Scotland Route

Summary Route Plan

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This Route Plan for Network Rail in Scotland sets out our vision, strategy and plans for the safe and efficient management and operation of the rail network for the period April 2014 to March 2019 – Control Period 5 (CP5) – and beyond.

It describes the marketplace in which rail operates, its strategic role in the nation’s economy and how the expectations and requirements of Scottish Ministers and other stakeholders for the next control period are proposed to be delivered.

Network Rail receives considerable public funding to allow it to maintain what in many cases are socially necessary but commercially unsustainable routes. In the current economic climate, all aspects of public spending are under scrutiny and it is right that railways are no exception. This Route Plan sets out how Network Rail proposes to not only deliver greater efficiencies in its management of Scotland’s existing rail infrastructure, but how the network is planned to grow, consistent with ever greater passenger numbers and freight tonnage.

The requirements of Scottish Ministers for Network Rail to deliver in CP5 have been set out in their High Level Output Specification (HLOS) which was published in June 2012. In summary, this reflects a growing railway – carrying more passengers and more freight and doing so safely, efficiently and in an environmentally sustainable way. The HLOS requirements call for improved service punctuality, building on the high performance levels being achieved during CP4 and also for specific service enhancement requirements, such as the Edinburgh – Glasgow Improvements Programme (EGIP) and the Borders railway reopening, reflecting the needs of specific communities.

The Scottish rail network has a long and distinguished history but, inherent in its past lie many of the challenges of the future. We have witnessed some highly successful line re-openings in the past few years, such as Airdrie to Bathgate and the Larkhall branch, and patronage on these lines has outstripped all expectations. But the vast bulk of the earthworks, bridges and tunnels which support routes across the network date from the original railway construction and are considerably more than 100 years old. Most of these assets continue to provide good service today, well beyond their anticipated design life but inevitably the rate of required renewal and major refurbishment will increase to address the need for continued reliability and safety of these assets.

The railways are busier today than at any time since the 1920s and all indicators point to further growth, as the benefits of rail travel over other modes become more universally recognised. Coping with this growth will be a key opportunity in CP5 and this Route Plan sets out a number of proposals to expand the capacity and capability of the railway. These range from major enhancement projects such as EGIP and the Borders railway reopening to other schemes which increase the number of trains that a route can operate, or reduce the journey times between key destinations.
The dependability of trains arriving at their destination on time is a key expectation of customers. It may be no coincidence that the continual growth in patronage experienced over the last 10 years has occurred in parallel with similar improvements in train performance. The last year or so has seen train performance at historically high levels. This Route Plan aims to go further in CP5, with higher targets yet.

The railway has a role to play in the safe and sustainable custody of our environment. Encouraging modal shift from road and air travel is one aspect of this, but more sustainable modes of rail travel are also a priority. Planned electrification schemes will contribute greatly to both, with demonstrable modal shift being a standard feature of past electrification schemes and cleaner energy being an added bonus.

Railways have a further interest in such environmental considerations. The effect of climate change has been a source of concern to all transport modes, with the railway not being immune to changing weather patterns. Improved resilience of the rail infrastructure to extreme weather events will therefore become an increasing focus as we look to the future.

To achieve all of this efficiently is the base challenge for Network Rail. This Route Plan sets out a range of initiatives, from innovative approaches and technological developments to cultural and behavioural changes, to help us rise to that challenge. Working with our customers, suppliers and other stakeholders is the common thread that informs our approach to this task. To this end, we anticipate developing the alliancing approach forged with ScotRail during CP4 and extending this to the new ScotRail franchise due to commence in March 2015.

The HLOS clearly signals the continuing key role of the railways in Scotland in supporting the Scottish economy and being a facilitator of future prosperity. That is a big responsibility but one which Network Rail proudly accepts and is committed to deliver.

Alan Ross, Director Route Asset Management

David Simpson, Route Managing Director
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Route overview

The Scotland Route Plan is a key building block in preparing Network Rail’s CP5 Strategic Business Plan (SBP). It sets out the relevant outputs, activity and expenditure at Route level to achieve the specified outputs for CP5, as well as forecasting the long-term activity and expenditure to demonstrate that the Route is delivering CP5 outputs based on a sustainable whole-life, whole-system basis.

The rail network in Scotland serves a diverse range of markets, from long distance interurban flows to significant daily commuting to Glasgow, Edinburgh and, to a lesser extent, Inverness and Aberdeen. It also includes the northern ends of the East and West Coast Main Lines which facilitate travel to England and Wales. There are also a number of rural markets and considerable freight flows, both within Scotland and cross-border. In total, the Route covers some 1,718 route miles and 2,754 track miles.

The Scotland Route has a natural boundary along the border with England but it is also distinct in that political direction and funding support is devolved to the Scottish Government. This direction for CP5 is set out in the Scottish Ministers’ High Level Output Specification (HLOS), published in June 2012, which details the Scottish Government’s high level ambitions for the rail industry and output objectives for Network Rail to deliver. These include both requirements on sustaining the current railway and provisions for improvements and growth, through specified enhancement projects.

Operational control of the Route is devolved to a locally based team led by the Route Managing Director. This, together with a close alliancing approach with the principal train operator, ScotRail, has strengthened the Route’s ability to meet customer needs in an efficient and focussed manner. The Route has seen considerable investment during CP4 with both the Airdrie – Bathgate and Paisley Corridor Improvements projects being completed and development work well advanced for both the Edinburgh – Glasgow Improvements Programme (EGIP) and Borders railway, delivery of which will commence in the latter stages of CP4 and continue into CP5.

Passenger demand for rail travel has exceeded forecasts during CP4 and this will put more pressure on the known capacity constraints in the Route. Current forecasts are that a further 24-48% growth can be anticipated to the end of CP6. Projects such as EGIP are designed to address some of these issues and provide a sustainable basis upon which future growth can be achieved.

The railway is recognised as a key contributor to the well-being of the Scottish economy and aligns closely with the low carbon future aspirations of the Scottish Government. Efficiency in ongoing rail provision is key to successful progress and this Route Plan continues the trend established over the current control period of aiming to offer ever greater value for money for the funding allocated to the railways.

Beyond CP5 the longer-term strategy for the Route is focused on further growth and more efficiencies. This will include further phases of line of route upgrades, more electrification and schemes to shorten journey times on interurban routes, all consistent with maintaining high levels of performance. Operational efficiencies are planned through ongoing re-control of signalling systems into Rail Operating Centres (ROCs) based in Glasgow and Edinburgh together with satellite Signalling Centres at Inverness and Banavie. Increased use of innovative technology will benefit engineering activities as Network Rail aims to be a world leader in the provision of a safe, efficient and reliable railway.

This Route Plan, whilst principally dealing with CP5, also serves as the Delivery Plan for 2013/14, this being the final year of CP4. It therefore summarises the extent to which objectives set for CP4 have been delivered and forms the baseline from which the requirements of CP5 are to be measured.
Markets served

The Scotland route can be split into six markets: Glasgow conurbation, Edinburgh conurbation, interurban, rural, Anglo-Scottish and Freight.

**Glasgow and Edinburgh conurbation markets**
The Glasgow conurbation market covers rail journeys that start and end at stations in the greater Glasgow area including Ayr, Carstairs, Kilmarnock, Drumgelloch, Helensburgh, Cumbernauld, Croy and Shotts. These services are provided by ScotRail. Some connectivity between Motherwell and Glasgow Central is provided by other operators.

Glasgow is the largest population and employment centre in Scotland and it has the most comprehensive rail network. Demand for travel is particularly concentrated in the morning and evening peaks, and this demand can exceed available seating on some services. The level of crowding varies by corridor, reflecting the service provision and the demographics.

Recent traffic changes in the Glasgow market have included:
- the introduction of faster and more frequent services on the Ayrshire route following the completion of the Paisley Corridor Improvements project and
- the introduction of electric services to Paisley Canal, following electrification of that route.

Both of these improvements were implemented in December 2012.

Following completion of the electrification of the Springburn to Cumbernauld line as part of EGIP in 2014, some services on this route will be operated by electric trains. Other electrification schemes which will benefit the East Kilbride and Whifflet line services and the Edinburgh – Glasgow via Shotts services are proposed for CP5.

The Edinburgh conurbation market includes the journeys that start and end within the Edinburgh area. This is taken as all stations to/from Fife, Falkirk Grahamston, North Berwick, Caldercruix and Shotts. These services are all provided by ScotRail.

Whilst Edinburgh is the second largest city in Scotland, the Edinburgh conurbation rail market is less well developed than Glasgow, largely due to the much smaller suburban network. Edinburgh has seen significant investment in recent years with the introduction of the Edinburgh Crossrail services and the construction of the Airdrie to Bathgate line which both provide new commuter journey opportunities into the capital city. The construction and re-opening of the Borders Railway line in 2015 will provide further opportunities. Nevertheless the majority of passengers arrive from outside the immediate suburban area. The largest demand is from Fife, Linlithgow and Stirling.

The service changes planned under the EGIP programme will offer faster electric trains with increased seating capacity on the principal route between Edinburgh and Glasgow via Falkirk High. The routes to Stirling, Dunblane and Alloa are also included in the planned rolling electrification programme, extending the benefits to these key commuter flows.

**Interurban services**
The interurban market provides links between the major centres within Scotland. The majority of trains are operated by ScotRail, with CrossCountry and East Coast providing some services north of Edinburgh to Dundee, Aberdeen and Inverness and between Edinburgh Waverley and Glasgow Central via Carstairs. Interurban journeys for business or leisure tend to be less focused on peak period arrivals and experience a more even all day demand. Even so, the morning peak arrivals at major centres can often feature load factors in excess of 100 per cent as they serve both interurban and local commuter markets. This occurs on the approach to both Glasgow and Edinburgh.

The interurban market also includes local commuter services into the regional centres. Aberdeen is the largest city outside of Glasgow and Edinburgh. Between 2005/06 and 2009/10 demand for rail travel has grown by 6.1 per cent per year. Much of this increase has been shorter distance travel with demand between Aberdeen and Dyce and Inverurie growing rapidly, resulting in crowding on some peak services. Dundee and Inverness have also seen growth in rail demand, albeit at a lower rate than Aberdeen.

To cope with anticipated future growth, additional/enhanced services are planned to be operated on the routes below following the completion of the relevant HLOS specified projects:
- Glasgow Queen Street High Level to Edinburgh Waverley.
- Inverness to Aberdeen.
- Inverness to Perth.

**Rural market**
The rural market includes rail journeys that start or end at stations on the rural lines. This includes the Far North, Kyle of Lochalsh, Mallaig, Stranraer and Glasgow and South Western lines (G&SW). Services on the routes are provided entirely by ScotRail with the exception of the seasonal Jacobite service between Fort William and Mallaig.

On the rural lines seasonal traffic is a significant element of the overall rail passenger market. Tourism produces seasonal variations in rail demand, with the summer period having the highest demand. The degree of seasonality is measured as the percentage difference between summer per period ticket sales and winter per period ticket sales. The output shows that summer demand is considerably higher at some rural stations and on that basis Fort William and Kyle of Lochalsh summer demand is more than twice winter demand.
This seasonality, together with often low population density, is reflected in the level of service provision on most rural lines. These limit their use for commuter purposes on account of journey times and service frequency. The routes with lower seasonality are those where service frequency is highest such as the routes south of Dumfries and between Dingwall and Inverness. On these routes the rail service offered allows the use of the network for other purposes, such as commuting.

**Anglo Scottish market**

The Anglo Scottish market is all journeys between England and Scotland on the East Coast Main Line (ECML) and West Coast Main Line (WCML). East Coast and CrossCountry provide the majority of the ECML services and Virgin Trains and FTPE provide most WCML services. First TransPennine Express (FTP) also provides services between Edinburgh Waverley, Glasgow Central and Lockerbie. ScotRail operates the Caledonian Sleeper services from Inverness, Aberdeen, Fort William, Glasgow Central and Edinburgh Waverley to London via the WCML. For many journeys on these routes, rail competes with air as well as road. Since 2003, rail’s modal share compared to air has increased and this is especially the case between London and Scotland.

Anglo Scottish services typically have a similar demand pattern to interurban services, with higher demand at the start and end of the day, and at weekends. Analysis undertaken for the West Coast Main Line RUS established in July 2011 suggests that adequate capacity is provided over the day between Scotland and England. Some services in peak travel times of day and year experience high loads where occasional standing may occur.

To facilitate anticipated future growth the following traffic changes are being progressed:

- First Trans Pennine Express diesel services will be replaced with electric units from December 2013.
- Further Pendolino sets have been converted to 11 car operation on both the London Euston and Birmingham to Glasgow Central routes.
- CrossCountry service changes in CPS assume current 4 car voyagers will become 5 car with the additional vehicle being an electric power car from a date to be confirmed. Current 5 car formations will remain as 5 car diesels as in CP4.
- The current East Coast diesel operated services will be replaced by bi-mode trains in CP5 through the Intercity Express Programme (IEP) work as specified by the DfT. Between Edinburgh and Aberdeen this may require platform extensions or Automatic Selective Door Opening.

Where maintenance, renewal or enhancement activity is required on cross-border routes, the Scotland HLOS requires at least one of those routes to be planned to be available at all times for the passage of timetabled sleeper, passenger and freight services through from Scotland to London without the need for change. Journey times should be no greater than the relevant service level commitments on that route.

**Key freight markets and traffic flows**

The Freight markets include Intermodal, Royal Mail, construction, coal and other bulk traffics. Intermodal terminals at Mossend, Coatbridge, Grangemouth, Elderslie, Aberdeen and Inverness currently handle over 3 million tonnes of rail borne containerised produce per annum. Almost 9 million tonnes of coal is transported from Hunterston, Killoch, Chalmerton, New Cumnock and Greenburn in Ayrshire, Leith in Lothian and Ravenstruther on the WCML and conveyed to Longannet, Cockenzie and English power stations. The freight companies which operate these services on most of Scotland’s routes are: Colas Rail, DB Schenker, Direct Rail Services, Freightliner and GB Railfreight. The WCML, ECML and G&SW routes are vital arteries for Scotland plc, providing connectivity to the rest of the UK and Europe.

Industry supported forecasts, based on modelling by MDS Transmodal, highlight that volumes of product lifted to, from and within Scotland, are forecast to grow by just over 60% from 13 million tonnes (mt) in 2011 to 22mt by 2030. Growth of this magnitude will require investment in the rail network and fit for purpose rail terminals if rail is to provide a “green” transport option for Scotland. The sectors which will drive substantial growth are intermodal (from ports and between domestic terminals) and Waste/Biomass. More modest growth is expected in other commodities.

In terms of tonnes carried, the predominant commodity moved to, from and within Scotland is coal. Decisions surrounding future of energy generation have not yet been finalised, however, Longannet is believed to have a medium to long term future whereas Cockenzie is scheduled to close in 2013 and be redeveloped into a gas fired power station.

Our forecasts are based on an energy industry that will see a decline in the movement of coal. Decisions surrounding future of energy generation have not yet been finalised, however, Longannet is believed to have a medium to long term future whereas Cockenzie is scheduled to close in 2013 and be redeveloped into a gas fired power station.

Recent announcements with regard to grant support for biomass may lead to power stations converting in part or whole from coal to biomass. This could have an impact on the capacity of biomass supply routes as broadly speaking it requires 2 biomass trains to replace 1 coal train. On a mixed network where both freight and passenger trains share the same infrastructure and with growth in both sectors, some parts of the network are becoming increasingly congested. Targeted investment will be required to improve capacity but improving freight train productivity and performance and reducing industry costs are also vitally important if the freight sector is to continue to grow.

Future growth will also mean that traffic may emerge on routes that currently have very little (or no) freight traffic. It is anticipated that there will be new traffic flows in Fife, Inverness and the Far North, to Aberdeen (and between Aberdeen and Inverness) and to Annat on the West Highland Line.
Current train operators

At present, five franchised passenger train operators run services in Scotland. These are:

**ScotRail**  
The current ScotRail franchise was awarded to First Group in 2004 for a period of seven years to October 2011. In April 2008 the Scottish Government awarded First Group a three-year extension to the franchise in recognition of the achievements of the franchisee in relation to performance and improvements. As part of the extension agreement, more than £70 million is being reinvested through a number of new rail initiatives and projects across Scotland including a stations community regeneration fund. In December 2012 a further franchise extension to March 2015 was also announced.

**East Coast**  
East Coast is a trading name of East Coast Main Line Company Ltd., a subsidiary of Directly Operated Railways Limited, which was formed by the Secretary of State for Transport when the National Express East Coast franchise was terminated. East Coast operates high speed, long distance passenger services principally from London King’s Cross to central Scotland, Inverness and Aberdeen via York and the East Coast Main Line (ECML), and from King’s Cross to Leeds and Newcastle. The ECML timetable was amended from May 2011 to operate to a more regular stopping pattern with reduced journey times and the number of through trains from Glasgow Central – London King’s Cross via Edinburgh Waverley was reduced.

**Virgin Trains**  
Virgin Trains operates an electric service from London Euston – Glasgow Central and a largely diesel service from Birmingham New Street to Glasgow Central and Edinburgh Waverley via the West Coast Main Line (WCML). Virgin Trains also operates services from London Euston – the West Midlands, Northern England and Wales. The current Virgin Trains franchise is due to expire in November 2014.

**CrossCountry**  
CrossCountry is operated by Arriva. The current cross country franchise was formed through the amalgamation of most of the former cross country franchise held by Virgin Trains with some of the longer distance routes operated by Midlands-based Central Trains and runs from 2007 until 2016. The company operates a number of key long distance interurban routes outside London including the cross country route from Scotland with services starting from Aberdeen, Dundee, Glasgow Central and Edinburgh to the South West via the ECML. It also operates a range of shorter distance regional expresses mainly in the Midlands within England. A more regular service from Glasgow Central to the South West of England via Edinburgh Waverley, York and Birmingham was introduced in May 2011.

**First TransPennine Express**  
First TransPennine Express (FTPE) is a joint operation between First Group and Keolis. The franchise commenced in 2004 and was extended in early 2012 to run until April 2015. It operates regular services in the north of England including services linking the west and east coasts across the Pennines. Since 2007 FTPE has provided a service between Manchester Airport and Edinburgh Waverley and Glasgow Central via the WCML.

Currently only one other company operates scheduled passenger services over Scotland’s rail infrastructure.

**West Coast Railway Company**  
West Coast Railway Company is a licensed Train Operating Company (TOC) operating the Jacobite service, a seasonal steam service between Fort William and Mallaig, under open access arrangements. It also operates a number of charter trains including the Royal Scotsman land cruise train.
Current freight operators

At present, five freight operators run services over the lines covered by this Route Plan. These are:

**DB Schenker**
DB Schenker operates bulk, intermodal, Royal Mail, wagonload traffic and charter trains to most parts of Scotland.

**Freightliner**
Freightliner operates in Scotland under two subsidiaries. Freightliner Intermodal operates intermodal traffic between Coatbridge and various destinations in England, while Freightliner Heavy Haul operates coal and cement traffic within Scotland and coal to English power stations.

**GB Railfreight Limited**
GB Railfreight Limited operates a number of bulk flows including alumina traffic and coal.

**Direct Rail Services Limited**
Direct Rail Services Limited operates intermodal services from Grangemouth, Mossend and Coatbridge to Daventry, Inverness, Aberdeen and Elderslie. It also runs nuclear services to Hunterston, Torness and Georgemas as well as various charter train services.

**Colas Rail**
Colas operate fuel services from Grangemouth Ineos to Prestwick, Linkwood and Derby.
Alliancing

Network Rail and ScotRail signed an Alliance Agreement in CP4 (December 2011) and have been working more closely together as a result in order to focus on providing passengers with a better service. In order to deliver this objective a variety of initiatives have been jointly agreed and are being worked on.

The most noticeable of these, as it is a change to the infrastructure, is the electrification of the 8km Paisley Canal line. Alliance working has meant that this project has cost £12m, significantly down from the original estimate, with no reduction in the outputs of the project. The project was completed on time in November 2012 and timetabled electric services are now in operation. Customers are benefitting in a number of ways: a more comfortable and reliable train service as this enables the last remaining diesel trains in the area to be redeployed; quiet, eco-friendly trains that include the newest trains in ScotRail’s fleet, the air-conditioned class 380s, together with Class 314s. The alliance between the two organisations has enabled cost savings across all aspects of the project. Significant savings have been achieved as a result of early joint engagement between both organisations as to the correct scope for the project.

Examples of other alliance workstreams that are underway include:

- reviewing our joint approach to the timetable process in order to simplify and improve the process, thereby reducing error in the timetable and improving the service to customers
- reviewing the arrangements within our control organisations to create a more appropriate structure that is better informed to make the correct decisions to better deliver services for passengers and freight users

By working together innovatively, we have been able to jointly propose a more appropriate and efficient scope for a new station at Conon Bridge which has reduced costs to the Industry by more than £0.5m. Conon Bridge station will also be delivered using our newly co-located property works teams, which helps maintain the customer involvement directly throughout the project.

The Scottish Government recently announced its plans for the future of Scotland’s rail network which included the requirement for the next ScotRail franchisee and Network Rail to work together to develop a deeper alliance. This will create an incentive for both organisations to work together and share the benefits of delivering a more efficient railway system in Scotland while more importantly, making it a better product for those who use Scotland’s rail network. Working together in this way will generate significant changes in how the Industry delivers day to day operations in CP5 and will build upon the alliance work undertaken in CP4.
Scottish Ministers’ required outputs

Scottish Ministers’ Specified Requirements
The Scottish Ministers’ High Level Output requirements (HLOS), published in June 2012, sets out the key delivery requirements for Network Rail in CP5. These are:

Improving journey times
Improvements to journey times and a clear process for measuring opportunities as part of renewals is required. This process currently exists and is managed via the Route Strategy Planning Group (RSPG) Sub Group meetings. The opportunity to raise linespeeds and improve capability of the network is considered when renewals are identified and discussed at this forum. Scottish Ministers anticipate that, in time, this will result in an improvement in journey times across the network.

Safety output requirements
The HLOS, produced by the Department for Transport (DfT), which describes the safety outputs for the whole of the GB wide railway in CP5 are specified in the following manner:

‘the Secretary of State considers the continued safe operation of the railway to be of the utmost importance. She therefore requires the industry to continue to improve its record on passenger and worker safety through the application of the ‘so far as is reasonably practicable’ approach and to ensure that current safety levels are maintained and enhanced by focusing domestic efforts on the achievement of European Common Safety Targets.’

‘the Secretary of State wishes the industry to reduce the risk of accidents at level crossings and is making a ring-fenced funding provision for this purpose.’

The HLOS does not specify any safety targets at a devolved level but Scotland Route’s Safety Improvement Plan is set out in this Route Plan.

The Scottish Government’s HLOS also includes a fund to enable closure of level crossings in Scotland to reduce safety risk. The fund will be managed by the Route Safety Improvement Manager on a case by case basis.

Sustainable development requirements
Under the terms of the Climate Change (Scotland) Act 2009, the Scottish Ministers seek to reduce overall greenhouse gas emissions. In support of this, the Scottish Ministers seek a continuous and sustained carbon reduction per train kilometre and freight tonne kilometre in the operation, maintenance, renewal and enhancement of the network which is in line with the Key Performance Indicators (KPIs) set by the Office of Rail Regulation for CP5.

The areas indicated by the ORR include carbon and energy; climate adaptation and wider environmental impacts although at this stage there are no sustainable development targets set.

Performance output requirements

<table>
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<th>TOCs for which route is lead route</th>
<th>2013/14</th>
<th>2014/15</th>
<th>2015/16</th>
<th>2016/17</th>
<th>2017/18</th>
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<td>92%</td>
<td>92%</td>
<td>92%</td>
<td>92.5%</td>
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<tr>
<td>Sleeper</td>
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<td>92%</td>
<td>92%</td>
<td>92%</td>
<td>92%</td>
<td>92.5%</td>
</tr>
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Scottish Ministers have indicated their intention to establish a separate franchise for the Sleeper service from March 2015. The PPM target for each franchise is the same; however the definition of PPM for the Sleeper franchise is proposed to be 0-10 minutes to reflect the nature of the service.

The Scottish Government’s HLOS does not specify a Cancellation and Significant Lateness target.
**Capability and Capacity requirements**

The Scotland HLOS did not include any specific capacity metrics, The HLOS has, however, specified a need to review the capability of the major terminals to cope with the required volume of trains and passengers during CP5 to establish whether improvements are required in Control Period 6 (CP6) and beyond. As part of the Edinburgh Glasgow Improvement Programme, infrastructure interventions at both Glasgow Queen Street and Edinburgh Waverley will be required in CP5 to accommodate the longer trains specified.

The current network capability is shown (in map form) later in the plan.

The following projects which will enhance the network capability and capacity were specified in the HLOS for delivery in CP5:

- Edinburgh to Glasgow Improvements Programme (EGIP)*
- Aberdeen to Inverness Rail Line Improvements Phase 1*
- Electrification rolling programme (post EGIP)
- Highland Main Line rail improvements Phase 2*
- Motherwell area stabilising*
- Motherwell re-signalling enhancements
- Borders new railway

*It should be noted that the output requirements of these projects has been revised and, as a consequence, further development work has commenced.

**Flexible Funding Enhancement Opportunities**

The HLOS also specified a number of Funds for CP5. These are:

- Station Fund of £31m
- Strategic Rail Freight Investment Fund of £31m
- Network Improvement Fund of £62m
- Future Network Development Fund of £10m
- Level Crossing Fund of £10m
Route strategy

As we approach the final quarter of Control Period 4, this is an opportunity to reflect on the achievements of recent years and consider the status of the railways in Scotland today which will form the basis for going forward into CP5.

In the last few years we have seen continual positive trends in the numbers of people and volumes of freight carried, substantial improvements in the quality of services and their punctuality, growth in terms of new services and new routes and considerable reduction in the cost of rail infrastructure provision. The number of rail passenger journeys in Scotland has grown by 30% since 2004 and, with passenger satisfaction rates being consistently high, that trend is set to continue. This is reflected in the Scottish Ministers’ High Level Output Specifications (HLOS) for Network Rail in CP5, which predicts further background growth of at least 15% over the forthcoming 5 year Control Period.

Underlying Growth

The growth agenda is underpinned by consistent year on year increases in passenger demand experienced over the last two control periods as shown below:

![Graph showing passenger demand forecasts for Scotland Generation 2 Route Utilisation Strategy](image)

This growth is forecast to continue. The latest predictions from the Scotland Route Utilisation Strategy (RUS) anticipates the following trends for the period to early CP7:

The strategy for Network Rail in Scotland is therefore focused on coping with and encouraging growth, by means of further improvements in the quality of services and infrastructure capacity to facilitate them safely and efficiently.

The specific key challenges for the Route as it prepares for CP5 are as follows:

**Safety**

The Route has historically maintained an excellent safety record, consistent with rail being widely recognised as the safest form of transport. That gives no grounds for complacency, though, and further work is planned for the forthcoming period to achieve ongoing improvements. The objective in this respect is consistent best practice and will feature greater emphasis on behaviourally based safety techniques to complement physical safeguards and safety management systems. Whilst safety is already built in to the culture of the railways, further improvements remain possible and an increased focus on risk reduction will underpin ongoing safety related strategies. These approaches will address all aspects of Network Rail’s activities, which range from train operations and railway maintenance to some of the biggest construction projects in Scotland as major enhancements are delivered, often on a live operational railway.
Performance
In parallel with the recent trends in growth, there has been a steadily improving trend in train performance. For the ScotRail franchise, the Route is currently on target this year to achieve an overall reduction in passenger delays by 44% since 2004, despite the significant level of passenger growth. The objective for the end of CP4 is the achievement of a 92% Public Performance Measure (PPM) figure and the HLOS requires further improvements on that trend, with the target for the final year of CP5 being 92.5%. This will be a challenging target, with risks relating to future timetable changes, the extent of enhancement project work being constructed on a live railway and increasingly unpredictable localised severe weather events all needing to be managed.

Enhancements
The HLOS specifies a number of enhancement projects, most notably the Edinburgh – Glasgow Improvements programme (EGIP), the reopening of the Borders railway, Aberdeen – Inverness line Improvements and Highland Main Line improvements. Work is currently ongoing to define the timetable requirements for these projects, following which the appropriate infrastructure scope will be determined. This can be an iterative process with a number of inter-related dependencies, particularly on congested railways and single lines, to derive the most efficient cost consistent with other requirements, such as performance targets. Cost estimating for such projects relies on clarity of these basic requirements and a structured and staged refinement process so current estimates are indicative only at this stage and will be improved as the projects are developed.

The enhancement requirements also strongly feature electrification, both of the core EGIP route and beyond. A rolling programme of electrification is planned across key routes in the Central Belt, including to Stirling, Dunblane and Alloa. This is consistent with many of the wider objectives of the HLOS in that journey time improvements, superior passenger comfort and wider environmental benefits are all key gains from electrification. The stimulating effect that electrifying railways has on patronage growth is also well documented from past schemes.

Operations
Progress in CP5 and beyond is focussed on the operational improvements and efficiencies to be gained by consolidating signalling activities into a smaller number of centres, including the establishment of Rail Operating Centres where signalling, operations control and power control for electrified lines will take place under one roof.

Scotland’s network operations activity already achieves high levels of productivity and efficiency but further opportunities may exist in the alliancing initiative with the ScotRail train operator. Benefits from alliancing have already been gained in CP4, with the Paisley Canal electrification project successfully completed in December 2012 in record time for such a construction activity. Cost benefits for this project were also realised, as both Network Rail and First ScotRail worked closely to remove the obstacles to successful delivery. Opportunities for closer working in other areas are being developed for CP5 and will take into account the forthcoming re-franchising process for the ScotRail operation.

Asset management
The Route has a widely dispersed asset base, extending across a large geographical area. It includes track, bridges and tunnels in many remote locations, often difficult highland terrain where the effects of weather can be particularly challenging. It also features some of the most distinctive buildings and structures in Scotland, including Glasgow Central and Edinburgh Waverley stations and the Forth and Tay bridges. Maintaining and renewing such assets in keeping with today’s needs, when many were constructed during the initial establishment of the railways in the 19th century, is an ongoing task. Substantial activity is planned in CP5 to maintain and improve the average condition of this asset base in keeping with the growing demands placed on it. Major signalling renewals, track renewals, work to improve the resilience of assets to adverse weather related impacts and better lineside management, where fencing degradation or unchecked vegetation within or beyond our boundary can impact on the operational railway, are all planned in CP5.

The opportunity will also be sought, wherever reasonably practicable, to align asset works with planned enhancement projects so that the maximum output benefit can be gained. Examples of this are the planned renewal of Greenhill and Winchburgh Junctions on the main Edinburgh – Glasgow Route plus the slab track renewal in Queen Street tunnel and consolidation of signalling activities into one location. All of this will contribute to the high reliability requirements of the EGIP project once this is completed. This builds on a similar approach in CP4 when signalling and electrification renewal projects, plus roof renewal at Paisley Gilmour Street station and new platforms at Glasgow Central, were linked with enhancements on the Paisley Corridor to provide a comprehensive upgrade of that route. This has enabled the substantial timetable improvements to Ayrshire which were introduced in December 2012, with more trains and faster journey times.

Access Strategy
Growth in railway patronage has increased the pressure on the limited opportunities for undertaking maintenance, renewal and enhancement works. The business of railways is to run trains so it is not desirable for rail passengers to be redirected to bus journeys for part of their journey during such works. The extent of engineering activities required to comply with the objectives set for the railways, however, makes it necessary for access at some point to be granted. The Route Network Availability Strategy seeks to find innovative ways of enabling such access to be granted when it has the least disruptive effect on passengers and freight. There is a difficult balance between minimising disruption to services and efficient cost delivery of works but new technology, including High Output track equipment and better possession management processes are planned to improve the quantum of output achieved for every given access opportunity.
**Costs and Efficiency**

The objectives for the Scotland Route in CP5 are substantial and challenging, but these also include achieving the required outputs for an efficient cost. The extent of works requiring to be undertaken in CP5 include substantial volumes of additional track, off track (fencing, drainage and vegetation) and structures work to comply with asset policies. To a large extent, the spend levels proposed for CP5 also take into account a significantly lower spend level for structures and earthworks in CP4 which has resulted in a worsened average asset condition for those assets and this is an unsustainable position for the medium to longer term.

The key challenge is delivering the work during CP5 efficiently and to agreed unit rates. Greater track access for mid week activities is being sought through discussions with TOCs and FOCs. However the lack of alternative routes and concerns about potential loss of revenue following disruptive operations remain issues to be overcome.

Forecast costs for asset management activities are largely driven by asset condition and the increasing demands placed on the asset base by rising traffic levels and increased risk levels posed by weather. The age of many assets, particularly earthworks and structures, is a significant feature and this is also applicable to track, especially on more rural routes. Asset policies drive interventions to maintain compliance and Scotland’s relatively high proportion of single lines has a disproportionate impact on the extent of works required and the associated unit rates.

For maintenance, the main cost drivers are track and off track activities. For the latter, an increase in the baseline costs, driven by the need to achieve compliance on fencing and vegetation management in particular, has been included in the CP5 spend forecast. Future performance benefits can, however, be anticipated from this reversal of recent trends in lineside activity.

The main driver for operating costs efficiencies is acceleration of Network Operating Strategy (NOS) projects, in particular the planned re-signalling of routes in central Scotland to facilitate re-control to Edinburgh.

**Strategy beyond CP5**

Beyond CP5, industry strategy is directed by RUS conclusions and recommendations. Government policy and transport objectives, and future customer requirements. Key strategic considerations, outlined in the HLOS for development in CP5, which may help to shape future rail investment include:

- Further phases of electrification in line with the conclusions of the Scottish Transport Projects Review October 2009 (STPR)
- Aberdeen to Inverness Corridor Improvements Phase 2
- Highland Main Line Corridor enhancements Phase 3
- Aberdeen to Central Belt, including both journey time improvement and freight enhancement
- Passenger capacity at Glasgow Central, Glasgow Queen St, Edinburgh Waverley and Edinburgh Haymarket, including any requirements resulting from the introduction of High Speed 2 (HS2) services

- Train handling capability at Glasgow Central, including potential to use the Central low level line for further local services
- Train handling capability at Edinburgh Waverley.

Progression of these projects will be subject to the prioritisation of future investment and funding based on their benefits to the rail industry and its customers, the economy and the environment.

From 2026 some Anglo Scottish services are expected to use the new high speed line being developed by HS2 Limited on behalf of the UK Government before continuing on the existing network for the remainder of their journey.

Given the early stage of development of these proposals Network Rail has not sought to reflect the financial and economic impact of these high speed line proposals into our forecasts of future outputs, revenues and costs for the current network.

The Scottish Government has established a Scottish Partnership Group involving key stakeholders to help develop a business case for extending the high speed rail network to Scotland. Associated with this, Scottish Ministers have recently announced plans for a high speed link between Edinburgh and Glasgow, to be delivered by 2024, which may offer synergy with Anglo-Scottish high speed services when they are introduced.

Network Rail recognises its role in contributing to the Scottish economy and the proposals set out in this Route Plan are designed to rise to that challenge. There will be risks to the delivery of these objectives, but risk mitigation plans are outlined in the delivery strategy and these will be reviewed and refined on an ongoing basis. Governments, both in Holyrood and Westminster, have endorsed the key role of the railways in satisfying the ever growing need for sustainable transport provision. This Route Plan is designed to reflect that level of confidence expressed in the railways. Network Rail believes that it has earned that confidence through the significant improvements achieved in recent years but is also well aware that continuing confidence is not a given – it too must be earned. This Route Plan is designed to explain how the Route aims to deliver an improving railway in CP5 such that continuing confidence is indeed deserved.
Route Safety Improvement Plan

This section sets out our plans to deliver a safe and sustainable railway for all of our stakeholders.
Introduction

The Route Safety Improvement Plan (RSIP) has been prepared for the Scotland Route to reflect both the national and our own Route based vision for safety and sustainable development throughout CP5. As a minimum, the RSIP will lay out a strategy for maintaining legal compliance in key areas of risk. However, in many cases the Scotland RSIP will look to exceed minimum legal requirements by outlining a best practice approach.

Furthermore, it will incorporate behavioural based safety techniques alongside our physical safeguards and safety management systems to provide a more holistic approach to risk management. In simple terms the RSIP is a framework for delivering our mission statement, which is:

Everyone will work together so that everyone returns home safely at the end of every day.

Safety Management System

The RSIP consists of two primary elements:
- National Safety & Sustainability Policy and Principles, and the application of these to the Scotland Route
- Local route based safety and sustainability initiatives.

Network Rail has a National Safety & Sustainability Strategy and suite of policies. The RSIP will take account of these items, where applicable, and identify the benefit or impact of doing so. The Scotland Route is mindful of the potentially harmful and stifling effect that having onerous levels of policies and systems can have. We are determined to limit action without progress and focus on outcome rather than output.

On a practical level, this means rationalising safety workstreams and greater utilisation of existing opportunities for improvement through the influencing of design and organisational changes.

Within any workplace there are risks or groups of risks that impact on our working environment. Many of these risks are generic and it is appropriate to deal with them via a national policy, but it is often the case that geography, legislative and structural differences create Route specific risks that will need to be managed on a Route basis.

‘Safety planning’ must be considered as the methodology employed to manage the safety risks associated with business operations. The planning can be, and often is, overlapped by other areas of the business plan.

The RSIP is governed by the same rules as any other business plan – whether it is systemic or plant and/or equipment, whether goods and/or services: ‘every system is in a state of decay without an input of energy’. As with many other parts of the workplace system, the strength of pro-active safety management planning is in its application, measurement and continuous review.

Risk management

The Scotland Route employs well-established risk assessment and reduction techniques which are supported by quarterly risk review sessions led by the Route Managing Director (RMD). Through CP5, we aim to become more sophisticated in our approach by moving from a largely hazard based approach to a risk based approach where mitigation is proportionate to risk.

To allow the Scotland Route to do this, we must first:
- develop a clear understanding of the safety risk profile for the Scotland route
- provide our workforce and service partners with the necessary competency to identify and manage risk proactively
- make available user-friendly risk management tools and systems
- rationalise the number and content of procedures affecting front line teams.

Moreover, nationally and locally, there is a realisation and desire to embed good risk management right from inception with increased focus on safety through design but also through construction, operation and dismantlement as appropriate. To help facilitate this, Scotland Route will:
- provide information on asset performance to allow better determination of where investment should be targeted to achieve the optimum level of risk reduction and performance improvement
- adopt a whole-life approach to costing asset designs to optimise safety when we build, operate, inspect, maintain and replace assets in the future
- grow our understanding and command of the Client role and optimise the leverage such a position provides to demand and influence high safety standards from our Suppliers
- create an appropriate degree of freedom within our safety management system to allow our people to make informed decisions about safety without being bound to arbitrary standards which are devolved from risk.
Investigating accidents & incidents

We are determined to be a learning organisation and accordingly we will take the time necessary to appropriately and proportionately investigate our accidents and incidents. The core objective of the accident or incident investigation is to identify the root cause and prevent it from happening again in future. During CP5, we will improve the rigour with which learning from incidents is applied to the organisation and apply the “Just Culture” model used in other industries to herald a period of increased accountability.

This system of investigation is set against an agenda focussed on becoming a more forward looking organisation and through CP5 we will actively lessen our reliance on accident and other lagging data to drive our improvements through the use of leading indicators.

Assurance

In its simplest form, providing assurance will show that what we say we are doing is in fact, what we are actually doing, and this will match what we are supposed to be doing.

Within Scotland Route our safety assurance regime will be primarily delivered via safety tours and assurance checks conducted by line managers and engineers in a consistent and regulated manner.

Each year we will produce safety-tour and assurance plans that cover our requirements and allows us to track progress. All findings from safety tours and assurance checks will be consolidated and reviewed within the senior Route teams on a regular basis.

Safety Leadership and Culture Change Programme

Throughout CP4, Scotland Route has consolidated a systems approach to safety which so far has helped deliver a reduction in worker accident rates. To continue to reduce worker and indeed public and passenger injuries and generally mature our approach to safety, Scotland Route will embark on a cultural change programme using behavioural change principles to deliver a workforce increasingly able to meet future safety challenges.

To co-ordinate this change and demonstrate leadership, Scotland Route will use its Safety Leadership Team (SLT) to strategically orchestrate change and devolve tactical deliverables to task forces made up of a cross-section of employees and other interested parties.

Scotland Route has looked to academia and industry leading organisations to inform the cornerstones of the safety element of its culture change programme and this will help direct many of the workstreams deliverable in CP5.

Workforce safety

During CP5 we will target the leading causes of injury and develop co-ordinated plans to tackle the immediate, root and underlying causes of each area as much as it is practicable to do so. This will not only encompass physical areas of risk such as manual handling and slip, trip, fall but will also consider factors such as late change, which is often associated with unsafe acts and accidents.

Moreover, during CP5, we aim to put the health agenda on par with the safety agenda. Because health hazards are often perceived as having distant and uncertain consequences, they receive less focus than the more immediately devastating safety impacts of accidents.

Accordingly, we will raise awareness and understanding of occupational health and the benefits of a healthy lifestyle using a variety of media. We will arrange regular interaction with organisations that can help us educate our people to achieve a healthier lifestyle, enabling them to be more active at work and at home.
Public safety

Level Crossings
We aim to reduce the overall level crossing risk in Scotland by applying the ORR Level Crossing hierarchy of control, exploring and pursuing all opportunities to close level crossings where possible. In this context, the HLOS has made specific provision of a fund for the purpose of level crossing closures. However, seeking to progress closure of low risk crossings may not always be the most effective way to holistically reduce the danger, especially where full closure is not a practicable proposition. Accordingly, it is proposed that funds will also be targeted towards implementing control measures at the locations which will bring the greatest risk reduction overall. We will work with users of our level crossings to control the risk imported by misuse, changes to frequency and type of crossing movements to assess whether the provision at each individual crossing effectively controls the risk to as low as reasonably practicable.

Our approach to level crossings will align with the National Level Crossing policy and will look for solutions that not only deliver long term risk reduction, but which mitigate the risk in the short and medium term. Where appropriate, we will utilise innovative and novel methods in order to increase the delivery pace. Examples of our ongoing commitment to level crossing risk reduction through CP5 are given below:

- Within the route we will maintain a register of level crossings prioritised by risk as measured by All Level Crossing Risk Model (ALCRM), but augmented with expert local knowledge and reasonable customer requirements. This register will be a living document that drives the Route’s long-term risk mitigation aspirations for each level crossing.
- We will maintain an action plan for our high risk level crossings that details the mitigation interventions to be undertaken. By the end of CP5 it is our intention that each of the fifty level crossings at the top of our risk register at the time of entering the period will have mitigation solutions implemented before entering CP6.
- We will apply a holistic approach to level crossings based on funding, risk and operational and user benefit. This will include providing additional input to renewal and enhancement schemes to align them with our long-term plans for level crossing risk reduction.
- We will seek new ways to work with and educate our users and neighbours in order to raise awareness of the risks around level crossings.
- We will develop and improve our level crossing inspection and maintenance regime including the use of remote monitoring equipment to enable improved consistency and efficiency in our management of level crossing assets.
- We will work with our industry partners to identify solutions to mitigate risk based on the 4E principles of education, enforcement, enablement and engineering.

Route Crime, Theft and Vandalism
We will build on the success we have had in CP4 by using both existing and new initiatives across the various crime “hotspots” in an attempt to both reduce railway crime and improve relations in the local communities that surround Network Rail infrastructure. This will include fencing upgrades, a better strategy for scrap removal, considering alternative strategies for tackling graffiti and improved liaison with schools and local authorities.

Passenger safety

Irregular Working
By improving the consistency of risk ranking of irregular working events we will direct resources to the correct areas. We will specifically target areas during CP5 which are known, through analysis of CP4 incidents, to be a significant source of irregular working events. This will include measures to further encourage the reporting of all operating irregularities and to improve training, where lack of competence is seen as a cause of such incidents.

Seasonal Management
The more frequent incidence of extreme weather has increased the safety risk associated with landslips and rockfall. Such problems often originate from beyond the railway boundary. Our aim is to drive out some of the uncertainty around seasonal weather patterns so that the appropriate controls can be applied at the right time and in the right place. Over the last control period we have made significant gains in this area and we will build on this success to better manage the risks that arise from extreme weather. This will include better vegetation management, improvements in rail head treatment, seasonal change briefings and more Remote Condition Monitoring.

Signals Passed at Danger
Having made significant inroads to this area in CP4, we will continue with the strategy of reducing the risk of Category A Signals Passed at Danger (SPAD) by checking that signals are correctly placed, lineside vegetation is managed to maintain visibility, sighting inspections are carried out and that TOC/FOC customers are continually engaged in actively monitoring the effectiveness of all signals across the Route. This will include the five-year rolling Signal Risk Assessment plan, embracing the principle of safety by design in all resignalling schemes and prioritisation of risk mitigation works using the list of multi-SPAD signals.
Sustainable development

Our Route has a culture of pushing for higher levels of safety, reliability and transparency, as well as better value for money for our customers and stakeholders. Sustainable Development (SD) is the overarching principle at the heart of this as it supports these values, the change culture and is integral to the long term success of the company and the railways.

We have one aim with Sustainable Development:
To deliver a better railway for a sustainable Britain

We believe that good management of our economic and environmental impacts is key to maintaining a strong and sustainable business. Through sustainable development, we will drive efficiency, build trust and create long term value for our stakeholders.

In Scotland our approach to SD needs to move from being transactional, based on achieving compliance with standards, to transformational. Knowledge and momentum of SD within the Route is not as advanced as other issues such as safety and performance, and so this will form part of the challenge workstreams for CP5. In most areas of SD there is an element of legislative compliance but our aim during CP5 is to move beyond this and look for innovative ways to improve efficiency which, in addition to saving money, will provide a sustainable future.

Scotland’s SD strategy is based on the Network Rail strategy for SD.

Sustainable Development Improvement Areas
There are a number of key areas where we can effect change in order to help us achieve our aim. These are principally:
- Safety & Wellbeing (see workforce safety section)
- Energy & Resources
- Climate Change Adaptation
- Buildings & Land
- Environmental Protection
- Communities
- Accessibility and Inclusivity
- Employees

Energy & Resources
In the Scotland Route, avenues already exist for us to reduce energy and water use, waste generation, and resource use in general as we invest significant amounts of money in projects to maintain and develop our infrastructure. Increasingly incorporating sustainable development into these projects, whether this is through sustainable procurement or accounting for whole life cost, will afford ample opportunities for Network Rail’s to reduce its long term draw on finite resources. Specifically, Scotland will require that all major projects have an environmental impact assessment completed from which we will specify sustainable options from Investment Projects and our suppliers using the S&SD guidelines when these are produced.

As a route we recognise that the biggest impact on sustainable energy production can be achieved through the lead role that Strategic Sourcing and NDS have through working with electricity suppliers to provide the most sustainable options for electricity for Network Rail at the best price. This may also be the case for other key resources we procure such as sleepers, track and ballast and such opportunities will be explored during CP5. We will also work with our TOC/FOC customers to assist and support energy efficiency improvements and consider the potential for part funding/benefit sharing of schemes.

Waste management is another important area for our Route to focus on. We will work with national Strategic Sourcing to maximise the efficiency of national waste contracts so that we can collectively make full use of these services. As a route we need to focus on managing waste by designing out potential waste creation in the planning of projects, reducing the amount of materials we use, and maximising the potential for recycling waste from all our activities. We will work with internal delivery services to help create the ability for us to measure our waste so that this data is available by business unit which will allow us to focus our efforts on critical waste streams and areas where performance can be most improved.

We will undertake activities to improve the knowledge and understanding of resource and energy management. This will include designing for energy use/waste minimisation; and through our culture change work streams improving behaviours associated with waste management and water/energy usage. We will also consider local initiatives and opportunities including mechanisms for measurement and reward for desired behaviours.
Climate Change Adaptation
The impact of increasingly unpredictable weather patterns and climate change on the running of a safe and efficient railway cannot be underestimated. In order to build better weather resilience of our assets there are a number of things we can do at Route level which links to our Route Asset Management Plans (RAMPs). We will seek to further develop our understanding of asset resilience and manage the risk identified through our risk assessment models. We will need to test the adequacy of our knowledge on climate change patterns on the Route and its likely impacts on our asset base; review as necessary our approach to Climate Change Adaption locally and develop more mature asset protection plans as necessary.

We will support the industry programme FRACAS (Flood Risk Assessment under Climate Change) and set an agenda locally such that climate change is adopted into the ‘consciousness’ of the business. Our Asset Management plans will reflect any issues that are identified by Asset Management Services to optimise strategic opportunities to enhance the resilience of our route and the rest of the country’s resilience via the rail network so far as is reasonably practicable.

Buildings & Land
As the owner of a large number of buildings, we have the opportunity to make simple changes that contribute to energy efficiency as replace and refurbish locations across the Route. We will develop robust business cases in order to seek to retrofit buildings with energy efficient technology to bring our whole estate up to a more modern standard. We will work with Asset Management Services and Property to set minimum specifications for sustainable buildings, and to define and mandate the use of a common assessment tool (e.g. BREAAM) and a recognised carbon calculator.

The Route also has a responsibility to maintain the land appropriately. This is underlined further given that the rail network in Scotland travels through many Sites of Special Scientific Interest. Opportunities exist for us to continue to operate, maintain and develop the railway whilst protecting the habitats we co-exist with and the land we own. We will also establish, account for and quantify the extent of contaminated land in our Route and, as a minimum, maintain compliance with legislation in this respect.

Communities
The Route seeks to be a good neighbour to the communities we operate in. We will work with Local Authorities to improve our presence in the areas of social regeneration, community involvement and, where necessary, helping to change the public’s behaviour around the rail infrastructure. We want to maximise the potential for our railway services in the sustainable economic development of Scotland and will work with our strategic planning department in furthering this aim during CP5.

Accessibility and Inclusivity
The Route understands the important social role played by public transport. Public transport is vital to improving accessibility for all individuals, thereby minimising social exclusion and enhancing social cohesion. We already have an ‘access for all’ programme at stations which we will continue to operate. Scotland Route intends to take diversity and inclusion much further within CP5 and will actively seek opportunities to diversify its workforce and maintain a fair environment for all. We will learn from best practice in award winning organisations known for their diversity and inclusion innovations and use this to develop workstreams for the Route People Plan.
Route Performance Improvement Plan

This section sets out the Route’s plans to achieve sustained high levels of performance.
Performance overview

It is a fundamental expectation of all stakeholders that the railways in Scotland are safe, but it is no less important that they are reliable. Train performance addresses the extent to which actual train operations adhere to the plan, as set out in the passenger and freight timetables. Performance is therefore how the reliability of railway operations is measured and managed.

This section documents how actual performance trends have developed during CP4 and details the plans being put in place to meet the performance targets for CP5, as per the HLOS performance requirements.

Delivering CP4 performance

At the start of CP4, the PPM Moving Annual Average (MAA) for ScotRail stood at 90.7%. Network Rail delays minutes for the last year of CP3 were 507,000, a significant improvement on the first year of that control period, 717,000. The performance at the end of CP4 is a predicted PPM MAA for ScotRail of 92.0%. Network Rail delays for the last year of CP4 are predicted to be 382,000. This is all in the context of a significant increase in train miles over the two control periods.

The general improvement delivered in CP4 focused on key asset reliability and timetable resilience. These improvements have been made whilst maintaining journey times across the network and managing large enhancement projects such as Airdrie to Bathgate and Paisley Corridor Improvements.

The major challenge for performance during CP4 was extreme weather; snow and prolonged freezing temperatures during the winters of 2009 and 2010 and hurricane and gale force winds in 2011/12 had a significant effect on the network and consequent performance measures.

As part of a continual improvement approach, the industry has paid close attention to all categories of delay. Through CP4 we have seen a steady overall decrease in delay minutes year on year. While this is good news, there are some trends within specific delay categories that will continue to require close attention in CP5, as can be seen below:

As part of a continual improvement approach, the industry has paid close attention to all categories of delay. Through CP4 we have seen a steady overall decrease in delay minutes year on year. While this is good news, there are some trends within specific delay categories that will continue to require close attention in CP5, as can be seen below:
Route required outputs

The HLOS specified that the operators of each franchise let by the Scottish Ministers will achieve a Public Performance Measure (PPM) of 92.5% by the end of CP5, with a minimum PPM of 92% achieved across each year of that Control Period.

Currently there is a single franchise let by Scottish Ministers which expires in March 2015; this will be replaced with two separate franchises. The Caledonian Sleeper services from London to Glasgow, Edinburgh, Fort William, Inverness, and Aberdeen will split from the ScotRail franchise and will be tendered separately for a period of up to 10 years.

In addition the Scottish Ministers have specified that, in support of the delivery of the PPM, Network Rail will be required to work with its industry partners to develop key performance indicators (KPIs) which as a package:

- encourages and facilitates outperformance of PPM, as outlined above
- measures and improves performance on ‘right time’ (RT) measures over the lifetime of the Control Period
- are not to the detriment, and where possible improve, the level of service provided to other operators
- reflect the impact of performance on passenger experience
- reflect the economic value of services, disaggregated by Scottish service group, or line, or time period or a combination of those things
- are sufficiently flexible to take account of periods of severe disruption, with a focus on working with all affected operators in those circumstances to provide the best service possible for rail users
- do not add additional expenditure to the baseline costs of the Scottish operating route.

The range of potential KPIs has been extensively discussed within industry groups, and will be developed with an aspiration for shadow running in the final year of CP4. We will refine these KPIs with Transport Scotland and the wider industry as experience is gained of their usefulness and as the trends and information become more widely used.

The following KPIs will have an agreed target and associated delivery plans against which progress will be measured. The rationale for inclusion is also outlined below:

- Right time for ScotRail and Sleeper franchises: Consistent with the Scottish HLOS aspiration to measure and improve performance on RT for ScotRail.
- PPM and RT for passenger operators who operate on Scottish Network Rail: Consistent with England & Wales HLOS requirements and meets aspiration of Scottish HLOS to improve the level of service provided to other operators
- Freight delivery metric: Consistent with England & Wales HLOS requirements and meets aspiration of Scottish HLOS to improve the level of service provided to other operators.

The following proposed KPIs provide a more detailed view of overall performance and will be measured and tracked as a package of performance indicators. These KPIs will not have a target but trends will be reviewed and any improvement plans, where required, will be developed, implemented and tracked. Their rationale is detailed below:

- Measuring PPM and RT at a service group level: Consistent with the Scottish HLOS aspiration to measure and improve performance across the range of service groups.
- Measuring peak commuter services PPM and RT at destination and any relevant heavily-used intermediate stations: Consistent with the Scottish HLOS aspiration to measure and improve performance at specific commuter peaks. Measuring performance at intermediate stations will reflect an element of performance on the passenger experience, for example highlighting any variance in arrival and departure at Glasgow Queen Street Low-Level and Glasgow Central Low-Level stations. These have high passenger numbers but currently performance is measured at final destination, which can be up to an hour later.
Measuring PPM and RT on the mostly heavily loaded trains: Consistent with the Scottish HLOS aspiration to measure and improve performance by time of day and more accurately reflect passenger experience. Based on the most recent passenger counts, 16% of passengers travel on 5% of trains. This measure will monitor the performance of the top 5% of heavily loaded passenger trains and therefore help focus improvement efforts on the most popular services which will thus impact on the largest population of peak travellers.

Measuring the number of weekday services which are consistently late at destination: Consistent with the Scottish HLOS aspiration to measure and improve performance by time of day and more accurately reflect passenger experience. This will be measured as the total number of services which fail to reach destination on time on a regular basis, for example trains which fail regularly PPM on one or more weekdays.

Measuring impact of severe disruption: Consistent with the Scottish HLOS aspiration to have measures which are sufficiently flexible to take account of periods of severe disruption. This measure will report the number of trains which were actually run on any day, compared to the number planned to run as part of any applicable contingency plan and finally compared to the normal train plan for the day. These percentages will aim to be as close as possible and will reflect the severity of the event and the last minute changes that were made. The resultant statistics will indicate the robustness of the industry contingency planning processes.

A proposal for a KPI to measure passenger experience is still at early stage of development. The intention is to develop this KPI in conjunction with Passenger Focus. Examples of the measures being considered are below and subject to further wider industry discussions:

- the National Passenger Survey (NPS) score for performance.
- the NPS score for Passenger Information During Disruption.
- Number of public complaints and MSP concerns will be measured each month.
- Consistent with the increasing use of social networking as a communications medium, measuring the number of messages issued and the number of followers. These measures will indicate how well the industry is communicating with the passenger.

Measuring the advance boarding availability of the sleeper train at Glasgow Central, Edinburgh Waverley and London Euston stations: Consistent with the Scottish HLOS aspiration to measure passenger experience, this will calculate a percentage of train availability for passengers boarding the sleeper 30 minutes prior to the train departing.
Delivering CP5 performance improvements

Network Rail Improvements
The long term performance plan is a mixture of benefits delivered through asset renewals workbanks, continued refinements of rules, processes and procedures in network operations as well as the development of improved management tools for handling incidents on the network.

In addition Scottish Ministers have provided a Scottish Network Improvement Fund which has a value of £62 million. The intent of the fund is to enable interventions on the Scottish network which support the development of the capacity and capability of general infrastructure and network communications systems in line with the strategic priorities of the Scottish Ministers, including improved journey times, improved connectivity and resilience.

Non-track asset performance
Network Rail will focus on asset improvement plans to improve the reliability at key network hubs as well as renewal and refurbishment projects which are focused on condition led renewal, rather than compliance based. This will lead to the renewal of poorly performing assets and refurbishment or life extensions to stable assets which will aid overall performance. For all assets a review of the policies and standards is underway and any amendments to compliance or rule book changes will be evaluated to understand if there is a positive effect on performance.

Track
The improvement plans focus on improvements to delay associated with broken rails and speed restrictions.

Network management & other
Key areas of focus are within operations, train planning, small minutes (delays under the reportable threshold of three minutes) and unexplained delay and possession management.

External
Key areas of focus are on trespass & vandalism, bridge strikes, external agencies such as power companies and Scottish Water.

Weather, autumn and structures
Improvements will also focus on mitigating the effects of the weather and how to better manage train movements throughout extreme events. Various plans such as the implementation of pre-agreed amended timetables, provision of weather resistant equipment, flooding mitigation works and extensive de-vegetation works will take place throughout CP5.

Operator improvements
The current ScotRail franchise expires in March 2015 and detailed operator improvements are being discussed. The overall PPM relies on the new franchise continuing to operate a reliable and well maintained fleet and having effective resource plans to deliver the base timetable plan and manage the required contingencies for effective incident management.

Operator schemes fall into the following categories:

Fleet improvements
Key areas of focus are fleet component reliability. Current plans being developed maximise the benefit of information contained within the OTMR monitoring system. In addition on-going engine, electrical and door replacements and refurbishments would be expected to bring performance benefit.

Train operations/traincrew improvements
Key areas of focus are improvements in crew diagramming and rostering. In addition a focus on right time and joint timetable changes with Network Rail will help reduce unexplained delay and small minutes.

Station delays improvements
Key areas of focus are on passenger information, passenger flow management, boarding, announcements and dispatch.

Other Operator Improvements
There are currently a number of unknown factors in terms of the effects that other cross border and freight operators would have on the two Scotland franchises. Further work must be done in terms of understanding any change in traffic volumes, destination and journey paths as well as interconnections to other forms of transport. It is currently assumed that there will be no material effect on performance as a result of these changes.
Risks to performance

Extreme Weather
The most significant risk to delivery in CP5 is extreme weather. Experience within CP4 has seen an average of 100,000 delay minutes per annum due to the impact of severe weather in Scotland. Amended timetables have been planned and are able to be implemented if triggered on the previous day but these are also vulnerable to changing conditions on the ground and the need to integrate with train crew and set resources. In addition, it is generally less practicable to change booked timetables for long distance operators and freight customers due to customer reservations/information system impacts. This has a direct impact on the delay minutes associated with the extreme weather event. It is also the case that planned safety control measures, such as blanket line speed restrictions where there is an increased risk of obstructions on the line, will cause performance detriment.

Enhancement Projects
The infrastructure enhancement schemes specified in the HLOS will provide an overall benefit to the Scottish Network, meeting the forecast growth. As with all major work on a live network, there is a risk to train performance, both planned and unplanned, whilst project activities take place. The current phasing of engineering access points to a peak in work during the latter stage of CP5, requiring increased performance risk focus during those times.

The majority of enhancements planned for CP5 are at an early stage in respect of scope and so performance modelling has yet to be undertaken. It is therefore not yet possible to assess the impact that the following schemes may have on the achievement of the HLOS performance target, and further analysis will take place as scope and outputs are finalised:

- Edinburgh to Glasgow Improvements Programme
- Borders Project
- Aberdeen Inverness improvements
- Highland Main Line improvements
- The introduction of IEP trains
- New franchise commitments in terms of increasing service levels and stations

History has also shown that, during the implementation phase of major projects on the existing network, performance risk increases due to the scale of the work involved and the short access durations in which the works take place. Mitigation plans will therefore be developed to minimise the impact of TSRs, possession management issues and new asset/fleet failures.

The risk that enhancement projects pose will affect the consistent delivery of PPM MAA of 92% during major construction phases. To the extent that enhancement projects are still in major construction mode during the final year, delivery of 92.5% may be similarly affected.

Refranchising
As well as the infrastructure improvements taking place, the passenger railway will be refranchised during CP5. This affects the ScotRail franchise and also, at various points in CP5, cross border operators. This provides funders with the opportunity to re-define the outputs that they wish to buy through the franchises. Operators may also be given greater freedom, subject to meeting their franchise commitments, to find the best commercial balance between outputs. However, they also create a risk that Network Rail’s regulatory outputs, as set in the periodic review, may be inconsistent with future franchise commitments, or with operators’ commercial decisions.

Caledonian Sleeper franchise
The current sleepers are measured on a 0-5 PPM basis, consistent with the rest of the ScotRail franchise. However the duration and nature of sleeper journeys is more in keeping with the long-distance sector, which measures PPM on a 0-10 minute basis. Given the small number of trains currently aligned to the franchise and the interdependency of those trains because of the joining and splitting of services (two trains from England split into five portions within Scotland and vice versa), the ability to deliver 92.5% PPM is limited, with the current services never having achieved that level of performance. Therefore Network Rail proposes to measure the sleeper franchise on a 0-10 minute basis, in line with the long-distance sector.

Other risks
A key deliverable within CP5 is a high performing network with sufficient capacity to meet customer needs, being delivered at a reduced and efficient cost. The risk to performance that may arise from the extent of cost savings necessary has still to be fully understood.

Maximisation of employee competencies, introducing more flexible working and less geographical restrictions, alliancing with operators and moving to Rail Operating Centres are all efficiencies which are being considered. The risk of industrial relations difficulties associated with implementing these efficiencies is recognised.

The volumes of renewals and refurbishments at key network hubs taking place throughout CP5 are greater than in CP4. This will require a higher utilisation of engineering times as well as a greater pull on critical resources which may also suppress performance. Some of the renewals are being delivered using new technology and techniques which may cause isolated performance issues. Plans will be put in place to control this risk.

The Commonwealth Games and Ryder Cup in 2014 may import additional performance risk. Mitigation plans will be developed and lessons learnt from the Olympics will be shared and implemented for both events.
Summary of performance improvements

A summary of the main improvement plans that Network Rail believe will deliver the performance improvement required in CP5 are shown below:

<table>
<thead>
<tr>
<th>Starting PPM</th>
<th>Final PPM at the end of CP5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Network Rail improvements</td>
<td>92.5%</td>
</tr>
<tr>
<td>Joint improvements</td>
<td></td>
</tr>
<tr>
<td>Self operator improvements</td>
<td></td>
</tr>
<tr>
<td>Risk</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Starting PPM</th>
<th>Final PPM at the end of CP5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Network Rail improvements</td>
<td>92.0%</td>
</tr>
<tr>
<td>Details of the plans will be communicated to all stakeholders via JPIP process.</td>
<td>0.3%</td>
</tr>
<tr>
<td>Asset renewals and refurbishments</td>
<td>0.3%</td>
</tr>
<tr>
<td>Modification of operational rules and restrictions</td>
<td>0.3%</td>
</tr>
<tr>
<td>Network Operating Strategy</td>
<td>0.3%</td>
</tr>
<tr>
<td>Vegetation, embankment and fencing improvements</td>
<td>0.3%</td>
</tr>
<tr>
<td>Joint improvements</td>
<td>0.2%</td>
</tr>
<tr>
<td>Joint working groups will continue to develop proposals utilising the CP4 methodology on priority routes.</td>
<td>0.2%</td>
</tr>
<tr>
<td>Timetable improvements to deliver RT improvements</td>
<td>0.2%</td>
</tr>
<tr>
<td>Amended timetables for extreme weather</td>
<td>0.2%</td>
</tr>
<tr>
<td>Joint management of reactionary delays and incident recovery</td>
<td>0.2%</td>
</tr>
<tr>
<td>Self operator improvements</td>
<td>0.2%</td>
</tr>
<tr>
<td>Details of the plans will be communicated through the bid process.</td>
<td>0.2%</td>
</tr>
<tr>
<td>Fleet improvements</td>
<td>0.2%</td>
</tr>
<tr>
<td>Train operations traincrew improvements</td>
<td>0.2%</td>
</tr>
<tr>
<td>Station delay improvements</td>
<td>0.2%</td>
</tr>
<tr>
<td>Risk</td>
<td>-0.2%</td>
</tr>
<tr>
<td>The details of this risk will be reviewed and potentially removed or at least reduced throughout CP5.</td>
<td>-0.2%</td>
</tr>
<tr>
<td>Traffic growth</td>
<td>-0.2%</td>
</tr>
<tr>
<td>Passenger growth</td>
<td>-0.2%</td>
</tr>
<tr>
<td>Enhancement construction phase</td>
<td>-0.2%</td>
</tr>
<tr>
<td>Industrial Unrest</td>
<td>-0.2%</td>
</tr>
</tbody>
</table>
Deliverability of the plan

The performance improvement plans are well developed and the asset policies have been applied in the development of the detailed workbanks. When the delivery contractors are awarded access, mitigation plans will be finalised and the performance trajectory updated. The progress on national workstreams such as Network Operating Strategy and rules modifications continues and will be delivered as each component is available.

However some risks remain and the given the high volume of engineering activity in some years of CP5, there remains a risk that performance may dip below 92% in any one or more years.

Preparation for extreme weather events will continue to be undertaken and all equipment and resources will be deployed to protect the network and customer interests. Engineering solutions will be delivered at known problem locations. However, given the changing climate and the increase and predicted severity of isolated severe weather events, there remains a risk to performance. Historically, the effect of extreme weather events has been the cause of 14% of overall PPM failures, suppressing ScotRail PPM by around 2%. This still remains a risk in the future and could affect the Route’s ability to deliver 92% in any one or more specific years.

It is expected that base levels of performance would be expected to continue to improve in CP5, based on the improvements and investment in recent years, more efficient working practices, and building reliability into infrastructure and fleet assets. However, the effect of predicted increases in passenger and freight traffic, together with the impact of enhancement works during construction, new fleet and re-franchising needs further analysis. We have a plan to deliver the HLOS requirements, based on our current understanding of the inputs and an ability to have a change control process for deliberate trade-offs between industry outputs – principally capacity, journey time and train performance. Our plan is expected to deliver 92.5% PPM for both the ScotRail and Sleeper Franchise by the end of CP5.
Capacity & capability

This section addresses the capacity constraints on the current network and outlines plans to address these. It also summarises the current network capability.
Current capacity and capability

Assessment of the capacity and capability of the Scotland Route was carried out, in consultation with passenger and freight operators and other stakeholders, as part of the development of the Scotland Route Utilisation Strategy (RUS) established in June 2007. This set out a high-level rail industry strategy through to 2017. Supporting this is the second generation Scotland RUS, published in 2011, which focuses on the Scotland Route and reviews the longer term requirements up to 2024.

In addition, the East Coast Main Line RUS published in 2008 and the East Coast Main Line 2016 Capacity Review, established in 2011, plus the West Coast Main Line RUS established in 2011, are also relevant source documents. These respectively cover the route from Edinburgh Waverley to Berwick-upon-Tweed and from Carstairs to Carlisle, thus taking in the remainder of the Scotland Network.

The Long Term Planning Process (LTPP) replaces the RUS going forward and will improve the planning process through, for example, stronger links to asset management and a greater focus on options which go beyond incremental changes to the existing network. The programme is made up of four stages: market studies for passenger, freight demand; cross-boundary analysis and individual Route studies. The Route has commenced implementing the LTPP and expect that outputs will be completed in time to inform the Initial Industry Plan for CP6.

As part of the Infrastructure Capability Programme a number of Network Changes to Route Availability and Gauge have undergone consultation. Details of the Network Changes that have been established can be found on the Network Rail website.

Current capability is shown in the Network Rail Sectional Appendix.

Capacity constraints

The Scotland Route has a number of capacity constraints on the network in CP4, some of which will be addressed by enhancement schemes in CP5. These are as follows:

- the congested approaches to Glasgow Central High Level station, particularly the Muirhouse Jn to Bridge Street Jn section
- the congested section between Finnieston and Hyndland
- restrictive platform lengths at a number of stations, most significantly at Glasgow Central High Level, Glasgow Queen Street and Edinburgh Waverley
- key single lead junctions at Westerton, Bellgrove, Sighthill, Winchburgh, Portobello and Slateford
- lack of stabling capacity at Edinburgh, Perth, Motherwell and Ayr Townhead (the completion of the recent works at Perth and Ayr has eased the constraint but in the long term stabling remains an issue at various locations across Scotland)
- restricted capacity between Perth and Aberdeen and on the North and West Highland routes due to long single line sections
- restrictive signalling headways across the Forth and Tay Bridges, around Stirling and between Haymarket and Carstairs.

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

- the capacity of Fouldubs Jn and access to terminals around Grangemouth
- lack of passing loops of adequate size to accommodate current maximum train lengths. This is particularly acute between Mossend and Stirling, between Dundee and Aberdeen and on the West Highland route. In addition longer loops on the both WCML and ECML will be required
- the single line sections between Mauchline and Newton-on-Ayr, Montrose and Usan
- a lack of long looping capability at Mossend.

Work at the following locations is currently being developed under various enhancement projects to consider options to address some of these constraints:

- Glasgow Queen Street platform extensions under EGIP
- Edinburgh Waverley platform extensions under EGIP and IEP
- Sighthill East Junction doubling under EGIP
- Portobello Junction redoubling under EGIP
- new depot proposal at Millerhill under EGIP
- improved signalling headways between Haymarket and Inverkeithing under EGIP
- Slateford Junction capacity improvements
- Motherwell area stabling enhancements.
Delivering improved CP4 capacity and capability

There are a number of schemes in the delivery plan in the final year of CP4 which will improve the capacity and capability on the route. These are funded through:

**Scottish Small Project Fund** – delivering schemes that enhance capacity and capability such as:
- **Glasgow South Suburban Renewals** – provides the opportunity, as part of the signalling renewal, to double Busby Junction, provide a turnback at Whitecraigs station and additional signalling in the Kennishead area.
- **Stirling Middle S&C Junction enhancements** – provides a double junction capability which improves the capability of the network and improves the performance and potentially the journey time to Stirling, Alloa and Kincardine for passenger and freight services.
- **Midcalder S&C Junction enhancements** – provides a double junction capability towards Shotts and Holytown route. Improves the capability of the network and improves performance and potentially journey times. Provides the design capability to raise the linespeed on the through route from Haymarket to Carstairs.

**Tier 3 Development Fund**, developing schemes that enhance capacity and capability in CP4 for delivery in CP5. An agreement has also been reached with the Scottish Government to deliver some projects in CP4 with this fund, e.g. Dalmarnock Station improvements and Highland Main Line Phase 1 linespeed improvements.
Delivering improved passenger CP5 capacity & capability

The following enhancement projects have been specified in the HLOS for delivery in CP5 and are detailed below:

**Edinburgh to Glasgow Improvements Programme (EGIP)**, Electrifying the route between Glasgow Queen Street and Edinburgh Waverley (via Falkirk High) enhancing the existing service of four trains per hour by the introduction of new four-car Electric Multiple Unit (EMU)'s, strengthened to operate as eight-car formations during peak periods. In addition there will be a target end to end journey time of 42-44 minutes as well as infrastructure changes to Haymarket Station in CP4, a new station at Edinburgh Gateway and enhancements to Edinburgh Waverley and Glasgow Queen Street in CP5.

**Borders New Railway**, supporting the reinstatement of the former Waverley line between Newcraighall and Tweedbank by providing 35 miles of new single track with passing loops and seven new stations. A service of two trains per hour with an end to end journey time of less than one hour will be provided.

**Aberdeen to Inverness Rail Line Improvements Phase 1**, delivering the network capability to enable the operation of enhanced commuting services from Aberdeen to Inverurie and from Elgin to Inverness. In addition, working with station promoters to deliver new stations at Kintore (Nestrans) and Dalcross (Hitrans).

**Highland Main Line Rail Improvements Phase 2**, providing infrastructure to deliver an hourly train service in both directions between Inverness and Perth extended to either Glasgow or Edinburgh. The project will also seek to deliver an average end-to-end journey time reduction of around 10 minutes in both directions (measured against the timetable in place on the date of the publication of the HLOS or any improvements introduced between then and 31 March 2014) and more efficient freight operations that better respond to the demand from freight customers

**Electrification**, implementing a rolling programme of electrification which will cover around 100 single track kilometres per annum, commencing from the completion of EGIP. The routes to be electrified are:

- E&G diversionary routes (including routes to Stirling/Dunblane/Alloa)
- Muirhouse South Junction to East Kilbride
- Midcalder Junction to Holytown Junction
- Rutherglen East Junction to Coatbridge

**Motherwell re-signalling enhancements**. Opportunity to include the following enhancements to support more effective operation of train services by providing:

- Reduced capacity bi-directional signalling in the up direction over the down line from Law Junction to Carstairs; in the down direction over up line from Carstairs to Shieldmuir South Junction.

- Increased signalling capacity on the Down Shotts Line between Carfin and Holytown Junction.

**Motherwell Area stabling**, improvements to support more efficient stabling and servicing of EMUs in the area.

**Future network development specified within the HLOS:**

- Review passenger capacity at Glasgow Central, Glasgow Queen Street, Edinburgh Waverley and Edinburgh Haymarket.
- Review train handling capability at Glasgow Central and Edinburgh Waverley.

**Cross-Border projects specified in E&W HLOS:**

- **Intercity Express Programme (IEP)**, to provide capability to support the operation of the Super Express train (10-car, 260 metre) to be introduced on the East Coast Main Line. Platform lengthening and/or selective door opening will be considered.

- **WCML (North of Preston) capacity enhancements (Strategic Freight Network – SFN)**, there is a workstream looking at freight capacity north of Preston on the West Coast Main Line that will assess what options may be appropriate to cater for the forecast increase in freight and passenger traffic between Preston and Mossend, in the periods up to 2019, and between 2019 and 2030. Options will not be restricted to infrastructure enhancements, but may include timetabling solutions and routeing options.

**Projects not specified in HLOS but will deliver required outputs in CP5:**

- **Carstairs Junction Remodelling**, the opportunity to rationalise and enhance the infrastructure has been identified due to the synergy with signalling and S&C renewals planned at Carstairs. The proposed increase in speed over the junctions are expected to offer reductions in journey times for both passenger and freight operators as well as increasing the capability of the network.

- **Edinburgh Suburban line electrification**, as part of the W12 gauge clearance works over the ECML to Mossend via the Suburban line in CP4 the project team is also reviewing the cost to electrify the route. It is the Industry view that the cost to electrify should be included in the Strategic Business Plan (SBP) request for funding.
Delivering improved freight CP5 capacity & capability

Many of the passenger capacity and capability interventions described above will also offer benefits to freight traffic. The Scottish Minister’s HLOS objectives are to encourage rail freight and reduce emissions. The ring fenced fund of £30 million was specified in the HLOS in CP5 to fund improvements identified through the Freight Joint Board (Scotland) and managed by the Freight Working Group. The main focus of the group is to:

- Improve productivity
- Allow focused input from the freight industry into the development of the railway
- Promote rail freight
- Reduce costs
- Improve communication and relationships to the benefit of customers
- Provide a strategic and high level overview of safety, performance and security

In CP4 the route will have delivered a gauge improvement from W9 to W12 clearance between Berwick to Carstairs via the Edinburgh Suburban line. The opportunity has also been reviewed for electrification of the Edinburgh Suburban line in CP5. This would have the benefit of:

- reducing congestion in Edinburgh Waverley by pathing electric freight trains via the Suburban line
- providing an opportunity for pathing empty coaching stock (ECS) via the Suburban line to/from the proposed new EMU depot at Millerhill
- offering a flexible diversionary route during perturbation/engineering works.

The following projects have been prioritised by the Freight Working Group as key schemes for development using Tier 3 funding in CP4 for possible delivery in CP5 which will impact on the capacity and capability of the network in Scotland:

- Mossend Yard, provision of 775 metre loops will improve capacity to enable the use for longer freight trains.
- Slateford Jn, enhancement of the current junction layout to provide either a double junction or faster single lead junction, providing greater capacity.
- Inverness Yard, to improve capacity and flexibility where DRS and ScotRail operations co-exist in close proximity.
- Elgin to Inverness gauge improvement, increasing the gauge clearance from W7 to W8 providing enhanced capability.

Capability outputs

The capability of the Scotland Route will be restored to the published gauge at the end of CP4, other than those routes covered under Network Change.

The Edinburgh South Suburban route will benefit in CP4 from enhanced capability by increasing from W9 to W12 gauge clearance. This project also includes the route from Berwick to Carstairs via the Edinburgh South Suburban route.

The maps provide an indication of the predominant capability on each section of the route. These maps are an extract from the Network Specification.

Linespeed improvements are being reviewed along with renewals at a number of locations outwith those projects specified in the HLOS, these include:

- West Coast Main Line (WCML) – a number of locations
- Haymarket to Carstairs, where the linespeed is a mix of 60mph up to 95mph. The opportunity to raise the speed at certain locations is being developed in CP4 for possible delivery in CP5
- Carmuires West to Carmuires East Jn, linked with track renewals
- Greenloaning area, linked with the possible removal of sidings and main line crossover
Route Plan Scotland Route

Gauge

[Diagram of railway routes in Scotland showing different gauge lines with labels and station names such as Edinburgh Central, Glasgow Central, and Dundee, among others.]

Note: the routes can accommodate certain vehicles outside the published gauge. See Section of Appendix for details.
Route Network
Availability Strategy

This section sets out our plans for striking the right balance between efficiently maintaining, renewing and enhancing the railway and keeping routes open for our customers.
Network availability

Network availability is about how best to efficiently undertake necessary maintenance, renewals and enhancement works on the railway consistent with the reasonable expectations of customers that the network remains open to traffic when users wish to operate services.

The purpose of our Route Network Availability Strategy (RNAS) is to determine the access strategy for delivery such works during CP5, in line with customer requirements for network availability. The approaches developed through Joint Network Availability Plans (JNAPs) agreed with each operator are expected to inform the RNAS.

Network availability is therefore about striking the right balance between when operators wish to run services and when access is required for infrastructure works. The agreed strategy for availability needs to maximise net industry value and revenue. The main drivers are customer requirements and the work on the network to be delivered during CP5. The inputs for determining the RNAS are illustrated below.

Developing a Route Network Availability Strategy

To develop a CP5 strategy for network availability, there has been dialogue with operators and relevant teams within Network Rail. For Anglo-Scottish operators, we are also co-ordinating access principles with other Network Rail routes. The approach adopted in CP4 provides the starting position for the RNAS.

The scope of maintenance, renewal and enhancement work considered in the RNAS reflects the Initial Industry Plan (IIP), the Route Asset Management Plan (RAMP), and the Scottish Ministers’ High Level Output Specification (HLOS). These informed the asset specific workbanks which have in turn driven the access requirements.

During CP4, a programme of activities has established network availability within the industry. Nationally, disruption caused by planned engineering works has significantly reduced, resulting in increased availability of the network for customers. The table below shows actual and planned performance at the end of each year as measured by possession disruption indices for passenger and freight, and we are currently on course to achieve our end of CP4 targets.

### Network availability performance in CP4

<table>
<thead>
<tr>
<th>Year</th>
<th>Passenger possession disruption index</th>
<th>Freight possession disruption index</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Target</td>
<td>Actual/Plan</td>
</tr>
<tr>
<td>2009/10</td>
<td>1.02</td>
<td>0.65</td>
</tr>
<tr>
<td>2010/11</td>
<td>0.91</td>
<td>0.52</td>
</tr>
<tr>
<td>2011/12</td>
<td>0.83</td>
<td>Actual Pending</td>
</tr>
<tr>
<td>2012/13</td>
<td>0.68</td>
<td>0.62</td>
</tr>
<tr>
<td>2013/14</td>
<td>0.63</td>
<td>0.46</td>
</tr>
</tbody>
</table>
Process

The starting point for the RNAS was the JNAPs agreed with operators on an annual basis, in particular the JNAP for ScotRail as the operator of the majority of services on the route. The JNAP requires that:

- Network Rail and train operators will work together to minimise the disruption to rail users caused by engineering work
- Network Rail will put measures in place so that, unless exceptional circumstances make it impractical, passengers travelling at weekends on key routes between the originating and terminating stations or between ‘primary intermediate stations’ on a route:
  - will not be transferred on to buses, and
  - where trains have to be diverted, in general end to end journey times will not be exceeded by more than 25%

Network Rail and ScotRail commit that wherever reasonably practicable, passengers will be conveyed on a train in preference to transferring on to a bus.

To supplement the JNAP, all key operators on the route were contacted in October 2011 to obtain their priorities and expectations which are summarised below. They have participated in a quarterly rail industry Scotland CP5 Working Group meeting which has included updates on the RNAS.

Freight operators were consulted in a series of briefing sessions co-ordinated nationally to advise on the RNAS for each route. The starting point for this consultation was the Freight JNAP which was agreed with all the freight operators for the national network. The development and principles of the Scotland RNAS was discussed at these meetings.

Interface with other Routes principally relates to cross-border routes. This is driven by the requirement in the HLOS that ‘...where maintenance, renewal or enhancement activity is required on cross border routes, at least one of those routes will be planned to be available at all times for the passage of timetabled sleeper, passenger, and freight services through to London without the need for change.' Where maintenance, renewal or enhancement activity is required on cross-border routes, it is the overall intent that at least one of those routes should be made available to timetabled services, for the passage of scheduled sleeper, passenger, and freight services between Edinburgh or Glasgow and London without the need for change.

On certain dates (particularly English Bank holidays) the volume of work may make this difficult to achieve. Such instances will be advised to Transport Scotland timeously.

A series of workshops have been held with the maintenance, renewals and enhancement delivery teams to review the access requirements for the CP5 workbanks on each of the key routes. These mapped the major possessions required during CP5 to deliver the Route Plan with the aim of reconciling these with the operator requirements identified during the consultation for the RNAS. The integration of these requirements will continue as a key part of the access planning through the development of the Engineering Access Statements using the recognised industry process for each year of CP5.
Key routes and flows

Following consultation with operators, the most important end to end flows for network availability have been confirmed and are listed in the tables below.

Key passenger flows

<table>
<thead>
<tr>
<th>Operator</th>
<th>Key routes</th>
<th>Important intermediate stations (in Scotland Route)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ScotRail</td>
<td>Edinburgh Waverley to Glasgow Queen Street</td>
<td>Croy, Falkirk High, Linlithgow, Polmont, Edinburgh Haymarket</td>
</tr>
<tr>
<td></td>
<td>Glasgow Queen Street to Aberdeen</td>
<td>Stirling, Perth, Dundee</td>
</tr>
<tr>
<td></td>
<td>Edinburgh Waverley to Aberdeen</td>
<td>Edinburgh Haymarket, Dundee</td>
</tr>
<tr>
<td></td>
<td>North Glasgow Suburban Electrics Argyle Line</td>
<td>Glasgow Queen Street (Low Level)</td>
</tr>
<tr>
<td></td>
<td>Glasgow to Ayr</td>
<td>Paisley Gilmour St, Kilwinning, Irvine</td>
</tr>
<tr>
<td></td>
<td>Glasgow/Edinburgh to Inverness</td>
<td>Perth</td>
</tr>
<tr>
<td></td>
<td>Edinburgh to Dunblane</td>
<td>Falkirk Grahamston, Stirling</td>
</tr>
<tr>
<td></td>
<td>Fife Circle</td>
<td>Dunfermline, Glenrothes, Kirkcaldy</td>
</tr>
<tr>
<td></td>
<td>Glasgow to Gourock/Wemyss Bay</td>
<td>Paisley Gilmour St</td>
</tr>
<tr>
<td>West Coast</td>
<td>Glasgow Central to Euston</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Glasgow Central to Birmingham</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Edinburgh Waverley – Birmingham</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Operator</th>
<th>Key routes</th>
<th>Important intermediate stations (in Scotland Route)</th>
</tr>
</thead>
<tbody>
<tr>
<td>East Coast</td>
<td>Edinburgh Waverley to London Kings Cross</td>
<td></td>
</tr>
<tr>
<td>TransPennine Express</td>
<td>Glasgow Central to Manchester Airport</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Edinburgh Waverley to Manchester Airport</td>
<td></td>
</tr>
<tr>
<td>CrossCountry</td>
<td>Aberdeen to Penzance</td>
<td>Dundee, Edinburgh Haymarket, Edinburgh Waverley</td>
</tr>
</tbody>
</table>

Key freight routes

<table>
<thead>
<tr>
<th>Operation</th>
<th>Strategic freight route</th>
</tr>
</thead>
<tbody>
<tr>
<td>Freight</td>
<td>Crewe/Daventry to Central Scotland (Mossend, Grangemouth, and Coatbridge)</td>
</tr>
<tr>
<td></td>
<td>Hunterston to Longannet</td>
</tr>
<tr>
<td></td>
<td>South Yorkshire Power Stations to Hunterston/Ayrshire</td>
</tr>
<tr>
<td></td>
<td>Newcastle to Edinburgh &amp; Central Scotland</td>
</tr>
<tr>
<td></td>
<td>Grangemouth/Mossend to Inverness</td>
</tr>
<tr>
<td></td>
<td>Grangemouth/Mossend to Aberdeen</td>
</tr>
</tbody>
</table>

The priority for the network availability strategy is to protect these key flows, so far as it is practical to do so. For the key passenger routes, this means limiting the increase in journey times when considering the available options, such as diversionary routes, if the normal booked route is blocked. The strategic freight flows identified above are taken from the national Freight JNAP, and the need to ensure a suitable through route, utilising appropriate diversions, remains the overriding concern.
Customer priorities and expectations

In terms of service requirements for network availability, the table below highlights additional requirements that have been identified with operators for CP5.

Specific service aspirations for CP5

<table>
<thead>
<tr>
<th>Operator</th>
<th>Service aspirations</th>
</tr>
</thead>
<tbody>
<tr>
<td>ScotRail</td>
<td>Later trains for special events e.g. Edinburgh Festival Trains – 0100am – Edinburgh Waverley to Glasgow Queen Street service</td>
</tr>
<tr>
<td>Virgin Trains</td>
<td>Less diversions via G&amp;SW with a preference for Single Line Working on the WCML</td>
</tr>
<tr>
<td></td>
<td>Sunday morning – 0840am departure from Glasgow Central</td>
</tr>
<tr>
<td>East Coast</td>
<td>Access to Highland Mainline via Fife during disruptive engineering works in Central Scotland</td>
</tr>
<tr>
<td></td>
<td>Access to Aberdeen via diversionary routes via Fife and Stirling/Perth</td>
</tr>
<tr>
<td></td>
<td>Edinburgh – Berwick upon Tweed would prefer Single Line Working to diversions via the WCML</td>
</tr>
<tr>
<td></td>
<td>Preference to commence running services from lunchtime on Sunday and shutdown earlier on Saturday during disruptive weekend working</td>
</tr>
<tr>
<td>TransPennine Express</td>
<td>Earlier Sunday morning departures from Edinburgh/Glasgow circa 0900hrs</td>
</tr>
<tr>
<td>CrossCountry</td>
<td>Disruption free Sundays given core business is vacation travellers</td>
</tr>
<tr>
<td></td>
<td>Services commencing on a Sunday after a disruptive possession by 10:00</td>
</tr>
<tr>
<td></td>
<td>East Coast more work weekday night to enable more Sundays availability</td>
</tr>
<tr>
<td></td>
<td>Review Single Line Working</td>
</tr>
<tr>
<td></td>
<td>Some ROTR changes for specific trains</td>
</tr>
<tr>
<td>Freight</td>
<td>Support growth in intermodal flows (domestic and maritime)</td>
</tr>
<tr>
<td></td>
<td>Planning of access restrictions co-ordinated across NR routes</td>
</tr>
</tbody>
</table>
Network availability strategy and access

For key routes and traffic flows, the access strategy for CP5 is being developed as a five year plan which recognises the major maintenance, renewals and enhancements to be undertaken. This is to give operators greater visibility of planned disruption to allow them to plan accordingly.

Access for planned maintenance in CP4 has been mostly restricted to section 5 midweek night opportunities, varying between one out of every three to twelve weeks. The strategy is aligned with adjacent routes to provide diversionary routes for cross-border traffic flows, in particular overnight freight and sleeper services. It also aims to protect first and last trains midweek. It is proposed for CP5 to develop opportunities for enhanced midweek access. The industry benefits of this approach will need to be demonstrated to operators. To this end, a pilot scheme to deliver a plain-line track renewal site at Bearsden on the Milngavie Branch using extended midweek access is planned to be undertaken in February 2013.

However, a key risk to the wider rollout (and also to reducing weekend possession durations) is the recent changes in Adjacent Line Open (ALO) working practices resulting from ORR intervention.

Plain-line track renewals have been delivered in what is referred to as Bottom-Up Relays (BUR) which enables significantly greater volumes to be achieved in one single 29 hour double line block. This results in fewer disruptive interventions compared with multiple weekends with Single Line Working.

Longer access is taken for S&C renewals – generally 27 hours for a standard unit which increases for more complex locations. This is based on the use of tilting wagons (for specific sites) and modular S&C.

It is planned that high/medium output track renewals equipment will be deployed in CP5 on the ECML and WCML routes in Scotland.

For major enhancements projects access plans are agreed with operators on a case by case basis to establish the most efficient access plan from an industry perspective.

The Route Network Availability Strategy for CP5 is based on the key routes and access principles that were agreed with operators for CP4 as outlined in preceding pages.
## General approach for maintenance, renewals and enhancements on key route sections in CP5

<table>
<thead>
<tr>
<th>Key section</th>
<th>General principles (incl. key dependencies)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Edinburgh Waverley to Glasgow</td>
<td>Improved collaboration with the TOC/FOCs to develop a CP5 “line of route” access strategy which will include establishing extended Section 4 opportunities where appropriate. Track renewals will continue to be delivered within 29/52hrs weekend possessions where access synergies exist with Civils. Dating and durations for the more complex S&amp;C renewals including Haymarket East Jn, Queen Street High Level Slab Track and EGIP enhancements where extended disruptive access is required will be negotiated with the TOC/FOCs. Generally Maintenance will be planned and delivered within existing “no trains” period but where existing disruptive opportunities exist this will be utilised.</td>
</tr>
<tr>
<td>Queen Street</td>
<td></td>
</tr>
<tr>
<td>Glasgow Queen Street to Aberdeen</td>
<td>Improved collaboration with the TOC/FOCs to develop a CP5 “line of route” access strategy which will include establishing extended Section 4 opportunities where appropriate. Track renewals will continue to be delivered within 29/52hrs weekend possessions where access synergies exist with Civils. Dating and durations for the more complex S&amp;C remodels, Queen Street High Level Slab Track and EGIP enhancements where extended disruptive access is required will be negotiated with the TOC/FOCs. Generally Maintenance will be planned and delivered within existing “no trains” period but where existing disruptive opportunities exist this will be utilised.</td>
</tr>
<tr>
<td>Edinburgh Waverley to Aberdeen</td>
<td>Improved collaboration with the TOC/FOCs to develop a CP5 “line of route” access strategy which will include establishing extended Section 4 opportunities where appropriate. Track renewals will continue to be delivered within 29/52hrs weekend possessions where access synergies exist with Civils. Dating and durations for the more complex S&amp;C remodels, Tay Bridge High Girders and other enhancements where extended disruptive access is required will be negotiated with the TOC/FOCs. Generally Maintenance will be planned and delivered within existing “no trains” period but where existing disruptive opportunities exist this will be utilised.</td>
</tr>
<tr>
<td>Argyle Line</td>
<td>Improved collaboration with the TOC/FOCs to develop a CP5 “line of route” access strategy which will include establishing extended Section 4 opportunities where appropriate. Track renewals will continue to be delivered within 29/52hrs weekend possessions where access synergies exist with Civils. Dating and durations for the more complex S&amp;C renewals where extended disruptive access is required will be negotiated with the TOC/FOCs. Generally Maintenance will be planned and delivered within existing “no trains” period but where existing disruptive opportunities exist this will be utilised.</td>
</tr>
<tr>
<td>Glasgow to Ayr</td>
<td>Improved collaboration with the TOC/FOCs to develop a CP5 “line of route” access strategy which will include establishing extended Section 4 opportunities where appropriate. Track renewals will continue to be delivered within 29/52hrs weekend possessions where access synergies exist with Civils. Dating and durations for the more complex S&amp;C remodels e.g Kilwinning S&amp;C where extended disruptive access is required will be negotiated with the TOC/FOCs. Generally Maintenance will be planned and delivered within existing maintenance strategy 1 in 6 weeks 4-5hrs (for Hunterston to Longannet coal services) and “no trains” period where existing disruptive opportunities exist this will be utilised.</td>
</tr>
<tr>
<td>Glasgow/Edinburgh to Inverness</td>
<td>Improved collaboration with the TOC/FOCs to develop a CP5 “line of route” access strategy which will include establishing extended Section 4 opportunities where appropriate. Track renewals will continue to be delivered within 29/52hrs weekend possessions where access synergies exist with Civils. Dating and durations for the more complex S&amp;C remodels and Highland Mainline enhancements where extended disruptive access may be required will be negotiated with the TOC/FOCs. Generally Maintenance will be planned and delivered within existing “no trains” period but where existing disruptive opportunities exist this will be utilised.</td>
</tr>
<tr>
<td>Edinburgh to Dunblane</td>
<td>Improved collaboration with the TOC/FOCs to develop a CP5 “line of route” access strategy which will include establishing extended Section 4 opportunities where appropriate. Track renewals will continue to be delivered within 29/52hrs weekend possessions where access synergies exist with Civils. Dating and durations for the more complex S&amp;C renewals including Haymarket East Jn and EGIP enhancements where extended disruptive access is required will be negotiated with the TOC/FOCs. Generally Maintenance will be planned and delivered within existing “no trains” period but where existing disruptive opportunities exist this will be utilised.</td>
</tr>
<tr>
<td>Fife Circle</td>
<td>Improved collaboration with the TOC/FOCs to develop a CP5 “line of route” access strategy which will include establishing extended Section 4 opportunities where appropriate. Track renewals will continue to be delivered within 29/52hrs weekend possessions where access synergies exist with Civils. Dating and durations for the more complex S&amp;C renewals including Haymarket East Jn and EGIP enhancements where extended disruptive access is required will be negotiated with the TOC/FOCs. Generally Maintenance will be planned and delivered within existing “no trains” period but where existing disruptive opportunities exist this will be utilised.</td>
</tr>
<tr>
<td>Glasgow to Gourock/Wemyss Bay</td>
<td>Improved collaboration with the TOC/FOCs to develop a CP5 “line of route” access strategy which will include establishing extended Section 4 opportunities where appropriate. Track renewals will continue to be delivered within 29/52hrs weekend possessions where access synergies exist with Civils. Dating and durations for the more complex S&amp;C renewals where extended disruptive access is required will be negotiated with the TOC/FOCs. Generally Maintenance will be planned and delivered within existing “no trains” period but where existing disruptive opportunities exist this will be utilised.</td>
</tr>
<tr>
<td>Key section</td>
<td>General principles (incl. key dependencies)</td>
</tr>
<tr>
<td>-----------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
</tbody>
</table>
| WCML (Glasgow Central to Euston) | **Conventional Track Renewals**: Renewal strategy Weekend Sat/Sun 10hrs 45min, and to develop a Sun/Mon strategy on the 13 weeks when sleeper services are diverted. Like for like S&C renewals to be carried out in BH access with complex remodels, access to be negotiated with he TOC/FOCs.  
**High Output Renewals**: Renewal strategy Weekend Sat/Sun 10hrs 45min, and to develop a Sun/Mon strategy on the 13 weeks when sleeper services are diverted. Packaging of other renewals will be integrated with the longer disruptive access required with the significant S&C renewals at Rutherglen Central and East Jns, Carstairs Jn Remodel, Motherwell North & South Re-signalling and also the Strategic Freight Network – West Coast looping strategy. |
| ECML (Edinburgh Waverley to King’s Cross) | **Conventional Track Renewals**: to be delivered using existing weekend and maintenance strategy weeks combined with any negotiated disruptive strategies agreed for civils.  
**High/Medium Output**: Intention is to deliver in midweek 8hrs DLB. For HOBC in 16/17 required to deliver 10,870yds of Ballast. & 6 x 4 midweek nights 8hrs DLB for TRS in 16/17 to deliver 10,870yds and similar strategy in 17/18 & 18/19.  
**Maintenance**: continuation of the 1 in 3 weeks for 5-6hrs is expected to continue into CP5 which will be optimised with any changes to pattern of midweek DLB access for High Output.  
Packaging of other renewals will be integrated with the longer disruptive access required with the significant S&C renewals and EGIP enhancements at Abbeyhill Turnback and Portobello Jn Remodel. |
| G&SW (Kilmarnock to Carlisle)     | Improved collaboration with the TOC/FOCs to develop a CP5 “line of route” access strategy which will include establishing extended Section 4 opportunities where appropriate. Track renewals will continue to be delivered within 29/52hrs weekend possessions where access synergies exist with Civils. Dating and durations for the more complex S&C and significant structure renewals, e.g. UB248 Carronhill Viaduct and UB264 Campsie Viaduct (Kilmarnock to Dumfries) where extended disruptive access is required will be negotiated with the TOC/FOCs. Generally Maintenance will be planned and delivered within the revised strategy implemented in CP4 i.e. 1 in 8 weeks for 6hrs but where existing disruptive opportunities exist this will be utilised. |
Access principles for key passenger routes

The Route Asset Management Plan (RAMP) brings together the inspection, maintenance and renewal interventions for each asset discipline. The RAMP identifies the most appropriate approach to asset interventions to deliver the required outputs for the minimum whole life, whole system cost. This is one of the key inputs for the access strategy and RNAS.

There are some significantly disruptive works planned for CP5 that can be highlighted at this time. The most disruptive project is Edinburgh Glasgow Improvement Programme (EGIP) A number of S&C renewals are planned, particularly on the north end of the WCML between Wamphray inclusive and Glasgow Central. These are summarised below.

Significant renewal and enhancement works on key route sections in CP5

<table>
<thead>
<tr>
<th>Key sections</th>
<th>CP5 work headlines</th>
</tr>
</thead>
<tbody>
<tr>
<td>Edinburgh to Glasgow Queen St</td>
<td>EGIP Queen Street High Level</td>
</tr>
<tr>
<td></td>
<td>Queen Street High Level Tunnel Slab Track</td>
</tr>
<tr>
<td></td>
<td>Haymarket East Junction S&amp;C</td>
</tr>
<tr>
<td></td>
<td>EGIP Waverley Station West end Throat (Mound Tunnel Crossover)</td>
</tr>
<tr>
<td></td>
<td>EGIP Scissors crossover to Platforms 10/11</td>
</tr>
<tr>
<td>ECML</td>
<td>EGIP Abbeyhill Turnback &amp; Portobello Jn Remodel</td>
</tr>
<tr>
<td>WCML</td>
<td>Rutherf Reno Junction S&amp;C</td>
</tr>
<tr>
<td></td>
<td>Rutherf mono Junction S&amp;C</td>
</tr>
<tr>
<td></td>
<td>Law North Junction S&amp;C</td>
</tr>
<tr>
<td></td>
<td>Motherwell North Re-signalling</td>
</tr>
<tr>
<td></td>
<td>Motherwell South Re-signalling</td>
</tr>
<tr>
<td></td>
<td>Carstairs Junction S&amp;C Re-modelling</td>
</tr>
<tr>
<td></td>
<td>Abington S&amp;C</td>
</tr>
<tr>
<td></td>
<td>Wamphray S&amp;C</td>
</tr>
<tr>
<td>Fife</td>
<td>Tay Bridge High Girders refurbishment</td>
</tr>
<tr>
<td>Ayrshire</td>
<td>Kilwinning S&amp;C</td>
</tr>
<tr>
<td>G&amp;SW</td>
<td>UB248 Carronhill Viaduct (Kilmarnock to Dumfries)</td>
</tr>
<tr>
<td></td>
<td>UB264 Cample Viaduct (Kilmarnock to Dumfries)</td>
</tr>
<tr>
<td>Highland Main Line</td>
<td>Loop/double track construction and line speed enhancements</td>
</tr>
<tr>
<td>Aberdeen – Inverness</td>
<td>Loop/double track construction and line speed enhancements</td>
</tr>
</tbody>
</table>
Access principles for key strategic freight routes

The JNAP for freight has been developed at a national level given the long distance nature of the traffic flows. It recognises that the rail freight industry market base is changing from predominantly moving bulk goods for heavy industry towards moving consumer goods for the distribution and retail sectors. This change produces an increasing demand for a 7 day railway for freight. In some cases freight’s 7th day opening requirements can be met from early Sunday afternoon availability. To deliver this specification for freight requires a network of diversionary options.
Operations Plan

This section considers how the Scotland route will deliver its operations plans, including migration of signalling control to a small number of Rail Operating Centres and heritage considerations.
CP4 delivery

Changes in advance of CP5
There are a number of changes planned for CP4 that will impact upon the exit point where operations move into the start of CP5. This will provide a more efficient baseline position for operations activities in CP5.

The main elements include:

Signaller Supervision – Scotland has undertaken a detailed analysis of the requirements for supervision at those locations within the Route where there are currently Shift Signaller Managers (SSMs). This examined the workload and demands on supervisor posts across the Route. These locations will be migrating into the Rail Operations Centres (ROCs) and there is currently a review into the management and supervisory structure within the ROCs which the analysis will help to inform. Some SSM posts have been removed as part of previous migrations, and it is likely that the supervision of signalers will change as the ROCs are established and more signaling control is migrated in and integrated with the Route Control in 2013 and beyond.

Signal box closures – The signal boxes at Polmont and Millerhill were re-controlled to Edinburgh IECC in November 2012 Cathcart will close in April 2013, resulting in all posts being removed. Under the Edinburgh to Glasgow Improvement Project changes, the existing Cowlairs Signalling Centre will be migrated to Edinburgh, the current plan for that being late 2013. Craigo is a relatively simple potential switch out of the box, with the signalers posts being removed and the staff being accommodated within existing vacancies at adjacent signal boxes.

Local Operations Manager (LOM) Realignment – There are additional LOM posts being introduced at WSSC and Edinburgh IECC. The LOM Yoker area will be split, with the Cowlairs signal box being transferred to Edinburgh, and the Yoker signalling centre being transferred to Glasgow.

Area Directors – As part of the developing structure of network operations in Scotland, the General Manager post will be removed, along with the Route Infrastructure Maintenance Director, to be replaced by two Area Directors. These posts will lead the operations and maintenance teams to work more effectively together.

Automatic Route Setting (ARS)+ Implementation – Whilst in itself it offers no savings, the implementation of ARS+ in WSSC in early 2013 will facilitate potential changes to workstation layout at WSSC as more modern wide-screen technologies become available. The introduction of ARS+ may also generate some modest performance improvements.

West of Scotland Rail Operating Centre (WSROC) – It is intended to split the existing Network Rail Scotland Control and integrate the control function into the two ROCs based in Glasgow and Edinburgh. This is being pursued in alliance with ScotRail and would involve staff from that company’s control also transferring to those locations. The more immediate priority is to move the Strathclyde area control into West of Scotland, effectively creating the ROC.

Finance
Benchmarking studies show Scotland ranks amongst the lowest cost Routes for operations activities. The opportunities for yet further significant cost reductions lie in extensive signal box closure campaigns, and, as Scotland does not have a sufficiently large enough programme within CP4, achieving the 2013/14 financial targets remains challenging.

Compliance
Compliance remains excellent within the Operations team in Scotland, with both the internal assurance processes and the national audits confirming the healthy state of compliance. We do not anticipate any deterioration of that position as we enter CP5.

Industrial relations
The level of change proposed for CP5 and beyond is significant and this will need to take account of a mixed industrial relations climate in recent years. In conjunction with both the human resources and maintenance teams, there is a conscious effort to change direction and find a more engaged way forward with our staff and the unions. The success of that will be seen in a recognition that change will happen and in agreement as to how best to serve the interest of staff affected by the reduction of posts, largely driven by the operations strategy.

This is a key to success for CP4 in setting the correct environment for significant change in CP5 and the new IR strategy is aimed at that outcome.
CP5 Delivery

The opportunity exists to reduce Scotland’s annual operations costs and deliver improved operational performance. Some enabling elements of the strategy are being deployed in CP4 providing the capability to accelerate renewals investments to successfully reduce OPEX costs. The longer term goal is that no mechanical signalling will remain in operation on the Route, with signalling activities progressively migrating to Rail Operating Centres (ROCs). The signalling locations that will remain at the end of CP11 per the current plan are detailed below:

<table>
<thead>
<tr>
<th>Signalling locations remaining at the end of CP11</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 East Scotland ROC (Edinburgh)</td>
</tr>
<tr>
<td>2 West Scotland ROC (Glasgow)</td>
</tr>
<tr>
<td>3 Inverness Signalling Centre</td>
</tr>
<tr>
<td>4 Banavie Signalling Centre</td>
</tr>
</tbody>
</table>

Inverness & Banavie will be retained as the Radio Electronic Token Block (RETB) system is being life extended to 2035 and there is no business case at this point to move these locations into the larger ROCs.

Rail Operating Centres

Signalling migration synopsis

There are two ROCs proposed for the Route and both will be based in current facilities, at West of Scotland Signalling Centre (WSSC) in Glasgow and Edinburgh IECC. Apart from some smaller schemes, re-control to the Edinburgh ROC begins in earnest in 2013, with the Cowlairs re-control scheme transferring 369 SEUs. A further 557 SEU’s are re-controlled with the Perth to Dundee scheme which is now planned to be accelerated to CP5. The most significant re-control period is planned to be 2024 and 2025, with a total of 960 SEUs migrating in a number of schemes.

It is planned that an accelerated programme of signal box migration (accelerated NOS) will be delivered in CP5. The plan will re-control all signalling locations from the Central Belt to Perth in the North and as far as Longforgan in the East, taking the area of control of the Edinburgh ROC to the fringe of Dundee. Once delivered, these changes will release annual OPEX savings in the range of around £3.5m by the end of the control period. Early development will take place towards the end of CP4. Current assessments suggest that there is a positive business case for this accelerated NOS programme and funding has been included in the signalling renewals section of this submission.

Glasgow ROC signal migration will include Motherwell North resignalling (606 SEUs) in 2016 and re-control of the remaining Motherwell South signalling in 2018. The potential migration of Yoker IECC to West of Scotland ROC is also being considered as part of a larger re-signalling scheme. Following this, levels of signal migration are lower, in 2023 and 2025.

SEUs per workstation (Edinburgh)

![Diagram showing SEUs per workstation in Edinburgh]
Work is about to commence on an assessment of workload drivers to provide an initial estimate of the number of workstations required in each ROC. As part of this exercise, maps will be produced to show an indicative assignment of sections of route to workstations.

**Headcount and costs**
Summaries of forecast operating costs and headcount are detailed in the Route delivery strategy section.

**ERTMS**
ERTMS (European Rail Traffic Management System) migration for Scotland is currently forecast to commence after CP5.

The first roll-out of ERTMS in the East Scotland ROC area is planned to take place in CP6, with widespread roll-out in CP7 and full roll-out in CP10.

In the West Scotland ROC area, ERTMS roll-out commences towards the end of CP6, with additional conversions throughout CP7, 8, 9 and 10. By CP11, just over half of the signalling will be ERTMS standard.

**Electrical control**
All existing Electrical Control supervisory systems are due for replacement by 2022. Within the existing 13 Electrical Control Rooms, we have 16 different control systems, none of which has a back up capability.

**Electrical control migration timeline**
Network Rail is currently working nationally with the unions in a Joint Working Group to define the migration of the ECOs to the ROCs, including what will transfer, the scope of control, locations and timelines. It is currently anticipated that the existing Cathcart ECO will migrate in its entirety to WSROC in 2017. The further electrification schemes planned for Scotland are acknowledged and built into this migration plan. For disaster recovery purposes, a duplicate ECO control system is proposed to be installed at the East of Scotland ROC.
Stations

There are two managed stations within the Scotland Route, Glasgow Central High-Level and Edinburgh Waverley. These represent respectively the two busiest stations in the Route.

Glasgow Central is situated in the heart of the city centre and serves locations to the south and west of the city including the West Coast Main Line, commuter routes to the south of the city and the Ayrshire/Inverclyde routes. It currently facilitates approximately 34 million passenger journeys annually, with this figure expected to increase in line with general patronage trends.

Edinburgh Waverley is also situated in the city centre and deals with mostly inter-city services, including Inverness, Aberdeen, Glasgow and London via the East Coast Main Line, plus significant commuter flows from Central Scotland and Fife. Passenger levels are at around 25 million per annum and these are also expected to increase in CP5. There is no major renewals work planned during CP5 at either Glasgow Central or Edinburgh Waverley but enhancements may be undertaken arising from the extended platform needs of EGIP and the Inter City Express Programme. The stations will also focus on maintaining and incrementally improving the existing station facilities and environment and preventative measures to improve passenger safety. The longer term capacity needs of the stations to meet predicted patronage growth in CP6 and beyond will be considered as a development project in CP5.

Heritage considerations

The Route currently has more than 100 signal boxes, of various sizes and ages, of which 74 currently remain operational. The operating strategy will, over time, render more and more of them redundant. It is recognised that a coherent strategy is needed for dealing with these assets to avoid redundant buildings remaining a liability to the company and to comply with Network Rail’s sustainability policy. Not proactively managing the heritage has consequences of unused boxes being prone to vandalism and also results in an increased maintenance burden.

Many of our signal boxes are of interest to heritage bodies, preserved railways and local communities. Some 25 such signalboxes are listed buildings, which imposes certain legal requirements with regards to maintenance and upkeep, despite the fact that 10 of these signalboxes have no ongoing operational use. To address some of these issues and start to create a coherent approach to our signalling heritage, members of the operating strategy team have been proactively engaging with listing bodies, the National Railway Museum, the Heritage Railway Association and internal Network Rail colleagues.

A key part of creating a signalling heritage strategy has been identifying what signalling assets Network Rail currently has. To that end, the operating strategy team has created a comprehensive register of signal boxes which is currently being validated by local operations staff. This information has enabled us to identify what structures each Route has, as well as their historic importance and any other associated issues. It is hoped this information will help inform a proactive approach to effectively managing these assets in a sustainable way which benefits the company.
People development

A key element of the Route people plan is the focus on the development of our employees at all levels and the specific identification and development of those employees with potential to progress and contribute in key roles within the organisation. Through a systematic process of talent identification and succession planning the Route maintains an intelligence of both broad leadership and management capability and invests in development plans appropriate to maintain and enhance that capability.

Supported by the professional development and training function, the Route provides development for all areas of the business, from executive leaders and senior leaders to first, second and front line managers. Development interventions include:

- senior programmes delivered by the University of Warwick, providing nationally recognised qualifications
- front line programmes aimed at first, second and front line managers, including the Practical Leadership Programme, Introduction to Management Programme, Team Leaders Development Programme and the nationally recognised Certificate in Leading and Managing Teams
- coaching & mentoring.

The Route also employs the use of cross industry secondments and project based development.

Additionally, in terms of technical and competence training we are moving towards a system of role based capability rather than task based and monitoring via competence assurance systems. All front line employees will be trained against core technical skills as a minimum supplemented by specific technical skills (assessed as frequently/rarely used and deployed as required).
Asset management plan

This section outlines the diverse nature of the infrastructure in Scotland and the Route’s plans for ongoing maintenance and renewal.
Strategic overview

The Route’s Asset Management Plan has been developed in accordance with the CP5 asset policies and is designed to deliver the requirements of the HLOS. The resulting bottom-up workbanks have taken into account the underlying condition and performance of the assets and seek opportunities to integrate renewal and committed enhancements.

Scotland’s CP5 renewal requirements are dominated by the three main categories of track, signalling and civils (structures and earthworks).

For track, the introduction of high/medium output equipment on the ECML and WCML is critical to achieving the volumes and efficiencies. This also drives an increase in the requirements for midweek possessions on these routes. Although initial discussions have taken place, this change in access requirements has yet to be agreed with the TOCs and FOCs and remains a significant risk to the delivery and efficiency strategies for CP5. The renewal of the slab track in Queen Street Tunnel, the rail joint reduction programme and the significant increases in the volumes for off track (vegetation and fencing) are also key features of the track submission.

The migration of Motherwell Signalling Centre to the West of Scotland Signalling Centre is the key component of the Route’s CP5 Signalling renewal strategy, delivering almost two thirds of the CP5 signalling volume. The end of CP5 sees the start of development work associated with the first deployment of ETCS in Scotland planned for mid CP6. For level crossing renewals, driven by asset condition, the first option that will be explored will be the closure of the crossing rather than renewal. This will be assisted by the funding stream identified in the HLOS for closure of level crossings.

The Route’s structures portfolio has a significant number of assets classified as either poor or deteriorating. For bridges in particular the Route’s average condition rating is lower than the national average. The structures CP5 plan addresses this by prioritising the high risk/poor condition assets for remediation. The Route’s aim is to stop the deteriorating trend of the asset condition seen through CP4 and achieve a sustainable position.

The Route extends across a significant geographical area with a high proportion of rural railway, predominantly single line, where the railway either traverses a large number of rivers and streams with extensive water catchment areas or where the railway is below mountainous geography. This presents an increasing challenge in our ability to mitigate risks imported from slopes and other third party land where large volumes of “run off” flow onto the network. This drives considerable effort and expense to operate a safe and reliable network in the more remote areas. The need to deploy remote monitoring of slopes and other assets to detect failures such as earth slips, rock fall and flooding is catered for in the submission.

Across the asset disciplines, the impact on renewal workbanks of the re-scoping of EGIP has been assessed. Removal of the proposed grade separated junctions at Greenhill and Winchburgh has resulted in the requirement to reinstate a number of S&C renewals into the track workbank as well as having some minor impacts on the signalling plan.

As part of the ongoing development of enhancement schemes outlined in the Scottish HLOS, the Route will evaluate the impact on the whole-life cycle costs of any asset(s) involved including the impact on maintenance costs.

Significant challenges exist in addressing the impact of incidents of adverse and extreme weather on the asset base. These can result in severe disruption to services due to high winds bringing down trees, heavy snow falls blocking lines and very localised and heavy rainfall leading to flooding and landslips in historically low risk areas. The Route’s understanding of the impact of the change in the weather on our assets is increasing but still evolving. Asset plans include elements to tackle the changing weather patterns or have policies that allow for flexibility when carrying out renewals including the provision of monitoring equipment.

The CP5 efficiency plans have been based on the nationally derived asset efficiency opportunities which have been assessed for Route specific implementation. Key enablers for the successful delivery of the Routes efficiencies plans are:

• the move to more midweek possessions for track renewals, the introduction of high/medium output track renewal methodology and the deployment of S&C stone blowers and S&C re-ballasting equipment for the first time
• the implementation of the new framework contracts and the letting of full five year contracts for major renewal types, i.e. S&C renewals
• the introduction of new technology especially for track renewals
• improved cross-discipline planning, including enhancement schemes, to maximise the efficient use of disruptive possessions
• the successful implementation of ORBIS for improved asset information
• embedding the new signalling framework contract (major) including those for minor works and level crossings.
ORBIS is a key enabler for our efficiencies

Plans for CP5 include a variety of efficiencies which vary in impact across different Routes and asset types. ORBIS (Offering Rail Better Information Services) is a key enabler for many of these efficiencies. ORBIS is focused on providing Routes with better asset information, in a readily usable form, and advanced decision support capability. This will enable the Route to achieve efficiencies through improving decisions and is required to effectively implement CP5 policies. The level of efficiencies attributable to ORBIS across all Routes is consistent with the £270m identified in the IIP business case. Where ORBIS is split out as a separate efficiency component it is expected that additional changes will be required within Route asset management and infrastructure maintenance to realise the efficiencies. Where ORBIS is not split out it is acknowledged as a key enabling component required to achieve identified efficiencies.

ORBIS Overview: ORBIS is a major programme of Asset Information capability enhancements that provides a vital enabler for condition-led asset policy implementation, enabling us to better manage our asset base for less, and better exploit existing railway system capability.

Efficiency Treatment: Routes propose two different treatments for recognising ORBIS efficiencies, either: to split out ORBIS as a separate efficiency component, acknowledging that additional process or working practice changes will be required within Route asset management and infrastructure maintenance to realise the efficiency; or to leave ORBIS embedded as a key enabling component across identified efficiencies. Scotland Route has applied a combination of these two treatments.

Renewals: ORBIS will provide better information to support CP5 asset policies, focusing effort on critical assets, identifying opportunities for refurbishment and life extension, while assisting with effective prioritisation of renewals activities. ORBIS supports Routes in Track, Signals, E&P and B&C renewals. Full Track efficiencies are recognised from 2016/17, other efficiencies are expected to ramp up from 2015/16.

Track renewal plans have been reduced based on ORBIS capabilities; including Linear Asset Decision Support (LADS), which overlays different sources of information to enable a better understanding of condition, degradation, impact of interventions, and underlying root cause; S&C verification and S&C criticality; enabling Routes to make better informed choices.

Signals renewal plans have been reduced based on ORBIS decision support using full asset inventory and condition information, rather than the current sample, identifying optimum renewal points, creating scope and value engineering efficiencies across maintenance delivered renewals, minor works, and major schemes.

Maintenance: ORBIS better information and decision support tools will enable maintenance efficiencies in a number of ways: by volume reduction across budget lines, by reductions in administration across asset disciplines, through to improved asset and incident location information enabling maintenance and incident response teams to respond more effectively. Based on early availability of capability including mobile access and productivity-focused applications, efficiencies are expected to ramp up from 2014/15.

Track Opex: ORBIS provides a multi-layered view of linear asset data, which enables us to better predict faults and understand the effectiveness of previous work. It will create a range of efficiency opportunities dependent on Route plans and asset condition. A range of expected benefits has been identified across a number of track and off-track budget lines.

Non Track Opex: ORBIS will create significant efficiencies in Maintenance Indirect. Routes have identified up to 50% reductions in administration across CP5 due to ORBIS enabling direct data capture, eliminating elements of rekeying, automating and optimising work orders and providing a platform for other applications. Direct Opex efficiency opportunities in Signals and E&P are limited where teams are sized for rapid response or other working practices. Additionally ORBIS has been recognised as an enabler within Rapid Response, providing planning support and mobile applications to facilitate information sharing.

Financial benefit: ORBIS financial benefits are primarily achieved through reduction in asset renewal volumes by means of implementation of a lowest whole-life cost management policy for each asset type, based on driving effective CP5 policy implementation decisions. In making this readily accessible, ORBIS smart-phone and tablet-based handhelds will eliminate paperwork, avoid future cost of positive reporting, improve incident response time and accuracy and improve operational safety. These reductions will be enabled by ORBIS but require different processes or working practices within Route asset management and infrastructure maintenance to realise the benefits. ORBIS is funded to support the business change activity required.
E&P renewal plans have been reduced based on ORBIS improving asset information and providing decision support capability. Better condition data supports a fundamental E&P policy shift from time to condition based intervention, leading to a move from renewals to refurbishment in a number of major asset types including DC distribution, AC distribution / OLE, electrical traction equipment, and signalling power cables, as well as fixed plant.

B&C renewal plans have been reduced in structures, buildings and earthworks, based on ORBIS support for risk based renewals policies providing better understanding of asset risk profiles, and decision support in conjunction with the Buildings & Civils Asset Management transformation.

Non-financial benefit: ORBIS will support a range of non financial benefits, including: Asset Management policy optimisation, better management of safety risk, safer working documentation, improved accuracy of location descriptions, improved investment planning, improved Route Asset Management Plans, improved operational performance, regulatory compliance and reputation benefits. ORBIS will help Routes to avoid recording asset condition information in locally held files, unnecessarily renewing infrastructure assets, planning work from outdated schematics, wasting time trying to locate an incident, rebuilding a network model each time it is required, re-surveying project sites and assets that have already been recently surveyed and the costs and adverse environmental impact of paper based systems.

Benefits-Led: The ORBIS programme has accelerated activity in advanced decision support across Track, Signals and E&P. ORBIS will continue to be benefits-led and work closely with Routes to achieve optimum realisation of benefits and efficiencies. Typically for a benefits-led programme which is creating and exploiting new capabilities, the efficiencies mix identified has evolved since the IIP. Further change can be expected over the course of CP5 as new opportunities for information exploitation emerge.
Track

Context
Scotland Route has a diverse variety of track construction to mirror the range of traffic patterns over its broad geographical area.

Main lines including cross border routes are generally ‘regular’ Continuous Welded Rail (CWR).

Commuter routes feature a considerable population of ‘legacy’ CWR in addition to islands of jointed track.

Rural routes are predominantly ‘jointed’ track, with significant populations of aged bullhead rail and cascaded obsolete flat bottom constructions.

Track CP5 scope of activity

Criticality Band 1: There is no track in criticality band 1 in Scotland.

Criticality Band 2: The Route has three sections categorised as criticality band 2, these being the West Coast Main Line, East Coast Main Line and Edinburgh to Glasgow Main Line (reclassified from 3 to 2).

All track assets on these sections will be targeted with renewal and life extension works as appropriate.

Criticality Band 3: The Route has 10 sections categorised as criticality band 3, covering key passenger and freight arteries. This includes most of Airdrie to Bathgate, G&SW and Ayrshire lines (excluding Ayr to Stranraer), Dundee north to Aberdeen and most of the Glasgow Suburban routes, Freight Trunk Routes (East) and West are also included in this category.

All track assets on these lines, other than those deemed critical which are listed separately will be targeted with renewal and life extension works as appropriate.

Criticality Band 4: The route has eight sections categorised as criticality band 4. These are principally the Highland Main Line north of Perth, Dundee and Perth routes to Fife including the Fife Circle, the Edinburgh suburban line and the Glasgow North Electrics.

All track assets on these lines will be targeted with life extension works as appropriate.

Criticality Band 5: The Route has ten sections categorised as criticality band 5. These include North Berwick Branch, Aberdeen – Inverness, Far North and Kyle Lines, Stranraer – Ayr, West Highland Lines and Other Freight Lines (North).

Performance of these will be primarily maintained by refurbishment.

Delivery plan for the final year of CP4

The delivery plan for the final year of CP4 is fairly typical of other years within the control period except that three sizeable S&C renewals at Stirling Middle, Ladybank and Midcalder are planned for delivery in conjunction with Enhancements schemes.

Volumes of off track activities, including vegetation management, fencing maintenance and renewals will increase during the final two years of CP4 to reach sustainable levels that will be maintained during CP5 and beyond.
**Output Objectives**
Network Rail has set out to the Office of Rail Regulation its planned KPIs for CP5. At present the required CP5 levels for each route are being developed.

**Key local issues**
The Route still has high levels of assets approaching the end of their technical lives which require replacement to maintain performance and produce spares to maintain the remaining asset population. An ongoing programme of renewal and refurbishment will continually reduce the population of obsolete assets during CP5 and beyond.

**Criticality Band 2:** The aim during CP5 is to reduce the population of pre 1976 rail and increase the population of modern equivalent form of track construction, including ballast, by deployment of high output renewals. It is anticipated that this will improve asset condition and performance whilst enabling sustainability. During CP5 it is intended to replace legacy S&C layouts with modern equivalent form components to improve performance & reliability.

The renewal of the slab in Queen Street High level tunnel is primarily driven by condition however the need to complete the scheme prior to the commencement of the new electric services delivered under the EGIP project is recognised. This avoids major disruptive works post the completion of EGIP and the introduction of the enhanced services that it delivers. Re-scoping of the EGIP project has increased required track interventions by £16.5m in CP5 particularly at Greenhill & Winchburgh junctions, where existing S&C layouts will now be renewed.

**Criticality Band 3:** Conventional renewals and refurbishment will be targeted to address localised issues. Targeted replacement of life expired assets with particular focus on reducing the population of pre 1976 rail and obsolete components to improve asset condition and performance.

**Criticality Band 4:** The HLOS requirement for journey time improvements between Perth & Inverness is likely to require increased track maintenance, however this is still under evaluation.

There are several slab sections within criticality band 4 track, all of which are of similar age. Performance of these will be primarily maintained by refurbishment with small sections requiring renewal during CP5.

**Criticality Band 5:** The HLOS requirement for journey time improvements between Aberdeen & Inverness is likely to require increased track maintenance, This is still under evaluation.

**Summary of CP5 Activity**
The Tier 1 modelling tool was used to identify indicative renewal & refurbishment volumes by Strategic Route Sections (SRS) as per track policy. The CP5 Route Plan workbank was developed bottom up using local knowledge of asset condition and best value for money delivery methods in compliance with the policy.

The route will introduce high/medium output renewal methods for the first time during CP5, focussed on the East and West Coast Main Lines, supplemented with conventional renewals and significant volumes of refurbishment across the route where suitable.

**Variance to application of policy**
Track policy and Tier 1 modelling indicates higher volumes of half-life ballast than is currently proposed in the CP5 bottom up workbank. This is due to the current service life of the ballast asset being higher than the assumptions in the model. Sleeper/bearer volumes are higher than Tier 1 modelling to address a known issue with non-standard sleepers on high speed routes.

As a result of the remaining high volume of pre-1976 and obsolete rail sections across the Route, rail replacement volumes are significantly higher than Tier 1 modelled figures.

High/medium output is only planned on criticality band 2 routes in Scotland due to the location of the high/medium output operating base at Carlisle and the national demands on the relevant plant.

Whilst the model indicates sizeable volumes of renewals on the Far North lines, the CP5 workbank proposes targeted re-railing & refurbishment works to reduce joint and obsolete components.

**Drainage:** Improved asset information from the recently completed survey indicates that the asset population is considerably different from the assumptions made in the IIP and therefore has an impact on the Route Plan submission.

**Fencing:** Boundary fencing renewal volumes are in line with policy. This delivers significantly more volumes than in CP4 and will recover the fencing assets on the Route to a sustainable renewal position by the end of CP6. The volumes are based on current volumes and condition recorded in Ellipse. The increase in volumes is based on the policy, taking account of the legal requirement to “fence in” the railway.

**Vegetation:** The vegetation management volumes for CP5 are far greater than those in the CP4 plan. This will redress the unsustainable position of excessive vegetation found on most routes within Scotland. An aerial survey of the vegetation asset has recently been undertaken to establish the extent and condition of vegetation both within the operational boundary and beyond. The outputs of the survey are risk profiled and a prioritised programme for tackling the issue will commence January 2013.
CP5 Work profile
The CP5 workbank currently has indicative years for delivery, however the key efficiency initiative for CP5 centres on the delivery teams’ ability to package work. Volumes are spread evenly with the exception of:
- Queen Street HL Tunnel Slab – 2015/16 (Pre EGIP Commissioning).
- Edinburgh – Glasgow main line works – The sites arising from the recent re-scoping of EGIP will require developing and delivering before the introduction of the enhanced service.

CP5 includes a significant increase in volumes on key routes in comparison with CP4 which will require novel plant and radically revised access strategies to support sustainable volumes.

Efficiency plans
The greatest scope for efficiency in CP5 relies on the negotiation of new contracts and an increase in midweek access, neither of which are yet assured. The asset policy for track introduces the use of novel equipment such as high/medium output and S&C stone-blowing plant to Scotland and a level of efficiencies have been assumed on these activities. Refurbishment and re-railing activity efficiencies have been based on the plant efficiency elements of the maintenance business plan. Efficiencies are planned for off track activities, such as fencing, through the use of more mechanised plant.
Signalling

Context
The Route has an eclectic mix of signalling which can be divided into eight basic types of interlocking, ranging from the oldest mechanical lever operated to the latest Computer Based Interlockings (CBI) installed at the recently opened West of Scotland Signal Centre. In the Route the signalling asset condition is generally good.

Scotland’s oldest mechanical signal box is at Hilton Junction and was commissioned in 1889. The oldest relay interlocking in service in Scotland is the interlocking at Perth. This is due for conversion to ERTMS in 2021 by which time it will be 58 years old. The newest interlockings are the two Westlock Interlockings which were commissioned at Paisley and Shields Junction in 2011.

Predominately the Route has colour light multi-aspect signalling with Track Circuit Block (TCB) but there is also fairly extensive use of mechanical signalling. The more remote routes are operated by Radio Electronic Token Block signalling (RETB) controlled from Banavie and Inverness.

As new signalling schemes and major renewals are commissioned, the proportion of axle counters versus traditional track circuits will increase. At Christmas 2011 the line between Paisley and Port Glasgow was converted to axle counter operation and at Christmas 2012 axle counters will be introduced between Haymarket and Princes Street Gardens.

The West Coast Resignalling and Electrification took place between 1972 and 1974 and is therefore approaching its 40th year in service. The East Coast, from the Route border to Ladybank, was resignalled between 1977 and 1981 is in a fair condition, the relay interlockings on this corridor are currently undergoing a programme of internal wiring renewals and this will extend their life.

The projected Asset Stewardship Indicator (ASI) for condition remains static for the remainder of CP4, however the significant interventions planned for signalling assets in CP5, predominately the renewals on the West Coast, will improve the asset condition progressively through CP5 and into CP6.

Delivery Plan for the final year of CP4
A key focus during the remainder of CP4 will be the Glasgow South Suburban Renewal (GSSR) project, the major renewal of the signalling on the Glasgow South Suburban network, due for commissioning in 2013. By the end of CP4 the development works for the key early CP5 schemes will be complete: Motherwell South and North signalling renewals and the re-interlocking of Polmadie and Rutherglen relay rooms. These renewals will allow the transfer of control from local signal boxes to the new West of Scotland Signalling Centre (WSSC), taking another step towards the eventual plan to have only two Rail Operating Centres (ROCs) in Scotland, supplemented by two Signalling centres.

Output objectives
Network Rail has set out to the Office of Rail Regulation its planned KPIs for CP5. At present the required CP5 levels for each route are being developed.

Key local issues influencing the plan
Climate change is an issue in Scotland and there have been numerous instances of track circuit failure which have been caused by flooding. To mitigate this increasing risk, conversion from conventional track circuits to axle counters will be considered for train detection as part of the project development works.

Summary of activities
Signalling renewal activities planned in CP5 align with policy.

Variances to application of policy
An agreed deviation from policy is the proposed renewal of the signal box at Camoustie driven by the need to renew the adjacent level crossing. Policy states that a closed signal box should have its area of control transferred to an adjacent box. However due to local constraints and the fact that the route will transfer to ERTMS by 2024, it has been agreed with the central NOS team that a localised renewal of the box with a small relay interlocking is the most pragmatic solution.

Funding and SEU count for the proposed NOS project for re-control of the Central Belt routes into Edinburgh IECC has been included in this submission.
**CP5 Work Profile**

The signalling workbank policy in CP4 was based predominately on asset condition. The CP5 workbank has been generated utilising the guidelines and rule sets defined in the CP5 asset policy. This has resulted in a workbank that contains a mix of conditions and business case led interventions, the latter being predominately the re-control of mechanical signal boxes in accordance with the Network Operating Strategy (NOS).

The CP5 spend profile for signalling has a degree of front end loading as the development for the two key CP5 projects (Motherwell and Polmadie/Rutherglen) will be complete by the end of CP4. This means the high cost elements of detailed design and implementation fall into 2015/16 and 2016/17. The last two years of CP5 are more lightly cost loaded but will facilitate the closure of Motherwell SC with the migration of the remaining areas of control to WSSC.

There are CP5 enhancement projects that impact on signalling infrastructure, the most significant of these being EGIP. The re-scoping of EGIP has driven the need to reconsider the requirement to renew signalling infrastructure that has been removed from the original scope. This includes the re-control of Greenhill Junction to Edinburgh which would originally have been undertaken by the planned re-modelling of the junction.

Carstairs Junction is being considered for remodelling in 2016/17 and the synergies between this project and the planned signaling renewal in December 2017 have been recognised.

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**Efficiency plans**

The key to delivering the efficiencies is through the successful negotiation of new framework contractor. The national assumption that a scope reduction of 10% of SEUs can be delivered for conventional signalling renewals may not be achievable as the main focus in CP5 is the renewal of Motherwell SC’s area of control. Much of this area was rationalised in 2003/04 and there is very little scope for further SEU reduction.
Geo-technical assets (earthworks)

Context
Scotland has a total of 2,100 miles of examined embankments, cuttings and rock-cuttings which provide the foundation to or run alongside the line. Earthworks are examined in 5 chain (110 yard) sections and are assigned a geotechnical risk rating of ‘Poor’, ‘Marginal’ or ‘Serviceable’ using a hazard index score for rock and soil slopes respectively.

Earthworks generally form the oldest and most variable assets on the railway network; often being formed or constructed manually using empirical rules and available raw materials 150 years ago. Wholesale replacement of earthworks is generally impracticable, and works are usually restricted to protection of the existing earthwork from the effects of outside influences such as weather, flood, historical mining or vermin. Where the condition has degraded significantly techniques such as piling, gabion retaining walls, granular replacement, re-grading, soil nailing, rock bolting and meshing are used to strengthen and refurbish the asset.

It is evident that the level of funding for earthworks in CP4 was inadequate to address the extent of geo-technical work required. Plans have therefore been developed to address the extent of backlog over two control periods, commencing in CP5.

There are 934 known mining hazards on the Route, comprising ancient shafts, galleries and adits passing beneath or within the zone of influence of the line. This forms around 29% of our national mining hazard.

Delivery plan for the final year for CP4
The delivery plan for the final year of CP4 is similar to the rest of CP4 as geotechnical work types are generally constant from one control period to another.

Output objectives
Our interventions will be sustainable, efficient and will deliver lowest whole life cost solutions. In CP5 there will be much more emphasis on refurbishing and maintaining the Geotechnical asset. Ways of delivering more effective maintenance are currently being developed and will be finalised in 2013.
Key local issues influencing the plan
Scotland has approximately 41% of the national population of rock cuttings due to its geography. Consequently it has a higher proportion of spend on this asset in the Route Plan than for soil embankments and cuttings. The primary driver for work in rock cuttings is safety due to the unpredictability of failure.

Critical earthworks include an embankment on the ECML known as Megs Dub, a sea cliff supporting the railway. Sea erosion has resulted in continuing deterioration of the sandstone and work is in hand in CP4 to evaluate options for remedial works ranging from localised major engineering solutions to line diversion.

Other critical earthworks exist in the Route and there are many locations where the railway is below mountainous geography. The potential exists for rock fall and landslip from the upper slopes of these locations, most of which are owned by third parties, and work is being undertaken in CP4 to develop a proactive monitoring approach utilising techniques such as an acoustic fibre optic ‘listening’ cable that may serve to provide warning of rock fall at these locations.

Scotland has been particularly susceptible to localised events which deposit 25mm+ of rain within a short period of time. The drainage infrastructure cannot cope with these events and inevitably the water can have a devastating effect on slopes. Derailments at Loch Treig and Rosyth were both attributed to localised thunderstorms depositing tonnes of water into a catchment adjacent to the Network Rail boundary. Remote monitoring will become an ever increasing part of the approach to the management of these assets.

Summary of activity
Earthwork assets are managed through a planned proactive renewals programme, combined with a robust reactive repair strategy for emerging and emergency incidents. The proactive approach combines technical evaluation of degrading assets with knowledge of the potential effects of outside influences. Safety and performance are managed through a system of monitoring and enhanced visual examination, targeted to earthworks in poorer condition.

CP5 earthworks policy is proposed to quantify output by measuring overall number of 5ch (100m) lengths of earthwork removed from poor condition. This is different from CP4 policy, which recorded volumes of earthwork renewal delivered irrespective of whether it improved the condition category of the earthwork.

The aim of maintenance works through CP5 and beyond is to refurbish poor earthworks at a rate greater than their degradation to poor condition and to proactively identify those at risk of degradation at an early stage by regular hazard/risk based examination regimes.

Variances to application of policy
Our current asset management policy is to maintain the overall condition of the earthworks within the Route through each control period, intervening where deterioration due to natural weathering processes, or an outside agent such as floodwater, has an effect on the condition of the asset. The policy directs work on the “top poor sites” first as these locations are deemed to be the highest risk to the safe running of trains. Specific schemes outside of the policy are detailed below:

- Following recent severe winters, a number of incidents occurred at approaches to tunnels including Bishopton, Drumlanrig and Pinmore. A Route specific requirement has been included in CP5 to net all tunnel approaches to mitigate the risk.
- An allowance has been made in the CP5 plan for addressing legacy issues associated with mining. This covers both ground investigation and remediation works.

CP5 work profile
In general the aim has been to keep the earthworks spend profile even throughout. There is funding for the fitting of monitoring equipment to geotechnical assets to understand the condition and deterioration mechanism of the Route’s slopes. The monitoring will be efficiently delivered by the minor works project team. This aspect of monitoring is separate from work streams described previously such as rock fall detection systems.

HLOS and impact of enhancement projects on renewals costs
The impact of enhancement projects on renewal costs of geotechnical assets is negligible. Generally, slopes are left in a better condition than before. However, those enhancements which include new sections of railway will add to the earthworks asset portfolio.

Efficiency
The key assumptions underpinning the efficiencies are: reducing delivery costs by efficient packaging of works, working with other functions to achieve better track access utilisation and more efficient use of resources, including RAM team, contractor and maintenance teams.
Structures

Context
The Scotland Route asset portfolio, as defined in the Structures Policy, contains 12,289 structures, of which 4,400 are bridges.

In addition there are 430 structures owned by outside parties which require examination by Network Rail. Of these, the vast majority of masonry bridges and tunnels generally date from the original construction of the railway lines between the 1840s and 1900, with a large proportion of the metallic bridge stock dating from the 1870s to 1890s. Structures built to current standards have a design life of 120 years, therefore structures dating from these periods can be considered to be out-performing engineering expectation, especially when comparing current permitted traffic and volume to that envisaged at the time of construction.

The nature of the bridge stock, with large variations in material type, forms of construction and history of ad hoc interventions carried out in their long asset lives, means that we manage a large number of bespoke assets for which it is often difficult to model and predict future behaviour.

The condition of bridges is measured using the Bridge Condition Marking Index (BCMI), with 100 representing a bridge in perfect condition, and 0 being the lowest possible score. The average overall BCMI score for metallic bridges in Scotland Route was 62 in 2010, against the British national average figure of 64. For masonry bridges the average overall BCMI score was 68, the same as the national average. Both measures reflect the reduced level of funding allocated to structures during CP4. Plans for CP5 will seek to address this backlog and this is forecast to continue into CP6.

In comparison with other disciplines, structures asset failures leading to safety or performance incidents are rare. However, the consequences of failure can be severe and the time required to remediate and remove a restriction can be lengthy.

Interventions are primarily aimed at preventing unacceptable increases in safety or performance risk. The need for works is informed by regular structural examinations (which report on condition) and structural assessment (which report on capability). This is supplemented with proactive programmes of investigation related to address specific high safety risks. The final volumes and costs have subsequently been reviewed against the modelled numbers and other Routes to align and rationalise nationally managed/delivered work.

Delivery Plan for the Final Year of CP4
Structures delivery through CP4, albeit constrained by available funds, has had to deliver a large and increasing workbank. The renewal programme in Scotland included additional works to address the output of the ORR Route Availability (RA) verification exercise which identified a significant number of under strength structures that required remediation to fixed timescales.

Examination costs have increased due to the application of more rigorous standards following incidents at Stewarton, Enterkine Burn and elsewhere.

The Route’s ability to react to emerging defects has been improved by the release of additional funds to the minor works programme. This is an important transition towards the rate of delivery required in CP5, where the volume of work is expected to triple from the CP4 low point.

There are, however, limited options for significant capital spend on assets such as retaining walls, footbridges and coastal & estuarial defences in 2013/14 and on other condition driven works.

The increase in proposed funding in CP5 across most structure types is designed to address the current adverse trends in asset condition whilst maintaining funding for ongoing capability issues.

Output Objectives
Network Rail has set out to the Office of Rail Regulation its planned KPIs for CP5. At present the required CP5 levels for each route are being developed.

Key Local Issues Influencing the Plan
In general intervention strategies are heavily influenced by the remoteness of many of the asset locations. Logistics of access are more expensive in Scotland and it is often more cost effective to carry out multiple work items together than at the optimum time for each work item.

Key local issues by asset type are as follows:

Underbridges
- Greater proportion of ‘Discrepancy’ and ‘Marginal’ capability structures than the national average. This is compounded by a historic legacy of RA10 route licence requirement.
- Asset portfolio contains a larger proportion of metallic structures than the national average, in a poorer overall condition than the national average. Metallic structures generally require more frequent and expensive interventions than other material types.
- Due to the proportion of the network passing through highland terrain, a greater proportion of the assets span watercourses susceptible to flooding. An increased focus in addressing the large number of higher risk scour sites is required to help mitigate the effects of global warming.
- The proportion of the Route carrying RA10 traffic, together with a higher frequency of freeze/thaw cycles increases the risk of spandrel wall defects.
- Issues with small span masonry arches, specific to the G&SW line, will require a continued large programme of structure renewals on this route throughout CP5.
Overbridges (including Bridgeguard 3)
The aggressive weather conditions in the Route, compounded by a need for increased road salting, has left a legacy of a significant number of heavily corroded, under strength metallic overbridges. A significant proportion of these are large structures in urban locations over electrified lines, which are the most expensive to remediate.

Major Structures
The Route contains the two largest civil engineering structures on the national network, the Forth and Tay Bridges.

Tunnels
The Route has a significant number of unlined rock tunnels. Freeze/thaw cycles have resulted in deterioration in condition and increased risk of rock falls after the recent severe winters. The effects of global warming are likely to accelerate deterioration. The network of shallow cut and cover tunnels on the Glasgow Low-Level network are susceptible to water ingress after severe weather events, causing performance issues in this key network area. With global warming, these events are becoming more frequent.

Culverts
Due to the highland terrain, some routes contain a large number of small diameter under-track culverts on sidelong ground. The safety consequences, and historic instances, of asset failure are not reflected in the current national policy. Expected increased frequency of severe weather events will increase the risk of asset failure, embankment washout and derailment with severe consequences.

Coastal & Estuarial Defences
The route has a high number of coastal & estuarial defences, as many routes were built along the coast to avoid upland terrain.

Other
There is a Route specific legacy of over 1100 structures which have been identified as having no edge protection. Working at Height legislation requires that this issue be addressed. The Route has agreed a risk based prioritised action plan in conjunction with the ORR that will commence in CP4 and continue into CP5.

Summary of Activity
The SBP figures for non-minor works categories in CP5 are based on a full bottom up workbank, with the exception of underbridges and overbridges/bridgeguard 3, where the final 2 years are approximately 50% bottom up and 50% modelled. 80% of schemes in 14/15 and 15/16 have IP GRIP 3 estimates with the remainder having AM or IP GRIP 2 estimates. Schemes in the last 3 years of CP5 have been priced using unit rates. Minor works figures are based on centrally-modelled figures.

An allowance for unplanned emergency works and for development of CP6 schemes has been included in the CP5 Route Plan as an overlay spread pro-rata between asset types.

The main programmes of work in CP5 are:

**Underbridges**
- Strengthening of discrepancy (Cat E & F) and poor condition marginal (Cat A3 to D) structures.
- Refurbishment/renewal of poor condition metallic structures.
- Spandrel tie installation programme. Works in this category is included within the underbridge repair rather than other category in accordance with NR/B&C/Civ/Vol. Strategy programmes. Programmes of work outlined in the WHL Viaduct, ECN4/5 Viaduct, GSW Masonry Arch Viaduct, and GSW Single Span Arch Strategies will continue.
- Implementation of a programme of planned preventative maintenance of steelwork painting on the portfolio of metallic structures.

**Overbridges/Bridgeguard 3**
- Under strength metallic public road bridges in the poorest condition.

**Major Structures**
- Work planned on the Forth Bridge is restricted to annual maintenance and small scale works.
- The final phase of the ongoing Tay Bridge refurbishment programme will commence in 2014/15 and finish in 2016/17. The budget includes for signalling and track work required to allow a single line working strategy to be utilised. A small annual maintenance budget has been included for the remaining years of CP5.
- Repainting of Clyde Bridge is programmed for 2017/18 and 2018/19.

**Tunnels**
- A programme of rock stabilisation works is planned for the unlined tunnels identified as being of higher risk of rockfall.
- Void grouting in Charing Cross, High Street and Haymarket South Tunnels, together with installation of drip shields in other tunnels, is planned to manage water ingress and reduce performance risk.

**Culverts**
- 50% of the programme relates to renewal of fireclay pipe culverts on sidelong ground as part of the WHL Culvert Strategy. Programme has increased from CP4 because of increased failure risk caused by global warming weather effects.
Coastal & Estuarial Defences
- The renewal budget is mainly focused on major works to key defences in the poorest condition, as mitigation against more frequent weather events caused by global warming.

Minor Works (All Assets)
- The Route has identified a budget for minor works and will be working through the centrally-modelled detailed allocations to determine a viable programme of work.

Other CP5
- Provision has been made to address working at height issues, by installing handrails to all medium risk sites by the end of CP5.

Variances to Application of Policy
The recently issued policy for structures contains advice on condition trigger levels for intervention. Tools are still being developed to allow full analysis of the asset portfolio against these proposed trigger levels, which will allow reconciliation of the bottom up plan against Policy.

CP5 Work Profile
In general the aim has been to keep the spend profile even throughout CP5, with 2014/15 being lower than average to allow a steady transition from the lower delivery rates in CP4. Notable exceptions are as follows:

Overbridges/Bridgeguard 3: The budget figures do not include Roads Authority contributions to schemes, where the work required is over and above Network Rail’s liability obligations. Therefore the spend profile is dependent on liability and does not reflect the actual work profile.

Major Structures: The reduction in annual budget after 2016/17 coincides with completion of the Tay Bridge refurbishment, and the start of work on Clyde Bridge.

Coastal & Estuarial Defences: The large spike in 2015/16 relates to the scheme to repair 200/433 Saltcoats Seawall, where beach erosion and sheet pile corrosion has led to undermining of the foundations.

Minor Works (All Assets): The spend profile is subject to review as stated above in 5.5.5.

Efficiency Plans
The efficiency initiatives have been taken from the national efficiency opportunity list and applied to the Route workbank. This has been done at a high level and will require further refinement and amendment as the efficiency initiatives are worked up in detail.

Efficiency figures may be lower than in other Routes; however a number of the national initiatives are based on best practice already in operation within this Route, which limits potential additional benefits. This is reflected in the lower unit rates for Scotland in the rate book, even though they would be expected to be higher than average with the additional logistics costs that come with working in remote locations and poorer weather conditions.

It is anticipated that the opportunity for efficiency is less in Minor Works schemes than with renewal works where there is greater opportunity for scope efficiency and work packaging.
Buildings

Context
The buildings portfolio consists of a variety of asset types, totalling 1,200 in number. These vary in age from Victorian right up to present day. This presents a unique challenge to ensure all these assets are able to perform and function efficiently in a modern railway environment.

Stations are the main focus and are at the forefront of the passenger experience. There are 350 stations in Scotland that account for 28% of the national portfolio and many are of special architectural interest. At present there are 14 Grade A, 59 Grade B and 14 Grade C Listed buildings, all of which require a specialist and individual approach.

There are 52 Maintenance Delivery Unit (MDU) assets. The national programme of rationalisation and centralisation at the start of CP4 has seen an improvement in the overall asset condition measure and added some crucial standardisation of accommodation.

There are 11 train maintenance depots in Scotland and these provide the facilities for the servicing, maintenance and repair of rolling-stock operated by the three TOCs.

The Route’s lineside operational building portfolio is the largest at 447 and most diverse of all the asset types, this includes signal centres, signal boxes, relay rooms, storage units and equipment rooms. Similar to stations, this portfolio varies in age from the mid 1800s to present day. There are 108 signal boxes at present and, of these, 74 are operational. Some 25 of the total number of signalboxes are listed from Grade A to C. There are 153 equipment rooms, critical to the operation and functionality of the railway. These assets now require further investment in CP5 to provide suitable levels of security and reliability. In Scotland around 160 redundant buildings and disused platforms have been identified. The continuing safety and ultimate removal or rationalisation of these assets is being considered.

Delivery Plan for the Final Year of CP4

Stations
Scotland differs in the reporting of stewardship measures from England and Wales in as much as it has an overall combined target for the Route, rather than an individual Station Stewardship Measure (SSM) target for the separate station categories A – F and the depot categories A – D. These are rolled up into a single SSM for Stations and a single Light Maintenance Depot Stewardship Measure (LMDSM) for depots.

The condition of our managed and franchised stations is steadily improving as indicated by the SSM. This is currently at 2.19 which is better than both the CP3 Exit at 2.33 and CP4 target at 2.39.

Managed Stations
The route has two managed stations, Edinburgh Waverley and Glasgow Central, which form an important part of the rail network in Scotland with some of the largest footfalls outside London’s main stations.

At Edinburgh Waverley, major renewal works are currently ongoing that will bring the station up to an acceptable condition with a new roof, renewed platform canopy over platforms 8 and 9 together with building, concourse and platform repairs. Improved access to the station has also been provided, including new escalators and lifts.

At Glasgow Central, renewal of the platforms is currently underway with completion of the works by the end of CP4. Once this work is complete there are no major renewals immediately required at the station.

Light Maintenance Depots
The current condition measure for the depots in Scotland is slightly adverse to the end of CP4 target of 2.56. However, with the opening of a new depot at Bathgate in 2010 and the renewals at programmed at Inverness, Perth and Glasgow Shields depots, the Route is confident that it will achieve this end of control period target.

Lineside Buildings
For lineside buildings and other assets where a specific asset type condition measure is unavailable, internal surveys have been carried out. These have scored the buildings and evaluated risk based upon standard asset criteria. This is then factored against the criticality of the route served and type of the equipment housed.

Maintenance Delivery Units
A focused programme of renewals and enhancements, linked to the maintenance re-organisation, has improved the asset condition of our MDUs within the route during CP4 with renewals at Inverness, Dumfries, Irvine and Glasgow Cowlairs. This programme of works, and the removal of dilapidated buildings and cabins, has resulted in good quality accommodation in this part of the estate. The main focus is now on planned preventative maintenance with limited renewals required going forward.

The asset management policy dictates that interventions will take place when justified by a risk (safety, technical or business), asset criticality or customer requirements.
**Buildings CP5 scope of works**

The Route Plan funding requirement is based on the CP4 funding levels and is predominately reactive, minor works and planned preventative maintenance (PPM), with depot funding for fabric and M&E works prioritised. In CP5 there are two high priority renewals, comprising Haymarket Depot and Shields Depot roofs. Both of these were deferred from CP4.

With regards to the MDU assets, these were considerably upgraded during CP4 and there is a small provision to maintain the current reactive and PPM obligations, together with an adequate provision for minor works.

A review of the existing PPM strategy for lineside buildings has driven a proposed increase in the PPM funding to accommodate the increase in activity needed.

Franchised stations were heavily affected in the years 2009 – 2011 by frost heave. This resulted in over 200 stations having interventions of major renewals and accelerated repairs. The CP5 asset policy provides greater focus on station footbridges and canopies, which were both deemed lower priority when compared with frost heave platform repairs in CP4.

Potential options will continue to be evaluated for the following, subject to funding:

- removal or management of redundant buildings
- tenant and TOC maintenance liabilities at franchised and leased depots
- rectification of station platforms that are low to gauge and outwith current guidance for stepping distances
- modification of existing assets to comply with DDA requirements or legislation.

**Efficiency plans**

Efficiencies will be gained by improving how projects are packaged and contracted. Further efficiency opportunities will arise from closer alliancing TOCs to obtain better site access (maximise joint working) as well as implementing innovative and better work practices.
**Electrification & plant**

**Context**
There are three principal types of assets in the Electrification & Plant (E&P) portfolio: Overhead Line Equipment (OLE), distribution and plant.

**Overhead Line Equipment (OLE):** There are currently 1,495 single track kms of electrification, supplied at 25kV single phase AC OLE. The OLE is not currently due any major renewals in CP5 under the asset policy and is performing well in terms of incidents and attributed minutes.

**Distribution:** The distribution equipment provides the 25kV single-phase AC power to the OLE. The assets vary in age with some being in excess of 40 years old. The main concern with this asset group is the condition and performance at a number of the Structure Mounted Outdoor Switchgear (SMOS) sites.

**Plant:**
- Points heating – 2,002 point ends
- Principal supply points – 130
- Signalling power feeder cables – 352
- Pumping stations – 12
- Non traction HV transformers and switchgear – 53 Substations
- Low voltage distribution network operator (DNO) supplies – 1,100
- Air compressor systems – 2
- Swing bridges – 2

The main plant asset that causes concern is signalling power cables. These range in age and condition and have been the root cause of a significant number of delay incidents within CP4. The signalling power feeder cables have suffered from historical under investment in previous control periods.

**Delivery plan for the final year of CP4**

**OLE:** On the ECML and WCML all outstanding OLE campaign changes will be delivered, this work involves renewing jumpers, bi-metallic connectors and flexible droppers.

**Distribution:** Refurbishment works at 7 SMOS (outdoor HV switchgear) sites will be delivered. Additionally, 10 booster transformers will be renewed.

**Plant:** The signalling power feeder cable renewals will continue as part of the GSSR project and a further 95 kms as part of RAM funded schemes, this will include the fitting of insulation monitoring devices connected to the Intelligent Infrastructure (II) system. This will enable the condition of the signalling power supply feeder system to be monitored, trended and will enable maintenance to react proactively.

Dalmarnock Pumping Station will be upgraded in conjunction with the station enhancement project. This is designed to make the pumping system more robust and provide increased capacity given the increased flood risk associated with climate change.

**Output objectives**
Network Rail has set out to the Office of Rail Regulation its planned KPIs for CP5. At present the required CP5 levels for each route are being developed.

**Key local issues influencing the plan**
There are a number of enhancement and other discipline projects that impact on the E&P infrastructure. Across all these projects and the E&P renewals plan, the RAM teams have started to review opportunities to capture synergies and identify efficiency opportunities. The future electrification enhancement schemes will significantly increase the extent of E&P infrastructure; including new 25kV feeder stations, track sectioning cabins and extensive OLE.

**Summary of CP5 activity**
The E&P asset policy driver for CP4 renewals was age. The policy has changed for CP5; renewals will now be driven by asset condition, obsolescence and route criticality. Energy efficiency alternatives, such as the use of solar and wind energy will be considered as a core part of renewals. At points heating locations, heat retainers will be installed to improve the heat transfer efficiency.

**OLE:** An increase in wind speed, especially gusts has highlighted the requirement to carry out OLE strengthening work. This will be carried out at Ardmore, Craigendoran and Gailes.

The New Measurement Train (NMT) will be utilised to check contact wire wear. The NMT data will then be used to target contact wire renewals as required. The Route will renew return conductors, small part steelwork (SPS) and Insulators on the North Electrics due to corrosion issues.

**Distribution:** Cathcart Electrical Control Room (ECR) will relocate to the WSSC at Cowlairs and the SCADA system will be renewed and upgraded. A combination of refurbishment and renewal work will be carried out on the 25kV SMOS and GEC Metalclad equipment.

**Plant:** The overall condition and management of the signalling power supply feeder cables and systems will improve through CP5. This will be achieved by carrying out renewals at locations based upon condition, route critically and age, improved maintenance activities and the installation of dual end feeding arrangements as part of renewals and enhancement where appropriate. Renewal and refurbishment work will be carried out across a number of non-traction high voltage substation sites and principal supply points. The plan will
address condition and obsolescence concerns, especially with Uninterruptable Power Supply (UPS) units.

Variance to application of policy
The plan will comply with the asset policy, except for signalling power feeder cable renewals. The plan includes a number of feeder cables that are compliant with route criticality, but fall slightly short of the 50 years renewal age.

CP5 work profile
The delivery profile is based upon asset condition, performance requirements and optimisation for programme delivery efficiencies.

Efficiency plans
Efficiencies will be delivered through programme optimisation (locking down, packaging and smoothing of workbank to enable optimal utilisation of supply chain), use of standard scheme design and improved delivery models (optimise mix of internal and external resources for GRIP 1-4, standardise build approach and contract direct with Tier 2 contractors.)
Telecoms

Context
Network services on the route are provided by a mixture of legacy transmission, Fixed Telecoms Network (FTN) Infrastructure with some use of leased services. In addition to this, there is an ongoing rollout of an Internet Protocol (IP) Network which is currently being used to carry Long Line Public Address (LLPA) announcements to stations throughout Scotland.

The legacy transmission systems hold a number of risks due to the general age profile and the availability of some components to support faulting and maintenance. Knowledge of the system is good and, in the main, spares are available. The FTN system is part of a new build and the system has a high level of reliability.

The operational telecommunications assets hold very limited risk and due to the utilisation of common equipment types supportability is high.

Telephony: Operational telephony is provided via Siemens Hi-Com, Siemens Hi Path and STS Intertec solutions. All operational voice communications via both telephone and radio are recorded.

Operational Radio: Operational radio services are provided by National Radio Network (NRN), GSM-R, RETB and local radio spot schemes which provide radio coverage at Major Stations and on the major rail bridges in Scotland.

Driver Only Operation Closed Circuit Television (DOO CCTV): There are currently 126 DOO CCTV or DOO mirror systems in operation throughout the Scotland Route.

Cable Route: Lineside cable troughing is in place throughout the route. The route is generally in good condition.

Station Information Security Systems (SISS): NR-owned Customer Information Systems (CIS) are present at only a limited number of stations located throughout the route. This includes major, complex and sub-surface stations. NR owned Security CCTV systems are present at underground and major stations in Scotland. LLPA has been rolled out to 140 stations utilising an IP backbone with an on-going renewals programme in place to install at further 53 stations across the route. Stand-alone PA schemes are being installed at a limited number of stations throughout the route. The majority of the SISS assets are at mid-life with only targeted renewals planned for CP5.

Delivery Plan for Final Year CP4
Schemes being delivered in the final year of CP4 include Edinburgh Waverley Public Address Voice Alarm, Yoker CIS Renewal (5 Glasgow Stations), Scotland PA (PA at 6 stations), Network Rail Control Concentrator renewal and Cathcart Electrical Control Room Concentrator renewal.

Output Objectives
The Asset Stewardship Indicator is used as the specific indicator for Network Rail Telecoms. It combines observed condition of telecoms assets and the number of telecoms failures that cause delay in excess of 10 minutes. This KPI is used for scoring Telephone Concentrators.

Local Issues/Variations to Policy
The workbank review currently aligns with initial industry plan numbers and policy.

CP5 Scope of Works
Major schemes being delivered in CP5 are RETB Next Generation, Yoker Long Line Public Address, Fixed Telecom Network battery renewals, and a number of smaller schemes included within the EGIP scope of works e.g. Glasgow Queen Street PA & Haymarket CIS.

Efficiencies
Telecoms asset management is carrying out targeted renewals throughout CP5 and continue to reduce asset risk by migrating, where possible, circuits onto FTN cable and transmission where life expired systems exist. The Telecoms Decision Support Tool (DST) assists in this process by allowing the engineers to score individual assets and to build effective work packages.
Level Crossings

Context
Scotland route has risk assessed all 458 level crossings and has identified the top 50 priority crossings. These have been assessed using the All Level Crossings Risk Model (ALCRM) score. Each of the 50 identified crossings has an action plan showing risks and mitigations.

During Control Period 5, Scotland Route will pursue level crossing closure opportunities that have been identified, regardless of the type of crossing.

Risk reduction works will be undertaken at all of the Automatic Half Barrier (AHB) crossings such as LED wigwag conversion which offers a 20% vehicular risk reduction per crossing along with conversion works of life expired crossings to Manually Controlled Barrier with Obstacle Detection (MCB OD) or similar rather than the pursuance of life extension works.

Passive crossings where sighting issues are controlled by speed restriction will be fitted with miniature warning lights, thus allowing the potential line speed to be realised. Further developments include a control for the risk of trains in long sections so the signaller can make an informed judgement as to the location of a train when giving the user authority to cross and the fitment of gate closers to all crossings where there is poor user discipline in relation to closing gates. The installation of sighting markers at all passive crossings will aid level crossing inspectors and maintainers in identifying a loss of sighting at the crossing.

We also intend to extend the “darkness trial”, where solar panels and batteries are used to generate energy to illuminate the signs and walkways during the hours of darkness.

Delivery Plan for the final year of CP4
The Route delivery team is engaged in a number of level crossing activities during the remainder of CP4. Currently, the plan is to convert four crossings at Halkirk, Bilbster, Garve and Duirinish to Automatic Barrier Crossings – Locally Monitored (ABCL). It is also planned to fully renew one Automatic Half Barrier (AHB crossing at Nigg and pursue closure of a number of crossings including Camperdown, Dalcross, Murie and Rosarie. The conversion of further level crossing road traffic lights from lamps to LEDs is also planned.

The “in-house” works delivery organisation will be installing the Automatic Open Crossing – Locally Monitored plus Barrier (AOCL+B) programme of level crossing conversions at 14 locations.

Moreton on Lugg mitigation works, which involve modification to crossing barrier interlockings to improve safety, have been completed at six level crossings on the route as part of a national project.

There is also a project to upgrade the “another train coming” audible warnings at a number of automatic level crossings on the route to allow a spoken word warning to be delivered to the user in addition to the more familiar warbling tone.

Key local issues influencing the plan
There are no particular local issues that are affecting our level crossing plan with the exception of the AOCL+B programme of works. Our first option is always closure and, if this option is not achievable, we will always strive to improve safety at the crossing.

Summary of activities
There is currently one planned project in CP5 that does not directly align with policy (details in section below). All other level crossing renewal activities planned in CP5 fully align with policy.

Variances to application of policy
The only deviation from policy is the renewal of the level crossing at Carnoustie. The crossing requires to be renewed and policy states that the renewal of this type crossing should drive its conversion to one with obstacle detection. However, due to local constraints and plans the most cost effective option is envisaged to be conversion from an unreliable life expired two barrier installation with long booms to a new four barrier crossing with a local signaler retained. The future level crossing and signalling workbank in CP6 make an allowance for the conversion of this crossing to obstacle detection as part of the line of route signalling renewal in 2024.

CP5 Work Profile
The level crossing workbank policy in CP4 was based predominately on asset condition. The CP5 workbank was built up using this same philosophy, and the requirements of NOS were added. This highlighted signal boxes where a level crossing closure or renewal, coupled with a signalling renewal, could improve the business case for the closure of that signal box and its migration to the ROC.

The ERTMS workbank drives a significant number of level crossing conversions from MCB or MCB-CCTV to MCB-OD.

A number of targeted Level Crossing minor works will be undertaken to maintain asset condition at existing installations under a “like for like” remit to maintain asset condition and prevent any reliability issues developing.

All the above workbank elements have been combined to develop the most appropriate and cost effective delivery plan, smoothed into an acceptable delivery profile.
In line with the NOS Policy, where an MCB crossing is migrated to the ROC, it shall be converted to MCB-OD at that time where technically feasible.

In early CP 5 the AHB at Kingsknowe LC on the Edinburgh Carstairs line will be upgraded to complement the late CP4 MCB – OD intervention at Kirknewton LC. Also in CP5 the Motherwell North Signalling Renewal Project will address three crossings (Heatherbell, Logan’s Road and Cleghorn) and make an early step towards the closure of Motherwell Signalling Centre.

The following years of the control period have a more even spend profile with broadly two level crossings renewed, or where possible, closed, per annum.

The migration of Auchengray AHB in 2017/18, the conversion of Cove MCB-CCTV to MCB-OD in 2018/19 coupled with the signalling renewals on the WCML, will allow the final closure of Motherwell SC within CP5.

In addition to the above renewals, there are also enhancement projects which impact on Level Crossing infrastructure the most significant being the Edinburgh -Glasgow Improvement Programme (EGIP). The re-control of Cowairs SC to Edinburgh IECC, including Greenfoot MCB-CCTV will be funded by the EGIP.

Efficiency plans
These are included in the overall signalling efficiency plans.
Drainage assets

Drainage asset renewals are generally identified via maintenance inspections; this creates a reactive work arising programme. When Maintenance teams report a defective drainage system which they can no longer maintain, schemes are put in place, generally through a minor works programme to renew and replace broken drainage elements including pipes and culvert repairs. Drainage ditches, siphons and screened culverts are cleaned and repaired to agreed drainage standards.

Accountability for drainage renewals is set by the drainage policy. A Scotland Route Water Management Group co-ordinates and sets priorities for the remediation and intervention associated with complex flooding issues that impact on critical parts of the network.

The overall volume and condition of drainage assets has recently been surveyed by the National Integrated Drainage Project (IDP) has fed into the development of the Route Plan. Further work will be required through CP4 and into CP5 to determine a drainage asset policy and Route Drainage Asset Management Plan once the volume and overall condition of the drainage is determined.

Track drainage is proactively included in track renewal workscopes where flooding is not apparent but saturated formations are considered a risk. CP4 includes an extensive installation, renewal and refurbishment programme of track drainage that will continue into the new control period.

Critical drainage issues are noted below:
- Winchburgh – a hydrological survey has been funded jointly by Track and Geotech to determine a suitable solution for the drainage issues at this location.
- Drem – a hydrological survey has been funded jointly by Track and Geotech to determine a suitable solution for the drainage issues at this location.
- Dalmarnock – a hydrological survey has been funded jointly by Track and Geotech to identify and implement a suitable solution for the drainage issues at this location.
- Queen Street High Level Tunnel – this will be addressed prior to the replacement of the slab track.

Drainage CP5 scope of works
The surveys undertaken by the National Integrated Drainage Project (IDP) included all on-track, off-track and natural drainage in the Scotland Route. The aim of this initiative is to:
- deliver a ‘fit for purpose’ specification for drainage asset surveys, integrated with updated drainage standards
- document the extent of current drainage asset knowledge held by Network Rail
- develop a programme of drainage asset surveys with an overall AFC of £5m nationally and a duration of two years
- deliver an outline Ellipse design for drainage asset data
- agree a proposal from maintenance national programmes for the delivery of the drainage asset surveys.

The IDP data has been entered into Ellipse and maintenance is using the data to schedule MSTs (Maintenance Scheduled Tasks) for drainage inspections, this information will be used to inform renewal activities in CP5.

For the purpose of the CP5 Business Plan, the IDP Data was aligned with CP5 policy and was used to derive the earthworks drainage figures from extrapolated volumes.
Maintenance

The maintenance strategy for CP5 is heavily committed to delivering the volumes determined by the asset management organisation to reflect asset policy and sustainable whole life cost parameters. As documented in our asset policies, it is Network Rail’s stated intention to introduce “risk-based” rather than “reliability-centred” maintenance across our asset base. The introduction and roll-out will be on a prioritised and controlled basis with trials anticipated to commence in the last year of CP4.

This complements the additional works implemented in the last two years of CP4 to achieve exit targets specifically in track quality, performance and reliability. It provides focus on underpinning works such as drainage, vegetation and track quality measures to improve the Asset Stewardship Index and drive continued improvement in performance and reliability by proactive maintenance enabled by much improved data quality. The efficiencies identified in CP5 are heavily reliant on the enablers being achieved which, in themselves, will provide a significant challenge to the business.

Detailed consideration has to be given to the track renewals policy as this could have significant impact on maintenance capex activities and organisation.

Delivery plan for the final year for CP4

A number of initiatives have been identified recently which will require to be implemented prior to the end of CP4 to deliver the required CP4 targets for track asset condition. This has been supported by work undertaken by the Head of Asset Management for Track. This includes a significant increase in a number of key track activities such as tamping, rail replacement and fencing.

To address the issue of increased vegetation incursions the Route has carried out an aerial survey to better understand the vegetation population and associated risk. This will lead to a targeted vegetation management programme, which will run through the remainder of CP4 through to the end of CP5 to return the asset to a sustainable position.

Following implementation of the ‘2bc’ organisational restructuring in 2011, a review of the track organisation has been carried out to address the increase in volumes stated above and improved S&C management. These initiatives are consistent with technical advice from the Head of Asset Management (Track) and to address areas of non-compliance and remove temporary non-compliances.

Following the recent completion of the national drainage survey, combined with knowledge gained following recent flooding events, the Route plan submission is now based on far more robust information than was available at IIP submission.

Summary of activity

This Route Plan is based around the volumes determined by the Route Asset Managers (RAMs) in line with the relevant asset policies taking cognisance of necessary enhancements to meet HLOS requirements, including improved access to facilitate junction tamping for track quality reasons, strategy possessions on critical key routes and asset teams to improve the reliability of the asset to meet the required levels of performance.

Variance to application of policy

The Route Plan is broadly in line with asset policy although some changes have been made to certain route criticality classifications to reflect their importance to the Scottish network and HLOS requirements.

CP5 work profile

CP5 includes a significant increase in volumes, mainly track, on key routes in comparison with CP4 which will require improved access strategies to support sustainable volumes.

Maintenance will be undertaken to achieve compliance with standards and to volumes determined by the RAMs to meet asset policy requirements.

The CP5 work profile is based on volumes determined by the RAMs in line with asset policies. Due to the significant volumes required to achieve fencing compliance the necessary interventions have been spread over CP5-CP6. Delivery will be targeted on those parts of the network where the risk of trespass and animal incursions is the highest.

CP5 volumes in the off track areas of vegetation, fencing and drainage have been significantly increased from those delivered during CP4. This is to return the assets to a sustainable position by the end of CP5. The intention is to move from a reactive to a proactive management of drainage by routinely including drainage surveys within the maintenance remit. The RAM Track has identified increases in tamping and stoneblowing volumes to those assumed in IIP to maintain track condition following the recovery programme at end of CP4. Track Unit rates have also increased in a number of key activities such as plain line tamping, S&C bearer and crossing replacements, which in light of the associated volumes has a notable impact on the submission.

E&P base line has been increased to take account of the improved asset data and volume knowledge delivered by the national ADIP programme and the increased signalling power distribution testing requirements.

Further assessment has been undertaken to identify maintenance requirements driven by the enhancement schemes identified in the HLOS. The main impact is the additional OLE
delivered by EGIP and other route electrification schemes and the 35 miles of new Borders Railway.

The introduction and continuing progress and implementation of Remote Condition Monitoring (RCM) will continue to assist in improving asset reliability and provide efficiencies in maintenance. The work is in three phases and currently 73% of point end population is in scope, 87% of train detection population is in scope and all points heating will be covered. Further advantage of RCM will be taken in CP5 as the technology becomes available and this is reflected in forecast efficiencies. It should be noted that RCM currently only detects a percentage of the failure modes possible on the equipment being monitored.

**Efficiency**

National initiatives such as Risk Based Maintenance, Possession Management, Contract Strategy, Maintenance Indirect, Mechanisation, Standardisation, Rapid Response, Asset Information, Multiskilling, Intelligent Infrastructure, Recycled Materials and Workings Practices have been assessed and implemented where applicable to improve efficiency throughout the Control Period, specifically in track and E&P disciplines. Whilst similar efficiencies will provide benefits for the S&T discipline they will not generate cost savings to headcount as the plan is dictated by our required capability to provide 24/7 response. This is not considered as being capable of being reduced throughout the Control Period due to the challenges posed by the level of enhancements and renewals and the HLOS requirement for a consistent 92% annual PPM and a target of 92.5% PPM at the end of CP5. We have proposed a local initiative to move to two person S&T Teams which will drive efficiency in this discipline.

All the above efficiency savings derived from national and local initiatives are caveated that the enablers for the initiatives have to be in place to achieve the efficiencies. This includes resolution of IR issues, standard changes, implementation of the relevant technology and availability of the necessary recycled materials, both in volume and cost.
Route delivery strategy

This section summarises the key outputs, activities, risks and assumptions behind the Scotland Route Plan.
The Route faces a considerable delivery challenge in CP5.

As has been detailed in the asset management plan section, the current condition of the infrastructure varies extensively across the Route. Although considerable renewals are planned in CP5, this will not fully address what remains an aging asset base. The required output capability of these assets will continue to be stretched during the Control Period, with more trains, faster trains, longer trains, more freight tonnage, increased performance and reliability expectations and the probability of greater weather related risks. And all of this is to be delivered for a reduced cost.

To address these challenges, the Route will embrace new technologies and more efficient working practices, better targeted interventions and more integration of work plans across the engineering functions. A shift to risk based maintenance and enhanced lineside vegetation and earthworks management are designed to make the Route infrastructure more resilient and achieve the high performance targets set by the HLOS. Ongoing work to develop the optimum value for money solutions for enhancement projects will also continue during CP4, in preparation for delivery in CP5.

There are always risks to the achievability of any plan and one as ambitious as this is certainly no exception. The key to effective management, however, is the extent to which such risks are mitigated and work is ongoing in this respect.

The Route aims to step up the rate of progress during CP5 towards the longer term aim of having all signalling operations in Scotland controlled from just four locations, as described in the Operating Plan section. In addition to the Motherwell North re-signalling, re-control of the Motherwell South area to the West of Scotland ROC and the consolidation of other signalling into Edinburgh ROC as part of the EGIP project, re-control of other lines in Central Scotland and up to Perth and Longforgan will enable considerable operating efficiencies to be achieved by the end of CP5.
Maintenance

The main risks to the deliverability of the maintenance plan relate to:
- the extent of reliance on new technology
- changes to working practices
- availability of midweek access opportunities for maintenance
- changes to standards for adoption of a risk based maintenance regime.

Much of the new technology planned to be adopted during CP5 is still at the advance development stage and limited experience of intensive operational use is currently available. It is therefore not yet proven that the predicted efficiencies will be deliverable in all cases.

The efficiency targets in the Route Plan also rely heavily on changes to working practices, especially the move from three to two person S&T teams. Although the concept of this is not new and has been discussed with the unions before, agreement has not yet been reached. Better presentation of the benefits of such changes to the staff involved, coupled with a more directly engaged approach, is planned to facilitate this change.

Improved midweek access provides the opportunity for more productive use of the workforce, as current access is often for much shorter durations than the average shift length. Discussions with train operators are ongoing on the practicality of agreeing such improved access but this will need to be in the context of the overall access strategy, including the needs of asset renewals and enhancements. Failure to achieve enhanced midweek access will require alternative efficiency opportunities to be developed.

The risk based maintenance regime seeks to establish an appropriate maintenance plan based on the criticality of the particular asset in question to the overall obligations and objectives of the Route. These include safety, role of the asset relative to network capability and operations and assessed risk of failure or sub-optimal performance. This approach to prioritising maintenance regimes differs from past practice and will, in some cases, require a change to the current maintenance standards.

Asset management

The Route has responsibility for managing one of the largest and most diverse asset bases of any industry in Scotland. Its geography extends the full length and breadth of the country and includes some of the most iconic buildings and structures of any railway internationally.

The key requirements of asset management for CP5 are to achieve and maintain asset condition at a level consistent with the increasing expectations of the Scottish Government, train and freight operators and other stakeholders. In some cases this will be enabled by continuing a rolling programme of asset renewals and/or life extensions, utilising improved techniques where appropriate to achieve greater efficiencies. In other cases, notably for structures and earthworks, a step change in the level of investment is required to address underfunding in recent years which has caused a net deterioration in average asset condition. The increased risk level associated with the current adverse trend for structures and earthworks requires to be addressed in CP5.

The impact of increasingly unpredictable weather patterns is also a significant driver to the workbanks planned. The more difficult terrain in Scotland, with mountainous geography and fast flowing watercourses through which many important routes pass, serves to underline the need for improved resilience of the asset. The fact that many communities rely on their rail service at times when other modes of transport can be severely impaired by adverse weather helps emphasise the importance of asset resilience to the country’s economy.

Many key aspects of the asset management plan rely on adequacy of access to the infrastructure to undertake the works involved. This is currently under discussion with the train operators but, until suitable agreements are reached, it remains a risk. A mix of high and medium-output equipment for track renewals is planned, but the full efficiency opportunities offered by such new plant relies on suitable access windows being available.

Other efficiency initiatives are founded on new framework contracts – particularly for signalling renewals – and better targeted interventions based on improved asset condition assessments for which ORBIS will play a key role. The opportunities for synergy between enhancement projects and planned renewals will also be exploited to drive greater efficiencies, both in terms of cost and optimisation of access requirements. This will be particularly evident in the EGIP project, where a fully integrated approach will be taken to achieve efficiency opportunities.
Enhancements

The HLOS sets out requirements for the delivery of a number of specified enhancements during CP5. In most cases, these are output based (i.e. relating to a specified service frequency or journey time aspiration) rather than input based (i.e. specifying a fixed scope of works). For the more significant of such schemes, including EGIP, the Aberdeen – Inverness improvements and the Highland Main Line (HML) improvements, the HLOS output requirements are different from those specified for development work which was undertaken during CP4. Work to determine, with a reasonable degree of confidence, the scope required to deliver these outputs is therefore at an early stage.

For these schemes, early agreement on the timetable is key to then establishing the infrastructure requirements necessary to deliver the required outputs. For EGIP, the extent of electrification beyond the core Edinburgh Waverley to Glasgow Queen St main line will determine the mix of diesel and electric trains operating on the same route. This will bear heavily on what the timetable is capable of delivering and the sufficiency or otherwise of any proposed infrastructure scope. For the Aberdeen – Inverness and HML projects, the timetable is even more central to determining the infrastructure that may be necessary, as both are predominantly single lines with passing loops. The HML timetable will also have a dependency on prior crystallisation of the EGIP timetable, as this will drive the availability of paths from the Central Belt. It is therefore necessary to fix the detail of the timetable in terms of number of trains, desired journey times, stopping patterns etc before optimisation of crossing locations can be undertaken. This will be an iterative process between timetable and infrastructure, especially as the cost of new loop or double track construction will vary significantly from site to site.

For all timetables, the performance characteristics relative to the HLOS requirements must also be assessed prior to final determination of the necessary scope.

For these reasons, the cost estimates in this Route Plan for many of the specified enhancement are indicative only, and have a low degree of cost certainty. They will be refined as the projects are progressed from their current status through the project development cycle.
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Renewals expenditure graphs
## Renewals volumes

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Key outputs

The output requirements in the HLOS are more fully described within the various sections of this Route Plan but these can be summarised as follows:

- Maintain existing network capability as a minimum
- Achieve Public Performance Measure (PPM) for each franchise let by Scottish Ministers of 92% in years 1-4 and 92.5% in year 5
- Maintain at least one route open between Scotland and London during engineering works without the need for changing trains
- Deliver EGIP
- Deliver Borders railway re-opening
- Deliver Aberdeen – Inverness Phase 1
- Deliver Highland Main Line Phase 2
- Deliver the first stages of a rolling programme of electrification
- Deliver enhancements to Motherwell re-signalling
- Deliver Motherwell Area Stabling enhancements.
Performance

Achieving a minimum 92% PPM level during CP5, rising to 92.5% in the final year, will be particularly challenging. The principal risks to delivery of this relate to:

- Expectations of increasingly frequent and severe incidence of adverse weather. Mitigation plans relating to improved infrastructure resilience and amended timetables are well developed and will continue to be refined in the approach to CP5.
- The large extent of engineering works planned on different sections of the network throughout CP5 will give rise to performance risks during the construction phase. These will include possession handback risks, temporary speed restrictions and initial new asset failures during the bedding-in period. Mitigation plans will include refinement of the possession risk assessment processes, improved TSR planning and enhanced rapid response coverage during, and immediately following major works.
- There is also a currently unquantifiable risk arising from timetable changes. Sources for such changes may be emerging customer requirements, including those from new franchisees, and enhancement projects where the timetable requirements are not yet defined in detail. Mitigation options for such a risk include establishing a principle that no timetable will be implemented which is predicted to result in an adverse performance impact. Possible alternative options include establishing an agreed change control process in respect of the HLOS performance requirements under which sub-optimally performing timetables are accepted for implementation. It is anticipated that such an option would require involvement of the ORR.

Key assumptions

The Route Plan does not exist in isolation – it needs to react to changing requirements and retain sufficient flexibility such that key obligations on the network remain deliverable.

Planning assumptions must be made, however, and those relevant to this plan are summarised below:

- that no material structural changes will be made to the rail industry during the course of CP5
- that the levels of passenger and freight traffic will broadly correspond with those growth predictions documented in this Route Plan
- that the levels of external incidents, such as weather, vandalism, cable thefts and suicides, will not materially increase in CP5 from the levels experienced in CP4
- that the Route will meet its CP4 exit targets, in particular that of achieving 92% PPM in year 2013/14
- that weather trends in Scotland will not materially vary from those upon which the asset policies and performance plans are founded
- that the legislative framework as it affects Network Rail in Scotland will not have any materially adverse effects on its activities or costs of delivery during CP5
- that franchise changes will not require any material change to the operating plan in terms of new timetables which may affect performance targets
- that any new or altered service patterns introduced through enhancement projects during the course of CP5 will be performance neutral
- that higher line speed requirements on key routes to meet HLOS requirements will not cause material adverse impact on the costs of maintenance
Summary

It is highly likely that some identified risks will not occur and others which were not foreseen will nevertheless happen but that is to be expected in any business concern. This Route Plan is presented as an integrated strategy, in which the safe and efficient operation and management of the rail network in Scotland is the central objective. This will facilitate the growth in demand anticipated by the rail industry and reflected by Scottish Ministers in the HLOS.

It is Network Rail’s overriding aim to make a distinctive contribution to Scotland’s economy, environment and future prosperity by enabling a high quality rail service to be available to all, in a sustainable manner and at an affordable price. In setting out our plans to achieve this, it may be necessary to consider the need for trade-offs on performance, capacity and cost to achieve optimum value for money. Open dialogue with all stakeholders will help make the right decisions when this is required. Network Rail accepts the challenge to deliver the railway that Scotland reasonably expects by the presentation of this Route Plan.