

Route Plans 2007
Route 24
East of Scotland



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Route 24 East of Scotland



Today's route

The principal elements of the East of Scotland Route are described below. The relevant Strategic Route Section is shown in brackets:

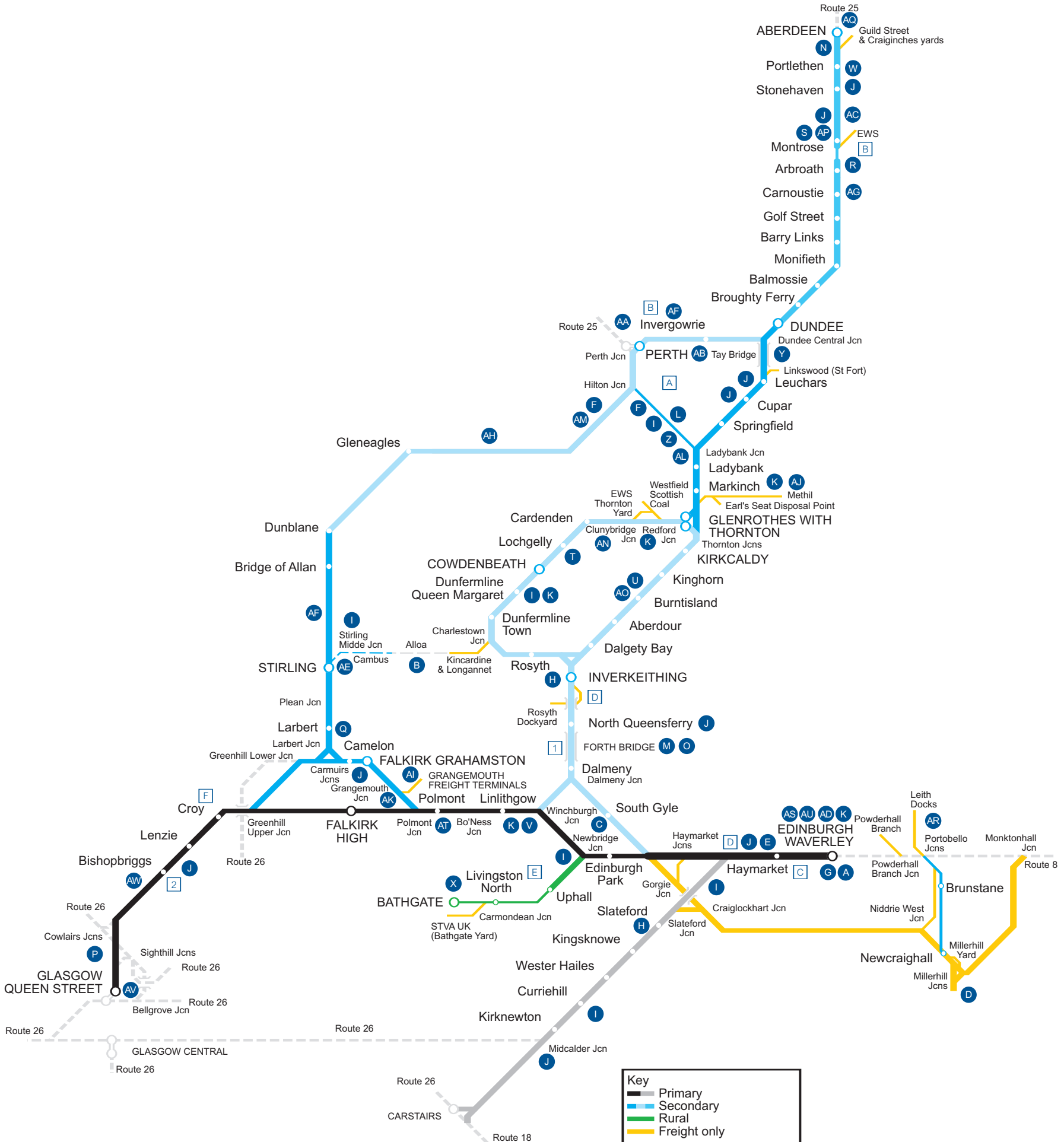
- the main line between Glasgow Queen Street and Edinburgh Waverley via Falkirk (24.01);
- the main line between Edinburgh Waverley and Aberdeen via Fife (24.06, 24.08, and 24.09);
- the connecting main line between Greenhill Junction and Dundee (24.04 and 24.07);
- the connecting main line between Ladybank and Hilton Junction (24.08);
- the main line between Haymarket East Junction and Carstairs (24.02);
- the line from Polmont to Carmuir/Larbert Junctions (24.04);
- the line from Winchburgh to Dalmeny Junction (24.06);
- the Bathgate branch (24.03);
- the line from Portobello to Niddrie South Junction (24.05);
- the west side of the Fife Circle (24.06);
- the Edinburgh South Suburban Line (24.10); and
- freight branches to Grangemouth (24.04), Rosyth (24.06), Longannet (24.11), Westfield (24.06) and Methil (24.08).

Route context

The East of Scotland route serves two principal passenger markets; fast, frequent inter urban services and commuting. It connects Scotland's principal cities of Glasgow, Edinburgh, Perth, Dundee and Aberdeen and includes the link between Edinburgh and the east of Scotland to the West Coast Main Line at Carstairs. It also encompasses the significant suburban networks that radiate around Edinburgh and around the north-east of Glasgow, the remainder of the Glasgow suburban network being covered by

Route 26. The route also serves a number of freight terminals, the most significant of which are Millerhill, to the east of Edinburgh, and the growing hub at Grangemouth. Transport Scotland commissioned its Scottish Planning Assessment (SPA), as one of the inputs to the development of their strategy for rail in Scotland, and the Route Utilisation Strategy (RUS) for Scotland was recently published by Network Rail. Both of these pieces of work have informed the development of this route plan.

Route 24 East of Scotland



| Key | |
|-------------|--------------|
| Black line | Primary |
| Blue line | Secondary |
| Green line | Rural |
| Yellow line | Freight only |

Passenger and freight demand

The East of Scotland route serves two principle passenger markets; fast, frequent inter-urban services and commuting. It connects Scotland's principal cities of Glasgow, Edinburgh, Perth, Dundee and Aberdeen and includes the link between Edinburgh and the West Coast Main Line (WCML) at Carstairs. It also encompasses the significant suburban networks that radiate around Edinburgh as well as suburban services into Glasgow from North Eastern suburbs.

Edinburgh's population had been in decline since the 1960s, although this has reversed over the last decade. There is significant and growing demand for commuter services from surrounding areas of West Lothian and Fife into Edinburgh.

The rail network has a much lower market share for commuter services in the other cities on this route due to its poor penetration of their suburbs with consequently less impact on train loadings.

The economies of Edinburgh and Glasgow, Scotland's two major cities, are becoming increasingly interlinked. The fast, frequent inter-urban service between Edinburgh and Glasgow

Queen St plays an important role in connecting these centres. Rail journey times on this corridor are extremely competitive due to the increasing levels of road congestion around the two major conurbations. On the other inter-urban corridors road journey times can be as fast or faster than rail journey times as a consequence of major investment that has been carried out on the A9 and A90.

Following the publication of the Scottish Planning Assessment (SPA), analysis was undertaken for the Scotland RUS which reported on current daily passenger numbers on a number of geographically aggregated sectors. The daily trip data from the SPA for the sectors on this route are shown in Figure 1.

For further information, see the published Scotland RUS at www.networkrail.co.uk

The RUS also reported on current peak load factors on individual service groups, averaged over the three hour morning peak. The load factors for services that operate on this route are detailed in Figure 2.

Figure 1 Current passenger numbers

| Sector | Daily Trips |
|---------------------|-------------|
| Central Edinburgh | 22,600 |
| Edinburgh Commuter | 17,700 |
| North East Scotland | 10,300 |

Figure 2 Peak loading

| Service | Load Factor |
|----------------------------------|-------------|
| Stirling to Glasgow | 104% |
| Glasgow to Edinburgh via Falkirk | 88% |
| Fife (Local) to Edinburgh | 84% |
| Dunblane to Edinburgh | 78% |
| Fife (Inter-Urban) to Edinburgh | 77% |
| Edinburgh to Glasgow via Falkirk | 77% |
| Glasgow to Edinburgh via Shotts | 58% |
| Bathgate to Edinburgh | 54% |
| North Berwick to Edinburgh | 50% |
| Newcraighall to Edinburgh | 16% |

Freight traffic on the route is dominated by the coal traffic from Hunterston deep water port in Ayrshire to Longannet power station which accounts for some 4 million tonnes per year. Following the closure of Scotland's last deep coal mine at Longannet in 2002 and the introduction of limits for sulphur dioxide emissions which can only be met by the use of imported low sulphur coal, most of the power station's coal requirements are now fed by rail. This traffic, which is routed via Glasgow, Falkirk and the Forth Bridge, crosses a number of capacity constrained sections on the route.

Other significant freight flows on the route are open cast coal from Fife to English power stations and petroleum from Grangemouth. Over recent years there has been a significant growth in Anglo-Scottish inter-modal and express parcels traffic, largely in response to road congestion in England, the EU's Working Time Directive and increased fuel costs, all of which have improved rail's competitive position relative to road for these time-sensitive longer distance flows. Grangemouth has now emerged as a significant freight handling location following the construction of three new container transfer facilities.

Current services

The East of Scotland network carries mixed traffic, with a significant range of speed, acceleration and train stopping patterns. On many corridors this involves a complex mix of freight, urban, and interurban services with speeds up to 100 mph. There is little traffic segregation on the main corridors. As the route is predominantly two track, this leads to high levels of utilisation, imposing constraints on the timetable. Several sections of the route particularly around Edinburgh, are operating at or close to capacity.

The principal passenger train operator on the route is First ScotRail. First ScotRail operate fast interurban services between the major cities on the route. With the exception of services from Edinburgh to Perth (and onwards to Inverness), these operate on a minimum hourly frequency for most of the day. Services on the key Edinburgh to Glasgow corridor have operated on a 15 minute frequency since 1999.

Passenger traffic on the Edinburgh suburban network is predominantly commuter based, although there are also significant off-peak leisure flows into Edinburgh. The growing and dynamic economy in the east of Scotland and the establishment of the Scottish Parliament in Edinburgh, have resulted in a significant growth in demand.

Cross-border services from England are operated by GNER and Virgin Cross Country beyond Edinburgh to Dundee and Aberdeen and Inverness via Perth. Over the Edinburgh to Carstairs section of the route, GNER also operates through services from London Kings Cross to Glasgow Central. Virgin Cross Country services between the WCML and Edinburgh and the ECML and Glasgow and Virgin West Coast services between London Euston and Edinburgh also operate over this section.

The principal freight operator on the route is English, Welsh and Scottish Railway who operate the majority of the coal traffic and the petroleum from Grangemouth amongst other flows. DRS also provide services from Grangemouth and have recently introduced additional services from there to Aberdeen and Elderslie. Freightliner Heavy Haul Ltd provides services to Aberdeen and Inverness via Perth. The greatest volume of freight traffic is carried on the sections between Greenhill Lower Junction and Inverkeithing via Falkirk Grahamston, between Haymarket and Inverkeithing and on the Edinburgh South Suburban Line which runs from Slateford and Haymarket Junctions to the freight yard at Millerhill.



Figure 3 shows the tonnage levels on the route.

Traffic volumes are summarised in Figure 4.

Figure 4 Current use

| | Passenger | Freight | Total |
|------------------------------------|-----------|---------|-------|
| Train km per year (millions) | 17 | 2 | 18 |
| Train tonne km per year (millions) | 3,149 | 1,259 | 4,408 |

Current infrastructure capability

The following maps set out the capability of the current network.

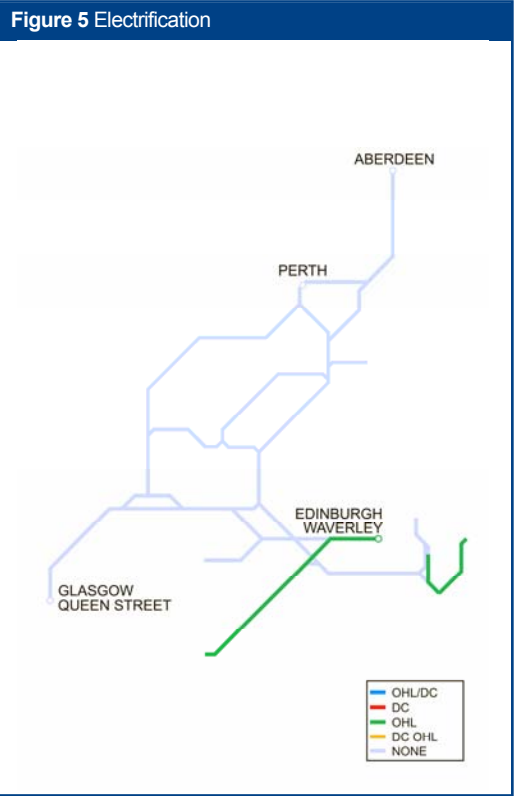


Figure 9 Current train service level (trains per hour)

| Route section | Daytime | Evening |
|-----------------------------------|---------|---------|
| Glasgow Queen Street to Edinburgh | 4 | 2 |
| Glasgow Queen Street to Aberdeen | 1 | 1 |
| Edinburgh to Aberdeen | 1 | 1 |
| Edinburgh to Fife (local) | 4 | 2 |
| Edinburgh to Stirling/Dunblane | 2 | 1 |
| Edinburgh to Bathgate | 2 | 1 |

Current capacity

The baselining work carried out as part of our current Scotland RUS work has confirmed that there are a number of significant capacity constraints on the existing network. The most significant of these constraints for passenger services on this route are:

- the congested western approaches to Edinburgh Waverley station (24.01);
- restrictive platform lengths at a number of stations, most significantly Glasgow Queen Street and Edinburgh Waverley (24.01);
- the single line section from Usan to Montrose (24.09);
- the single line sections of the Bathgate branch (24.03);
- other single line sections between Portobello and Newcraighall (24.05), on the north side of the Fife Circle (24.06) and between Ladybank and Hilton Junction. (24.08);
- key single lead junctions at Newbridge, Winchburgh (24.01) and Dalmeny (24.06) and;
- restrictive signalling headways across the Forth Bridge (24.06), in the Stirling/Larbert areas (24.04) and between Haymarket and Carstairs. (24.02).

Figure 9 shows the number of trains per hour during the day and in the evening.

In addition to the above, key constraints for freight services are:

- the single line approaches to Millerhill Yard and their existing control arrangements;
- restrictive loading gauge and route availability at various locations and;
- lack of passing loops of adequate size to accommodate current maximum train lengths. This is particularly acute between Larbert and Perth and between Dundee and Aberdeen.

Figure 10 shows the number of trains in the peak hour at critical locations.

Current performance

Figure 11 shows the current PPM for the TOCs running along the route.

Performance across Scotland has improved dramatically over the last two years with an approximately 35 percent reduction in delay minutes leading to an improvement in First ScotRail's ppm from 83.1 percent to 88.9 percent. To achieve this, the focus has been on attention to detail particularly to ensure the reliability of strategic points and signalling equipment at key nodes.

Figure 10 Current train service level (peak trains per hour)

| Route Section | Number of trains |
|-------------------------|------------------|
| Edinburgh – Haymarket | 23 |
| Dalmeny – Inverkeithing | 10 |
| Larbet – Stirling | 8 |
| Uphall – Bathgate* | 5 |

* Total trains in both directions over single line

Figure 11 Current PPM MAA (2006/07)

| TOC | MAA | As at period |
|----------------------|-------|--------------|
| First ScotRail | 88.9% | 11 |
| GNER | 83.6% | 11 |
| Virgin Cross Country | 83.7% | 11 |
| Virgin West Coast | 86.4% | 11 |

Traditionally the autumn period has resulted in a significant dip in performance. Great efforts, (for example, targeting lineside vegetation at high risk sites) have been made to minimise these seasonal delays which resulted in the autumn of 2006 showing a great reduction in delay across the route.

Long distance high speed and slower local passenger services operate over a number of sections of this route. This mix of traffic can lead to performance problems during times of perturbation, particularly at junction locations.

The Network Rail and First ScotRail controls are co-located within the same office in Glasgow to ensure prompt and effective response to any incidents in order to mitigate subsequent delays. During 2007, we will work towards integration of the control centre to combine maintenance and operations into one control. We will continue to work with First ScotRail, the principal train operator in Scotland to ensure rapid decision making during perturbed working to enable normal working to be resumed as quickly as possible.

The control centre will deliver effective real time management of planned and un-planned disruptive events, to minimise the impact on passengers, by better anticipation and avoidance of foreseeable disruptions.

We are undertaking reviews of the timetable on individual parts of the network to identify where adjustments would result in an improvement in service reliability. Revised timetables have been introduced in Fife. We are also reviewing our regulating policies to ensure that overall delays are minimised in the event of any out of course running.

A number of specific initiatives are being progressed on this route to effect performance improvements. Examples of these are:

- weatherproofing initiatives at key locations;
- targeted renewal of power and multi-core signalling cables;
- enhanced management of strategic spares;
- enhanced maintenance regime for under-track cable routes;
- improved renewals handback processes;
- enhanced bridge bashing contingency plans.

Future requirements **Strategic direction**

Improved use of the rail network is a central element of the Scottish Executive's plans for effective delivery of its rail objectives. Scottish

Ministers published 'Scotland's Railways' in December 2006, which promotes sustainable economic growth and sets the context for the development of sustainable transport solutions for Scotland over the next 20-25 years. This strategy promotes connectivity between major towns and cities, supports faster journey times on key routes and aims to improve quality, accessibility and affordability of Scotland's railways. This strategy will feed into the Scottish High Level Output Specification (HLOS) which will determine the rail services which Scottish Ministers wish to purchase from Network Rail. Two major enhancement projects are currently being implemented on the East of Scotland route. The first of these is the re-opening of the Stirling/Alloa/Kincardine line to passenger traffic between Stirling and Alloa and to freight traffic throughout. This would enable diversion of the coal traffic from Hunterston to Longannet power station away from the congested Edinburgh to Glasgow and Edinburgh to Fife routes. The second is the Edinburgh Waverley project, which will enable the introduction of additional services at the west end of the station through the provision of a more flexible station throat and additional platforms.

Scottish Ministers are committed to the following further projects which are being developed: reinstatement and electrification of the Airdrie-Bathgate line; reinstatement of part of the Waverley Route from Newcraighall to Tweedbank (Scottish Borders Railway); and a new link to Edinburgh Airport. Network Rail are contracted to undertake the development of the first of these and are working closely with the developers of the other two.

On behalf of the rail industry, Network Rail has recently published the Scotland and Freight Route Utilisation Strategies (RUS). These documents summarise the current operating restrictions on the network and analyse future growth and the impact on rail. A number of options have been proposed, which will address the current and predicted restrictions on the network. These options set out the strategic direction for the rail infrastructure over the next 10 years. Within Route 24 these predominately focus on options to increase capacity at Edinburgh Waverley and Glasgow Queen St, including enhanced passenger access and station facilities; line speed enhancements between Edinburgh and Perth'; additional services between Fife and Edinburgh; and additional infrastructure between Aberdeen and Dundee to improve capacity, particularly for freight.

Following the implementation of the Government's Rail Review proposals, Network Rail is now responsible for the strategic development of the network in partnership with our key industry stakeholders. A discretionary fund has been established to allow enhancements to be progressed where an industry business case can be made. Contributions from this fund have been agreed for Grangemouth Junction, Montrose, Edinburgh Signalling Centre and improvements to line speeds in West Fife. In addition projects currently being developed, which are likely to receive funding from this source include Signalling enhancements between Larbert and Stirling and on the Forth Bridge, junction improvements at Newbridge and Stirling and platform extensions at Bishopbriggs.

Future demand

Rail passenger demand has increased significantly in the last few years reflecting increased employment, especially in Edinburgh, and as a consequence of increasing road congestion.

Increased passenger demand will occur on services on this route from the following politically committed major rail enhancement schemes detailed above between 2007 and 2011:

- Stirling/Alloa (24.04);
- Additional Fife services post Edinburgh Waverley Phase 1 (24.06);
- Edinburgh Airport Rail Link (24.01/24.06);
- Airdrie to Bathgate (26.04/24.03); and
- Scottish Borders Railway (24.05)

We are currently discussing the level of additional demand that each of these will generate with the individual scheme promoters. In addition to the above additional demand generated by specific major projects, the Scotland RUS forecast that the

Edinburgh and South East region would enjoy Scotland's strongest economic growth over the next 20 years. Significant population growth is predicted in Edinburgh and in Fife, the Lothians and the Borders. These changes are supported by Local Structure Plan policies which seek to deliver planned expansion in many of these areas. A key component of these policies is the provision of high quality rail links into Edinburgh.

The RUS reported on projected daily passenger numbers on a number of geographically aggregated sectors during the 3hr morning peak period over the next 10 years. The projected passenger numbers on this route are detailed in Figure 12.

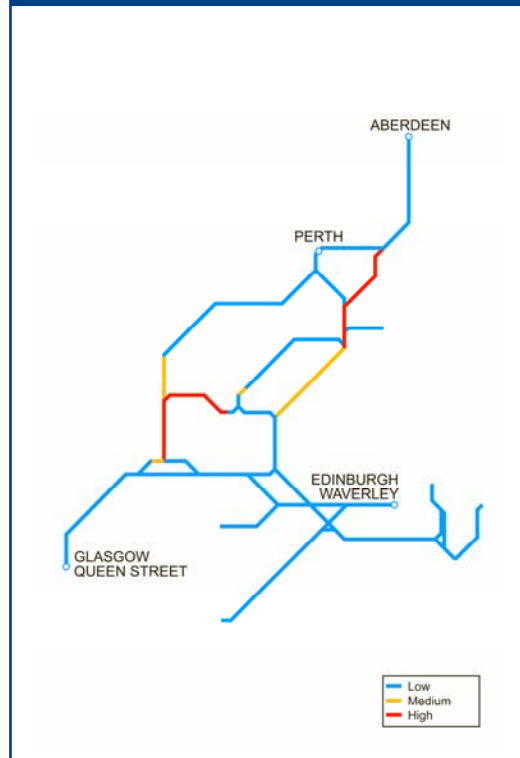
For further information, see the published Scotland RUS at www.networkrail.co.uk

The Freight Route Utilisation Strategy (RUS) published in March 2007, provides a robust forecast for growth on the route, which is fundamentally linked to the future of Longannet power station. Scottish Power has decided to equip the station with the necessary Flue Gas De-sulphurisation equipment required to meet the requirements of the emissions control directive. This will guarantee its future beyond 2015, although the equipment is not currently planned to be fitted at Cockenzie.

Other factors that will affect future freight demand on the route are the increased use of rail on trunk flows within the logistics chain, the national recycling strategy with the potential construction of associated waste transfer stations and the availability of grants towards the creation of new freight terminals.

Figure 12 Projected passenger numbers

| Sector | Morning Peak Trips | | Change relative to 2004 |
|----------------------------------|--------------------|------|-------------------------|
| | 2004/5 | 2016 | |
| Stirling to Glasgow | 2820 | 3000 | 5% |
| Glasgow to Edinburgh via Falkirk | 2490 | 2900 | 16% |
| Fife (Local) to Edinburgh | 2230 | 2430 | 9% |
| Dunblane to Edinburgh | 1100 | 1265 | 15% |
| Fife (Inter-Urban) to Edinburgh | 1390 | 1500 | 8% |
| Edinburgh to Glasgow via Falkirk | 2480 | 2850 | 15% |
| Glasgow to Edinburgh via Shotts | 460 | 540 | 18% |
| Bathgate to Edinburgh | 1100 | 1300 | 18% |
| North Berwick to Edinburgh | 870 | 1020 | 18% |
| Newcraighall to Edinburgh | 190 | 225 | 18% |

Figure 13 Tonnage growth

Future services

Figure 13 indicates the forecast percentage change in tonnage to 2015.

Improved use of the rail network is a central element of Scottish Ministers' plans for effective delivery of its rail objectives. Scottish Ministers are committed to delivering a number of enhancement projects on this route which will assist the rail network. Reduced journey times and the development of a new rolling stock strategy are key elements of Scottish Ministers' strategy. Within Route 24 reduced journey time, particularly on the inter-urban routes is a key aspiration for Scottish Ministers' in the delivery of future services in Scotland.

The Scotland RUS proposes alterations to the timetable from Edinburgh to Fife, Perth, Dundee and Aberdeen to increase the number of services and provide faster journey times between the main cities. This would provide significant additional seating capacity at peak times between Fife and Edinburgh. In addition it is anticipated that services to/from Newcraighall would be linked to Fife services providing new through journey opportunities on this line.

Development in the utilisation of all routes between Glasgow and Edinburgh, through the reduction in journey time and increased frequency are also key

aspirations of Scottish Ministers' to meet passenger expectations.

Future capability

A number of initiatives are being progressed to enhance the capability of the route. The most significant of these are summarised below:

- the Mossend to Elgin gauge enhancement project is being implemented to provide clearance for a wider range of freight vehicles on the route; and
- speed and signalling improvements are being included in planned switch and crossings renewals where appropriate.

The future capability of the network will be designed to deliver reduced journey times, as a key aspiration of Scottish Ministers'.

Fragile routes

Network Rail engineers have identified a set of 'fragile routes' across the country where the addition of any further loco hauled traffic would have a significant impact on the residual life of track and/or structures.

The rail freight industry provided to Network Rail a set of 10 year traffic forecasts, which we have used in developing the Freight RUS. The key route section within this route that has been identified as a fragile route and has clearly defined additional tonnage/train numbers projected by the industry is Larbert – Stirling.

Future capacity

Passenger numbers on Route 24 are projected to grow by up to 30 percent over the next 10 years. Analysis from the RUS and Scottish Planning Assessment (SPA), commissioned by the Scottish Executive, highlights key future operating constraints.

Traffic levels on the route have increased incrementally over recent years without any significant investment in additional capacity. For example, the current layout at Edinburgh Waverley handles 580 trains per day compared to the 380 trains per day it handled when it was installed some 30 years ago. As a consequence, the route is now operating at maximum capacity over a number of sections. The following measures are planned to address this:

- the Edinburgh Waverley (24.01) project (currently being implemented) will deliver additional capacity that can accommodate the operation of an additional four trains per hour during the peak period at equivalent

performance levels to those currently achieved; and

- a number of opportunities have been identified where modest infrastructure enhancement would yield significant improvement in the outputs that the network can deliver. The optimum method of undertaking these works is normally by extending the scope of a planned renewal when the incremental enhancement cost is significantly lower than the cost of delivery as a stand alone project. The first such initiatives to be progressed on this route will be the capacity and speed improvements that are planned to be provided in conjunction with the planned switch and crossing renewals at Larbert Junction (24.04) and Montrose (24.09)

In addition the Scotland RUS considered how current constraints could be eased and performance enhanced through timetable restructuring and minor infrastructure enhancements.

The most significant of these options are considered to be:

- relieving the single lead junction bottlenecks at Newbridge Junction (24.01) and Midcalder Junction (24.02) and ;
- progression of further work in the longer term at Edinburgh Waverley to provide further operating flexibility and address the lack of long platforms.

Certain stations will also require works to enable them to cope with the predicted growth in passenger numbers:

- Haymarket station is currently one of the most congested stations on the Scottish rail network and passenger numbers are forecast to increase further on completion of the Edinburgh Tram project in 2010. Transport Scotland is currently funding a study that will evaluate the options for re-developing the site to address this issue and create an enhanced facility that will permit proper integration of all transport modes.
- passenger congestion at Waverley station will reach the point over the next 5 to 10 years where road traffic will have to be taken out of the station. Options for achieving this are included in the RUS.
- passenger congestion is experienced in the peak hours at South Gyle station, principally due

to the lack of passenger circulating space as a result of narrow platforms

- although most station platforms on the route can accommodate six coach train formations, a small number still have platform lengths that are only capable of handling five or less vehicles. Consideration needs to be given to extending these for operational consistency, particularly during perturbation when additional stops may be introduced. Alternatively it may be possible to fit the rolling stock on these routes with Selective Door Opening (SDO) equipment. Key affected stations are Bishopbriggs (for which an option is included in the RUS), Markinch (which is being extended as part of the current works funded by Fife Council), Ladybank and Springfield. The latter has particular issues due to its very low usage; and
- congestion is also becoming an issue at Glasgow Queen Street High Level station where only four of the seven platforms can handle a six coach train. Options for expansion of the station to address this are included in the RUS.

Future performance

To achieve the targeted 90 percent PPM for First ScotRail (and to support the achievement of the targets for other TOCs) a further reduction of three percent in delay minutes across the industry is required. To deliver this we will continue to focus on ensuring the reliability of points and signalling. We will also be renewing a number of junctions across the route at critical locations such as Inverkeithing and upgrading the signalling at Montrose, Larbert and Stirling.

One area of particular attention in 2007/8 will be the interface with the major upgrade works at Edinburgh Waverley where there is potential for significant disruption. A close relationship has been developed between the local maintenance staff and the project team to minimise the impact of this work together with robust contingency plans to deal with any issues arising.

Figure 14 shows the forecast reduction in Network Rail delay minutes compared with 2006/07.

Figure 14 Forecast reduction in delay minutes

| | 2007/08 | 2008/09 |
|------------------------------|---------|---------|
| % reduction in delay minutes | 3% | 3% |

Figure 15 Forecast PPM MAA

| TOC | 2007/08 | 2008/09 |
|----------------------|---------|---------|
| First ScotRail | 90.0% | 90.4% |
| GNER | 85.0% | 87.2% |
| Virgin Cross Country | 85.1% | |
| Virgin West Coast | 87.7% | 87.6% |

Figure 15 shows the forecast PPM for the main TOCs running along the route.

Engineering access

Engineering access on the route can largely be accommodated overnight with most lines having lengthy periods with no trains. Exceptions to this include Edinburgh/Haymarket and Haymarket to Carstairs where access is largely limited to weekends.

A number of extended blockades are planned on this route over the next few years. These will permit switch and crossing renewals at Inverkeithing, Stirling, Newbridge and Hilton Junctions, bridge renewal work and work within Kippenross Tunnel to be undertaken. In addition we anticipate a number of blockages of the Bathgate branch with proposed redoubling.

Details of these are being discussed with the affected train operators.

Opportunities and challenges

Significant growth in passenger numbers is forecast on this route as a consequence of two factors. The first of these is Transport Scotland's programme of major enhancement projects, in particular the Airdrie to Bathgate, Edinburgh Airport Rail Link and Scottish Borders Railway projects. The second is the background growth on existing services that arises as a consequence of the growth in the Edinburgh economy and the continued migration of population from the city to the adjoining hinterland.

Modest freight growth is forecast, now that Scottish Power has agreed to fit the necessary Flue Gas De-sulphurisation equipment at Longannet power station.

The key challenge to the rail industry in the coming years will be to deliver the planned increased service levels, maintain performance and deliver a reduced journey time to meet passenger demands between the major conurbations.

Delivering future requirements Summary

Passenger growth and future capacity requirements on this route will be met by a combination of several separate initiatives:

- a review of existing service patterns to optimise the efficient balance between longer distance and local services, whilst reducing journey times;
- a programme of incremental capacity enhancement (which can be delivered as improvements to planned renewals); and
- limited stand alone capacity enhancements at critical locations.

The Edinburgh Waverley works that are currently being implemented will provide short to medium term relief at this key location. However this will not be sufficient to accommodate all of the growth over the next ten years projected in the RUS. Development work therefore needs to continue on options around Edinburgh to identify the optimum long term arrangement.

Certain infrastructure constraints on this route do not lend themselves to a solution in the foreseeable future. These factors therefore form an upper limit to the route's ability to cope with future growth. The most significant of these are detailed below:

- there are a number of single line sections where the railway line was originally built as a single line and the costs of doubling would be prohibitive, most significantly south of Montrose;
- there are several flat junctions on the route, but there is insufficient space available for grade separation at many of the locations that would benefit from it; and
- the twin track approach to Queen Street High Level station (through a deep cutting and a 1,000 yard long tunnel).

Expenditure

Figure 16 shows the planned level of expenditure on renewals on this route over the next two years.

However, the precise timing and scope of renewals remains subject to review to enable us to meet our overall obligations as efficiently as possible consistent with the reasonable requirements of operators and other stakeholders.

| Figure 16 Forecast expenditure | | |
|---------------------------------------|-----------|-----------|
| £m (2006/07 prices) | 2007/08 | 2008/09 |
| Renewals | | |
| Track | | |
| Plain line | 9 | 17 |
| Switches and crossings | 6 | 13 |
| Other | 0 | – |
| Track total | 15 | 30 |
| Civils | | |
| Underbridges | 2 | 6 |
| Overbridges | 0 | – |
| Bridgeguard 3 | 0 | 0 |
| Earthworks | 3 | 4 |
| Tunnels | 1 | – |
| Culverts | 0 | 0 |
| Coast and estuary defence | 0 | 1 |
| Major structures | 18 | 18 |
| Civils total | 26 | 28 |
| Signalling | | |
| Resignalling | 4 | 0 |
| Minor works/other | 1 | 2 |
| Signalling total | 6 | 3 |
| Electrification | | |
| AC systems | | |
| HV switchgear | 0 | – |
| OLE campaign change/refurbishment | 0 | – |
| Other | 0 | 0 |
| Electrification total | 0 | 0 |
| Telecoms | | |
| Customer information systems (CIS) | 1 | 0 |
| Long line public address (LLPA) | – | 0 |
| Other | 2 | 0 |
| Telecoms total | 2 | 1 |

| | | |
|-----------------------------------|------------|------------|
| Operational property | | |
| Stations | | |
| Managed | 4 | 3 |
| Franchised | 1 | 2 |
| Operational property total | 6 | 5 |
| Plant and machinery | | |
| Fixed plant | | |
| Point heating | 0 | 0 |
| Depot Plant | 1 | - |
| Other | 0 | 0 |
| Plant and machinery total | 1 | 0 |
| Total Renewals | 56 | 66 |
| Enhancements (funded by) | | |
| Network Rail | | |
| Planned | | |
| Other | 1 | 0 |
| Total | 1 | 0 |
| Network Rail (RAB) | | |
| Planned | | |
| Airdrie to Bathgate new rail line | 21 | 125 |
| Edinburgh Rail airport link | 1 | 9 |
| Stirling Middle remodelling | - | 2 |
| Bathgate branch track renewals | 0.2 | 1.6 |
| Other | 1 | 0 |
| Total | 23 | 138 |
| Potential schemes | 2 | 1 |
| Total | 25 | 138 |
| Scottish Executive | | |
| Planned | | |
| Airdrie to Bathgate new rail line | 49 | 20 |
| Borders new rail link | 1 | 10 |
| Edinburgh Waverley | 47 | 2 |
| Edinburgh tram enabling works | 0 | 5 |
| Other | 0 | - |
| Total | 97 | 37 |
| Other third party | | |
| Planned | | |
| Other | 2 | 1 |
| Total | 2 | 1 |
| Total Enhancements | 124 | 176 |

The exact funding mechanism to be used for Edinburgh Airport Rail Link and Airdrie to Bathgate new rail line is yet to be confirmed. For the purpose

of this business plan we have assumed a split between RAB funding and direct funding as shown above.

Figure 17 Forecast volumes

| | 2007/08 | 2008/09 |
|---|-----------|-----------|
| Track | | |
| Plain line (km) | | |
| Rail | 24 | 34 |
| Sleepers | 17 | 29 |
| Ballast | 18 | 34 |
| Total | 59 | 97 |
| Switches and crossings (no.) | | |
| Complete renewal | 11 | 29 |
| Partial renewal/reballasting | – | 5 |
| S and C (equivalent units) | 11 | 31 |
| Other (km) | | |
| Drainage | 1 | – |
| Civils | | |
| Underbridges (m ²) | 660 | 3,673 |
| Overbridges (m ²) | 236 | – |
| Bridgeguard 3 (m ²) | 53 | 0 |
| Earthworks (m ² slope surface) | 9,377 | 26,091 |
| Tunnels (m ²) | 1,811 | – |
| Culverts (m ²) | – | 20 |
| Coast and estuary defence (lm) | 62 | 285 |
| Major structures (m ²) | 44,451 | 44,642 |
| Signalling | | |
| Resignalling (SEUs) | 17 | – |
| Electrification | | |
| AC systems | | |
| HV switchgear (cb) | 1 | – |
| OLE campaign change/refurbishment (t. length) | 5 | – |
| Telecoms | | |
| Concentrators | | |
| Small (no.) | 1 | 2 |
| CIS (stations) | 2 | – |

The planned volume of renewals is detailed in Figure 17.

It should be noted that in order to manage the deliverability of our Civils, Signalling and Electrification plans we have included an element of overplanning in our work banks. As a consequence the sum of our route plans exceeds our plan for the network as a whole. It is likely that a small

proportion of the activities in these areas will slip to subsequent years.

Maintenance

Figure 18 shows the planned level of expenditure on maintenance on this route over the next two years.

Figure 18 Forecast expenditure

| £m (2006/07 prices) | 2007/08 | 2008/09 |
|---------------------|---------|---------|
| Maintenance | 19 | 18 |

Infrastructure investment

Figure 19 highlights schemes that are planned for completion in the financial year shown.

| Project | Project description | Output change | Main asset type(s) | Funding | GRIP stage | Completion year |
|--|---|--|--------------------|--|------------|-----------------|
| A Edinburgh Waverley (24.01) | Station Redevelopment | Provision of additional capacity | All | Transport Scotland/NRDF | 6 | 2007/08 |
| B Stirling/Alloa/Kincardine (24.04) | Reopening of line | Alternative and shorter freight route away from the E and G/Fife route | All | Clackmannanshire Council/Transport Scotland | 5 | 2007/08 |
| C Edinburgh Airport (24.01) | New Rail Link | New route diverting existing Edinburgh/Glasgow/Fife services via the airport | All | Transport Scotland/BAA | 3 | 2011/12 |
| D Scottish Borders Railway (24.05) | New Rail Link | New passenger railway to Galashiels and Tweedbank | All | Scottish Borders Council/Transport Scotland | 2 | 2011/12 |
| E Edinburgh Tram (24.01) | Enabling Works | Works to manage interface between Tram and Railway | All | Transport Scotland | 1 | 2010/11 |
| F Perth and Tayside (24.07) | New Station Programme | Proposed new stations at Bridge of Earn, Auchterarder | All | Perth and Kinross Council | 2 | 2012/13 |
| G Haymarket (24.01) | Station Redevelopment | Enhanced facility to improve integration of all transport modes. | All | City of Edinburgh Council/Transport Scotland | 2 | 2012/13 |
| H Track Renewals, S and C | S and C Renewals at Slateford, Inverkeithing | Renewals | Track | Network Rail | Various | 2007/08 |
| I Track Renewals, S and C. | S and C Renewals at Halbeath, Stirling Middle, Hilton Jn, Curriehill, Newbridge, Craiglockhart Jn | Renewals | Track | Network Rail | Various | 2008/09 |

Figure 19 Planned infrastructure investment

| Project | Project description | Output change | Main asset type(s) | Funding | GRIP stage | Completion year |
|---------|--|---|--------------------|---------------------------------|------------|-----------------|
| J | Track Renewals, S and C. S and C Renewals at Cupar, Cadder, Leuchars, Haymarket East, North Queensferry, Midcalder, Carmuir East, Laurencekirk, Stonehaven | Renewals | Track | Network Rail | Various | 2009/10 |
| K | Track Renewals, S and C. S and C Renewals at Linlithgow, Markinch, Redford Jn, Princes St Gardens, Townhill | Renewals | Track | Network Rail | Various | 2010/11 |
| L | Civils Renewals Ladybank to Perth (24.08) | Renewals | Civils | Network Rail | Various | 2007/08 |
| M | Forth Bridge Headways (24.06) | Performance and capacity improvement | Signals | Network Rail Discretionary Fund | 5 | 2008/09 |
| N | Aberdeen Craiginchies (24.09) | New freight facility | All | Union Square Developments | 5 | 2009/10 |
| O | Forth Bridge (24.06) | Painting and corrosion repairs | Civils | Network Rail | 6 | 2009/10 |
| P | Cathedral Street, nr Glasgow Queen Street. (24.01) | Bridgeguard programme | Civils | Glasgow City Council | 3 | 2008/09 |
| Q | Larbert SB (24.04) | Life extension of signalling equipment and removal of Plean and Stirling SB | Signals | Network Rail Discretionary Fund | 4 | 2007/08 |
| R | Buckie Den viaduct (24.09) | Strengthening work | Civils | Network Rail | 2 | 2009/10 |

Figure 19 Planned infrastructure investment

| Project | Project description | Output change | Main asset type(s) | Funding | GRIP stage | Completion year |
|---------|---|---|--------------------|---------------------------------|------------|-----------------|
| S | Montrose (24.09) S and C and signalling renewals including remodelling | Capacity and performance improvements including improved freight looping facility | Track/ Signals | Network Rail Discretionary Fund | 6 | 2007/08 |
| T | Fife line speed improvements (24.06) Performance improvement | Increased line speeds | Track | Network Rail Discretionary Fund | 6 | Complete |
| U | Lammerlaws Road, Burntisland (24.06) Bridgeguard programme | Complete overbridge renewal | Civils | Network Rail | 6 | 2007/08 |
| V | Craigton, Nr Linnithgow (24.01) Rockfall Protection Works | Slope stabilisation and de-vegetation | Civils | Network Rail | 6 | 2009/10 |
| W | Glenury/Den of Cowie/Viaducts Nr Stonehaven (24.09) Strengthening work | Major steelwork strengthening and painting | Civils | Network Rail | 2 | 2009/10 |
| X | Airdrie/Bathgate (26.04/24.03) New Rail Link | Re-instatement of disused line | All | Transport Scotland | 4 | 2010/11 |
| Y | Tay Bridge (24.08) Painting and corrosion repairs | Long term maintenance | Civils | Network Rail | 6 | 2009/10 |
| Z | Auchtermuchty, Nr Ladybank (24.08) Underbridge Repairs | Timber deck replacement | Civils | Network Rail | 5 | 2007/08 |
| AA | Kintfauns, Nr Perth (24.07) Estuarial defence work | Rock armour repairs | Civils | Network Rail | 2 | 2008/09 |
| AB | Kirktonhill, Nr Perth (24.07) Drainage improvement work | Rock armour repairs | Civils | Network Rail | 2 | 2007/08 |

| Project | Project description | Output change | Main asset type(s) | Funding | GRIP stage | Completion year |
|---|--|---|--------------------|---------------------------------|------------|-----------------|
| AC Carmont, Stonehaven (24.09) | De-vegetation | Undergrowth clearance and removal | Civils | Network Rail | 2 | 2008/09 |
| AD Edinburgh Signal Centre (24.01) | Edinburgh Concentrator Renewals | Renewals | Telecoms | Network Rail | 6 | 2007/08 |
| AE Stirling Middle Jn (24.04) | Junction remodelling | Capacity increase and looping facility | Track/Signals | Network Rail Discretionary Fund | 1 | 2008/09 |
| AF Cornton, Murie Level Crossings (24.07) | AHB Renewal | Renewal | Signals | Network Rail | 1 | 2010/11 |
| AG North East Corridor (Carnoustie to Newtonhill) (24.09) | Signalling Renewal Works | Renewals | Signals | Network Rail | 1 | 2010/11 |
| AH Mossend/Elgin Corridor (24.09) | Gauge Enhancement Programme | Facilitate additional freight traffic | All | Transport Scotland | 6 | 2007/08 |
| AI Grangemouth Tillyflats (24.04) | New freight terminal connection | New freight facility | All | W.H. Malcolm | 2 | 2007/08 |
| AJ Markinch (24.08) | New DDA access and transport interchange | Improved accessibility | All | Fife Council/Transport Scotland | 6 | 2007/08 |
| AK Grangemouth Jn (24.04) | Junction remodelling | Improved layout and performance | Track/Signals | Network Rail Discretionary Fund | 6 | Complete |
| AW Bishopbriggs Station (24.01) | Platform Extensions | Improved performance and increased capacity | Stations | Network Rail Discretionary Fund | 1 | 2008/09 |

Figure 19 Planned infrastructure investment

Figure 20 highlights other schemes under consideration

| Project | Project description | Output change | Main asset type(s) | Funding | Grip stage |
|--|---|--|--------------------|--|-------------------|
| 24.08 Ladybank to Hilton Jn (24.08) | Line speed enhancement | Reduced journey time | Signals | Potential Network Rail Discretionary Fund scheme | |
| 24.07/24.08 Hilton Jn, Nr Perth (24.07/24.08) | S and C Renewal with improved track lay-out | Increased capacity, line speed and performance | Track | Potential Network Rail Discretionary Fund scheme | |
| 24.06 Fife Freight Enhancements (24.06) | Improve gauge and route availability for routes in Fife | Ability to run larger/heavier freight vehicles in Fife | Track | Potential Network Rail Discretionary Fund scheme | |
| 24.06 Burntisland Station (24.06) | General accessibility improvements | DDA compliant access to station plus transport interchange and car park | Property | Fife Council | |
| 24.09 Laurencekirk Nr Montrose (24.09) | Proposed new station | Potential for additional passenger volumes in the Dundee/Aberdeen corridor | Signals/Stations | Aberdeenshire Council | |
| 24.10 Aberdeen Crossrail | Additional passenger services in N.E. Scotland | Increased service frequency | Track/Signals | To be Determined | Feasibility Stage |
| 24.10 Portobello Jcn (24.10) | Re-double Jn | Increased flexibility and Capacity | Track | To be Determined | |
| 24.01 Haymarket Tunnel (24.01) | Axle Counter Installation | Performance benefits from greater reliability | Signals | To be Determined | Pre GRIP |

Figure 21 highlights route enhancement aspirations

| Figure 21 Route enhancement aspirations | | | | | | |
|---|------------------------------|-------------------------------|---|----------|---|--|
| Project | Project description | Output change | Main asset type(s) | Funding | Status | |
| 41 | Polmont (24.01) | Signalling improvements | Improved performance | Signals | No longer being progressed – business case not robust | |
| 42 | Waverley station (24.01) | Station capacity improvements | Enhanced circulation space and capacity | Stations | To be Determined | |
| 43 | Queen Street station (24.01) | Station capacity improvements | Enhanced circulation space and capacity | Stations | To be Determined | |

Non infrastructure developments

Figure 22 highlights significant timetable scheme for the route under development

| Figure 22 Timetable development | | | | | |
|---------------------------------|--|---|---|---------------------------------|--|
| Description | Key issues | Actions or options being developed | Benefits | Target timetable implementation | |
| Resilient Timetables | Rules of the Plan update | Headways and Running Times being reviewed | Performance improvements | Ongoing | |
| Edinburgh – Fife – Aberdeen | Timetable recast to provide faster inter urban journeys and increased local services | Options being developed by First ScotRail and Network Rail for agreement with Transport Scotland. | Increased capacity and faster journey times | December 2008 | |

Appendix

| Figure 23 Strategic route sections | | | | | | | | | | | | |
|--|--|--------------|----------------------|-----------------------|----------------|---------------|-------|---------|-----------------|-----------------|--------------------|--------------|
| Predominant aspect recorded (secondary aspects recorded in brackets). ELR is Engineers Line Reference and RA is Route Availability | | | | | | | | | | | | |
| SRS | SRS Name | ELR | Classification | Funding | Community Rail | Freight Gauge | RA | Speed | Electrification | Signalling Type | Signalling Headway | No of Tracks |
| 24.01 | Glasgow QS – Edinburgh Waverley | EGM | Primary | Transport Scotland | No | W9(W8) | 10 | 90 | AC (Partial) | CL | 4"(3") | 2(4) |
| 24.02 | Carstairs – Haymarket West Jn | ECA | Primary | Transport Scotland | No | W9 | 10 | 95 | AC | CL | 8"(5") | 2 |
| 24.03 | Bathgate – Branch | NBE | Rural | Transport Scotland | No | W7 | 10 | 75 | none | CL | 15" | 2(1) |
| 24.04 | Dunblane/Allo a – Polmont Jn/Greenhill Upper Jn | SCM (PMT) | Secondary (Rural) | Transport Scotland | No | W8 | 10 | 100(60) | none | AB | 15" | 2(1) |
| 24.05 | Newcraighall – Portobello Jn | NDE | Rural | Transport Scotland | No | W9 | 10 | 30 | AC | CL | 15" | 1 |
| 24.06 | Fife Loop | ECN (CWH) | Secondary | Transport Scotland | No | W8 (W7) | 10(8) | 80(75) | none | CL | 5" | 2 |
| 24.07 | Dundee – Dunblane | SCM | Secondary | Transport Scotland | No | W8 | 10 | 100(60) | none | AB | 15" | 2 |
| 24.08 | Dundee/Hilton Jn – Markinch | SCM (CDC) | Secondary | Transport Scotland | No | W8 (W7) | 10(8) | 80(55) | none | CL | 15"(10") | 2(1) |
| 24.09 | Dundee – Aberdeen | ECN | Secondary | Transport Scotland | No | W7 | 10 | 80 | none | AB | 15" | 2 |

Figure 23 Strategic route sections

| Predominant aspect recorded (secondary aspects recorded in brackets). ELR is Engineers Line Reference and RA is Route Availability | | | | | | | | | | | | |
|--|--------------------------|-----------|----------------|--------------------|----------------|---------------|----|--------|-----------------|-----------------|--------------------|--------------|
| SRS | SRS Name | ELR | Classification | Funding | Community Rail | Freight Gauge | RA | Speed | Electrification | Signalling Type | Signalling Headway | No of Tracks |
| 24.10 | Edinburgh Suburban Lines | SUB (NDE) | Freight | Transport Scotland | No | W9 | 10 | 40 | none | CL | 5" | 2 |
| 24.11 | Other freight | LHS (CPH) | Freight | Transport Scotland | No | W8 | 10 | 30(20) | none | CL | OTW | 1 |

Capacity and operational constraints

- A Ladybank – Hilton Junction: single line section
- B Usan – Montrose: single line section
- C Edinburgh Waverley – Haymarket: limited track and platform capacity
- D Haymarket – Inverkeithing: three aspect signalling
- E Cawburn Junction – Bathgate passenger station: single line section
- F Glasgow Queen Street – Greenhill Upper Junction: line close to capacity

Other issues on the route

- 1 Forth Bridge: limited freight tonnage permitted
- 2 Bishopbriggs: limited platform length

Note

This Route Plan forms part of the business plan suite of documents which is produced annually and in accordance with our network licence condition 7. Our plans and the way in which we intend to achieve those plans are summarised in the Business Plan itself. This document provides further detail on the specific plans for this Strategic Route including the expenditure over the next two years to the end of Control Period 3.

This year our business plan focuses on the remainder of Control Period 3 (to March 2009). We shall provide a submission to the Office of Rail Regulation in October 2007, which will set out our view of the expenditure and activities that will be required in Control Period 4 (2009/10 to 2013/14).

The Route Plan shows in more detail how the strategies set out in the Business Plan will be delivered at a route level across the network, and how we are working with our customers and other stakeholders to improve the

performance and utilisation of the network. It presents a portfolio of activities to develop the network.

The expenditure section contains tables showing the planned level of expenditure and volumes on renewals on the route over the next two years, split by asset category. Expenditure figures are shown in 2006/07 prices, and are rounded to the nearest £1 million. An entry of £0 indicates spend of less than £0.5 million. It should be noted that in order to manage the deliverability of our Civils, Signalling & Electrification plans we have included an element of overplanning in our work banks. As a consequence the sum of our route plans exceeds our plan for the network as a whole. It is likely that a small proportion of the activities in these areas will slip to subsequent years.

Please note that figures in tables may not sum to the totals shown, because of rounding.

The other documents in the business plan suite can be found on the Network Rail website www.networkrail.co.uk



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To view or download the others
visit www.networkrail.co.uk