£46,000
Publications	Unpublished final report, 57pp. Hard and soft copy obtained.
Follow-up	This led on to NERA work and the formulation of the Rolling Stock Strategy.
<p>Objectives: The study aimed to advise the SRA on its strategy in relation to rolling stock and the ROSCOs (rolling stock leasing companies), of which there are three – Porterbrook, Angel and HSBC.</p> <p>Description and main results: The study included an evaluation of relevant information (including a partial database of current ROSCO leases), and interviews with a range of stakeholders. It argued that there were a number of different rolling stock leasing markets, relating to: financing new rolling stock; fleet replacement (i.e. requiring a fleet to be supplied at a specified future point); fleet increment (i.e. adding additional trains to an existing fleet); hand-back & modifications (i.e. getting changes made to an existing fleet); and short notice fleet replacement (i.e. requiring a new fleet to be supplied at short notice). It argued that there was evidence of competition between the ROSCOs in relation to financing the purchase of new rolling stock, and there were no strong barriers to market entry. In the other four markets, there was seen to be more scope for ROSCO dominance. For fleet replacement, the study argued that the current approach to re-franchising was generating negative effects. Specifically, it was seen as putting most TOCs in a position where they had to negotiate fleet replacement on a relatively short term basis. Meanwhile, variable franchise extensions and SRA’s ‘call option’, enabling them to secure an existing fleet for up to 3 years when franchises were renewed, meant that the ROSCOs were unclear about when their rolling stock would become available again for re-leasing.</p> <p>Discussion and future research: The study argued that the priority should be to encourage the efficient supply of rolling stock (rather than competition for its own sake), that there were no strong grounds for encouraging a new ROSCO market entrant, but that greater clarity and stability of policy would be helpful. In particular, it made recommendations for a future short and long term approach. In the short term, it recommended that the priority was to develop a specific SRA strategy for rolling stock leasing. In the longer term, it recommended moving towards a decentralised strategy, albeit with SRA changes to increase the length of time that TOCs would have to negotiate new leases, and to reduce the uncertainty for the ROSCOs about when their stock would become available again for re-leasing.</p>	

I-C2. Indicators of excessive pricing	
Status	Main report confidential given the inclusion of company specific, commercially confidential data.
SRA contact	Tabitha Jay, Policy
Contractor	NERA
Project start date	September 2003
Project completion	January 2004
Cost	£40,000 for all work undertaken by NERA on this topic.
Publications	Unpublished draft final report, 42pp (note that the draft is the final version). Hard and soft copy obtained.
Follow-up	This study was linked with NERA’s report on bundling, and fed into the SRA’s Rolling Stock Strategy (published December 2003). Following on from the strategy, NERA also advised the SRA on facilitating the market entry of new ROSCOs, and new trains, and helped in responding to a National Audit Office report on the topic.

Objectives: The study aimed to define indicators that would enable the SRA to assess whether the prices of the rolling stock leasing companies (ROSCOs) for rental and heavy maintenance of rolling stock could be considered ‘excessive’, under Chapter II of the 1998 Competition Act.

Description and main results: The study primarily involved an assessment of relevant economic and legal theory. It argued that, unlike the situation for predatory pricing, there was no established method for determining excessive pricing, and that most existing case law related to establishing the existence of a monopoly. It argued that it would be difficult to establish that the ROSCOs held a dominant market position given competition from other ROSCOs, the ability of TOCs to buy their own vehicles and the bargaining power of the TOCs. It argued that the most effective approach to assess whether prices were excessive would probably be assessments of earlier prices, competitor’s prices, prices in otherwise similar but more competitive markets or profitability. Profitability was seen as being the key measure. A spreadsheet model was developed to indicate how profitability could be calculated, although missing data prevented its application. In particular, the model required data about the original purchase costs of vehicles, their forecast value at the end of a contract period and an estimate of the additional return required to compensate the ROSCOs for regulatory risk (e.g. the risk that ROSCO assets might be altered by new legislation).

Discussion and future research: The study concluded it was unlikely that a persuasive case could be made to show that the ROSCOs prices were in breach of the relevant competition legislation. However, it recommended that the SRA could consider: imposing direct regulation of prices; strengthening the voluntary Code of Practice; or encouraging the Rail Regulator to undertake a further review of the market to assess whether there was effective competition in place.

I-C3. An analysis of bundling in ex-BR rolling stock	
Status	Not confidential
SRA contact	Tabitha Jay, Policy
Contractor	NERA
Project start date	September 2003
Project completion	January 2004
Cost	£40,000 for all work undertaken by NERA on this topic.
Publications	Unpublished final report, 12pp. Hard and soft copy obtained.
Follow-up	This study was linked with NERA’s report on excessive pricing (I-C2). It led on from the SRA’s Rolling Stock Strategy (published December 2003). NERA also advised the SRA on a number of other issues relating to rolling stock.
<p>Objectives: The study aimed to define how the SRA would assess whether the rolling stock leasing companies (ROSCOs) were abusing a dominant position via ‘bundling’ or ‘tying’ together different services, under Chapter II of the 1998 Competition Act.</p> <p>Description and main results: The study primarily involved an assessment of the theory as to how such abuse would be defined. It looked specifically at the example of a ROSCO requiring a TOC to purchase maintenance services in conjunction with a rolling stock lease. It defined the following arguments as being relevant:</p> <ul style="list-style-type: none"> • ROSCOs do not have a vested interest in reducing competition in the maintenance market. • There could be legitimate reasons for the ROSCO making such requirements, namely that the long-term condition of the stock would be a higher priority for them than for the TOC. • The value for money of the overall bundle of services should be considered more important than the cost of the individual components. • Raising leasing charges would probably be a more subtle way for a ROSCO to abuse its position than adding excessive maintenance charges. <p>In relation to the specific case of the Porterbrook ROSCO, which, at the time of the study, was reported to be quoting lease renewal charges including non-optional ‘reliability’ modification charges, the study argued that the ROSCO could only be defined as being anti-competitive if it had a dominant market position, if its technical justifications for the modifications were invalid and if its objectives could be met through an alternative approach where TOCs were given more choice.</p> <p>Discussion and future research: The study concluded that it was unlikely that a strong case could be made to show that the ROSCOs were in breach of the relevant competition legislation. However, it noted that it could still be useful for the SRA to monitor cases of bundling and alert the Rail Regulator to specific cases where bundling seemed to be used as a device to facilitate higher charges, or was, in some other way, interfering with the market’s ability to deliver value for money.</p>	

I-D2. Planning criteria: Research requirements	
Status	Not confidential
SRA contact	Rebecca Davies, Strategy, Economics and Appraisal
Contractor	Bristow AL et al, ITS Leeds
Project start date	October 1998
Project completion	March 1999
Cost	£24,506
Publications	Unpublished 78pp draft final report. Hard copy only obtained.
Follow-up	This work led onto 4 studies aimed at putting an economic value on different aspects of rail services, namely the studies on crowding (H1), station facilities (F3), interchange (F4) and reliability (G3). Work on option values and accessibility has been undertaken at a later date, (studies E4 and I-F respectively).
<p>Objectives: The study aimed to provide advice to OPRAF about the most cost-effective ways to quantify the value of addressing issues relating to interchange and integration; facilities for disabled people; and option values (i.e. the value to people of having a rail service available, regardless of use). It followed from the Integrated Transport White Paper.</p> <p>Description and main results: The study involved a review of literature relating to both the specific topic areas and to valuation methodologies. The study argued there were 3 main approaches to valuation, based on choices expressed in actual markets (AM), choices expressed in hypothetical markets (HM) and alternative cost methods (ACM) based on implied expenditure or costs incurred. Within these 3 approaches, 9 specific techniques were identified: AM – Revealed Preference – involves analysing real purchasing behaviour e.g. analysing ticket sales data for train services where customers have a trade-off between price and speed. AM – Hedonic Pricing – involves assuming that the price of a good is dependent on its characteristics e.g. examining how noise affects house prices. AM – Travel Cost Method – uses travel costs for valuation e.g. calculating the value of a leisure destination on the basis of what people pay to travel to it. HM – Stated Preference –often involves offering respondents a series of pairs of options to choose between, leading to an assessment of the relative importance of different attributes HM – Contingent Valuation - involves asking about willingness to pay for goods or to accept compensation for loss ACM – Replacement Cost - involves asking about the cost of replacing goods e.g. as recreating an ecological site ACM - Shadow Prices – involves asking about externalities e.g. what price would lead to a level of energy use consistent with climate change objectives. ACM – Consequential cost – involves calculating the cost of the impacts of a policy e.g. the effects of increased vibration on buildings ACM – Avoidance cost – involves asking people how much they are prepared to pay for mitigation measures e.g. installing double glazing to reduce noise</p> <p>Discussion and future research: The study came up with research recommendations for all three areas of work.</p>	

I-D3. Distributional analysis in appraisal	
Status	Not confidential (as financial information is aggregated by region).
SRA contact	Hadi Zamani / Douglas Medrisch, Strategy, Economics and Appraisal
Contractor	DH Johnson and PJ Mackie, ITS Leeds
Project start date	April 2004
Project completion	June 2004
Cost	Approx £17,800.
Publications	Final unpublished report (42pp). Hard and soft copy obtained.
Follow-up	The findings were presented to DfT. No further work commissioned.
<p>Objectives: The Treasury Green Book on public sector investment appraisal requires the distributional impacts of projects and policies to be considered. This project aimed to assess how to do this in relation to rail investment.</p> <p>Description and main results: The study involved a review of literature on distributive weights in public sector appraisal, and literature on the valuation of travel time. The effects of applying an illustrative weighting system to the assessment of three case studies were explored. These case studies involved the scenario of adding new GNER peak services to the East Coast Mainline; the scenario of adding WAGN peak services to the East Coast Mainline; and recent changes in fares policy.</p> <p>The literature reviewed highlighted that values of time varied with income, journey purpose, journey distance and other factors. The study found that attempting to use disaggregated values of time for different groups (rather than an average value) could alter the assessment of the benefits of a given project, although this was not in a consistent direction – i.e. distributive analysis could make some projects seem more attractive, and others seem less attractive. The study broadly endorsed the Green Book recommendation to use an elasticity of marginal utility of income of -1, but also recommended that additional sensitivity analysis should be undertaken when assessing particular situations. The study further concluded that full distributive analyses were costly and complex, and were therefore only merited in certain situations. It recommended that they should be undertaken for:</p> <ul style="list-style-type: none"> • Projects which were primarily social (rather than commercial) projects • Where projects were being assessed against other options which might have significantly different distributive implications • Larger projects • Policies with clear distributive implications • Where data was available to undertake the assessment, or data collection costs would not be prohibitive • Where social weights were expected to depart from willingness to pay weights <p>Discussion and future research: Following the study, the idea of undertaking routine assessments of the distributional impacts of rail projects and policies was dropped.</p>	

I-D4. Appraisal of alternative procurement / financing options	
Status	Main report confidential given the inclusion of company specific financial information.
SRA contact	Hadi Zamani / Douglas Medrisch, Strategy, Economics and Appraisal
Contractor	NERA (with RSM Robson Rhodes and DS&A Risk Analysis)
Project start date	January 2004
Project completion	June 2004
Cost	£84,482 plus VAT
Publications	Final unpublished report (70pp). Hard and soft copy obtained.
Follow-up	No follow up work commissioned.
<p>Objectives: The study aimed to assess the SRA’s appraisal methodology of rail investment projects. In particular, it examined the issues of optimism bias (i.e. the extent to which project costs are typically underestimated); risk (i.e. how far different projects share similar risks, and how issues of risks can be addressed) and tax treatment (i.e. whether different procurement options result in a different amount of tax being paid on a project).</p> <p>Description and main results: The results were as follows.</p> <p>Optimism bias: On average, completed projects were costing 22% more than expected at the time they were approved for contract. The problem was particularly severe for power supply, station upgrade, alliance and RAB/TAA funded projects. The unexpected costs associated with moving from the ‘design development’ stage of a project to contract approval were relatively small (3%).</p> <p>Risk: 11 generic risks covered 80% of specific problems encountered, 25 generic risks covered 99%, and there was a tendency for projects to have the same generic risks in the same proportion. Hence, a single generic risk register could be constructed. This could be used to estimate the possible scale of cost overrun for individual projects, and would provide a more accurate method than adding a simple percentage mark-up to allow for optimism bias. The study also commented on the need to clarify ownership of risk.</p> <p>Tax incidence: Due to lack of data, the study concluded that the SRA should continue to assess the tax implications of different procurement structures on a case-by-case basis. It was also recommended that there was a need to clarify Network Rail’s status in relation to corporation tax. Finally, it was noted that minimising the direct costs to the SRA would not necessarily be the same as minimising the overall costs to the public sector.</p> <p>Discussion and future research: In undertaking the work, the consultants experienced problems with data collection, and recommended that, for all future rail investment projects, consistent cost data should be collected at specified project stages and stored in one, central database by the SRA. This idea would have been pursued if the SRA were not being dissolved. Similarly, the idea of a generic risk register could potentially be pursued in the future.</p>	

I-E1. Employment in the rail industry 2001	
Status	Not confidential
SRA contact	Mervyn Humphries, HR, + RITC (Rail Industry Training Council).
Contractor	Terence Hogarth and Rob Wilson, IER, Warwick University
Project start date	April 2001
Project completion	September 2002
Cost	£50,000
Publications	Unpublished report (136pp). Hard and soft copy obtained.
Follow-up	This study fed into ongoing work on employment by RITC Ltd, SRA, DfES, Centre for Rail Skills etc.. It was felt that future work should be more focused on specific sub-sector and stakeholder needs. A 2002 survey was undertaken and published, but data from Network Rail were not included, making its results unrepresentative.

Objectives: The study aimed to assess the labour needs of the rail industry.

Description and main results: The study involved 178 railway organisations, who either returned a data sheet about their employment characteristics, or were involved in a telephone interview, in autumn 2001. Data obtained were compared with national labour skills and training surveys and a labour demand forecasting model was developed.

The study found that, in 2001, the rail industry employed 140-145,000 people, with approximately £20bn sales p.a.. Employment was concentrated in a small number of large firms. 40% of employees were employed by the TOCs, and 30% were working in London. Representation of ethnic minorities was high (13% vs. 5% national average), but there were few women (11% vs. 45%) or part-time workers (2% vs. 25%). Managers and professional staff were better qualified than the average for all industry, whilst staff in personal service, sales, operative and elementary occupations were less well-qualified.

Between 2000 and 2001, rail employment grew by 6% (12x greater than the growth in the whole economy) and 20% of rail companies reported that they were working at overload (compared with 7% across all industry). This was leading to a recruitment problem. Closer examination revealed that ‘hard-to-fill’ and ‘skill shortage’ vacancies were in line with the general economy – the main problem was the high level of recruitment required, and the fact that those recruited often needed to have rail-specific skills. Many organisations were attempting to attract and retain people by raising wages (although this had not led to excessive wage inflation at the time of the study).

In terms of skills, 17% of the workforce was considered to be less than fully proficient at their job, which was higher than average. Further examination showed that rail industry staff received more training than average, but relatively few companies had achieved Investors in People status (11% vs 28%). Nearly 25% of companies reported problems in recruiting new trainees.

Discussion and future research: The modelling work suggested that it could be necessary to recruit approx 5000 people p.a. for the next 5 years, and that there could be significant problems with recruiting staff in London. It argued the industry should particularly focus on part-time jobs, the associated issue of female employment, and the provision of more rail-specific training.

I-F1 Study of the Disabled Person's Reporting System	
Status	Not confidential
SRA contacts	Lyndon Adolphus, Alistair Barclay, Stephen Wolstenholme
Contractor	The BPRI group
Project start date	Early 2004
Project completion	May 2004
Cost	£87,000
Publications	The final report (20pp) was published in March 2005 in conjunction with the draft accessibility strategy entitled 'Railways for All'. Hard and soft copies obtained.
Follow-up	The report fed into the formulation of the draft accessibility strategy.
<p>Objectives: The Disabled Person's Reporting System (DPRS) was set up in 1990/91 to enable disabled passengers to book assistance at stations and on trains. This study aimed to evaluate the system.</p> <p>Description and main results: The study involved 79 interviews with staff at booking locations; 214 interviews with staff providing disabled assistance; 168 interviews with Disabled Person's Railcard holders and 132 interviews with passengers who had recently booked assistance by telephone. These were all undertaken in March 2004. It was recommended that the existing system should be improved by:</p> <ul style="list-style-type: none"> • Formalising the practice of station staff contacting the destination station with passenger details (regardless of booking) or 'no show' information. • Increasing awareness of staff that meeting passengers is key to success. • Promoting exchange of information between TOCs, and between TOCs and Network Rail about station facilities (e.g. sending leaflets to each booking location), and, longer term, updating the Station Information Database. • Encouraging station staff to specify a single meeting point for passengers (and informing booking locations accordingly). • Using tannoy 'good practice' to help in locating missing passengers <p>The study recommended that additional resources should be found to:</p> <ul style="list-style-type: none"> • Introduce a dedicated assistance (mobile) telephone line for inter-station communication. • Advertise the assistance service more effectively, (e.g. to send out flyers with railcards and/or give out cards to passengers during their journeys). • Create a dedicated 'disabled assistance' meeting point at stations with a clearly recognisable sign/logo, to be included in publicity literature. • Provide standard training to all station staff assisting disabled passengers. <p>Finally, it was noted that the recent upgrade from DPRS to APRS (Assisted Passengers Reservation service) should solve issues relating to the booking software and use of politically correct language.</p> <p>Discussion and future research: Following consultation on the draft, the final Railways for All accessibility strategy will be published in summer 2005. The SRA is also funding changes to enable the TOCs to input more consistent information into the Station Information Database, which should be useful to other TOCs and the National Rail Enquiry Service.</p>	

J-A1 The public interest benefits of freight by rail	
Status	Not confidential
SRA contact	Pre SRA (no contact known)
Contractor	Europe Economics
Project start date	n/a
Project completion	November 1999
Cost	n/a
Publications	Unpublished report to the sSRA Availability: Hard copy and electronic copy
Follow-up	None
<p>Objectives: The study was designed to increase the understanding of the benefits that would result from the government policy of encouraging rail freight and how these benefits/costs should be appraised.</p> <p>Description and main results: The report identified the likely public benefits/costs from switching freight transportation from road to rail to be as follows: reduced congestion, reduced road maintenance, reduced fatalities and injuries, reduced noise, reduced local air pollution and reduced climate change effects. The report also identified likely dis-benefits as being reduced revenue from HGVs and the distortion effects of other taxations introduced to compensate for reduced HGV taxation.</p> <p>The range of public interest benefits was estimated at -15 to 240 pence per lorry mile with congestion identified as the most significant component of these.</p> <p>Discussion and future research: The report outlined the key economic aspects of the public interest benefits of rail freight. Much of the work also underpinned the revisions to ‘sensitive lorry miles’ assessments implemented by the SRA, (c.f. studies J-A3 and J-A4).</p>	

J-A2 Rail freight appraisal methodology development	
Status	Not confidential
SRA contact	Jonathan Riley and Caroline Hughes, Freight
Contractor	Arup
Project start date	May 2001
Project completion	January 2002
Cost	See below under individual titles
Publications	Unpublished initial report “Appraisal methodology for rail freight: Initial report” (cost £24,600), and follow-up “Rail freight Appraisal Methodology Development – Stage 2” (cost £76,375) which involved applying the results from the first study in order to undertake an evaluation of the West Midlands Availability: Hard copy and electronic copy
Follow-up	None

Objectives: The objective of the project was to provide advice to the SRA on extending the appraisal guidance for passenger services to cover the appraisal of freight proposals.

Description and main results: The initial report provided guidance on the practical application of SRA’s appraisal criteria with respect to freight. This covered issues such as defining the base case, consistent measurement of externalities across passenger and freight, the difficulties of measuring freight user benefits and capacity considerations between passenger and freight.

The second stage report outlined ARUP’s proposal for freight appraisal and examples of its application on two projects – The West Midlands Freight Route Study and Felixstowe to Nuneaton Upgrade.

Discussion and future research: The reports provided valuable input into the process of including freight within SRA appraisal guidance. The study also helped to identify additional research requirements, for example, on elements such as freight user benefits, later addressed in study J-A6.

J-A3 Sensitive lorry miles (1)	
Status	Not confidential
SRA contact	Jonathan Riley and Caroline Hughes, Freight
Contractor	Arup
Project start date	Early 2001
Project completion	December 2001, but final report completed December 2002
Cost	£60,000
Publications	<p>Unpublished phase 1 report on literature review entitled “SLM Methodology: Review of recent research and initial findings” and unpublished phase 2 report “Re-evaluation of the marginal costs and revenue impacts of transferring freight from road to rail”</p> <p>Availability: Hard copy and electronic copy of both phases, although the electronic version of phase 2 is only the draft final report.</p>
Follow-up	Further work on the value of sensitive lorry miles was subsequently undertaken by LEK for the SRA (c.f. J-A4), which used a wider remit than that adopted by Arup
<p>Objectives: The objective of Phase 1 was to review the recent research on the external benefits/costs of transferring freight from road to rail. The reports reviewed included the previous 1996 review of Sensitive Lorry Miles (SLMs are the measure used to value to external benefits of removing one lorry mile from the road), ‘Study of Lorry track and Environmental Costs’ (NERA/AEA/TRL) and ‘Surface Transport Costs and Charges’ (ITS/AEA). Phase 2 provided additional research and a re-evaluation of the SLM values.</p> <p>Description and main results: Some key recommendations resulted from the Phase 1 review of research. These included the need to:</p> <ul style="list-style-type: none"> • provide estimates of congestion costs due to road freight at different volumes of traffic and for different types of road, size of vehicle and area; • review the valuation of congestion costs in time and money for lorry miles switched; • review the primary sources of noise and emissions costs such as the Royal Commission on Environmental Pollution, Transport and the Environment, The European Commissions ExternE Reports and others as appropriate; • provide a framework for SLM calculations that could take into account the new values. <p>The key results of Phase 2 took into account the Phase 1 recommendations and recommended a revised methodology for SLMs with 7 categories of road accounted for, namely: Motorways (high, medium, low congestion), Trunk and Principle (London/Conurbations and Rural/Urban), Other (London/Conurbations and Rural/Urban).</p> <p>Discussion and future research: Phase 2 was followed by LEK research (J-A4)</p>	

J-A4 Sensitive lorry miles (2)	
Status	Not confidential
SRA contact	Julia Clarke and Jonathan Riley, Freight
Contractor	LEK
Project start date	Early 2002
Project completion	June 2002
Cost	£53,485
Publications	Unpublished phase 1 report entitled 'Economic case for rail: key emerging findings', leading to unpublished report on 'SRA proposals for sensitive lorry miles'. Availability: Hard copy only
Follow-up	Work from both ARUP and LEK (c.f. studies J-A1 and J-A3) fed into further internal SRA research on sensitive lorry miles (SLMs) and a paper (sent to DfT) on revising SLM values.

Objectives: The SRA asked LEK to assist them in reviewing the high-level economic case for rail. Phase 1 looked at sensitive lorry miles (SLMs) and capacity utilisation. Phase 2 provided a proposal for the values of SLMs. (A sensitive lorry mile is the measure used to value the external benefits of removing one lorry mile from the road)

Description and main results: Key results were as follows.

Phase 1:

The study argued:

- The current review should be driven forward based on rigorous application of Government's appraisal criteria.
- An average SLM of 40-60p per lorry mile was appropriate
- Passenger and freight appraisal criteria should be the same.
- Freight trains can be more valuable than any passenger services.

Phase 2:

The study recommended an average SLM value of 55p per lorry mile. Notably, this was a much higher valuation than that estimated in the ARUP work.

Discussion and future research: As outlined above, the ARUP and LEK work was used as the basis for revising SLM values. The eventual weighted average SLM value across all seven road categories was 51.1p per lorry mile.

J-B2 Freight track access charges	
Status	Not confidential
SRA contact	Jonathan Riley, Freight
Contractor	NERA
Project start date	2000
Project completion	April 2001
Cost	£26,650
Publications	Unpublished report Availability: Hard copy only
Follow-up	None
<p><i>Objectives:</i> The context for the report was the 80% growth target for rail freight and the provision of £4bn for rail freight under the original 10 year plan. The report looked at how changes to track access charges could affect the attainment of the growth target.</p> <p><i>Description and main results:</i> The report looked at a number of key issues. Specifically, it involved:</p> <ul style="list-style-type: none"> • Outlining the main issues arising from the Office of the Rail Regulator’s (ORR’s) review of access charges and the implications for the SRA’s freight objectives. • Modelling the impacts of these changes on rail freight volumes and the likely cost to the SRA of some possible measures to reduce the adverse impact of these changes. • Outlining possible options for recovering freight fixed costs within the ORR regulatory framework. • Reviewing a number of mechanisms that the SRA could use for paying support to rail freight. <p><i>Discussion and future research:</i> No further direct research was commissioned.</p>	

J-B3 Track access grant policy evaluation	
Status	Not confidential
SRA contact	Maggie Simpson, Freight
Contractor	LEK
Project start date	Dec 2001
Project completion	Mar 2002
Cost	n/a
Publications	Final report as powerpoint, 57 slides. Hard and soft copy obtained.
Follow-up	The study formed part of a suite of studies looking at freight financing.
<p>Objectives: The study involved a policy assessment of the TAG (Track Access Grant) scheme.</p> <p>Description and main results: TAG was introduced in the 1993 Railways Act, to avoid the introduction of track access charges reducing the amount of freight transported by rail. Grants were paid to FOCs (Freight Operating Companies), in relation to specific flows, in proportion to the volume carried. The amount paid was related to the cost needed to tip the balance in favour of rail; the value of the environmental benefits that the grant would secure; or part of the track access charge.</p> <p>In assessing TAG, this study involved a review of files held by the SRA/DETR (including compiling them into a single database), 12 stakeholder interviews and 16 customer interviews. The study concluded that:</p> <ul style="list-style-type: none"> • The scheme was effective at retaining and encouraging rail freight, but only supported 2.5% of total freight volume. • Since inception, grant payments had been £11m, whilst environmental benefits were estimated to have been about £25m. • The scheme was efficiently administered, and well regarded by stakeholders. • The methodology for assessing the environmental benefits and economic needs for TAG should be simplified. This would probably result in higher assessments of both, and allow for higher payments, and, this, in turn, would probably lead to more freight being transported by rail. • Publicly available information on the scheme should be updated. • The current practice of paying FOCs rather than end users should be maintained. • The SRA should monitor the effects of each TAG more closely, partly to assess when and where extra grants were needed. • TAG should be reviewed again if other grants and charges for rail freight changed. <p>Discussion and future research: The study excluded a review of the Freightliner grant, (assessed in study J-B1). It supplemented study J-B5, whilst studies J-B6 and J-B7 represented later work on the topic.</p>	

J-B5 Rail freight grant regime review	
Status	Not confidential
SRA contact	Jonathan Riley, Freight
Contractor	Arup
Project start date	June 2000
Project completion	January 2001
Cost	n/a
Publications	Published report (on SRA website) on the results of a consultation exercise Availability: Hard copy only, but electronically on website
Follow-up	None
<p>Objectives: The report was commissioned to summarise the responses to the SRA’s consultation document on the rail freight grant regime – ‘Public Support for Rail Freight’.</p> <p>Description and main results: The report summarises the 70 written responses received by the SRA. The responses were reported under the heading of the consultation document, namely:</p> <ul style="list-style-type: none"> • Benefits and costs of transferring freight to rail • Appraisal • Company specific Freight Facilities Grants and Track Access Grants • New ways of supporting freight <p>Some key conclusions were:</p> <ul style="list-style-type: none"> • Local and regional planning is a key element in promoting rail freight • Freight operating companies’ costs need to be audited before public support is provided • Better coordination between rail agencies (Office of the Rail Regulator, Railtrack etc) is required to provide easier access to rail. <p>Discussion and future research: Following this consultation exercise further work on rail freight grants was undertaken including the development of the Company Neutral Revenue Support scheme for inter-modal traffic, (c.f. study J-B6).</p>	

J-B6 Company Neutral Revenue Support	
Status	Not confidential
SRA contact	Jonathan Riley and Caroline Hughes, Freight
Contractor	MDS + Mouchel
Project start date	April 02
Project completion	2003
Cost	MDS £78,000 Mouchel £24,000
Publications	Unpublished reports. Availability: MDS - hard copies of Phase 1 and Phase 2, and an electronic copy of Phase 2 only. No hard or electronic copies of the Mouchel reports are available
Follow-up	None
<p>Objectives: The MDS study was split into two phases. Phase 1 provided an outline of the structure of an effective grant scheme to promote non-bulk rail traffic. Phase 2 provided a more detailed development of the Company Neutral Revenue Support (CNRS) scheme.</p> <p>The Mouchel report provided a summary of discussions with stakeholders about CNRS and also provided a challenge to the CNRS methodology.</p> <p>Description and main results: Phase 1 set out the structure of the scheme under a number of headings, namely:</p> <ul style="list-style-type: none"> • Objectives, scope and avoiding distortion, • 10 year plan delivery, • Eligibility by traffic type, • Market processes, • Calculation and evaluation techniques, • Direct subsidy of terminals, • The case to the European Commission, and • Calculation and evaluation. <p>Phase 2 provided a more detailed assessment of rail and road costs, environmental benefits, how rates would be calculated, administration, timescales and implementation plan.</p> <p>Discussion and future research: The research was a key input into the development of the CNRS grant scheme that was introduced in April 2004 by the SRA.</p>	

J-B7 Cost of capital for freight grant applications	
Status	Not confidential
SRA contact	Stephen Armstrong, Freight
Contractor	LEK
Project start date	Feb 2003
Project completion	April 2003
Cost	£90,000
Publications	Unpublished report Availability: Hard copy and electronic copy
Follow-up	none
<p>Objectives: The objective of the study was to investigate the appropriate estimate of applicants' cost of capital, which could be used by the SRA in determining the recommended grant for Freight Facilities Grant (FFG) applications and other schemes.</p> <p>Description and main results: Three methodologies were employed:</p> <ul style="list-style-type: none"> • Estimation of the cost of capital for applicants in 2002, based on existing data. This method did not take into account the difference between the cost of capital of the project and of the applicant as a whole, and so it was only appropriate for comparative purposes. This method indicated a range of between 4.8% and 6.7% (real, post-tax) for the cost of capital. • Estimation of the underlying variability in the returns from FFG projects, taking into account the risk characteristics of FFG projects and their economic characteristics. This method suggested a cost of capital of 8.3% to 9.7% • Using observed betas for end user segments, and adjusting them to reflect the economic characteristics of FFG projects. This methodology had the added advantage that it was based on observed betas in the market. The results were 6.6% to 7.3% for the cost of capital <p>LEK recommended a range between 6.9% and 9.0% for the cost of capital. In order to provide a simple policy that the SRA could implement, they recommended that this range could be simplified to the midpoint, 8.0%.</p> <p>Discussion and future research: No future research in this area has been undertaken.</p>	

J-B8. Freight performance regimes (Phase 1 review)	
Status	Not confidential
SRA contact	Jonathan Riley, Freight
Contractor	LEK
Project start date	n/a
Project completion	May-02
Cost	n/a
Publications	Phase 1 review report, 79pp. Hard and soft copy obtained.
Follow-up	There were no subsequent phases of work because the wider SRA review of performance regimes did not take the direction expected by the Freight team.
<p>Objectives: The study aimed to provide information for the SRA’s freight team, to feed into an SRA-wide review of industry performance regimes.</p> <p>Description and main results: The study involved an analysis of freight operating company (FOC) and Railtrack performance, and their impacts on each other, together with a number of related issues. It showed:</p> <ul style="list-style-type: none"> • Pre-Hatfield, EWS was achieving its maximum penalisable level of delay (i.e. its cap) and consequently making regular payments to Railtrack. Following Hatfield, the situation reversed. • The majority (>90%) of EWS-caused EWS delays lasted more than 30 mins, which would be noticeable to a rail freight customer. • In general, rail freight customers gave FOCs adequate incentives to improve operational performance, independent of any performance regime. • Average freight paths were more valuable than many passenger service paths, according to illustrative economic benefit analysis. • FOCs were disadvantaged in their management of performance regimes by receiving limited information compared with Railtrack. • Uncapped performance regimes were a barrier to entry for prospective FOCs – for example, Mendip Rail had failed to become an open access freight operator for this reason. <p>The study also argued that:</p> <ul style="list-style-type: none"> • Railtrack no longer believed that meeting the Regulator’s performance target was feasible. • Compensation payments to long-term subsidised passenger train operating companies should not be allowed to commercially disadvantage FOCs. • The regulator should take into account the vastly different financial scale of Railtrack and the FOCs. <p>The study also involved modelling the potential impacts of several proposed future performance regimes.</p> <p>Discussion and future research: The report failed to note that freight delay, as measured by the rail industry, was often a result of customer delay or in response to changed customer needs.</p>	

J-B9 Independent validation of SRA use of KPIs for rail freight	
Status	Not confidential
SRA contact	Ricard Anguera, Freight
Contractor	Faber Maunsell
Project start date	July 2003
Project completion	September 2003
Cost	£2350
Publications	Unpublished report Availability: Hard copy and electronic copy
Follow-up	none
<p>Objectives: The objective of the report was to provide an independent review of the SRA’s proposed key performance indicators (KPIs) for freight. The report also provided an overall view as to the completeness, effectiveness and appropriateness of the proposed KPIs for rail freight users, providers and policy makers. It also provided recommendation for taking KPIs forward, including initial thoughts on data constraints.</p> <p>Description and main results: The main conclusion of the consultant was that the proposed KPIs for freight were useful and appropriate, and that the approach taken to calculate each indicator was robust and effective. The report also suggested some further KPIs that could be developed in the future in order to better reflect the level of ‘service performance’ of rail freight.</p> <p>Discussion and future research: No further research has been undertaken since this review. A number of the KPIs are regularly reported in the SRA publication ‘National Rail Trends’</p>	

J-C1 Channel tunnel rail link	
Status	Not confidential
SRA contact	John Chapman, Freight, and Caroline Hughes, Freight (now Planning).
Contractor	MDS Transmodel Ltd
Project start date	December 2000
Project completion	June 2001
Cost	n/a
Publications	Final report, 102pp. Hard and soft copy obtained.
Follow-up	This study fed into the 2001 Freight Strategy, which stated that the strategic freight network would be upgraded to standard 'W12'. The SRA is now in the process of completing a gauging strategy.

Objectives: The study aimed to examine the case for increasing the loading gauge of a freight route from the north of Britain to the continent (enabling the use of larger freight trains).

Description and main results: The study examined a number of scenarios of improved loading gauge, and the implications for freight. The conclusions were:

- Existing plans for improvements to loading gauge should raise cross-channel rail freight from 3m to 8.1m tonnes by 2010, if improvements were not extended to the continent, and to 12m tonnes if they were.
- Introducing reliable, frequent swopbody services operating at fixed schedules with longer (750m), heavier (2000 tonnes trailing weight) and faster (60kph mean speed) trains would increase the freight tonnage carried to 16m tonnes by 2010.
- Increasing to 750m train lengths, 1625m trailing weights and 60kph, and raising loading gauge to standard 'W18' would expand rail freight to 19.3m tonnes. (This would represent almost 20% of the UK-continent unit load market, and comprise 900,000 trailer movements p.a.)
- A 40% cut in Channel Tunnel tolls, combined with the above scenario, would increase the freight tonnage carried by rail to 25.7m tonnes.

The study estimated that if the relevant train services were given access to the 'Channel Tunnel rail link', the capital infrastructure costs could be limited to £35m. 12 piggyback trains per day would be needed. Costs could be justified on the basis that the modelling suggested that new services would cause 40m vehicle kilometres (0.5 billion tonne kms) to transfer from road to rail.

Discussion and future research: Although showing many *potential* benefits, the study emphasised that changes to the loading gauge alone would be insufficient to promote a transfer of freight to rail. Specifically, it argued that the 'friction cost' to operators of switching to liftable trailer equipment or swopbodies would need to be met by the scheme promoters, since the existing poor reputation of services through the Channel Tunnel would make operators unlikely to invest in new equipment. Promotion measures required would include developing leasing equipment for such equipment, securing paths across the continent, and providing a reliable source of traction.

J-C2 The London international freight exchange	
Status	Not confidential
SRA contact	Jeff Miles SRA
Contractor	Nathaniel Litchfield and Partners
Project start date	Feb 2003
Project completion	March 2003
Cost	£23,500
Publications	Unpublished reports – Vol 1: ‘An assessment of the Argent case’; Vol 2: ‘Implications of decisions’; and Vol 3: ‘A response to the strategy’. Availability: Hard copy only
Follow-up	See below.
<p>Objectives: The study aimed to collate expert opinions in order to understand, at a very detailed level, the underlying reasons why the planning inspector decided to turn down the London International Freight Interchange (LIFE) application for planning consent. Part of the purpose was to generate insights for use in guidance for other applications. The work was one of a number of remedial measures undertaken in order to mitigate the nervousness of the developer market following the planning decision, to restore confidence in the market, and to prevent destabilising the delivery of the freight strategy.</p> <p>Description and main results: Expert opinion concluded that the LIFE proposal was unsuccessful for a number of specific reasons particular to the site and the quality of the application itself. It also concluded that the ‘need’ argument sought by the inspector for that site specifically could not have been achieved. This conclusion was backed up by the supplementary work by SDG on assessment of the models used (c.f. J-D2).</p> <p>The work also explored the implications of this decision on the willingness and confidence of the market to continue to deliver the strategy, concluding that SRA should develop further guidance.</p> <p>Discussion and future research: The work was part of a series on one-off exercises to understand the reasons that LIFE failed in planning. (Other studies included J-D1 and J-D2). The outcomes of this, and the complementary work, fed directly into the Strategic Rail Freight Interchange Policy, published as guidance for developers and planning authorities in March 2004.</p>	

J-C4 Review of international rail freight	
Status	Main report confidential – contains commercially sensitive data from EWS
SRA contact	Alan Bennett, Freight
Contractor	LEK
Project start date	October 2003
Project completion	April 2004
Cost	Phase 1: £188,000 Phase 2: £199,000
Publications	Outputs include an interim report; briefing documents for workshops; an unpublished final summary report (36pp), an interactive Excel-based business economic model and a technical support manual. Availability: Hard copy and electronic copy of the summary report.
Follow-up	None commissioned, although the model has been used extensively by SRA Freight Team. Most of the activities summarised under (2-3) below have been delayed/cancelled due to rail industry restructuring.
<p>Objectives: The study involved the construction of a business profitability model (1) to inform SRA negotiations with EWS to secure continuity of freight services during the balance of the Minimum Usage Contract (MUC) period to 30/11/06; (2) to provide analytical support for anticipated renegotiation of the Channel Tunnel rail freight usage regime with Eurotunnel; (3) to provide input into the SRA’s international rail passenger and freight strategy (as required by the Transport Act 2000), and into the triennial public spending review.</p> <p>Description and main results: A fully-functional model was completed. It was used to support the SRA negotiations with EWS to secure continuity of freight services and to provide input into a public spending review.</p> <p>Discussion and future research: Given the time since the model was initially commissioned and populated with data, the database may need some revision/updating before the model is deployed in any detailed negotiations with Eurotunnel about the Channel Tunnel rail freight usage regime. The functionality of the model may also require review in the light of proposed future uses.</p>	

J-C5 Channel tunnel rail freight: the addressable market	
Status	Not confidential
SRA contact	Alan Bennett, Freight
Contractor	MDS-Transmodal
Project start date	May 2004
Project completion	November 2004
Cost	£26000
Publications	Unpublished final report entitled “Channel Tunnel Rail Freight: The Addressable Market – Review of international freight”, (68pp). Availability: Hard copy and electronic copy
Follow-up	Forecasts provided in report were used: (1) As input into an overall review of the costs of retaining /terminating cross-Channel rail freight services required by Ministers; (2) As input into the SRA’s detailed economic analysis of the financial performance of EWS’s cross-Channel freight services, used in negotiations with EWS regarding the extension of current funding arrangements.
<p>Objectives: The study involved the use of GBFM (a general rail traffic forecasting methodology) to generate forecasts of the addressable market for cross-Channel rail freight, by commodity and by origin/destination, under a range of scenarios covering macroeconomic and public policy developments, and changes in the competitive position of Channel tunnel rail and other modes.</p> <p>Description and main results: The study generated tables of forecasts of rail traffic under different scenarios, with interpretation and commentary. The study also enabled identification of key exogenous and industry-specific factors impacting most significantly on the addressable rail market.</p> <p>Discussion and future research: No further use of GBFM to generate forecasts of addressable cross-channel rail freight market is envisaged, unless the SRA/BRB is required to engage in renegotiation of the Channel Tunnel rail freight usage regime. The outcome of a DfT review of freight traffic forecasting methodologies may also impact on the future deployment of GBFM.</p>	

J-C6 Central Railway and the European freight market	
Status	Not confidential. (Significant information likely to be released under the provisions of the Freedom of Information Act.)
SRA contact	Jonathan Riley, Freight.
Contractor	Mouchel/Oscar Faber (phase 1) and Faber Maunsell (phases 2 &3)
Project start date	November 2000
Project completion	May 2001 (Phase 1); September/November 2002 (Phase 2); November 2003 (Phase 3 final report –Substantive completion March 2003)
Cost	Approx £440,000 (Phases 1&2) approx £45,000 (Phase 3)
Publications	Unpublished Phase 1 Report ‘Central Railway Review’ –Final Report (52 pp including tables and annex -May 2001): this forms the basis of the published SRA Report ‘High Level Review of Central Railway Project’ (32pp -April 2002). Unpublished Phase 2 Report ‘Final Report to SRA: Central Railway Project’ (305pp –September 2002) Unpublished Phase 3 report entitled ‘Europe Freight Market Project’ (144pp -November 2003). Availability: Hard copy of all reports and electronic copies of selected reports.
Follow-up	Phases 1 and 2 comprise a comprehensive technical and economic review of the Central Railway (CR) project. Phase 3 follow-up is a more detailed review of the determinants of/constraints on rail mode/route choice in the GB-Continental Europe freight market using information from earlier phases, to inform further engagement with the promoters of CR and to provide input into the SRA’s International Freight Strategy (not subsequently produced) and negotiations with EWS and Eurotunnel on usage arrangements (delayed). In April 2003, Ministers decided not to offer further support for the CR project, including their proposed Hybrid Parliamentary Bill. Completion of the Final Phase 3 Report was delayed until November 2003.
<p><i>Objectives, description and main results:</i> The Central Railway (CR) project was about creating a continuous freight line between Europe and the north of England.</p> <p>Phases 1 and 2 of the study were undertaken in response to a series of Ministerial requirements for a comprehensive technical and economic review of the concept. This included analysis of the robustness of the demand forecasts and a subsequent detailed review of the operational/engineering interface between CR and the national rail network.</p> <p>The Phase 3 follow-up comprised a more detailed review of the determinants of/constraints on rail mode/route choice in the GB-Continental Europe freight market using qualitative information obtained from earlier phases. Its objective was to support SRA in further engagement/ negotiations with the promoters of CR and to provide input into: the SRA’s proposed International Freight Strategy; negotiations with EWS; and the renegotiation of Eurotunnel usage arrangements.</p> <p><i>Discussion and future research:</i> No further review of CR issues is planned unless/until the project is reactivated. The contents of the Phase 3 Report informed the subsequent decision to utilise GBFM (run by MDS Transmodal) to provide forecasts of the addressable market for Channel Tunnel rail freight (c.f. study J-C5)</p>	

J-D2 Freight interchange need study	
Status	Not confidential
SRA contact	Jeff Miles/Stephen Armstrong, Freight
Contractor	SDG
Project start date	Jan 2003
Project completion	March 2003
Cost	£99,875
Publications	Unpublished Phase 1 report and Phase 2 presentation Availability: Hard copy only
Follow-up	none
<p>Objectives: Driven by a negative planning decision about a proposed London International Freight Interchange (LIFE), the work set out to assess whether existing freight models were adequate to justify ‘exceptional circumstances’ to extract land from greenbelt. This was done because all large interchanges, to a greater or lesser extent, impinged greenbelt land.</p> <p>Description and main results: The work critically assessed the three main models used in identifying interchange locations, namely the MDS GB Freight Model, the SKM Additional Freight Model and the Radical Model used to develop the 2001 SRA Freight Strategy. The study concluded that while all three gave a general indication of ‘need’ in an area, none provided sufficient granularity to be able to define site specific ‘need’.</p> <p>Discussion and future research: The work was part of a series on one-off exercises to understand the reasons that LIFE failed in planning (c.f. study J-C2). The outcomes of this and the complementary work fed directly into the Strategic Rail Freight Interchange Policy, published as guidance for developers and planning authorities in March 2004.</p>	

J-D3 Innovative solutions in rail-based logistics competition	
Status	Main reports confidential as they contain commercially sensitive information from participating companies.
SRA contact	Jonathan Riley, Freight
Contractor	Competition winners: Exel, Lafarge, Minimodal
Project start date	2000
Project completion	October 2002
Cost	Total cost of innovation projects: Exel £2.1m, Lafarge £2.9m, Minimodal £1m
Publications	Unpublished reports. Availability: hard copy only
Follow-up	See below
<p>Objectives: Following an Innovation competition, all three winners were required, as part of their contract, to document the development of their schemes and its final outputs. The innovation fund put in significant risk capital and the reports were designed to disseminate the learning for a wider industry audience and to complement a website presence.</p> <p>Description and main results: The Exel report details all the aspects of the project, from initial set up through description, experience of the command-and-control tracking systems, performance monitoring, operating costs and revenues, detail about customer feedback and issues / difficulties experienced in both the solution and operating environment. The final Minimodal report is expected in May 2005. The interim report details the development of the equipment, customer feedback to the design and subsequent changes, the outcome of the customer trials and customer feedback. The final report will detail how the project has moved from its initial trial service proposition to the development of a core network service product based on the requirements of Royal Mail. The LaFarge report detailed extensively the development of the asset solutions, the operational environment the trial was conducted in, the costs of the trial and challenges overcome to achieve the necessary approvals, lessons learned from the trial and how it may have been improved if done again. As a technical solution, ‘piggyback’ was proven to work, but its operational limitation were exposed. (During the trial period Blue Circle, the original winner, was bought by LaFarge Cement. During the period, their business and customer base changed sufficiently for aspects of the original plan to be unachievable.)</p> <p>Discussion and future research: Although each was planned for formal publication, the timescales experienced from all three schemes were far longer than originally anticipated. This delay reflected the heavily process-oriented and safety-conscious nature of the rail industry. Getting approvals was complex, extremely expensive in financial and management time and the ‘system’ of accountability and responsibility was unclear and very fragmented to parties not fully familiar with rail. In addition to injecting new ideas, the innovation competition also aimed to identify the barriers to new ideas and concepts coming through in rail freight. The work confirmed that there are major barriers.</p>	

J-D4 Rail freight value proposition studies	
Status	Not confidential
SRA contact	Jeff Miles/Stephen Armstrong, Freight
Contractor	LCP
Project start date	July 2003
Project completion	May 2004
Cost	Phase 1: part of General Freight Market Study cost (c.f. J-E5) Phase 2: £81,868
Publications	Three unpublished folders, reporting on activities including seminars, workshops and research studies. Phase 1: General Domestic Freight Value Proposition. Phase 2 Beverages, White and Brown Goods Availability: Hard copy and electronic copy
Follow-up	Internal work on modelling supply chains
<p>Objectives: The work aimed:</p> <ul style="list-style-type: none"> • to segment and size the general freight market into sub-sectors more likely to be suited to rail freight. • to explore the ‘value proposition’ rail could provide to these sub-sectors. • to explore the issues as perceived by customers in the sub-sectors that would need solving in the short, medium and long term. • to develop a marketing plan to engage the sector, communicate positive messages and stimulate interest in rail freight. <p>Phase 1 segmented ‘general freight’ into retail supply chains. Phase 2 identified and explored ‘beverages’ and ‘white and brown goods’ specifically.</p> <p>Description and main results: The work successfully captured and sized the most likely sub-sectors of ‘general freight’. Through detailed interviews with end users, it also gave significant insight into the ‘soft’ issues and barriers towards switching from road to rail. It highlighted the severe lack of knowledge within industry of what rail can and cannot do, and the significant negative perceptions of rail freight, often built up through negative, passenger biased news reporting. The work concluded with an invitation-only workshop to key end users to explain the work and counter established preconceptions.</p> <p>Discussion and future research: The work concluded at a time of material change within the SRA, and coincided with the announcement of the rail review. Taking the work forward in a proactive manner with freight operating companies and end users during this period was inappropriate. It has been used as source material for the development of the SRA’s multimodal supply chain model. This model looks at the economic aspects of rail in the supply chain.</p>	

J-E4 Forecast of Maritime Containers By Rail	
Status	Not confidential
SRA contact	Duncan Buchanan, Freight
Contractor	MDS
Project start date	Mid 2002
Project completion	Feb 2003
Cost	£14,000
Publications	Unpublished report Availability: hard copy and electronic copy
Follow-up	None
<p>Objectives: The purpose of this report was to forecast the volume of maritime containers likely to pass through UK ports; to consider the proportion of maritime containers which can be expected to move by rail under 10 Year Transport Plan assumptions; and to comment specifically upon the impact of 9'6" containers.</p> <p>Description and main results: The report provided valuable data on the historic movements of containers through UK ports. It also provided forecasts to 2016 for the growth in the overall market, and rail's share of this market. It provided a distribution of traffic by major ports, using assumptions about infrastructure investment over the forecast period. Finally, it provided a forecast for the proportion of containers that are likely to be 9'6" boxes over the forecast period.</p> <p>Discussion and future research: The research has been used extensively in public inquiry work undertaken by the SRA. It has underpinned other work in relation to maritime business undertaken by the SRA.</p>	

J-E5 Rail market studies	
Status	The summary reports (published on the SRA website) are not confidential. The main reports are confidential as they contain company specific information.
SRA contact	Stephen Armstrong, Freight
Contractor	Various (see below)
Project start date	Late 2003
Project completion	August 2004
Cost	See below
Publications	All main reports listed below are unpublished. Summaries were published on the SRA website Availability: Hard copy and electronic copy of the full reports
Follow-up	None
<p>Objectives: The SRA commissioned a series of sectoral studies to provide robust data on the current rail market share and forecasts of how this could change over the next 20 years.</p> <p>Description and main results: In general the studies built up forecasts by firstly assessing the current market sector and how that was likely to grow over the next 20 years. The studies then assessed rail's current market share and how a number of key factors going forward could alter this market share over the forecast period. The sectors covered were as follows:</p> <ul style="list-style-type: none"> • Petroleum and petroleum products: study by Arup, completed April 04, final report. Cost: £60,000 • Regional aggregate and related product flows: study by Atkins, completed June 04, reports from phase 1, phase 2 and phase 3. Cost: £60,000 • Waste: study by Symonds, completed February 04, final report. Cost: £35,000 • Iron ore, steel and other metals: study by Symonds, completed March 04, revised final report. Cost £50,000 • Coal: study by Arup, completed March 2004, reports from phase 1 and phase 2. Cost £102,000 • Automotives: study by Symonds, completed August 04, final report. Cost £44,000 • General freight (i.e. all other products): study by SDG, completed April 04, reports from phase 1 and final. Cost £195,000 <p>Discussion and future research: No further market studies research has been commissioned, but the outputs from the market studies have been used to feed into many strands of further work.</p>	