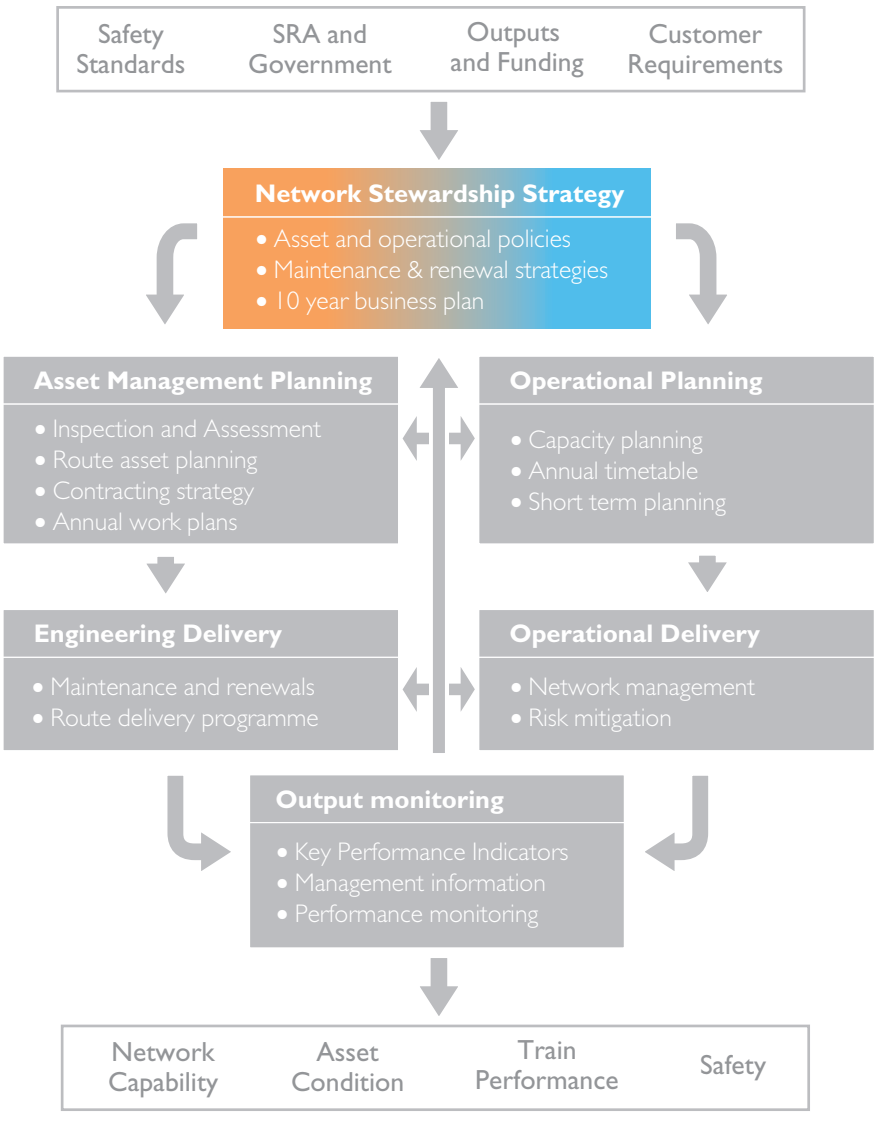
Section 3
Network Stewardship Strategy

This section explains how we assess what our customers, funders and other key industry partners expect from the rail network, determine what we must do to meet these expectations and define how we intend to meet these outputs in a cost effective manner through a set of interrelated network operations and asset policies. The output of this strategy is a 10 year business plan, setting out activity, expenditure and the outputs that will be delivered.



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Objective

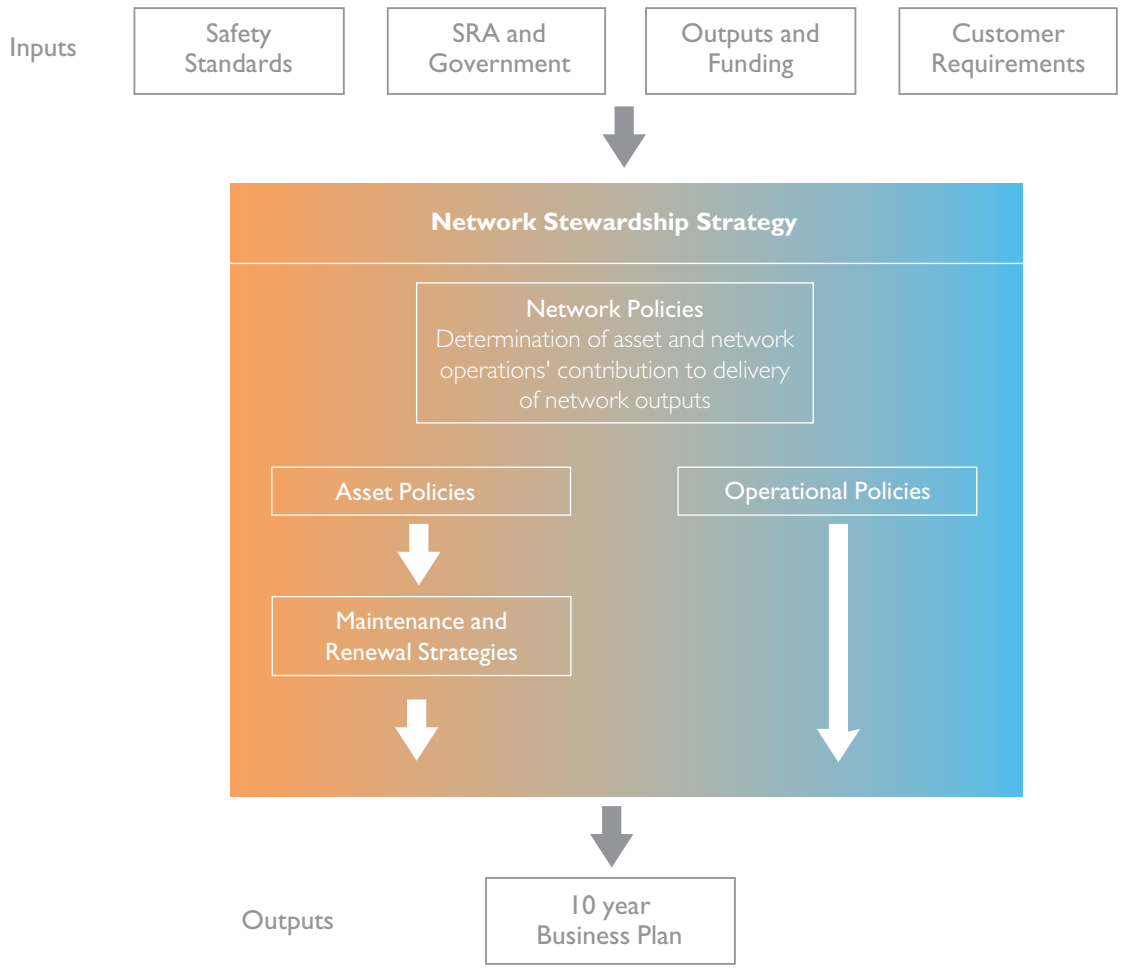
The aim of our Network Stewardship Strategy is to provide a robust and consistent framework for determining the actions that we need to take to deliver a safe, reliable and efficient rail infrastructure. In determining these actions there are two dimensions that we must consider:

- *train service delivery*: the translation of multiple train operators' requirements into a timetable that can be delivered reliably and consistently, whilst allowing appropriate access to the network for maintenance, renewal and asset enhancement; and
- *asset condition:* the achievement of optimum life-cycle costs, ensuring that asset condition and reliability can be maintained for current and future timetable requirements in the most cost effective manner.

Approach

The components of the development of an effective Network Stewardship Strategy are shown in the figure below.

Figure 3.1 Network Stewardship Strategy



In this section we identify the core activities required to develop a robust 10 Year Business Plan, describe the historic weaknesses in these activities and set out the actions we will take over the next two years to deliver robust processes. These activities are as follows:

Business Inputs. Clear identification of the business and safety drivers that determine the expected operational, performance and safety characteristics of the network. These include safety standards, the SRA's strategic specifications for the network, regulatory targets for asset serviceability and train operator's service aspirations. The resulting forecast demand influences our operational and asset stewardship planning.

Network Policies. Assessing the impact of the business inputs and ensuring that the relationship between drivers and policies, both for asset stewardship and network operations, is clearly understood.

Asset Policies. The development of asset management policies that when implemented cost effectively will deliver the required asset reliability and safety performance.

Operational Policies. Determining the most appropriate framework for the development and delivery of effective train timetables, working in close cooperation with our industry partners and ensuring that the constraints are challenged where these are sub-optimal for the industry as a whole.

Maintenance and Renewal Strategies. The development of specific strategies that ensure that the defined asset policies can be delivered at optimum whole-life costs, supported by the development of decision support tools and the use of new technology.

10 Year Business Plan. A key output of this series of activities is a 10 year plan which describes the activities, and consequential costs, required to deliver the agreed network outputs, articulating where appropriate the cost of alternative strategies and identifying clearly where required network outputs cannot be achieved due to supplier, network access or financial constraints.

Historically, weaknesses in these activities have been:

- mis-alignment between the objectives and expectations of our key stakeholders;
- setting targets for increased network traffic without fully understanding the impact on capacity utilisation, asset reliability and train performance;
- lack of robust information on assets and costs and an absence of strategic decision support tools to provide the capability to explore alternative strategic options for the network;
- asset policies based on short-term costs, developed in isolation from other assets and not consistently applied;
- engineering standards which may be inappropriate, contradictory or not cost-effective for the modern railway;
- outdated rules for train services and engineering access planning;
- a complex and extended process for timetable development with a product which does not always make the most efficient use of the network's capabilities;
- lack of robust performance information systems;
- inadequate operational processes and skills gaps in certain key areas;
- limited use of new technology;
- poor understanding of input/output relationships and the multiple interactions between them; and
- an event driven long-term planning process, with little or no capability to align interactions between asset types or between different elements of the business.

Good progress has already been achieved in addressing many of these weaknesses. Our priorities for action over the next two years are:

- a new approach for more transparent and effective relationships with the ORR, the SRA and other customers and stakeholders;
- supporting the SRA in its programme of work to develop Route Utilisation Strategies;
- identification of a set of high-level modelling tools that will assist our understanding of multiple interaction on the network which can be used to refine our policies and strategies and inform and align our stakeholders' expectations;
- establishing new asset stewardship policies, based on an integrated approach and processes for maintaining, reviewing and implementing them consistently across the business;
- implementation of a new process for standards development ensuring that costs deliver commensurate benefits and the elimination of those which are inappropriate or contradictory;
- building on our work with the SRA, updating and modernising the train services and engineering access planning rules;
- critical review of the timetabling processes and streamlining the information capture;
- development of a new information systems strategy for performance;
- creating clarity on organisational structure, roles and responsibility complemented by training and on-the-job support for staff;
- completion of a suite of asset decision support tools, supported by robust cost data and assessment of alternative maintenance and renewal strategies; and
- establishment of a Technology Business Unit to build on the work of the Engineering Innovation team.

Business Inputs

Historically, Railtrack's relationships with its regulators, stakeholders and customers have been described as being adversarial and suffering from poor alignment of objectives, supporting contracts and incentive mechanisms. Whilst there have been significant efforts to improve relationships over the past few years, this has been offset by the recent poor record on train performance and escalating costs.

Our acquisition of Railtrack has provided an opportunity for more transparent and effective relationships with the ORR, the SRA and others. The new relationship is best illustrated by the open and transparent approach which we are adopting towards the interim review where the company is working closely with ORR and SRA to help them assess the scope for improved efficiency and to understand the implications of alternative levels of expenditure. The SRA are playing a key role in enabling significant re-alignment of objectives with our customers.

Safety Standards

We are regulated for safety purposes by the Health and Safety Executive, through Her Majesty's Railway Inspectorate (HMRI) to secure the proper control of risks to the health and safety of employees, passengers and others who might be affected by the operation of the railway.

Specific areas targeted by HMRI for improvement over the next three years include:

- installing Train Protection and Warning System (TPWS) equipment, and measures to reduce the number of signals passed at danger;
- maintaining the infrastructure including track, signalling, embankments, tunnels and structures;
- improving the arrangements for managing contractors and reducing the risks to workers from trackside working;
- preventing vandalism, tackling the widespread problem of trespassing and reducing the numbers of assaults on rail workers; and
- improving recognition and understanding of occupational health issues.

The Railway Group Safety Plan is an annually reviewed over-arching industry plan and we make a significant contribution towards its delivery. The 2003 Plan aims to achieve objectives across five key areas:

- risk management;
- catastrophic risk;
- passenger safety and security;
- public safety; and
- workforce safety.

SRA and Government

The Government's Ten Year Transport Plan, as subsequently amplified through the SRA's Strategic Plan, sets out its objectives for the industry. The SRA is our major funder either directly or indirectly through access charges paid by operators which are subsidised by the SRA.

The SRA Strategic Plan outlines its goals:

- **growth** in passenger and freight traffic;
- **reducing overcrowding** on services within the London area to meet standards set by the SRA; and
- **performance** - in the form of train service punctuality and reliability – is to be improved.

Improving the utilisation and the development of the rail network is a core part of the Government's Ten Year Plan, and one of the three statutory purposes of the SRA. We are working closely with the SRA in its role as strategic specifier to facilitate the achievement of targets set out in its Strategic Plan and Capacity Utilisation Policy. Developing the network may take several forms, including equipping it to handle additional traffic, raising line speeds and improving its operational, safety and environmental performance. Fundamental to this development is an understanding of the likely demand for passenger and freight traffic.

Outputs and Funding

The costs of operating, maintaining and renewing the railway infrastructure have risen significantly over the past two years, exceeding the assumptions underlying the last periodic review. On 15th November 2002 the Rail Regulator published a consultation document on the forthcoming interim review of access charges. For the purposes of the business plan he stated that he would be asking us to produce costs for the following outputs:

- the measures of network capability, asset serviceability and asset condition set out in Chapter 14 of the periodic review final conclusions; and
- the trajectory for operational performance put forward by Railtrack in its 2002 Network Management Statement (broadly envisaging a return to pre-Hatfield levels of performance by 2006).

Our plan aims to be compliant with all of the asset stewardship output measures set by the Regulator. These include measures of network capability, such as line speed and loading gauge, and measures of asset condition, such as the number of broken rails and the number of asset failures causing significant train delays. Many of these measures are defined in terms of avoiding any deterioration in the average condition of the assets, but some, notably for broken rails, set targets for improvements in condition. In some instances, we have set more demanding targets for asset improvement for safety or performance reasons. The specific measures are discussed in more detail in the relevant asset sections of Section 9.

Whilst we have sought to deliver the train service reliability target, we have not yet identified a cost effective route given the projected traffic growth on the network and the rate at which we are able to improve asset reliability.

We are working closely with the SRA and the ORR to ensure that funding available over the foreseeable future is optimised between sustaining the current level of activity and providing increased capability. Options under review include improving the effectiveness of capacity utilisation and driving down costs through improved engineering access to the network. This plan represents a baseline against which these alternative strategic options will be explored and is therefore subject to change, in line with the ultimate conclusions.

Customer Requirements

Our customers' needs are key to our business. These needs are driven by increasing rail demand and by the SRA's aspirations. There is intense competition for rail paths, particularly in the southeast, and managing the use of available capacity will, but only in part, relieve some of the pressure.

Optimising capacity usage is obviously a challenge, especially when attempting to reconcile different needs and operating patterns. Passenger operators require regular and reliable timetabled services, while freight operators want maximum timetable flexibility in order to reliably meet their customers' requirements. In addition, greater volumes of maintenance and renewal activity are increasing pressure for engineering access to maintain the network. A balance must be struck between these competing needs, through better planning, enhanced cooperation and improved asset management.

Freight operators require maximum timetable flexibility, with high reliability levels, in order to meet their customers' needs for sophisticated just-in-time operations, essential if rail is to compete with the road freight sector. Demand patterns will be driven by cost, the level of SRA subsidy and the level and pattern of imports.

Our understanding of demand in the passenger markets is based on observations of current travel patterns and an understanding of how those patterns change with changes in the economy, population and employment levels and the costs, journey times, reliability and congestion on alternative modes of transport. We use demand forecasting techniques developed jointly with industry partners and refer to the high-level forecasts published by the SRA.

Similarly, freight demand growth is determined by understanding the comparative advantages of haulage by road and rail, the expected performance of the markets served by rail, changes in the geographical distribution of those industries and levels of cross-channel traffic. The forecasts are developed in close collaboration with the SRA.

This core forecast of demand feeds into a number of our activities including route capacity and operational planning, and asset stewardship planning. Whilst our understanding of demand is robust, its impact on capacity utilisation, assets and performance is not, which has often resulted in the introduction of new paths with a negative affect on performance. The process by which we analyse demand and capacity at a route level is described in the Route Plans volume, which includes details of current and future capacity utilisation.

We undertake analytical work to:

- understand how the existing rail network can be most effectively used to deliver the SRA and other stakeholder objectives;
- understand how performance can be improved, through the trade off between the number of train paths operated and performance level delivered; and
- ensure appropriate engineering access is available, so that the performance and output level required can be delivered.

We use this analysis to support the SRA in its programme of work to develop Route Utilisation Strategies, as described in its Capacity Utilisation Policy documents.

Changes to the number of trains on the network have an impact on our asset stewardship planning as changes in the level of usage affects the rate of degradation of our assets. The introduction of new types of train can also be a major issue through changes in the nature of the degradation relationships and performance. A clear understanding of future traffic patterns is essential to ensure that we understand the delay impact, that we carry out the appropriate degree of maintenance and that our renewal forecasts reflect the acceleration in asset deterioration that will result from increased usage. This is particularly important where step changes in traffic volumes are involved.

We have identified the key interactions which must be managed to address these issues. We are in the process of identifying the set of modelling tools, some of which are already in place, which will allow us to assess traffic impacts and evaluate alternative options. Early aspects of the work will be used to inform options for the interim review. Over the medium-term, as our understanding improves it will be fed back into the capacity work undertaken with the SRA in order that appropriate decisions can be made on accommodating demand and realigning the strategic objectives of our key stakeholders.

Network Stewardship Policies

To develop optimal asset and network operational policies we need to understand the complex relationship that exists between our infrastructure and the development and operation of the network in achieving the delivery of a safe and reliable railway. Whilst it is self-evident that improvements in asset reliability will have an impact on train service reliability, as will improvements in the day-to-day management of train service delivery, proposed action plans can impact upon multiple network outputs. For example, our programme of work to reduce the number of broken rails is primarily safety driven but will have a significant impact on reducing train delays. In addition, improved network management and train regulation will bring about a more reliable train service and, as a consequence, contribute to an improvement in overall safety on the network. Whilst some of these interactions are understood, for others the relationship is less clear.

The challenge we face is to develop interrelated asset and network operations policies that together provide the optimal economic solution to delivering the required network outputs. The process is iterative, particularly due to uncertainties between cause and effect. The robustness of the process adopted for this year's Business Plan is discussed later in this section.

A critical policy area concerns balancing demand for access to the network between the operation of trains and the need to carry out engineering work. This is at the core of the delivery of a safe and reliable railway and provides an inextricable link between the delivery of asset and network operational policies.

Cross Industry Cooperation

The integrated nature of the rail industry means that any initiative tackled in isolation can only bring limited benefits. In recognition of this, an overarching policy is to continue to be active in the development and progression of cross industry initiatives. These recognise the interdependence of the management of our infrastructure assets and the vehicles that use them, and of the operation of the network with the behaviours of the operators that use it. These cross-industry initiatives cover a diverse range of activities, including:

- Systems Authorities, such as that covering the wheel/rail interface;
- industry network control strategy;
- service recovery strategy;
- railway crime;
- reviews of professional train driving techniques;
- sharing of performance and other data; and
- area performance delivery groups.

Asset Policies

A robust infrastructure is central to the operation of the network. Its reliability underpins the effective delivery of the train timetable, allows the safe operation of the train services, and, when operated on an optimised whole-life cost basis, ensures that future timetables can be delivered in a cost effective manner. The development of effective asset policies is a complex task, particularly given the size of the network and the long life of many of the assets. Financial constraints over many years led to components being selected on the basis of initial capital cost, rather than a whole-life assessment. Wholesale replacement of such components cannot be delivered overnight, a problem exacerbated by the interaction of many assets on the network. The integration of new and existing technologies can be complex, particularly when one considers the extremely varied nature of the current network. Bespoke, rather than generic, solutions are often required.

Our new approach to asset policies is based on an integrated approach for delivering a safe and reliable railway by ensuring that:

- there is a clear and unified approach to the development of asset policies;
- the policies focus on the management of risk, as identified by our integrated, system-wide risk management process;
- we have accurate and comprehensive information about the assets and knowledge of how the assets are performing;
- we develop decision support tools that will assist in making objective decisions;
- our engineering and operational plans are integrated and developed together;
- we understand our resource constraints and future demands on the network, as well as the outputs we are trying to achieve;
- we understand the relationships between the inputs to, and the outputs from, our infrastructure; and
- what we plan to do is what is delivered on the ground.

The policies are dynamic, reflecting changes in the drivers and technologies with time, and are used to plan the business and to set the key framework for how the business is run.

The existing policy/standard/specification/work instruction hierarchy will ensure effective implementation is maintained. Asset policies have been developed for Track, Structures, Signalling, Telecoms, Electrification and Plant, and Operational Property and these are discussed further in the relevant parts of Section 9. Each policy covers inspection, maintenance, renewal and enhancement. We have retained Railtrack's basic policy framework and are reviewing each policy to ensure the optimum delivery of the required network outputs.

The key steps in our approach to establishing, maintaining and reviewing our stewardship policies are to:

- develop and annually review a policy map showing the internal and external business drivers and the interrelationship between policies;
- ensure there are clear rationales behind each policy and eliminate or update policies which do not support our business goals;
- formulate policy for each asset type, and where appropriate associated groups of assets, covering inspection, maintenance and renewals;
- undertake research and development to test the applicability, cost benefit and resource implications of policy changes;
- ensure that new or changed policies are rolled out under a controlled quality management system, including ensuring adequate resources and training as required; and
- undertake post-implementation reviews and provide feedback to policy developers.

Strong central control of policies will be maintained through an appropriate document management system and supported by implementation audits. The development of a comprehensive scheme of delegation, and integration of policies into maintenance and renewal contracts, will ensure that the objective of the policy is delivered on the ground. It is critical that a common approach is delivered throughout the company. If any policy cannot be followed because of local operating or asset conditions, the reason will be clearly documented through a derogation process that has appropriate authorisation.

It is our intention over the next 18 months to ensure that these policies will move from being predominately asset specific to a position where they will be integrated across asset groups to ensure that asset stewardship is delivered on a system wide basis.

Engineering Standards

As far as practicable, we will ensure that the stewardship of the asset base is supported by sufficient coverage of standards. A principle of future standards and procedures is that they should not impose costs unless they deliver commensurate benefits. We will move to reduce the number of standards through a risk managed process, eliminating any that are inappropriate or contradictory. All changes will be made in accordance with the change control philosophy that we are developing as part of our specific review of the company standards management system aimed at improving our company standards and business document framework. This will address identified deficiencies and recognise the impact of proposed European legislation; the importance of safe interface management across the railway systems; and improving compliance to standards.

Many assets installed were compliant with standards at the time of installation, or even installed before any relevant standards were written. Whilst not compliant with current standards, they remain fit for purpose. To formalise their continued usage every such asset requires a derogation, approved by an appropriately qualified professional engineer within the company or, under delegated authority, within a supplier organisation. Such derogations will specify limitations of scope, including expiry dates, limitations on usage, minimum condition levels or other appropriate controls. In the case of temporary non-compliances, a detailed undertaking to control or remove the derogation will also be provided.

European legislation is increasingly defining the standards that apply to the network. The EU Directive on High Speed, and the associated High Speed Technical Specifications for Interoperability (TSI), came into domestic law in 2002. These define additional requirements for new high speed trains and for upgrades to the fast lines on the West Coast, East Coast, Great Western and Channel Tunnel Rail Link. A further EU Directive on Conventional Interoperability is expected to come into domestic law late in 2003. It encompasses all rail vehicles and just over half of the rail network, and will also impose significant costs on the company. It should be noted that the cost of future changes in TSIs have not been included within this plan.

Further proposed legislation currently working its way through Brussels will, as currently drafted, extend the scope of interoperability to embrace renewals on high speed lines and the remainder of the network. This is expected to become EU law at the earliest around the end of 2003 and to be factored into UK law two years later.

The SRA has led a programme of work to evaluate the effects of the proposed specifications for conventional interoperability. Further work will be undertaken as part of the interim review, which will enable the SRA to form a view as to the most appropriate stance to take in leading the industry input to the development of the standards.

Operational Policies

Whilst reliable infrastructure can be considered as a pre-requisite to the delivery of the desired level of train performance, it provides only part of the solution. The complete solution requires all the factors that can influence operational performance to be addressed.

As a consequence operational policies are developed to:

- ensure the production of a robust timetable that provides an appropriate balance between demands for access for train services and for engineering works; this is the focus of our operational planning policies below;
- deliver the timetable in real time as effectively as possible; this is the focus of the network management policies below; and
- minimise the impact of external factors on the operations of the network; this is the focus of the risk mitigation policies below.

Operational Planning

Operational planning is the process which translates customer access requirements into plans for the provision of safe and reliable train paths, leading ultimately to the detailed timetable plans used by front-line staff to deliver the real-time day-to-day operation of the railway.

We are seeking significant improvements in the planning processes through initiatives targeted at long, medium and short-term planning. The key elements are outlined below and developed further in Section 6.

Capacity Utilisation

The lack of a cross-industry strategic focus since privatisation has resulted in timetables that do not make most efficient use of the network's capabilities. This is now being addressed though the SRA's development of a Capacity Utilisation Policy and associated Route Utilisation Strategies. These strategies are considering the capacity of the network from an holistic perspective and are likely to result in changes to the access allocated for both train services and engineering works.

In support of this initiative we are developing improved processes for planning access to the network at a strategic level, covering a 10 year period, which will provide an important input to the industry's long-term plans. We will also ensure that our longer-term engineering access requirements are clearly identified as an input to this process.

Interface Rules

The operational and engineering planning processes depend upon published rules and priorities that control the allocation of access. These are principally contained within the Rules of the Plan, for train services planning, and the Rules of the Route, for engineering access planning. We are working with the industry to update and modernise these planning rules.

We are continuing with the updating of the Rules of the Plan replacing, for example, point-to-point timings applicable to rolling stock no longer in use with those appropriate for current stock. We aim to ensure consistency with current operations, rolling stock and signalling systems with respect to sectional times, station dwell times, performance allowances and headways on an asset, route and location specific basis. This will facilitate the production of more robust timetables and, hence, more reliable operational performance.

Timetable Development

The development of the timetable is a complex and extended process. We do not propose any major structural change to the production process but we believe it is possible to reduce the overall timescales and we aim to streamline and simplify the process. A key concern is that the current timescales often require two year's notice of possessions for engineering work. In the majority of cases the detail of the work is not known at this stage and the possessions booked are not always what is required when the scheme is finalised.

We will retain the existing processes until we are satisfied that improvements can be implemented efficiently and with controllable transition risk. We anticipate that substantial improvements can be made through a critical review of the processes involved and streamlining information. We will also be seeking a reduction in the error rate, which can be determined by the timetable supplements.

Network Management

Network management is the real-time process by which we monitor and control the movement of trains on our infrastructure, with the primary objective of maximising the delivery of services in accordance with the timetable.

The dedication and commitment of our staff to the delivery of a reliable timetable is acknowledged throughout the industry. However, it is also acknowledged that their ability to discharge this responsibility is hampered by:

- skill gaps in certain key areas;
- processes that are inadequate given the complexities involved in the development and delivery of the train services; and
- the absence of robust information from existing legacy information systems.

The policies outlined below are aimed at addressing each of these issues. The implementation of these initiatives is set out in more detail in Section 7.

People

The skill and expertise of our people are critical to our future success. The implementation of the new regional structure allows us to bring together maintenance and operations under a single locally-based general manager, improving significantly our ability to optimise our resources and ensure our teams are focused clearly on the objective of delivering a safe and reliable railway. A consistent structure across the company brings with it additional benefits, including absolute clarity in roles and responsibilities and a more stable platform for introducing revisions to operating policies and procedures.

Competence requirements will be defined for all posts with a safety responsibility during the first half of 2003 allowing for the introduction of an improved training and development strategy that includes an apprenticeship scheme, encouraging operations careers for graduate trainees; and a cross industry training initiative with Virgin Trains. The SRA has recognised the importance of this issue across the industry and has undertaken research on industry skill gaps and provided funds for the establishment of a National Rail Academy.

Standard roles and responsibilities, new training, competence assessments and on the job support for signallers and other key operations staff will all support the drive to deliver improved network management and more reliable operational performance.

Processes

A key element of our strategy to improve network management is the adoption of a "one network" approach to ensure that the right procedures are in place and are being consistently applied across the company, removing local practices that have their roots in different BR regional policies. This will drive the process improvements in signalling operations and network control, supported by consolidated procedures manuals.

Technology

Whilst technology has always had a role to play in network operations, the opportunities brought about by advances in technology, primarily in the area of information systems, have not been fully exploited in recent years. Significant improvements in information systems and hardware will support improvements in training, front-line operations, network control and staff rostering. It will also help mitigate external risks.

The use of data warehousing and improved information on causation of train delays will improve reporting, management understanding and analysis of train service and network performance. Information system improvements and standard processes will drive a new network control strategy, designed to deliver world class, proactive control facilities, well equipped with current information on the status of the network.

Mitigation of External Risks

Operational performance can be significantly affected by external factors that are not wholly within our control. One of the key aspects of delivering a safe and reliable rail service is therefore to ensure that we identify the key external causes of delay and disruption and take appropriate action to mitigate these risks, by seeking to minimise the risks of disruption and to mitigate the impact of incidents.

This includes the proactive management of factors such as:

- weather and seasonal factors: through improved forecasting and seasonal plans; and
- bridge strikes: through initiatives to reduce the number of strikes and to minimise the resultant delays.

The risks and initiatives for mitigation are discussed in further detail in Section 7.

Maintenance and Renewal Strategies

Objectives

The objective of our maintenance and renewal strategy is to set the requirements for maintaining, renewing or upgrading assets to make sure that they deliver our desired performance and safety outputs at optimum whole-life cost. The resultant activities will form the basis of our business plans.

Principles

Our strategy is based on a set of 10 principles, developed and published in 2001, which are that the company should:

- take responsibility for asset stewardship decisions;
- deliver clear asset engineering policies, standards, and specifications;
- continue to contract out maintenance and renewals;
- take ownership of asset information;
- be able to demonstrate cost effectiveness of maintenance and renewals;
- lead industry research and development;
- take ownership of examination of the network;
- take ownership of work prioritisation decisions and the resulting work plans;
- take ownership of all engineering access to the network and manage possessions; and
- be accountable for developing the long-term view of the people and capability required.

Strategy

Consistent with these principles we will focus on:

- the adoption of an integrated approach to maintenance and renewals ensuring we develop plans that deliver optimum whole life solutions;
- a consistent prioritisation of maintenance and renewals according to condition, performance, current and expected usage, and operational risk;
- the adoption of a proactive approach to maintenance;
- recognition of the need to make available network access and resources to undertake the work safely and efficiently; and
- the introduction of an effective process for managing mitigations.

The successful implementation of this strategy will ensure the delivery of an integrated risk-based maintenance and renewal strategy for consistent application across all network assets.

Integrated Approach to Work Management

A key constraint on the development of appropriate integrated maintenance and renewal strategies is the limited availability and visibility of consistent data on the level of maintenance activity and the associated costs under the original RT1a infrastructure maintenance contracts. This has started to improve under the present contracts and is being systematically addressed through the development of MIMS (Mincom Information Management System), a proprietary work management system.

The implementation of a standard work management system and greater cooperation with maintenance contractors will enable us to develop a better understanding of the effects of maintenance practice on asset condition and performance. This will improve our ability to forecast the optimum timing of renewals and ultimately allow the development of serviceability indicators. The application of MIMS is described further in Section 5.

This approach will be backed up by improved asset information relating to cost and performance, research and development, the adoption of best practice, and the introduction of new technology to ensure that the maintenance regime delivers efficiency improvements.

Inspection and Asset Knowledge

A key element of our strategy is to ensure that all assets are inspected and subject to objective condition assessments on a systematic basis at appropriate frequencies. We will continue to exploit opportunities presented by Remote Condition Monitoring (RCM) systems, which aim to prevent infrastructure and vehicle asset failure by the early detection of deterioration. This will support the move towards a fully proactive approach to the identification of maintenance and renewal activity rather than merely reacting to asset failures after the event. The work we undertake will concentrate on assets whose failures have a high safety or performance impact on the rail network.

A significant programme of work, described in Section 4 and within the Asset Plans in Section 9, is in progress to ensure that our strategies are founded upon adequate knowledge of our assets.

Maintenance and Renewal

Cyclical asset maintenance is currently based largely upon fixed frequencies that have been established historically. Consequently there is an opportunity to implement risk and usage-based maintenance strategies and we are developing tools to support this approach. There are a number of obstacles to be overcome before such a strategy can be fully implemented, particularly where the tools indicate that optimisation of activity may involve reducing some maintenance frequencies while increasing others. We will maintain cyclic maintenance frequencies, based on updated assessments of need, where appropriate, because of the advantages this approach offers in terms of efficient resource and possession planning.

Renewal will normally be considered when the asset is approaching a condition where it is no longer safe and/or economic to maintain. In some instances renewal may be undertaken prematurely to facilitate enhancement, or where it is more economic or less disruptive to package with other work. Railtrack had been examining the case for cyclic renewals, on the basis of expired life or accumulated traffic. We are reviewing the work to date in developing our future renewals strategy. A key alternative that will be evaluated is a route renewals approach, whereby work is undertaken when the volume of prioritised work on a route reaches a level to support complete route renewal. This could maximise the benefits of high output track renewal techniques, reduce unit costs, minimise the overall level of disruption to traffic and, on certain routes, support the introduction of the European Rail Traffic Management System (ERTMS).

Delivery

We are working to ensure that we have processes to plan and deliver work in the most efficient and cost effective manner across our network. This will involve us taking responsibility for certain activities that have hitherto resided with our contractors. This work is underpinned by a contractual framework that will increasingly allow us control and visibility over contractor performance, while ensuring that the supplier market allocates resources according to our requirements. The New Maintenance Programme and the initiative we have to take some contract areas in-house, commencing with Reading contract area, are discussed in more detail in Section 4.

Engineering Access

Improving the way that we plan and manage engineering access is critical to delivering the required activity and achieving reductions in the unit costs of the work we perform on the network. The focus of work from early 2002 has been to challenge existing practices and to find new ways to plan and manage possessions to reduce costs and improve our efficiency and effectiveness.

We have recently introduced a new procedure known as RIMINI (RIsk MINImisation) which requires improved planning of work so that it is undertaken in Green Zones, i.e. separated from train movements, wherever reasonably practicable. The introduction an Automatic Track Warning System (ATWS) provides an automated warning to alert trackside staff of approaching trains more reliably and earlier than can be done by a lookout. Section 5 provides more details of these initiatives.

Decision Support Tools

Effective asset management is critical to our success. A number of key initiatives to deliver improvements to this process are currently underway. An issue that remains to be addressed is the optimisation of what work needs to be done and when.

There are currently numerous tools in operation within the company used to assist in determining workload on our asset base. These tools vary considerably in sophistication and usage, few achieving the objective of identifying work volumes based on a clear understanding of how the work will impact on our key outputs. The result is an asset management process that has much of its day-to-day decision making rooted in historical practice rather than in robust predictions of the future asset condition.

Whilst ad hoc solutions have been developed to improve decision making, work carried out recently has given a clear indication of the value of a coordinated Decision Support Tool (DST) regime that brings together best practice and focuses this thinking on our key assets. Key steps in developing this regime are:

- assembling, through consolidation and further development, a portfolio of predictive models that assess the impact of renewal and maintenance work volumes on the future condition and performance of our key assets;
- improving knowledge of the whole-life behaviour of the key assets, including failure modes, degradation mechanisms and the impact of asset deterioration and failure on our outputs;
- improving knowledge of the unit costs associated with renewal and maintenance work and aligning the cost information with our financial processes;
- specifying the data that will enable the models to predict with a level of detail and accuracy sufficient to support robust decisions; and
- ensuring that the determination of work volumes aligns with the processes by which the renewal and maintenance activities are delivered.

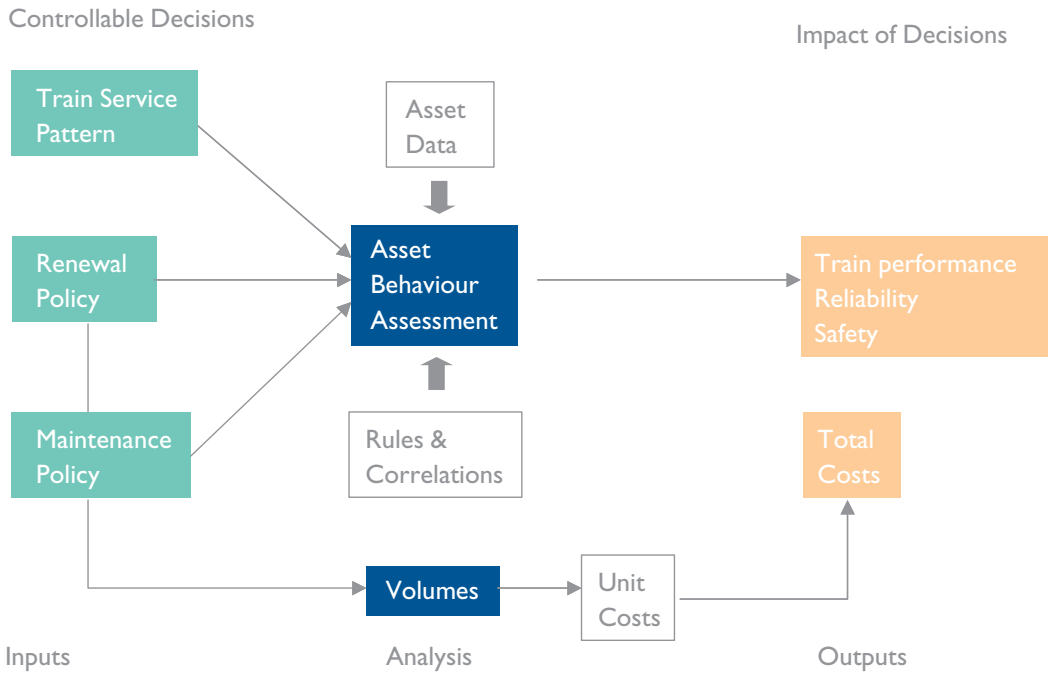
Prioritisation for the development of these tools is being determined by:

- the renewal and maintenance costs associated with servicing the assets; and
- the impact of asset failures and degradation on our key performance measures.

We will adopt a consistent approach to developing the models, whether they support strategic or tactical decisions, or whether they represent linear or discrete assets. It is expected that rollout of the next phase of the tools will take place towards the end of 2003.

The DST modelling framework is illustrated schematically in the figure below. The framework links our controllable decisions (such as how much to maintain, when to renew, what train service to operate) with the impact of these decisions on our key outputs (such as the number of broken rails, the number and severity of train delays).

Figure 3.2 DST Modelling Framework



The success of the DSTs depends critically on the extent and quality of the available data. The present extent of our asset knowledge is described in Section 4 and in the relevant Asset Plans in Section 9. The tools developed will identify and specify the data requirements and develop processes and procedures for how the data is to be extracted and input to the models.

The intention is for the DSTs to provide the user with flexibility in assessing the implications of a range of credible options for maintenance, renewal and operational regimes. Wherever possible the models will incorporate a scenario, or "what-if", capability for the main variables.

The models are required to express the way the asset behaves in terms of the key outputs for which we are accountable, for example train reliability and safety, and to identify the volumes of work and associated costs required to deliver those outputs.

Section 9 contains details of the tools in use or development for each of the asset categories.

Unit Costs

The company has suffered from a lack of robust data about the unit costs of maintenance and renewal activities. This is largely because of the lack of consistent definitions of the relevant units of volume and the treatment of particular aspects of costs, with the result that data has not been consistent between regions and contractors. This has hindered the measurement and assessment of efficiency and cost control and has adversely affected the accuracy of previous cost forecasting.

In the course of the last year, unit cost frameworks have been developed for track renewals, structures, signalling and some maintenance activities. These frameworks define the units of activity to be measured and the processes for allocating costs to the activities, ensuring, once the processes are fully embedded, that unit costs are measured throughout the company on a consistent basis. Frameworks for data collection will be developed for the other asset categories over the next six months.

Data is being collected to measure costs and volumes of activity for work undertaken in 2002/03 and plans for 2003/04 and beyond. Data collection is generally through manual processes and is of varying degrees of quality, but the process will become systemised over the next 12 to 18 months through the use of MIMS and the new Investment Reporting System, supported by the Information Plan, which will progressively improve data quality.

A regional benchmarking exercise has recently been commissioned. This will identify the variances in unit costs between regions and the cost drivers that underpin these variances. Whilst not providing supporting information for this business plan the exercise will support our overall goal of driving down costs and provide more information during the interim review process.

The improvements in the availability and visibility of robust unit cost data will deliver benefits by:

- facilitating whole-life cost decision making for asset maintenance and renewal;
- improving control over work volumes and costs; and
- providing a means for the assessment of the scope for efficiency improvements and of measuring progress in achieving them.

Operational Risk Framework

We are in the process of developing an Operational Risk Management (ORM) system to provide a comprehensive and structured approach to the management of all of the risks associated with the ownership, operation and maintenance and renewal of railway network assets.

Standard criteria will be developed to provide a coherent and uniformed process for the identification of safety hazards and operational risks, including those to train performance. This system for the evaluation and classification of risks and remedial actions will support cost benefit assessment, facilitating the identification of effective and proportionate control measures. This supports development of the Network Stewardship Strategy and the Annual Work Plans and is described in more detail in Section 4.

Technology

Objective

It is our objective to ensure the benefits of new technology are incorporated into our core business processes. This will be achieved by establishing a Technology Business Unit to build on the work of the Engineering Innovations team. This unit will be integrated with, and responsive to, all our operating functions, customers, suppliers, and other stakeholders. Where gaps are identified between the needs of the railway system and the available technologies, we will work in collaboration with our suppliers to develop specific technologies to fill those gaps, whilst encouraging our suppliers to innovate across all areas.

Approach

Our technology strategy will be directed at solving existing and emerging problems of the railway network and identifying new technologies that will improve safety and efficiency. Technology activities will have clear objectives, timed deliverables, specific budgets, and well-defined outcomes. Our technology activities will be driven by two over-arching objectives:

- to apply technology to eliminate the sources of failure that affect operational performance; and
- to seek out and implement technologies that can be applied to improve service reliability, cost effectiveness, and safety of the railway.

We recognise the risks inherent in the introduction of new technology and will ensure that we do not introduce it on strategically important projects unless the new technology is fully proven.

Methodology

We will adopt a technology development prioritisation process that systematically identifies programme objectives, deliverables, economic criteria and consistency with our seven strategic objectives. The process will also generate an anticipated implementation strategy and benefit stream in order to produce estimates of the net present value. These factors will then be taken into account in prioritising the projects. Strategic issues will be based on business drivers and include customer satisfaction, regulatory and legislative implications, relationships to other activities, alternative actions and any anticipated constraints on implementation.

Evaluation

The full range of potential technology development topics will be reviewed to determine the magnitude of each problem and whether promising solutions are possible either with existing technologies or emerging new technologies. A high-level economic assessment will then be performed to ensure that possible solutions will be cost-effective. The resulting short list will be subjected to a detailed evaluation.

The technology development and integration activities will be carefully defined to determine the full scale of the problem to be addressed. The project will then be evaluated and the benefits arising from implementation will be defined. The expected economic return will be discounted by probability of technical and implementation success.

The result of this analysis will be a range of technology development and demonstration topics that can be prioritised by initial cost, economic value, strategic value and time to success. These priorities will be reviewed and revised or approved by a steering committee.

10 Year Business Plan

Business Planning

Effective asset stewardship requires a planning horizon which reflects the long lives of the assets and the lead times associated with identifying specific activities and ensuring the resources and possessions are available. A key element of our stewardship strategy is to establish and maintain a 10 Year Business Plan that defines the activity volumes and associated expenditure required to deliver the target outputs. These activities and costs will be determined "top down" using the available DSTs. This Plan will be maintained over at least a 10 year time horizon.

Within the framework established by the 10 Year Business Plan, the Annual Work Plans process, described in the next section, will identify the workload in detail using a "bottom up" approach, over a rolling three year planning horizon.

The objectives of the 10 Year Business Plan are to:

- define the expenditure, volumes and outputs associated with the 10 year infrastructure asset management plans;
- provide the baseline for future funding;
- provide the basis for efficient medium-term asset management planning;
- provide a framework for the review of alternative policy options or decision scenarios evaluated both within asset management plans and across the plans, to identify potential asset and route trade-offs; and
- detail the work in progress to refine the asset management planning methodology and test new policy options or scenarios.

Long-term business planning within the company has historically been an event driven process geared towards supporting the five-yearly regulatory reviews, following which the asset management plans are frozen and lose much of their value. Our revised approach aims to introduce the systems and processes necessary to support continuous asset management planning based on common methods and datasets both from a top-down and bottom-up perspective.

Whilst progress has been made on the development and implementation of this new approach, there is still considerable work to do and this is reflected in the varying confidence levels associated with each of the infrastructure asset management plans.

Assessment of the Plan

We need to be in a position where our 10 Year Business Plan will be demonstrably robust in its approach to asset management. This will enable us to reach reasoned decisions with the SRA and the ORR on the outputs to be delivered and the associated funding, with a clear understanding of the associated risks and confidence levels. At present, for the following key reasons, we are not in that position.

Limitations of the Decision Support Tools

Utilising the best available data a series of DSTs have been used to support the identification of work volumes and predict the associated outputs. Work is in progress to improve data quality and the DSTs where this is significantly reducing confidence levels in the asset management plans. The aim is to establish a generic modelling approach which will provide consistency across asset groups such that their outputs can be compared and consolidated within the 10 Year Business Plan. Full alignment across the many DSTs currently in use within the company will not be achieved in time for the interim review.

T-SPA (for track) is the most developed of the DSTs in terms of establishing reliable linkages between volumes, costs and outputs. Although there are limitations within the current model, a number of these will be addressed in time for the interim review.

The maintenance/renewal mix is not adequately addressed in the top-down plan and it is therefore not currently possible to evaluate potential trade-offs in this area. The top-down maintenance forecasts are simply an extension of the 2005/06 bottom-up projections. Potential tools are currently being investigated to improve the maintenance projections for the interim review.

The 10 year plans have been developed on an individual asset basis to date. Further development and iterations of the plans will involve identifying synergies between asset plans, seeking out cost reduction opportunities and optimising the access to (and hence disruption of) the rail network. A key element of this further work will be the consideration of overall route asset strategies, which will be influenced by the proposed route classification outlined below. It is expected that the further work that will be carried out will help inform the interim review process.

Unit Costs

Levels of confidence in the application of unit costs across the asset management plans vary significantly due to a range of factors such as the availability, relevance and robustness of historical data. All unit cost assumptions will be reviewed and improved prior to the interim review.

West Coast Route Modernisation

Whilst the publication of the West Coast Main Line Strategy document sets out the SRA's aspirations for the output of the route upgrade the implications have not as yet been fully assessed, partly as a result of a lack of clarity on the timescales for the proposed expenditure. A joint SRA/ORR review is planned to clarify this position. Although asset management plans have been aligned with the scope and schedule as understood at present, there are likely to be some overlaps or omissions in the plans. It is intended that all the asset plans will be revised following clarification of the scope and schedule of the project.

Alternative Policy Options and Decision Scenarios

A series of engineering policies have been produced, which, although currently subject to internal review, underpin the asset management plans to deliver the regulatory outputs. An emerging alternative is the adoption of a route-based approach to support the Track Engineering Policy. This approach divides the network into five broad route classifications, as follows:

- primary routes, consisting of the inter-city network and other key routes such as the Continental Main Lines and London to Brighton;
- London and South East commuter routes;
- secondary routes, consisting of other mixed traffic through routes, such as Stowmarket to Birmingham via Ely and Nuneaton, and Highland Main Line to Inverness;
- rural routes, consisting primarily of regional railway routes carrying primarily lightweight infrequent passenger trains, such as branch lines in Cornwall and East Suffolk; and
- freight only routes.

A map showing details of these routes is in Section 11. A matrix has been developed identifying varying performance outputs, maintenance and renewal strategies, access and traffic assumptions which aims to deliver a high performing network of Primary and London and South East Commuter routes, with lower standards for the remaining route classifications. This classification will be the subject of further discussion with the SRA and the ORR.

This approach has begun to be applied within the track modelling tool and it is anticipated that the asset stewardship routes defined within the revised policy will be developed and rolled out across all of the other disciplines, where appropriate, to provide a consistent methodology which will support route based analysis and the identification of system-wide trade-offs.

Expenditure Summary

Information is provided within this plan on expenditure by region and asset type for the period 2003/04 to 2005/06 inclusive, as follows.

National Expenditure Summary

Figure 3.3 National expenditure to sustain the network

£ m (rounded) in 2002/03 prices	2002/03	2003/04	2004/05	2005/06
Maintenance	**1,202**	**1,328**	**1,313**	**1,253**
Renewals				
Track	913	1,205	1,242	1,153
Structures	372	440	529	539
Signalling	573	710	752	1,122
Electrification	148	228	215	251
Plant & Machinery	88	229	202	102
Information Systems	147	104	131	146
Telecoms	120	410	486	429
Stations	108	87	148	156
Depots	36	31	30	26
Lineside Buildings	15	14	22	19
Other	5	6	4	3
Total renewals	**2,525**	**3,464**	**3,760**	**3,947**
Total maintenance & renewals	**3,727**	**4,792**	**5,073**	**5,200**
Total committed enhancements	**860**	**1,209**	**1,195**	**534**

Figure 3.4 National activity volumes

	2002/03	2003/04	2004/05	2005/06
Rail renewal (km per year)	1,055	1,198	1,277	1,487
Sleeper renewal (km per year)	674	849	895	935
Ballast renewal (km per year)	717	985	1,178	1,190
S&C renewal (units per year)	270	393	535	607

Expenditure Breakdown by Business Unit

West Coast Route Modernisation

Figure 3.5 Forecast expenditure (West Coast Route Modernisation)

£ m (rounded) in 2002/03 prices	2003/04	2004/05	2005/06
Maintenance	**7**	**12**	**16**
Renewals			
Track	556	463	255
Structures	76	64	64
Signalling	446	391	356
Electrification	178	138	151
Plant & Machinery	2	0	0
Telecoms	26	54	46
Stations	1	0	0
Total Renewal	**1,283**	**1,110**	**872**
Committed enhancements			
WCRM Enhancements	215	189	228
Train Protection Warning System (TPWS)	2	0	0
Total committed enhancements	**217**	**189**	**228**

Figure 3.6 Forecast activity volumes (West Coast Route Modernisation)

	2003/04	2004/05	2005/06
Rail renewal (km per year)	366	324	168
Sleeper renewal (km per year)	304	200	104
Ballast renewal (km per year)	340	334	173
S&C renewal (units per year)	98	110	86

Eastern

Figure 3.7 Forecast expenditure (Eastern Region)

£ m (rounded) in 2002/03 prices	2003/04	2004/05	2005/06
Maintenance	332	326	314
Renewals			
Track	179	221	256
Structures	80	170	176
Signalling	67	53	127
Electrification	9	13	13
Plant & Machinery	7	5	4
Telecoms	13	18	8
Stations	12	31	18
Depots	4	7	2
Lineside	6	4	4
Total Renewal	375	521	607
Committed enhancements			
Felixstowe - Nuneaton Gauge Works	14	23	0
ECML Upgrade - SRA Committed works	8	19	0
Project X - Leeds	7	0	0
Cross Country Route Modernisation	6	0	0
CTRL Blockade Works	4	0	0
Eurostar ECS - NLL/WLL Upgrade works	2	15	20
Sunderland Tyne & Wear Metro Extension	2	0	0
Leeds 1st	2	0	0
Neville Hill Carriage Washer	1	0	0
AWS Programme	1	1	1
Train Protection Warning System (TPWS)	1	0	0
Thameslink 2000	1	0	0
Other	3	1	0
Total committed enhancements	50	58	21

Figure 3.8 Forecast activity volumes (Eastern Region)

	2003/04	2004/05	2005/06
Rail renewal (km per year)	226	266	381
Sleeper renewal (km per year)	153	189	214
Ballast renewal (km per year)	159	213	253
S&C renewal (units per year)	54	88	103

Great Western

Figure 3.9 Forecast expenditure (Great Western)

£ m (rounded) in 2002/03 prices	2003/04	2004/05	2005/06
Maintenance	215	210	192
Renewals			
Track	138	165	187
Structures	85	81	91
Signalling	34	37	69
Electrification	0	1	0
Plant & Machinery	5	6	6
Telecoms	5	2	2
Stations	6	12	14
Depots	5	10	10
Lineside	2	6	3
Total Renewal	**280**	**321**	**383**
Committed enhancements			
Barry - Bridgend (VOG) Route Upgrade	9	3	0
Swindon Platform 4	5	0	0
Old Oak Common - Wheel Lathe	3	0	0
Cross Country Route Modernisation	0	0	0
Train Protection Warning System (TPWS)	1	0	0
Southampton - West Coast Freight Upgrade	2	1	0
Other	1	0	0
Total committed enhancements	**22**	**4**	**0**

Figure 3.10 Forecast activity volumes (Great Western)

	2003/04	2004/05	2005/06
Rail renewal (km per year)	146	184	241
Sleeper renewal (km per year)	107	138	164
Ballast renewal (km per year)	127	189	207
S&C renewal (units per year)	83	90	115

Midlands

Figure 3.11 Forecast expenditure (Midlands)

£ m (rounded) in 2002/03 prices	2003/04	2004/05	2005/06
Maintenace	206	213	206
Renewals			
Track	125	128	144
Structures	38	29	30
Signalling	62	125	213
Electrification	12	13	18
Plant & Machinery	5	5	3
Telecoms	9	7	4
Stations	15	26	10
Depots	2	1	2
Lineside	2	3	2
Total Renewal	270	337	427
Committed enhancements			
CTRL Blockade Works	64	87	0
Southampton – WCML (Cherwell Valley Resignalling)	14	13	0
Cross Country Route Modernisation	12	0	0
Train Protection Warning System (TPWS)	3	0	0
Thameslink 2000	6	0	0
West Coast Related enhancements	3	4	0
Bescot Yard Sidings	6	0	0
Southampton - West Coast Freight Upgrade	2	1	0
West Midlands Strategy	1	0	0
Total committed enhancements	112	105	0

Figure 3.12 Forecast activity volumes (Midlands)

	2003/04	2004/05	2005/06
Rail renewal (km per year)	207	217	269
Sleeper renewal (km per year)	108	113	134
Ballast renewal (km per year)	148	155	180
S&C renewal (units per year)	82	86	97

North West

Figure 3.13 Forecast expenditure (North West)

£ m (rounded) in 2002/03 prices	2003/04	2004/05	2005/06
Maintenance	168	162	156
Renewals			
Track	40	72	84
Structures	40	56	62
Signalling	21	28	60
Electrification	1	3	4
Plant & Machinery	4	5	4
Telecoms	3	4	3
Stations	5	13	9
Depots	1	1	1
Lineside	1	3	3
Total Renewal	117	186	229
Committed enhancements			
Train Protection Warning System (TPWS)	7	0	0
Allerton Interchange	6	5	0
Other	4	1	0
Total committed enhancements	17	6	0

Figure 3.14 Forecast activity volumes (North west)

	2003/04	2004/05	2005/06
Rail renewal (km per year)	63	100	142
Sleeper renewal (km per year)	41	82	99
Ballast renewal (km per year)	46	91	116
S&C renewal (units per year)	7	54	43

Scotland

Figure 3.15 Forecast expenditure (Scotland)

£ m (rounded) in 2002/03 prices	2003/04	2004/05	2005/06
Maintenance	123	119	110
Renewals			
Track	58	58	56
Structures	57	52	56
Signalling	25	31	64
Electrification	2	11	11
Plant & Machinery	3	4	3
Telecoms	4	7	5
Stations	8	6	5
Depots	3	3	2
Lineside	2	2	2
Total Renewal	161	175	203
Committed enhancements			
Train Protection Warning System (TPWS)	8	0	0
Edinburgh Wire Degradation	1	0	0
Larkhill - Milngavie	1	0	0
Other	1	0	0
Total committed enhancements	10	0	0

Figure 3.16 Forecast activity volumes (Scotland)

	2003/04	2004/05	2005/06
Rail renewal (km per year)	79	62	65
Sleeper renewal (km per year)	31	38	38
Ballast renewal (km per year)	43	53	63
S&C renewal (units per year)	17	25	34

Southern

Figure 3.17 Forecast expenditure (Southern)

£ m (rounded) in 2002/03 prices	2003/04	2004/05	2005/06
Maintenace	**263**	**258**	**249**
Renewals			
Track	106	126	161
Structures	63	77	61
Signalling	51	84	232
Electrification	26	36	54
Plant & Machinery	3	8	8
Telecoms	5	5	3
Stations	15	22	12
Depots	3	1	1
Lineside	1	4	2
Total Renewal	**274**	**364**	**533**
Committed enhancements			
Southern Region Power Supply Upgrade Dev	355	469	70
Mark 1 Rolling Stock Replacement	53	132	55
Train Protection Warning System (TPWS)	15	0	0
Thameslink 2000	13	0	0
Ashford to Minster AWS	12	0	0
CTRL - Shortlands Grade Separation	10	4	0
Medway Valley AWS	8	2	3
Southampton - West Coast Freight Upgrade	2	1	0
Other	5	2	0
Total committed enhancements	**474**	**608**	**128**

Figure 3.18 Forecast activity volumes (Southern)

	2003/04	2004/05	2005/06
Rail renewal (km per year)	112	125	221
Sleeper renewal (km per year)	106	135	182
Ballast renewal (km per year)	122	143	198
S&C renewal (units per year)	52	82	129

Major Stations

Figure 3.19 Forecast expenditure (Major Stations)

£ m (rounded) in 2002/03 prices	2003/04	2004/05	2005/06
Maintenance	10	10	9
Renewals			
Structures	0	0	0
Telecoms	14	11	1
Stations	21	34	70
Total Renewal	36	45	71
Committed enhancements			
All Major Stations Commercial Investment	10	6	4
Kings Cross Hub - Concourse Development	6	0	0
Paddington Long-Term Vehicular Access	4	4	3
Other	6	0	0
Total committed enhancements	24	10	7

Other nationally managed expenditure

Figure 3.20 Other nationally managed expenditure

£ m (rounded) in 2002/03 prices	2003/04	2004/05	2005/06
Maintenance	**4**	**3**	**2**
Renewals			
Track	3	8	9
Structures	0	0	0
Signalling	4	3	3
Electrification	0	1	0
Plant & Machinery	202	169	73
Information Systems	104	131	146
Telecoms	331	376	357
Stations	3	3	19
Depots	13	6	9
Lineside	0	0	3
Other	6	4	3
Total Renewal	**667**	**702**	**624**
Committed enhancements			
Train Protection Warning System (TPWS)	121	26	0
Incremental Output Statements	30	15	0
Property Development Programme	29	31	28
Level Crossings	16	18	19
Modern Facilities At Stations	14	15	0
Fencing	14	15	18
Minor signalling schemes	12	15	16
Pollution Prevention at LMDs	9	22	26
ERTMS & Train Protection Strategy	7	7	7
ATWS	7	20	15
Contaminated Land Provision	6	7	6
Signallers Simulators	4	6	0
Operational Planning IT SAP	3	0	0
Pollution management	2	3	2
Fire Safety	2	4	6
User Worked Crossing (Novell Devices)	2	0	0
GSM-R System Concept Enhancement for ERTMS	1	0	0
Other	7	11	6
Total committed enhancements	**284**	**215**	**150**