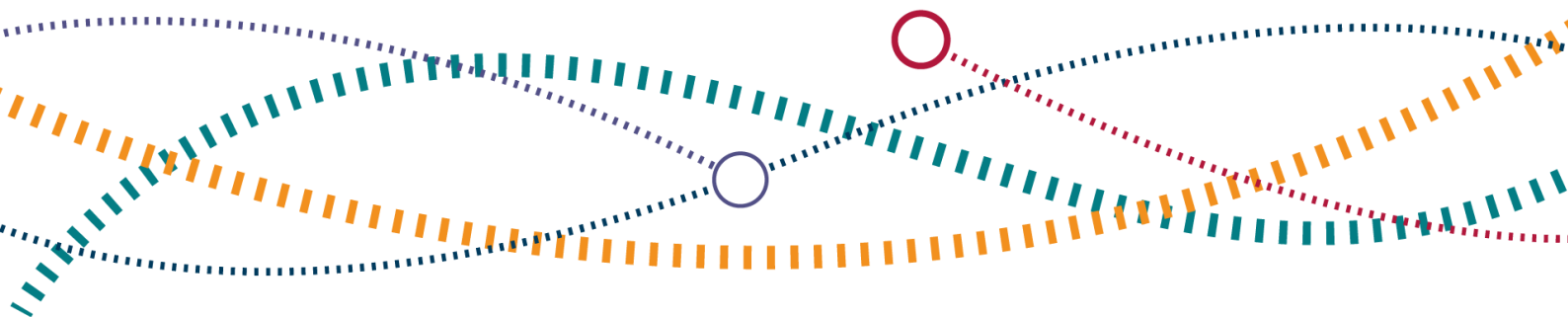




Benchmarking of Network Rail's maintenance and renewals expenditure, 2024-25

30 September 2026



Executive summary

Understanding the drivers of Network Rail's expenditure, including the reasons for changes over time is central to our work in assessing the scope for efficiency improvements. To achieve this, we use a range of complementary approaches including bottom-up assessments of Network Rail's business plans and performance, and top-down cost benchmarking using statistical (econometric) methods. This report summarises our econometric benchmarking of Network Rail's maintenance and renewals expenditure in the year from 1 April 2024 to 31 March 2025 ('2024-25') and complements our [Annual Efficiency and Finance Assessment of Network Rail](#).

Network Rail spent £6.3 billion on maintenance and on renewals activities in the most recent financial year, 2025-26, together accounting for around 42% of Network Rail's total expenditure (£15.0 billion). Network Rail operates under a business model of five regions – Scotland, Eastern, Southern, Wales & Western and North West & Central. Within each region, Maintenance Delivery Units (MDUs) are responsible for the majority of routine maintenance activities, accounting for 57% of total maintenance expenditure. More complex activities such as examinations of structures and the overhaul of major plant are managed by regional teams (38% of expenditure), and around 5% by Network Rail's central Route Services division.

Our analysis compares maintenance expenditure across Network Rail's regions and across MDUs to identify where expenditure may be out of line with what would be expected after taking account of scale, usage and complexity. This provides a source for investigation of possible inefficiencies. For reasons of data quality and availability our benchmarking analysis uses 2024-25 rather than 2025-26.

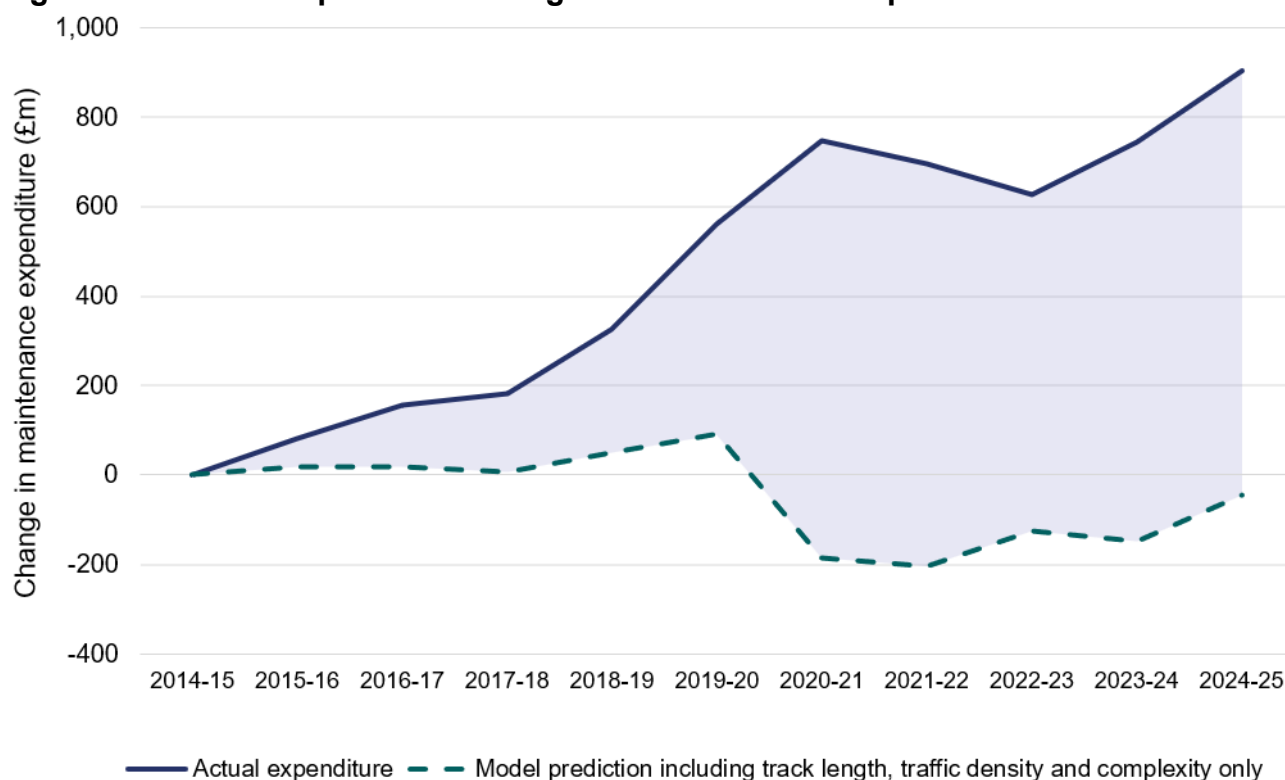
Key findings

Key finding 1: Network Rail's maintenance expenditure has increased substantially more over the past ten years than expected from changes in network scale, usage and complexity.

Adjusted for general inflation, maintenance expenditure increased by 56% to £2.5 billion over the ten years to 2024-25. In contrast, our modelling, which adjusts for changes to scale, usage and complexity, predicted a small decrease in expenditure. The shaded area in Figure 1 represents the increase in maintenance expenditure that cannot be explained by changes in track length, traffic density and network complexity or general price inflation (as measured by CPI).

Several factors may have contributed to maintenance expenditure increasing by more than our modelling predicts. These include a switch in asset management strategies from renewals to maintenance, initiatives to improve track worker safety and vegetation management, and input prices above general inflation. For our comparative analysis of regions and MDUs in this report, our modelling used dummy variables to account for the changes in costs over time not explained by scale, usage and complexity. This allows our analysis to focus on the relative performance of regions and MDUs.

Figure 1: Actual and predicted changes in maintenance expenditure since 2014-



Note: Predicted and actual maintenance expenditure is in 2024-25 prices and has been adjusted for inflation

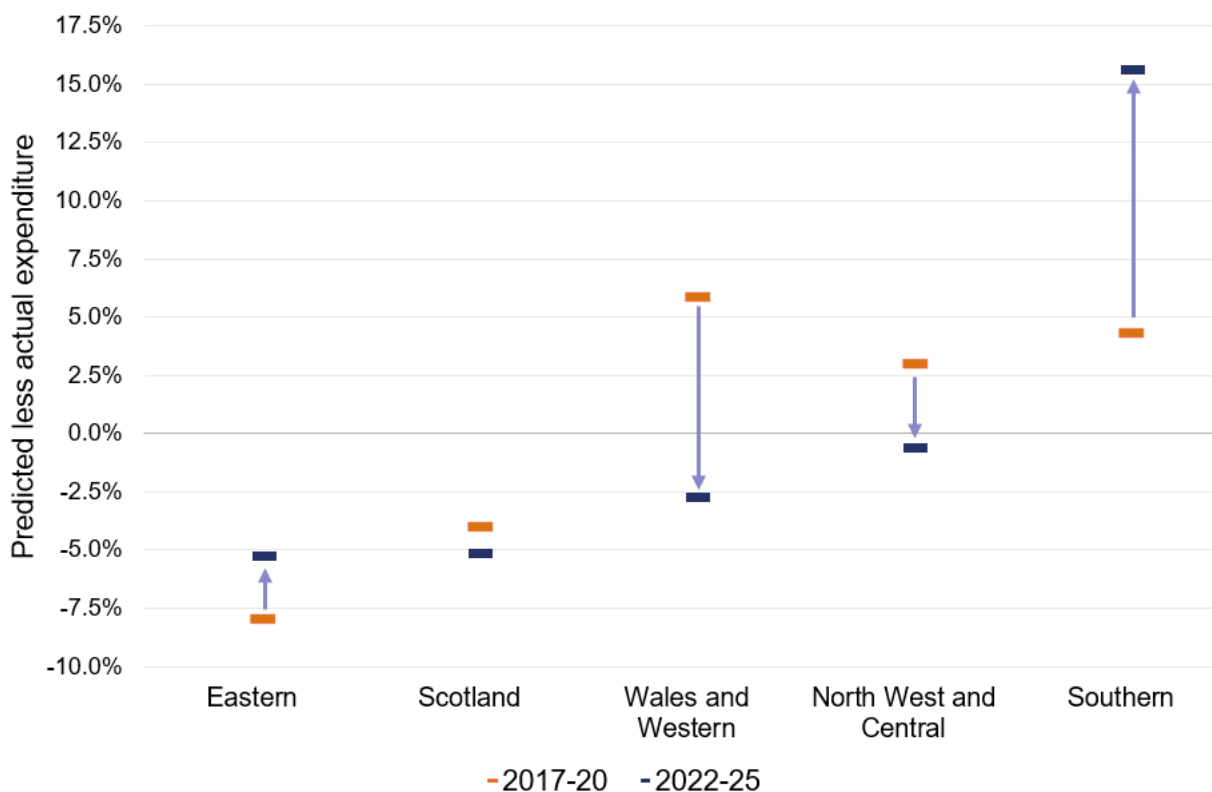
The changes in predicted expenditure shown in Figure 1 are mostly due to changes to usage which includes the significant disruption from Covid-19. However, there have also been changes to complexity and scale data. For example, the primary complexity variable in our modelling increased by 11% over this period, and track length reduced by 0.5%.

Key finding 2: Southern region has become an increasing outlier, with expenditure increasing compared to our model predictions relative to other regions over the past five years.

Regions' maintenance expenditure ranged from 15.6% higher for Southern to 5.3% lower than predicted for Eastern. As shown in Figure 2, variances to our model predictions have largely reduced over the past five years, with only Southern showing a significant

deterioration. This may partly reflect Southern making greater use of contractors, which can increase maintenance costs.

Figure 2: Regions' actual and predicted maintenance expenditure



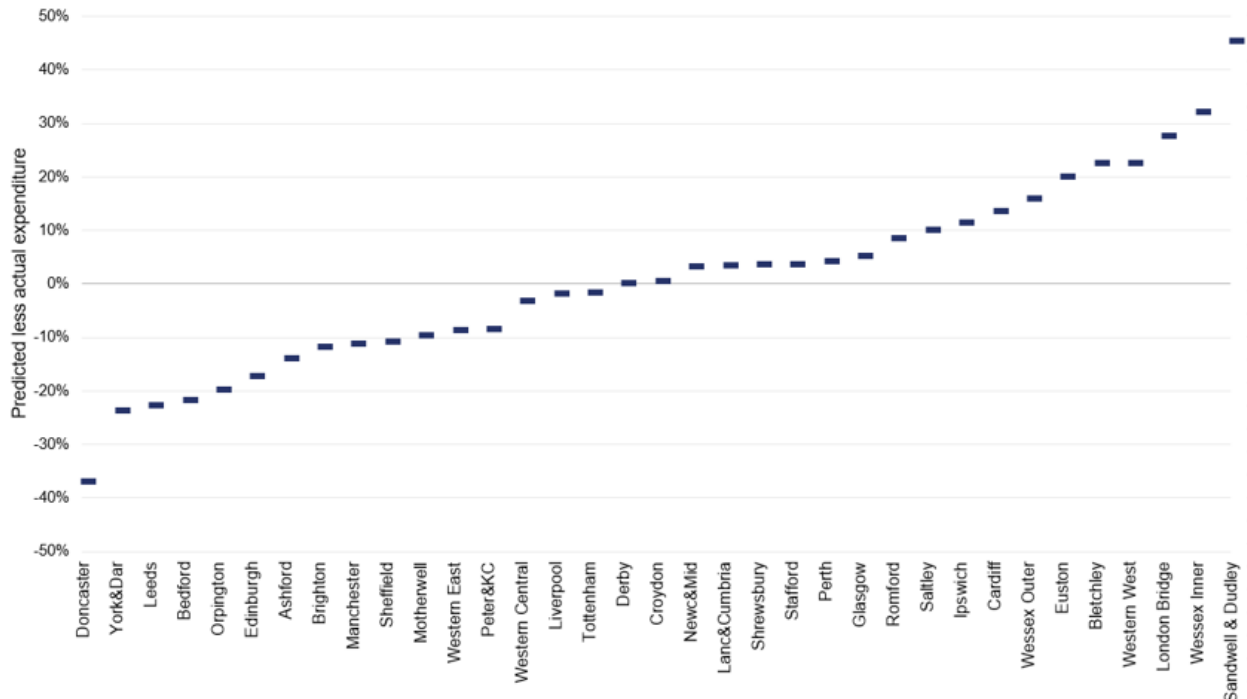
Note: A negative number means that a region spent less than our model predicted and vice versa.

Key finding 3: There are substantial variations between predicted and actual MDU expenditure. Indicative savings could be £120 million per year if MDUs with expenditure above our model prediction were brought in line with their predicted expenditure.

As shown in Figure 3, maintenance expenditure ranged from 36.9% below to 45.4% above our model prediction across MDUs. By way of illustration, If MDUs with expenditure above our model prediction were brought in line with predicted expenditure, Network Rail could potentially save around £120 million per year, equivalent to 5.0% of annual maintenance expenditure. However, this quantum of potential savings should be treated with caution and our report should not be taken as recommending a change to specific targets at this time. Some of the differences between MDU predicted and actual expenditure may reflect cost saving opportunities, however it may also reflect MDU specific factors not captured by the model. To understand these factors would require further work. It would also be important to better understand the interplay with the renewals strategy, practicable changes in working practices and the phasing of changes. Rather, our report identifies that

the relative performance of MDUs is an area where we recommend that Network Rail, and in future GBR, should be focussing attention.

Figure 3: MDUs' actual and predicted maintenance expenditure, 2022-25



Note: A negative number means that an MDU spent less than our model predicted and vice versa.

Renewals expenditure

In previous reports we have published econometric benchmarking of regions' track renewals expenditure. In our analysis for this year's report, **we have found some evidence of economies of scale for track renewal, with lower unit costs where there are higher volumes for both full and partial plain line track renewal.** However, as explained in Chapter 3, we have used a different unit cost dataset this year and the statistical robustness of our findings was not considered sufficient to make benchmarking conclusions with confidence across the Network Rail regions. We will continue to work with Network Rail to improve our understanding of which explanatory variables are most useful and available to use for benchmarking of renewals expenditure.

We also have concerns about irregularities in some of the data provided by Network Rail that underpins our analysis. We have sought to correct our analysis where possible for these irregularities. The technical annex supporting this report explains these matters further.

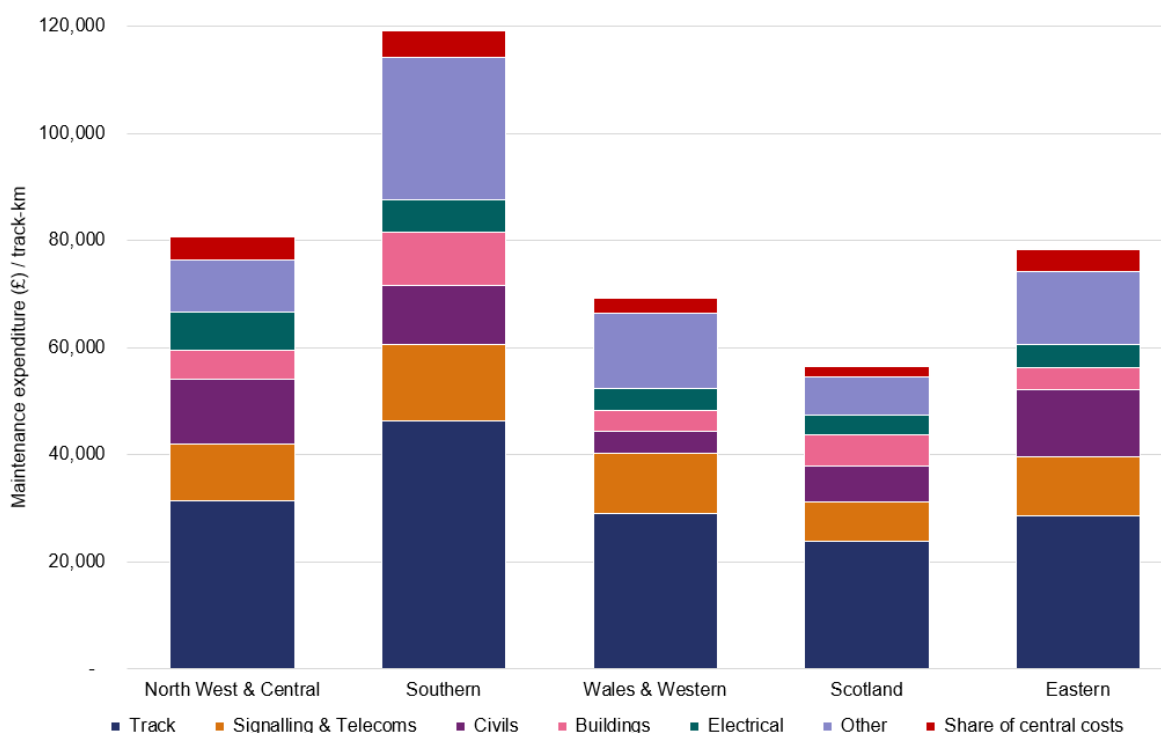
1. Regional variations in maintenance expenditure

- 1.1 Network Rail operates under a business model of five devolved regions. These are Eastern, North West & Central, Scotland, Southern, and Wales & Western. This chapter summarises our maintenance cost benchmarking of these regions.

Regional maintenance unit cost benchmarking

- 1.2 Figure 4 shows maintenance expenditure per track-km ('unit cost') across regions. Southern had a significantly higher maintenance expenditure per track-km than other regions across most asset categories, and Scotland the lowest. Track maintenance represents the largest share of expenditure across all regions. Differences in signalling, civils and 'other' costs also contribute to the observed variation across regions.

Figure 4: Breakdown of regional maintenance expenditure per track length, 2024-25



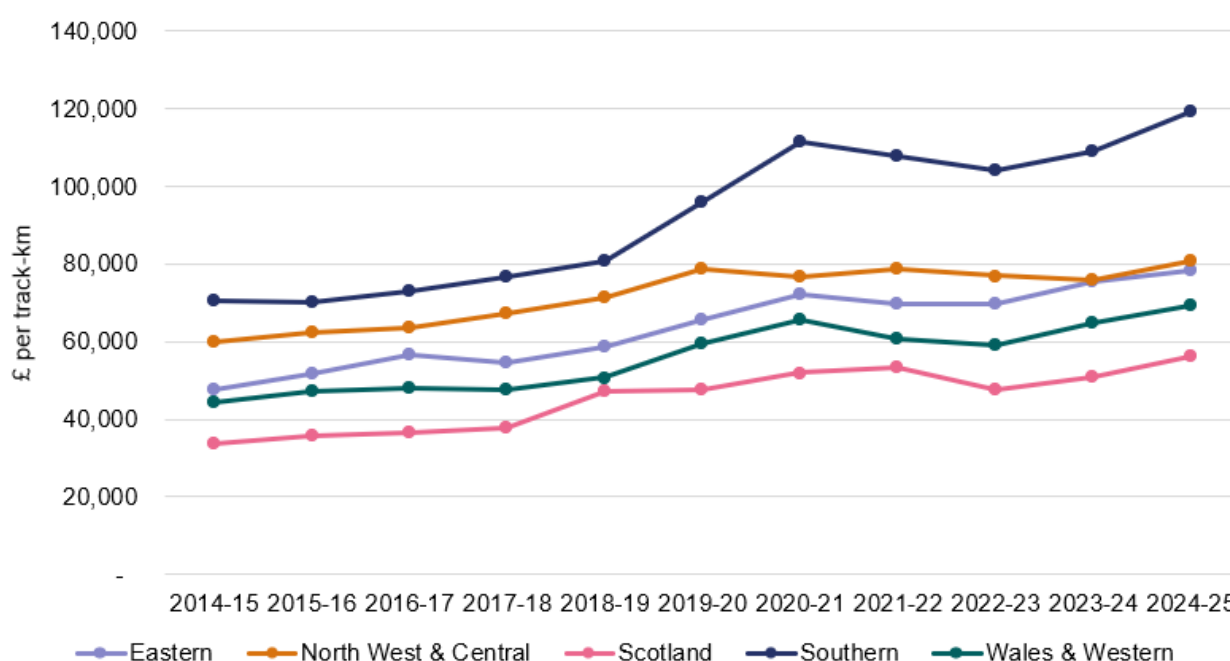
Source: ORR analysis of Network Rail data

- 1.3 As shown in Figure 5, adjusted for inflation, maintenance expenditure per track-km has increased across all regions over the past ten years, with the largest increases

in Southern and Wales & Western. The pattern is relatively steady over time, rather than being driven by a small number of isolated years.

- 1.4 Although maintenance expenditure per track-km increased in Wales & Western, as examined later in this chapter, the region's expenditure relative to our model prediction improved over time. This is because the benchmarking model accounts for factors such as usage and network complexity, which are not captured by the simple expenditure per track-km metric. As a result, increases in expenditure per track-km do not necessarily correspond to deteriorating relative performance.
- 1.5 The relatively steady increases shown in Figure 5 also suggest that the growth in maintenance expenditure is not primarily the result of short-term lumpiness in annual spending but instead reflects a broader upward trend in regional maintenance costs.

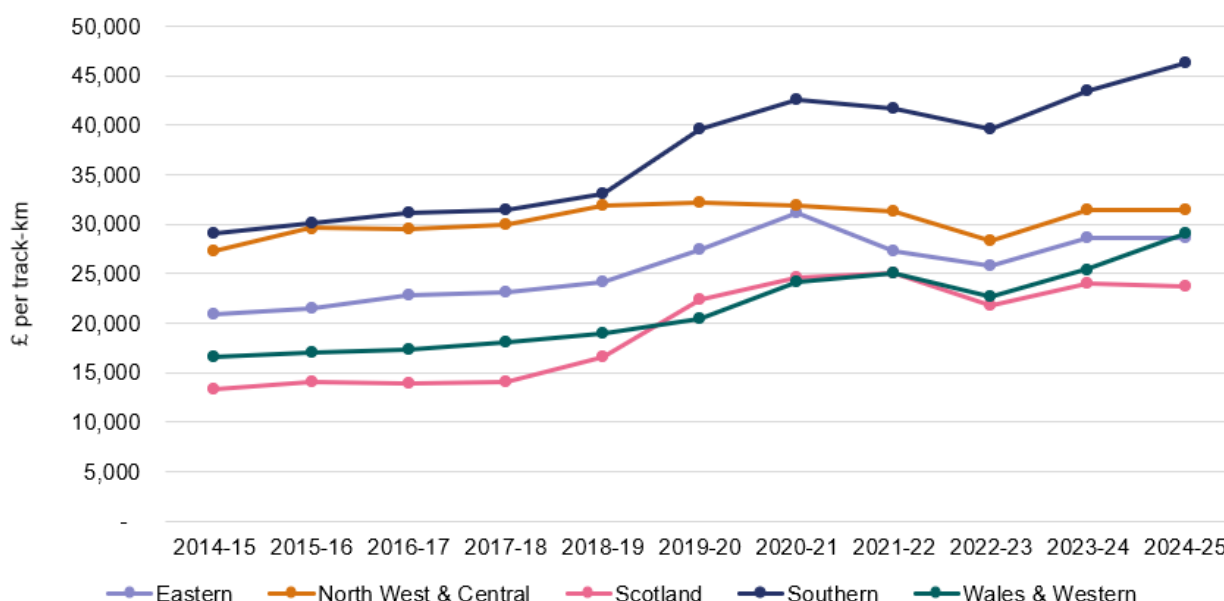
Figure 5: Regions' maintenance expenditure per track-km



Note: Total maintenance expenditure is in 2024-25 prices and has been adjusted for inflation

- 1.6 As shown in Figure 6, track maintenance cost per track-km increased for all regions over the past ten years. However, the scale of increase is lower than for total maintenance expenditure. This shows that track maintenance has not been the primary driver of regions' increased maintenance costs over the past ten years. Southern's track maintenance expenditure per km increased substantially more than the other regions.

Figure 6: Regions' track maintenance expenditure per track-km



Note: Track maintenance expenditure is in 2024-25 prices and has been adjusted for inflation

- 1.7 Differences in maintenance expenditure per track-km alone do not provide a reliable indication of relative expenditure performance across regions. Maintenance costs will also vary with, amongst other things, higher usage (for example, due to more wear and tear), and network complexity (for example, due to the need to maintain more switches and crossings). As explained in the [technical report](#), our cost benchmarking controls for these key cost drivers, to predict each region's maintenance expenditure¹.

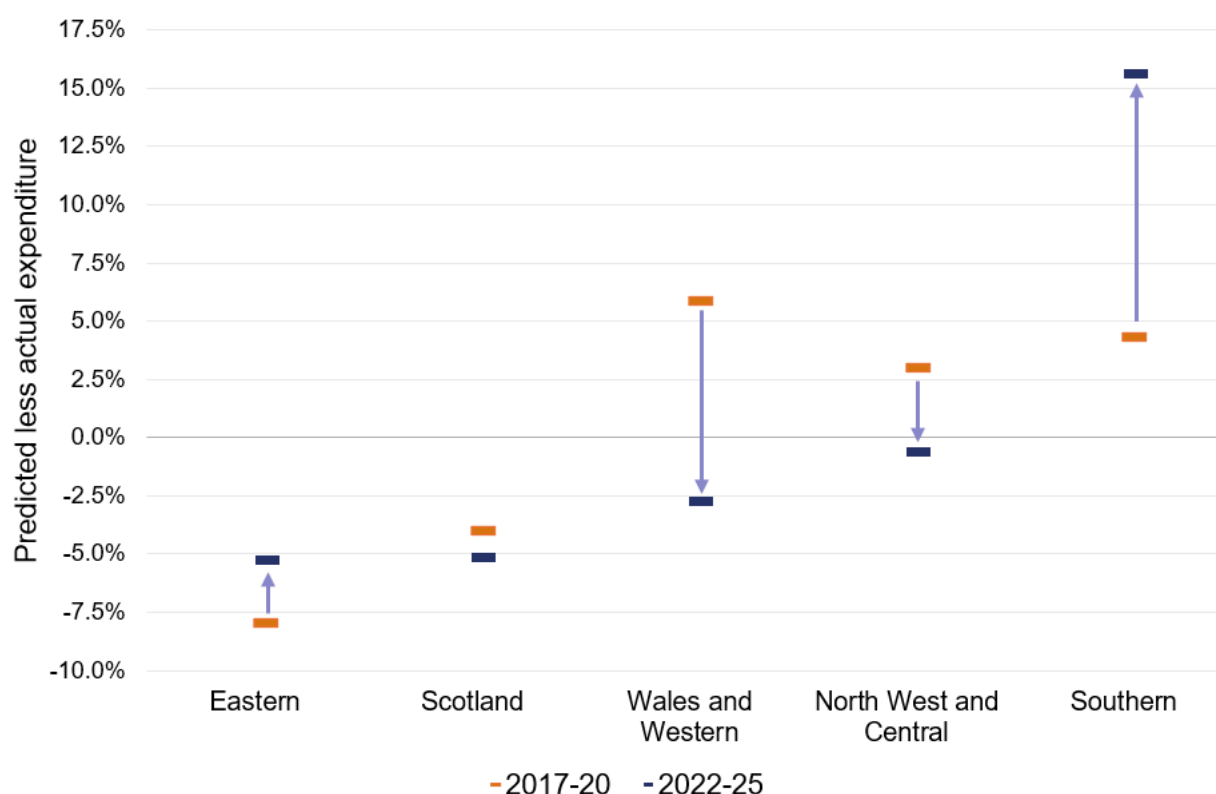
Regional model results

- 1.8 Our regional benchmarking model includes scale, usage and complexity variables. We compare our model predictions to regions' actual expenditure to identify variances for follow-up investigation about the scope for cost reductions.
- 1.9 Figure 7 shows the proportion of unexplained variance in maintenance expenditure for each region. We used a three-year average to mitigate data quality concerns outlined in the 'Data issues' section. A negative number means that a region spent less than our model predicted and vice versa.

¹ We also include year effects in our model to control for network-wide changes in maintenance expenditure over time, such as inflationary effects above CPI ('input prices'), and other factors affecting all regions.

1.10 Figure 7 shows regions' maintenance expenditure ranged from 5.3% lower than predicted for Eastern to 15.6% higher for Southern. Figure 7 also shows how these variances have changed over time, with Southern showing the largest deterioration and Wales & Western showing the greatest improvement. These variations may reflect regions' different approaches for targeting maintenance activities, differences in the degree of mitigation required for changes to regions' planned renewals activities and differences in efficiency. Southern was the largest outlier, while Eastern and Scotland spent less than our model predicted.

Figure 7: Regions' actual and predicted maintenance expenditure



1.11 Another way of representing regions' expenditure performance is to calculate the ratio of each region's actual expenditure divided by the model predicted expenditure. A ratio of above one means that a region has spent more than predicted, and a ratio of below one means that a region has spent less than predicted.

Table 1: Relative regional expenditure compared to model prediction

Region	2018-21	2019-22	2020-23	2021-24	2022-25
Eastern	0.94	0.99	0.99	0.98	0.95
North West & Central	0.98	0.98	0.98	1.02	0.99
Scotland	0.99	0.97	0.97	0.95	0.95
Southern	1.04	1.06	1.09	1.11	1.16
Wales & Western	1.05	1.01	0.98	0.95	0.97

- 1.12 Table 1 shows rolling three-year average expenditure relative to model predictions from 2018-19 to 2024-25. The results provide a smoothed view of expenditure performance over time, reducing the influence of year-to-year fluctuations in Network Rail's expenditure data. Southern consistently spent more than our model predicted and its relative expenditure increased over the period. In contrast, Eastern and Scotland consistently spent less than our model predicted.

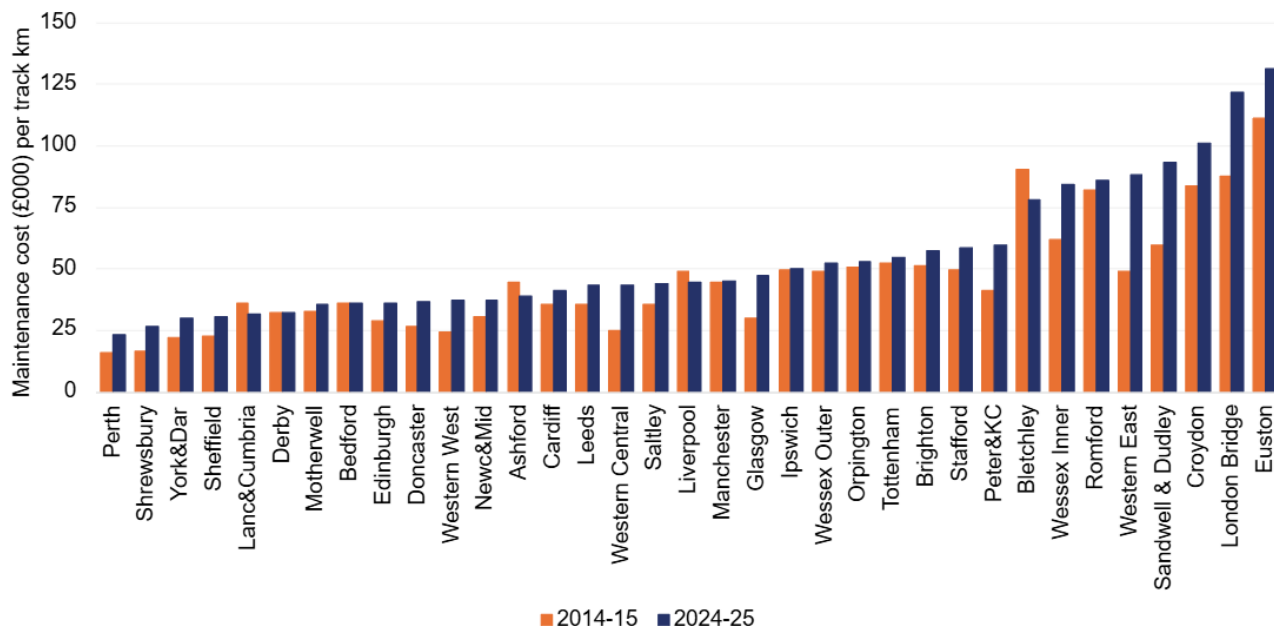
2. Maintenance Delivery Unit (MDU) variations in maintenance expenditure

- 2.1 Maintenance Delivery Units (MDUs) manage most routine maintenance activities within Network Rail's regions, accounting for 57% of Network Rail's total maintenance expenditure. MDUs maintain networks of different sizes with different levels of use and complexity.
- 2.2 Our MDU cost benchmarking analysis controls for scale, usage and complexity to predict each MDU's maintenance expenditure:
- Track length to account for network scale;
 - Passenger and freight traffic density to account for network usage; and
 - Criticality, track electrification and density of switches and crossings to account for network complexity.
- 2.3 We account for expenditure changes associated with the disruption caused by Covid-19. Further information on the model and statistical tests applied are available in the [technical report](#) supporting this report.
- 2.4 We compare each MDU's actual expenditure with the expenditure predicted by our model. This helps us identify the MDUs where expenditure is materially higher or lower than expected, given the characteristics of the network they maintain. These results identify areas for further investigation.
- 2.5 During our analysis we encountered some data irregularities. These issues and mitigations are explained in the final section of this chapter. Further discussion of our approach to managing the data issues are included in our [technical report](#).

MDU unit cost benchmarking

- 2.6 Figure 8 shows maintenance expenditure per track kilometre for each MDU in 2024-25, and in 2014-15.

Figure 8: Maintenance cost per track km (2024-25 prices)

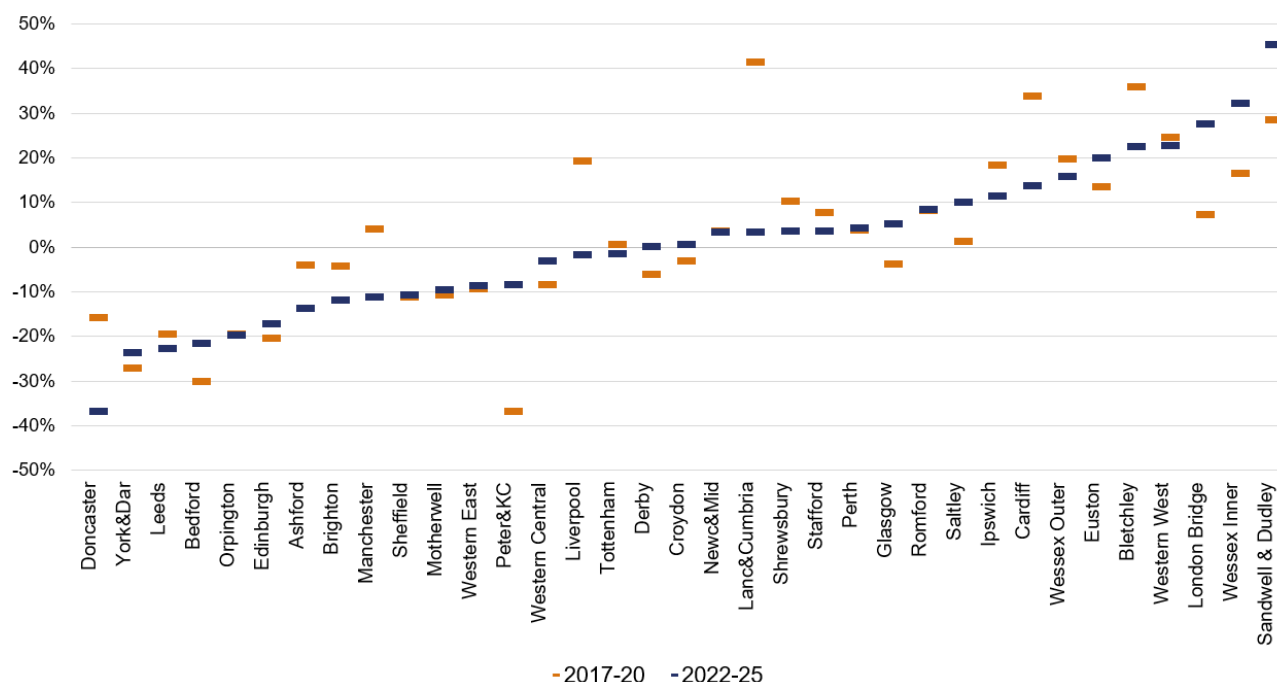


- 2.7 As shown in Figure 8, maintenance expenditure per track-km varies substantially between MDUs. In 2024-25, Euston's expenditure was more than five times higher than Perth MDU. Large differences in expenditure per track-km were also evident in 2014-15 and persisted across the past ten years.
- 2.8 On average, MDU expenditure per track-km increased by 23% between 2014-15 and 2024-25. Western East MDU had the largest increase at 79%.
- 2.9 However, expenditure per track-km does not take account of how intensively each network is used or how complex it is to maintain. A relatively high cost per track-km may be expected for an MDU operating a busy and complex part of the network. As MDUs have more distinct characteristics, the impact of traffic and complexity will be greater on the costs of MDUs than regions. We therefore use econometric cost benchmarking, which controls for scale, usage and complexity, to make a more like-for-like comparison.

MDU model results

- 2.10 Figure 9 shows the proportion of unexplained variance in maintenance expenditure for each MDU. We used a three-year average to mitigate irregularities in Network Rail's data.

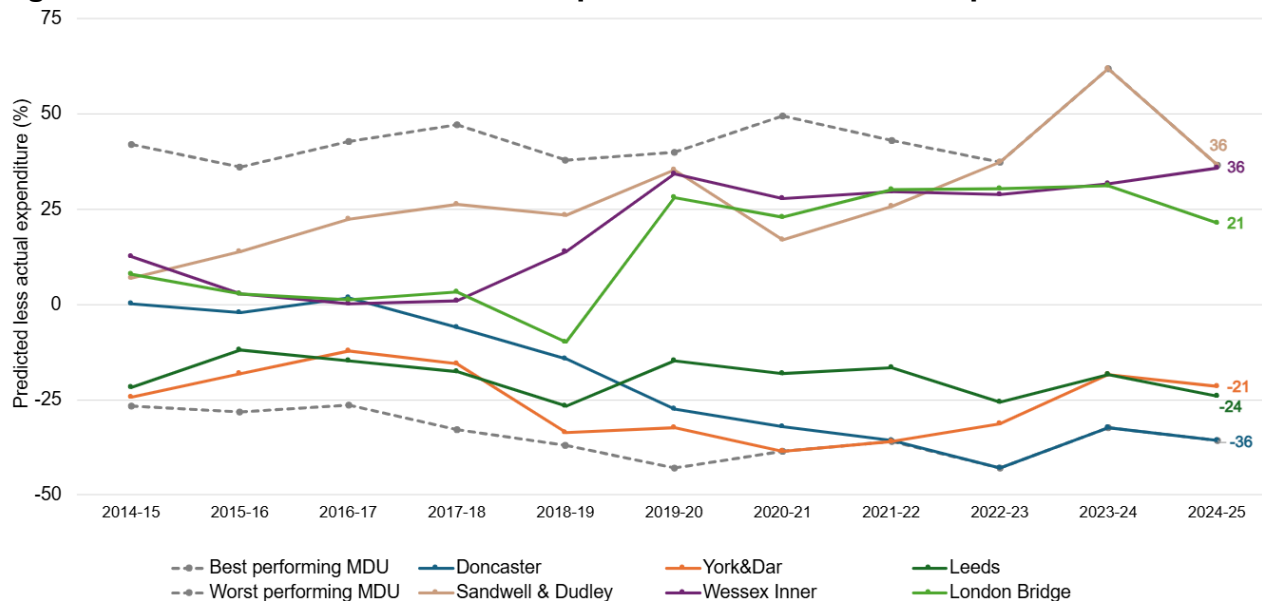
Figure 9: MDUs' actual and predicted maintenance expenditure



Note: A negative number means that an MDU spent less than our model predicted and vice versa.

- 2.11 Figure 9 shows the variation in maintenance expenditure for MDUs ranged between -37% (Doncaster MDU) and +45% (Sandwell and Dudley MDU) compared with our model predictions.
- 2.12 For some MDUs, there have been substantial changes in the variation between actual and predicted expenditure over the past five years. For example, Lancs & Cumbria's variation in maintenance expenditure has reduced by 38 percentage points, while Peter&KC's has increased by 28 percentage points.
- 2.13 If MDUs whose expenditure is above the model prediction were brought into line with predicted expenditure, our analysis indicates that Network Rail could save around £120 million per year. This is equivalent to around 5% of Network Rail's annual maintenance expenditure. However, this quantum of potential savings should be treated with caution and our report should not be taken as recommending a change to specific targets at this time. Some of the differences between MDU predicted and actual expenditure may reflect cost saving opportunities, however it may also reflect MDU specific factors not captured by the model. To do so would require further work. It would also be important to better understand the interplay with the renewals strategy, practicable changes in working practices and the phasing of changes.

Figure 10: Selected MDUs' actual and predicted maintenance expenditure



Note: A negative number means that an MDU spent less than our model predicted and vice versa.

- 2.14 Figure 10 shows the variation between actual and predicted maintenance expenditure for six selected MDUs between 2014-15 and 2024-25. These MDUs were the three best (Doncaster, York&Dar and Leeds) and three worst (Sandwell and Dudley, Wessex Inner and London Bridge) relative performers in 2024-25.
- 2.15 The relative performance of Doncaster has improved over time, while the performance of Leeds and York&Dar changed little over the last ten years. In contrast, the performance of Sandwell and Dudley, Wessex Inner and London Bridge have all declined over time (shown by an increasing trend on the chart). This suggests that changes in costs over time may be more important in explaining differences in MDU performance than factors unique to individual MDUs.
- 2.16 Overall, the relative performance of the best and worst performing MDUs is little changed over the last ten years, with the range changing from 69% to 72%.
- 2.17 Our analysis provides areas for further investigation of possible productivity gains, for example, through ways of working and technology adoption of higher performing MDUs. We have discussed our findings with Network Rail for further exploration.
- 2.18 We have compared our econometric benchmarking model to the simple maintenance cost per track-km to identify the wider impact of usage and complexity on MDU expenditure. The difference between MDUs' relative

performance in Figures 8 and 9 illustrates the importance of usage and network complexity in understanding MDUs' expected expenditure, i.e. that network scale is not the only important driver of MDUs' maintenance expenditure.

- 2.19 Table 2 shows that for two selected MDUs (Western West and Croydon), the maintenance cost per track is markedly different to the expenditure ratio rank. As an example, Western West is a larger but lesser used part of the network and has a middle-ranking maintenance cost per track km. Our model takes account of scale, usage and complexity. Our analysis shows that Western West's expenditure is substantially higher than predicted given its characteristics. For Croydon MDU, the opposite is the case. Croydon MDU covers a small proportion of the network but is a highly used and complex part of the network. It has one of the highest-ranking maintenance costs per track km, however, its expenditure is consistent with our model prediction taking account of scale, usage and network complexity.

Table 2: Selected MDUs maintenance cost per track km and rank for characteristic variables, 2024-25

MDU	Maintenance cost per track km rank (1 st = lowest)	Expenditure ratio rank (1 st = best)	Passenger km density rank	Electrified track km density rank	Switches and crossings density rank
Western West	11 th	33 rd	31 st	34 th	33 rd
Croydon	33 rd	23 rd	2 nd	1 st	2 nd

Data issues

- 2.20 Our analysis has had to deal with several problems with the data provided by Network Rail. The most significant of these was that three new MDUs (Darlington, Kings Cross and Middlesbrough) were created out of the York, Peterborough and Newcastle MDUs in 2020-21. The creation of the new MDUs also changed the boundaries of the existing MDUs. To address these boundary problems we combined the three new MDUs with the three existing MDUs to create larger composite MDUs:

- Newcastle was combined with Middlesbrough to become Newc&Mid;
- Peterborough was combined with King's Cross to become Peter&KC; and

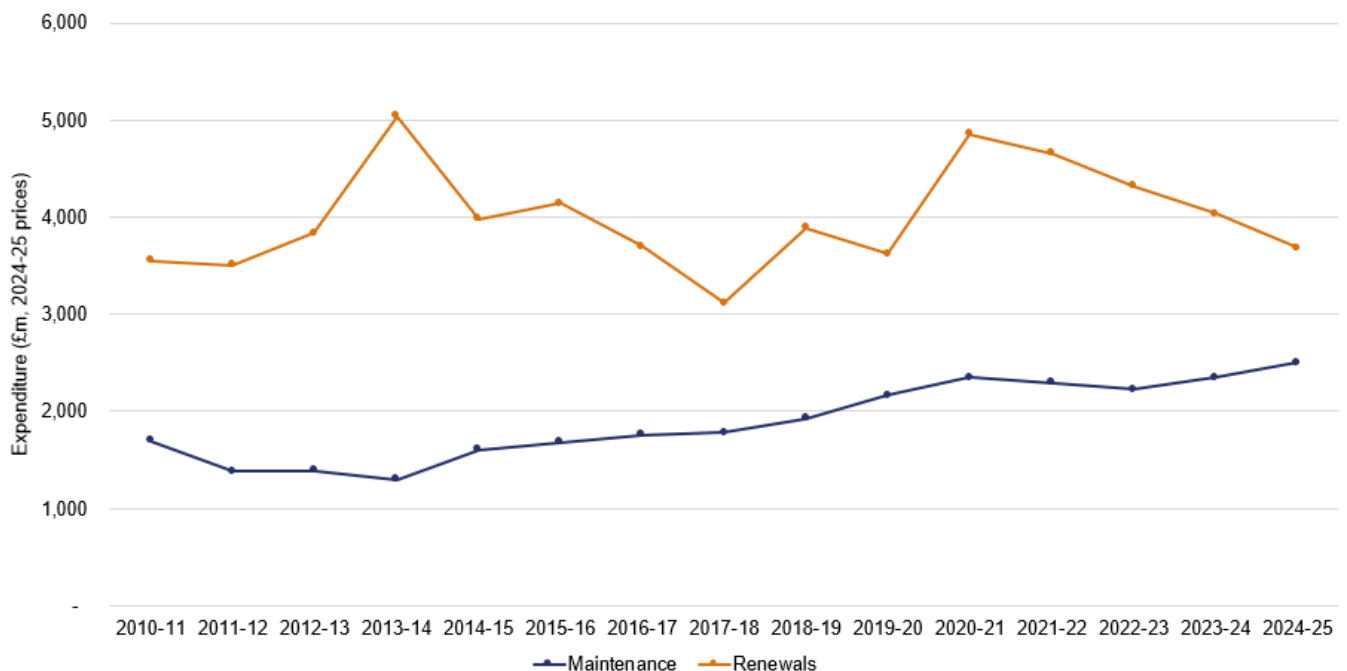
- York was combined with Darlington to become York&Dar.

- 2.21 To mitigate our concerns with Network Rail's data, we normalised the network characteristics data so that these were consistent pre- and post-boundary change. We also used three-year averages to construct our econometric benchmarks. More detail is provided in our [technical report](#).
- 2.22 Network Rail considers that its data is robust. In response to our concerns about the quality of their data, Network Rail stated that discrepancies arise between the cost benchmarking dataset and other datasets supplied to the ORR because each dataset is produced using different methodologies and for different purposes. We do not consider that these matters undermine the usefulness of the analysis presented in this report.

3. Track renewals expenditure analysis

- 3.1 Renewals relate to activities to replace, in whole or in part, network assets that have deteriorated such that they can no longer be maintained economically. Renewal of an asset restores the original performance of the asset and can add additional functionality as technology improves.
- 3.2 Figure 11 shows how maintenance and renewals expenditure have changed between 2010-11 to 2024-25.

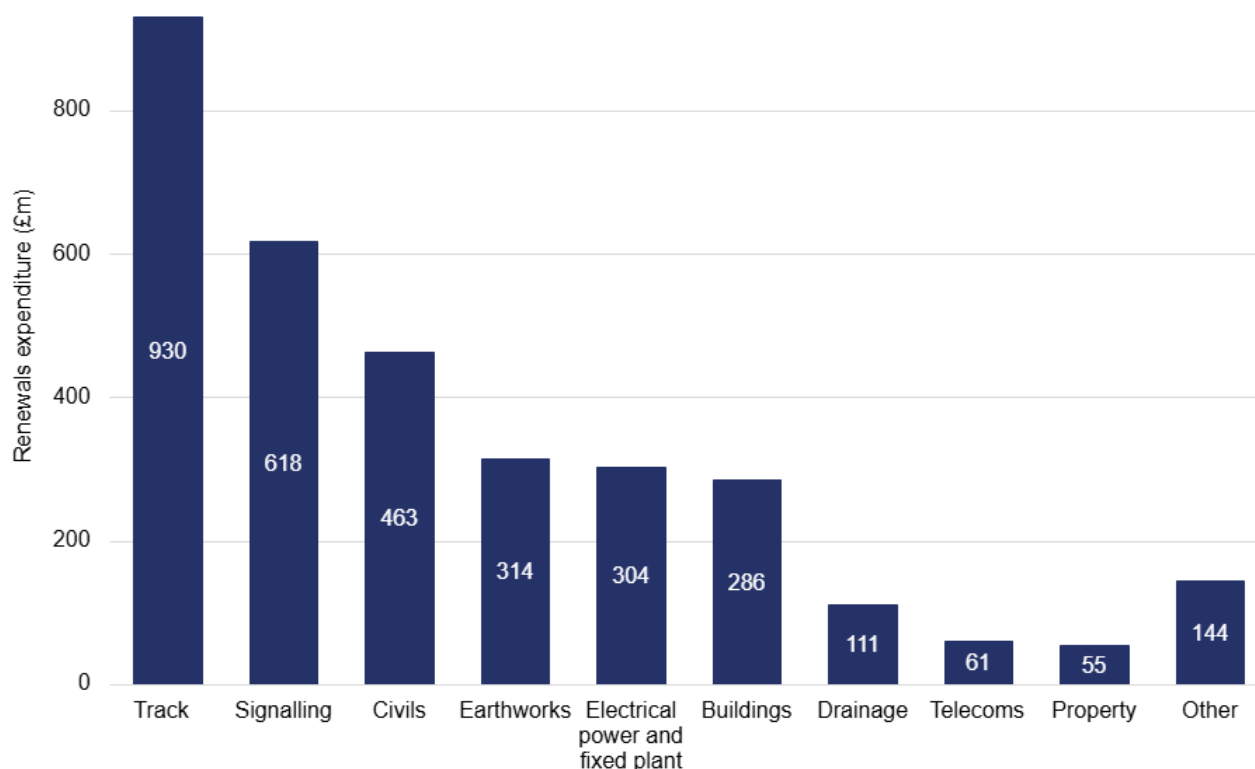
Figure 11: Network Rail's maintenance and renewals expenditure



Source: ORR analysis of Network Rail data

- 3.3 As shown in Figure 11, over the past five years there has been a steady decrease in renewals expenditure as Network Rail has reduced expenditure in line with the available funding. Over the same period, maintenance expenditure has increased partly due to the need for increased maintenance in lieu of reduced renewals. The relationship between maintenance and renewals expenditure in the ten years prior to this is less clear, largely due to the uneven annual profile of renewals expenditure.

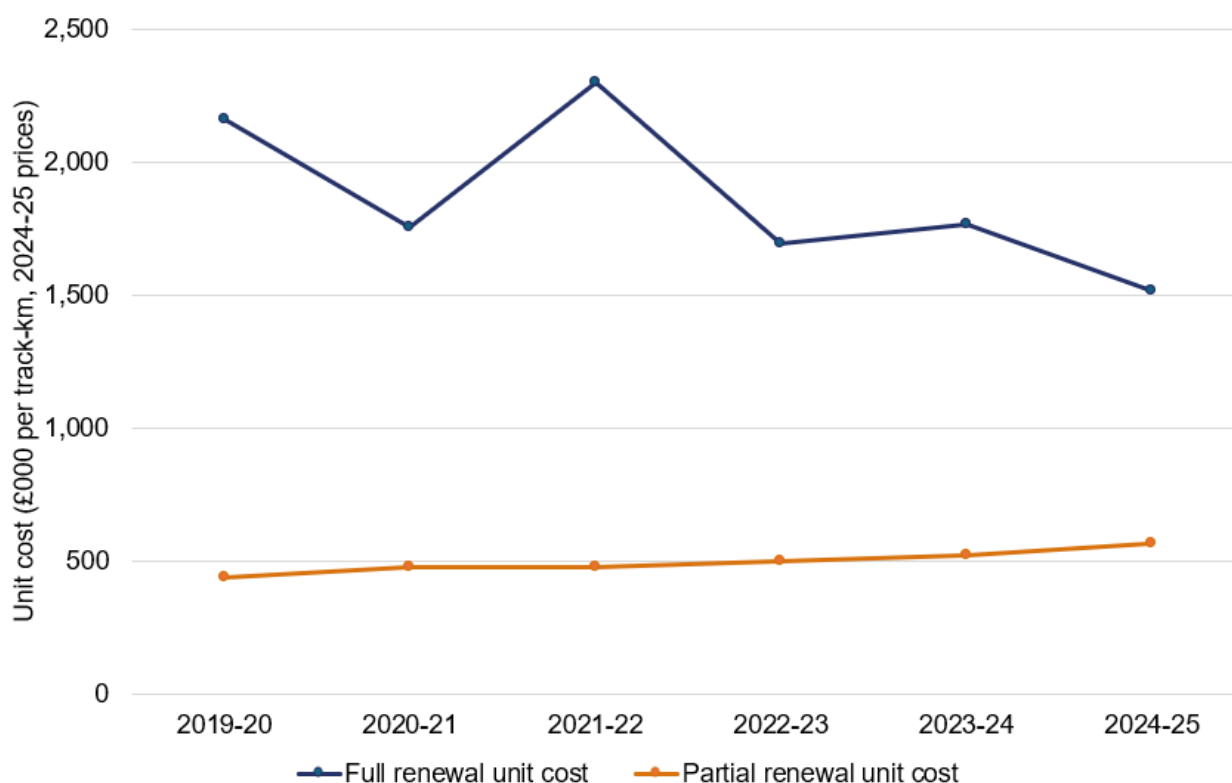
Figure 12: Combined regional renewals expenditure by asset class, 2024-25



Source: ORR analysis of Network Rail data

- 3.4 Figure 12 shows Network Rail renewals expenditure by asset class in 2024-25. Track was the largest category of renewals expenditure. It comprises full plain line track renewal (28%), partial plain line track renewal (28%), switches and crossings (30%), and refurbishment and other track renewals (13%).
- 3.5 Our previous renewals benchmarking analysis used a bespoke dataset that did not differentiate between full and partial plain line track renewals. However, full and partial renewals involve different activities with different associated costs. Combining full and partial renewals can lead to misleading benchmarking results, for example, if regions undertake a different mix of full and partial renewals.
- 3.6 This year we have used a different dataset based on information in Network Rail's [Regulatory Financial Statements](#) to separately analyse full and partial plain line track renewal unit costs. Full and partial plain line track renewals are reported separately in Network Rail's Regulatory Financial Statements from 2019-20 onwards. This improves comparability between regions as we can distinguish between full and partial plain line track renewal activities.

Figure 13: Unit costs for full and partial plain line track renewals



Source: ORR analysis of Network Rail data

3.7 As shown by Figure 13, full plain line renewals have consistently higher unit costs than partial renewals. Over the period, full renewal unit costs ranged between around £1.5 million and £2.3 million per km, compared with around £0.4 million to £0.6 million per km for partial renewals. Full renewal unit costs were also considerably more volatile from year to year. This pattern is consistent with the lumpy nature of full renewals programmes and fluctuations in annual delivery volumes.

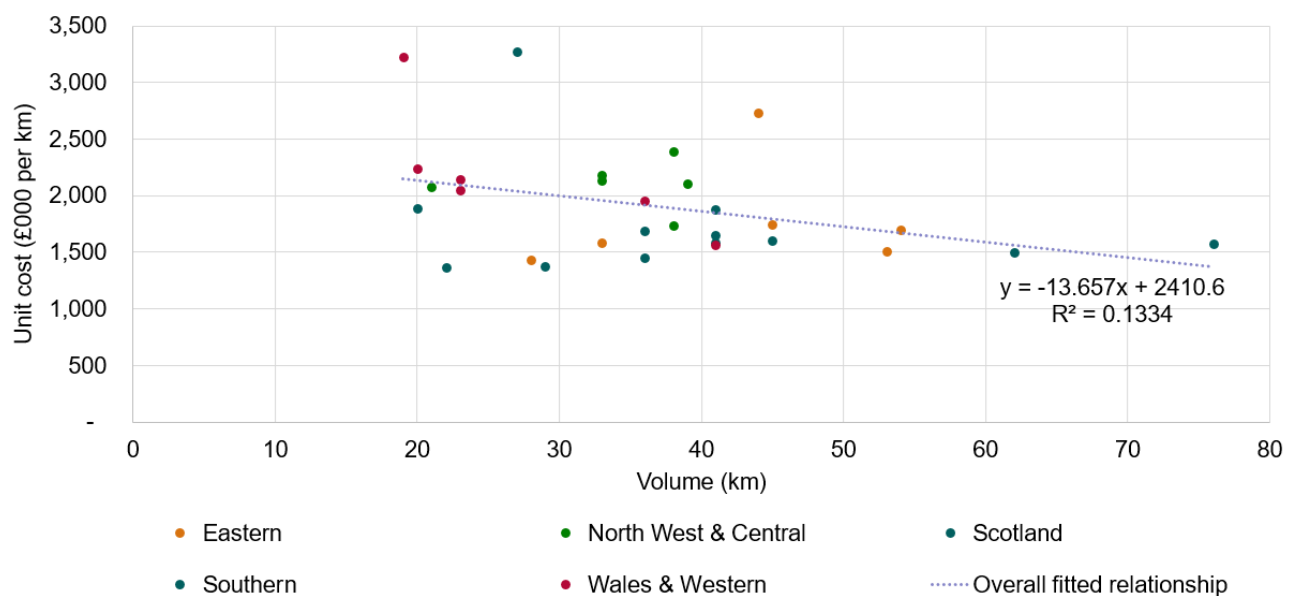
Track renewals unit cost analysis

3.8 Our analysis has found evidence of economies of scale for both full and partial plain line track renewals. This means that a higher volume of work undertaken by a region in a year is usually associated with a lower cost for each unit of work (renewal of a kilometre of track).

Full plain line track renewals

3.9 Figure 14 shows that unit costs fall as full plain line track renewal volumes increase, for example, a 10% increase in volume results in a 2.6% decrease in the unit cost. This is evidence of economies of scale. However, the relationship is weak, with volume explaining only around 13% of the variation in unit costs. This means that our finding of economies of scale for full plain line track renewal should be interpreted cautiously.

Figure 14: Relationship between full plain line track renewal volumes and unit costs, 2019-20 to 2024-25

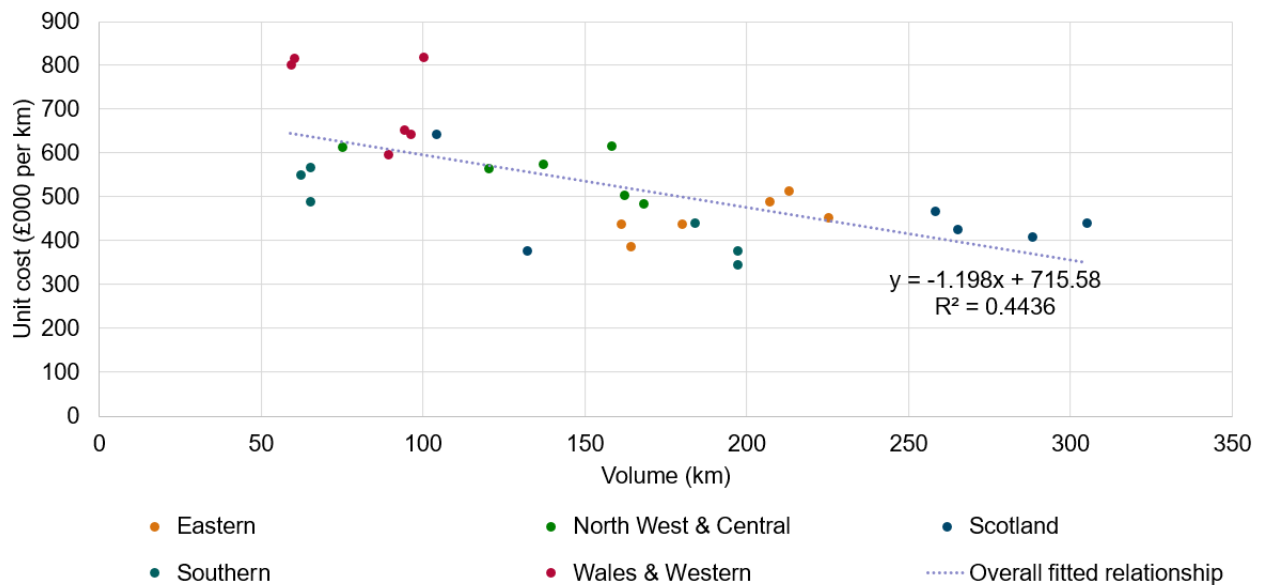


Source: ORR analysis of Network Rail data

Partial plain line track renewals

3.10 Figure 15 shows that higher volumes of partial plain line track renewals are generally associated with lower unit costs. For example, a 10% increase in volume results in a 3.4% decrease in unit cost. This relationship is more robust than for full renewals, with volume explaining around 44% of the variation in observed unit costs.

Figure 15: Relationship between partial plain line track renewal volumes and unit costs, 2019-20 to 2024-25



- 3.11 Figures 14 and 15 show that volumes and unit costs for plain line track renewals vary across regions. The relationship between volumes and unit costs is clearer for partial plain line track renewals than for full. However, there remains substantial variation around the relationships. We therefore do not consider that the results are sufficiently robust to support strong regional benchmarking conclusions.
- 3.12 Despite finding some evidence for economies of scale, we were unable to develop robust econometric modelling of predicted unit costs for regions including wider explanatory variables. We tested a range of explanatory variables including scale, usage and complexity variables, and used different statistical models, however, with only a limited available sample size. None of the models that we investigated produced reliable results. We will continue to work with Network Rail to improve our understanding of which explanatory variables may be useful and available to use for modelling of renewals expenditure.



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