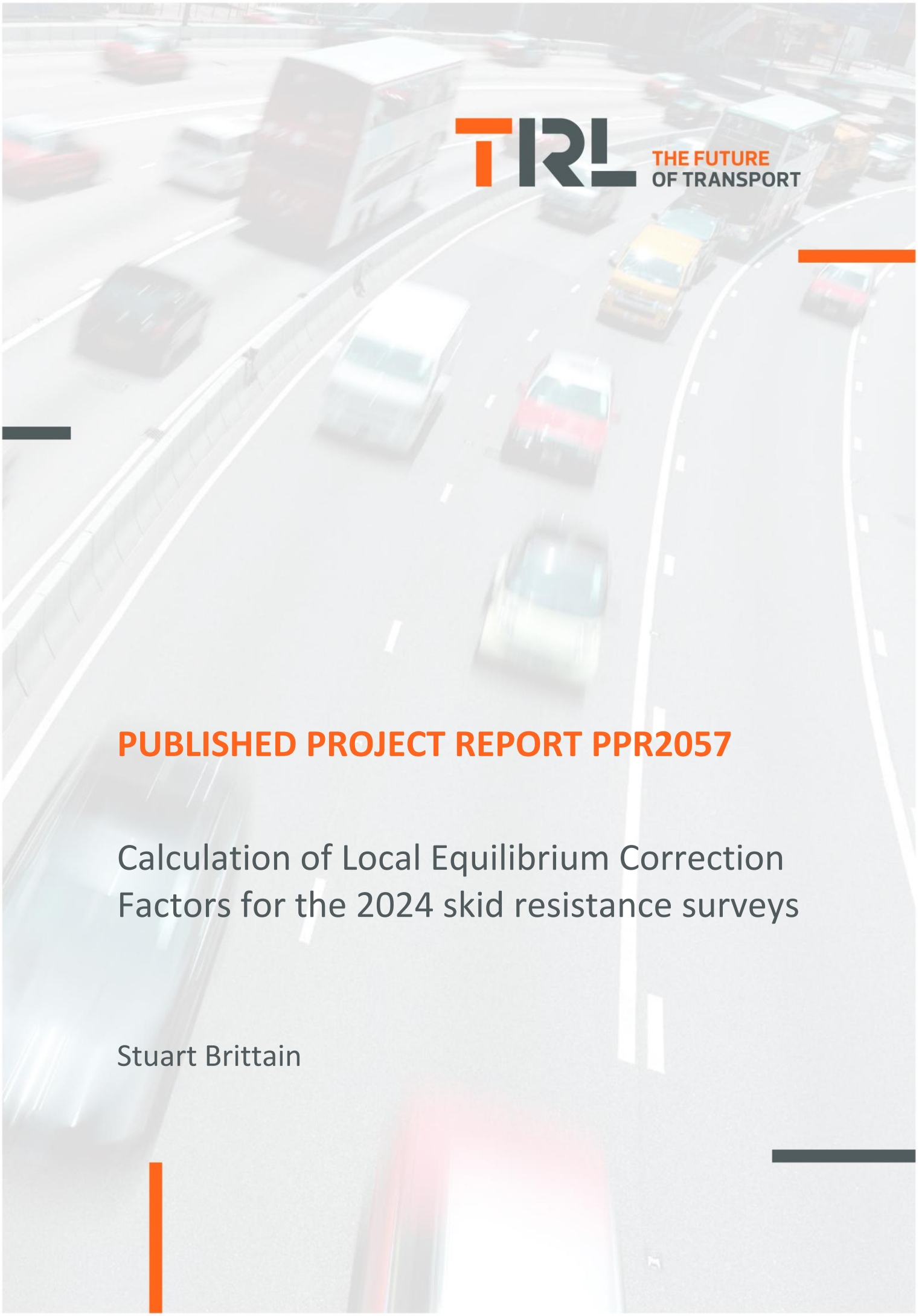

THE FUTURE OF TRANSPORT

PUBLISHED PROJECT REPORT PPR2057

Calculation of Local Equilibrium Correction Factors for the 2024 skid resistance surveys

Stuart Brittain

Report details

Report prepared for:	National Highways, SES		
Project/customer reference:	SPaTS 2: T0098		
Copyright:	© TRL Limited		
Report date:	06/08/2025		
Report status/version:	Issue 1		
Quality approval:			
Cathy Booth (Project Manager)	06/08/2025	Martin Greene (Technical Reviewer)	06/08/2025

Disclaimer

Executive Summary

As part of the process for managing skid resistance on its network (the Strategic Road Network or SRN), National Highways carries out single annual skid resistance surveys (SASS). The data from these surveys is used to identify sites where there is a need to undertake an investigation to determine whether a treatment to improve skid resistance would be beneficial in mitigating the risk of skidding collisions at a site. Further details on the site investigation process are given in the Skidding Resistance part of the DMRB (DMRB CS 228). In addition, this data feeds into the KPI for pavement condition (KPI3).

The measurements from these surveys are corrected for seasonal variation by the application of correction factors called the "Local Equilibrium Correction Factors" (LECF). The procedure used since 2007 to calculate the LECFs was used again during 2024. This document provides a record of the procedure used to derive the LECFs that have been applied to the 2024 skid resistance survey data.

A high percentage (97.4%) of the network length of the National Highways Areas had skid resistance data coverage in 2024, with each National Highways Area having at least 95.1% coverage. In addition to the National Highways Areas, LECFs were provided for the A1 Darrington to Dishforth, M25 and Second Severn Crossing DBFOs.

All of the Areas and DBFOs where LECFs were calculated were surveyed within their target survey period.

With the exception of South West, the spread of survey dates was 28 days or less for all Areas/DBFOs where a LECF was calculated. In the South West Area, only the M4 exceeded the 28 day target.

Surveys of lanes other than lane 1 were undertaken for some Areas and DBFOs. For the Areas and DBFOs where LECFs were calculated these surveys were carried out in the same period as the lane 1 surveys and therefore the same LECF has been applied (calculated using suitable data from all lanes).

Previous research by TRL identified that concrete does not appear to experience seasonal variation to the same degree as other surfacings. Therefore, an LECF of 1.000 (i.e. no correction) was applied to concrete sections. An investigation into the application of LECFs on concrete sections using the 2024 data found no conflict with the previous investigations into concrete. Therefore, due to the unsuitability of the calculated LECFs for concrete it is recommended that the application of an LECF of 1.000 for concrete sections is continued.

Analysis of the spread of 2024 survey data values suggests that the minimum value occurred towards the end of the middle period (i.e. slightly later than expected). The weighted average LECF value was 0.90 for 2024, which corresponds to an average to slightly high skid resistance year compared to the previous three years. Analysis of data from the National Highways benchmark sites that monitor long term trends in skid resistance across the network (reported separately) reached similar conclusions.

Table of Contents

1 Introduction

As part of the process for managing skid resistance on its network (the Strategic Road Network or SRN) National Highways carries out single annual skid resistance surveys (SASS). The test season for these surveys is broadly over the summer months, and is divided into three survey periods (early, middle and late). The network has been divided so that approximately a third of its length is tested in each survey period; the survey period rotates to ensure that each length of the network is tested once in each period over three years. Skid resistance levels vary during the year with the lowest levels of skid resistance generally experienced in the middle of the summer. The general trend for skid resistance is shown diagrammatically in Figure 1.1. Levels of skid resistance can also fluctuate from year to year.

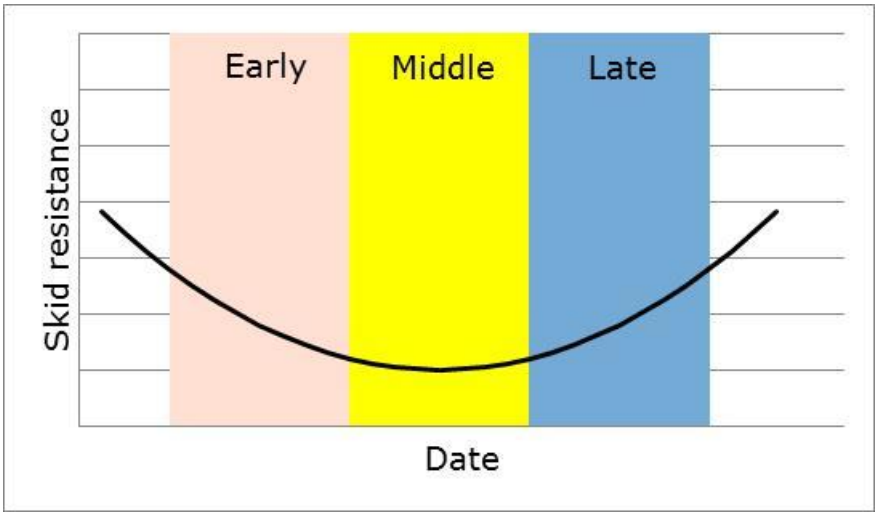

Figure 1.1: Idealised seasonal variation of skid resistance over the summer

In order to correct for this seasonal variation (both within and between years), Local Equilibrium Correction Factors (LECFs) are calculated which are then applied to the speed corrected skid resistance data (SC). Once this data has been seasonally corrected it is termed the Characteristic Skid Coefficient (CSC). Further details on the use of CSC data are provided in CS 228 of the Design Manual for Roads and Bridges (DMRB CS 228).

The network is split into “localities”, consisting of the length of each road within a specified National Highways Asset Delivery Area, and a LECF value is assigned to each of these localities. The LECF is calculated from the average of the past three years’ SC data for the locality (known as the Local Equilibrium SC or LESC) and the current average for the locality (known as the Local Mean SC or LMSC).

For each locality two types of LECF are calculated. The first, known as the road LECF, is calculated using the data available for that locality only. The other LECF is called the Area LECF and uses all of the data available for the Area that contains the locality. The Area LECF uses data from surveys which can be spread over several weeks and are over a wide area. Since fluctuations in skid resistance can occur within this period of time, this generally means that the Area LECF is less robust than the road LECF. However, some localities are

quite small and therefore have little data available for calculation of a robust road LECF. A minimum length is therefore applied for the calculation of a road LECF. If a locality has 25km or more of valid SC data (i.e. SC data for the current year and a suitable dataset for the past years) then the road LECF is applied, otherwise the Area LECF is used. Full details of the LECF calculation procedure are given in Appendix A.

Once the LECF values have been calculated for each survey period, they are loaded into National Highways' Pavement Management System (P-AMS) so that they can be used in conjunction with the skid resistance survey data.

This document provides a record of the procedure used to derive the LECFs that have been applied to the 2024 skid resistance survey data.

The procedure developed in 2007 (Brittain, 2007) which incorporates a visual analysis and was refined in 2008 to include an automated analysis (Brittain, 2009) was used again this year.

A summary of the survey coverage and range of survey dates is given in Section 2.1. Section 3 contains an overview of the calculation and delivery of the 2024 LECF values, along with any issues identified. Additional observations from the 2024 LECF calculation are discussed in Section 4 and Appendix B contains tables of the LECF values calculated.

2 Data quality

2.1 Survey Coverage

The survey coverage obtained for 2024 is presented in Table 2.1. These results have been calculated by comparing the data available within P-AMS at the analysis date against the network definition at this date. This will potentially underestimate the surveys undertaken as any surveys undertaken but not fully loaded/fitted will not be included. In addition, changes to the network during the course of the year may result in some lengths having not been surveyed as they did not exist when the survey contractor was defining their routes.

In some cases, the value shown for "Over year" does not equal the sum of the percentages surveyed in the survey periods. This is because the same length was surveyed in more than one survey period.

Table 2.1: Percentage of network data available in P-AMS for 2024, lane 1, not ox bow lay-by (data at 06/01/2025)

Target	Area	Early	Middle	Late	Very Late[1]	Over year
Early	South West	96.2%	-	-	-	96.2%
Early	Area 6	96.8%	-	-	-	96.8%
Early	Area 7	97.6%	-	-	-	97.6%
Early	Area 10	99.0%	-	-	-	99.0%
Early	Second Severn Crossing	98.1%	-	-	-	98.1%
Middle	Area 4	-	96.3%	-	-	96.3%
Middle	Area 13	-	98.6%	-	-	98.6%
Middle	Area 14	-	98.5%	-	-	98.5%
Middle	A1DD DBFO	-	100.0%	-	-	100.0%
Middle	M25 DBFO	-	91.8%	-	-	91.8%
Late	Area 3	-	-	99.8%	-	99.8%
Late	Area 8	-	-	97.8%	-	97.8%
Late	Area 9	-	-	95.1%	-	95.1%
Late	Area 12	-	-	97.9%	-	97.9%
not defined	A19 DBFO	-	-	-	-	-
not defined	A1M DBFO	-	-	-	-	-
not defined	A249 DBFO	85.0%	-	-	-	85.0%
not defined	A30/A35 DBFO	-	-	-	-	-
not defined	A417/A419 DBFO	67.5%	83.8%	80.3%	-	82.8%
not defined	A69 DBFO	-	-	-	-	-
not defined	M40 DBFO	-	-	-	-	-
n/a	NH Areas	43.4%	18.2%	35.8%		97.4%

[1] Surveys conducted between the end of the survey season (20th October) and the end of the calendar year

The 2024 survey resulted in data being available in P-AMS for a high percentage of the network; 97.4% total coverage for National Highways Areas with at least 95.1% coverage in

each National Highways Area. All of the National Highways Areas were surveyed in the target survey period. The spread of survey dates is discussed in Section 2.3.

High survey coverage was also seen for most of the DBFOs loaded into P-AMS with a defined (SASS compatible) survey rotation. As with previous years, some data has also been loaded for some of the other DBFOs. All of the DBFOs with survey data loaded into P-AMS are discussed further in Section 3.4.

2.1.1 Survey load dates

After the surveys are conducted, the data are loaded into P-AMS and undergo independent checks (discussed further in Section 2.2). The survey contract states that the Contractor shall ensure that data has been loaded, passes the independent checks and is ready for further analysis (i.e. the LECF calculation) by specified dates. It is not possible to carry out the calculation of the LECFs until a significant proportion of the survey has been loaded. As such delays in the loading of the data cause delays in the availability of the LECFs. The dates given in the survey contract for the data being ready are given in Table 2.2. The percentage of the data loaded by these dates for each Area is given in Table 2.3.

Table 2.2: End of survey period and target data availability dates

Survey period	End of survey period	Target date for data to be available for LECF calculation
Early	27th June	9th August
Middle	24th August	7th October
Late	20th October	30th November

Table 2.3: Percentage of current data available by target date (analysis run 06/01/2025)

Target survey period	Area	Percentage of current data available at the target date
Early	South West	99.4%
Early	Area 6	98.4%
Early	Area 7	94.8%
Early	Area 10	95.1%
Early	Second Severn Crossing	100.0%
Middle	Area 4	98.1%
Middle	Area 13	100.0%
Middle	Area 14	89.7%
Middle	A1DD DBFO	100.0%
Middle	M25 DBFO	97.6%
Late	Area 3	100.0%
Late	Area 8	100.0%
Late	Area 9	100.0%
Late	Area 12	100.0%

It can be seen from Table 2.3 that, with the exception of some of the Areas with an early or middle period survey, the majority of the data was available at the target dates.

2.2 Suitability of data loaded

During the survey season the survey data is reviewed visually to help identify any issues that should be resolved. This process was undertaken after each survey period when the survey contractor had loaded and carried out initial checks on the data for that period.

The types of anomalies that are looked for in this review include:

- Lengths where the data suggests that either the test wheel was up or it had experienced a puncture
- Lengths where the data appears to be misaligned relative to the previous years' data (i.e. the section markers may be in the wrong place)
- Lengths which exhibited oscillating data or otherwise anomalous data
- Lengths with duplicate surveys loaded

During the review the following anomalies were found:

- Very high SC values
- Large changes in SC values including low values

The lengths identified by this analysis were supplied to National Highways and the survey contractor for review and, where necessary, amendment.

2.3 Survey spread

The purpose of the LECFs is to correct for the seasonal and between year variations in skid resistance experienced on the network. However, the longer the timescale for the survey of a road the more likely the correction will start to become unsuitable for parts of the survey due to changes in the weather. Therefore, to obtain the most robust data it is necessary to conduct surveys within an Area in a short timescale, with particular attention paid to the time taken to survey an individual road. The survey contract states that the time between the start and end of a survey for each locality shall be no more than 28 days. In addition, any surveys not conducted in the target survey period will cause issues with the calculation of LECF values in future years (or would not be used).

The spread of survey dates for each Area is shown in Figure 2.1. The coloured bars represent the extent of the period during which the survey for that Area was undertaken, the vertical red lines show the survey period boundaries, and the crosses mark dates when surveys were conducted.

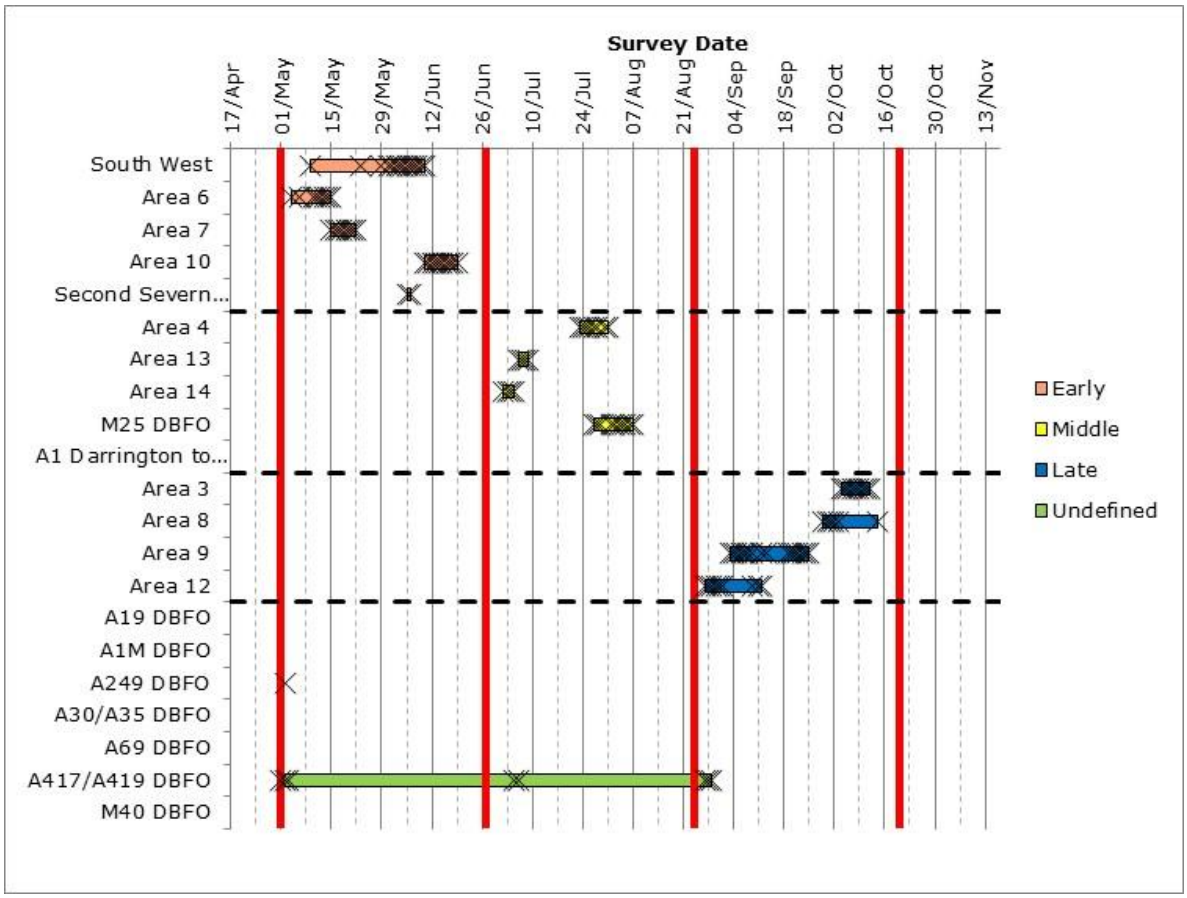

Figure 2.1: Spread of survey dates by Area/DBFO in 2024 (Lane 1 surveys)

On examination of the data it was found that other than South west, all Areas (with a defined survey rotation) were surveyed within 28 days or less. On examination of the data for South West (see Figure 2.2) it was found that only the M4 exceeded the 28 day target.

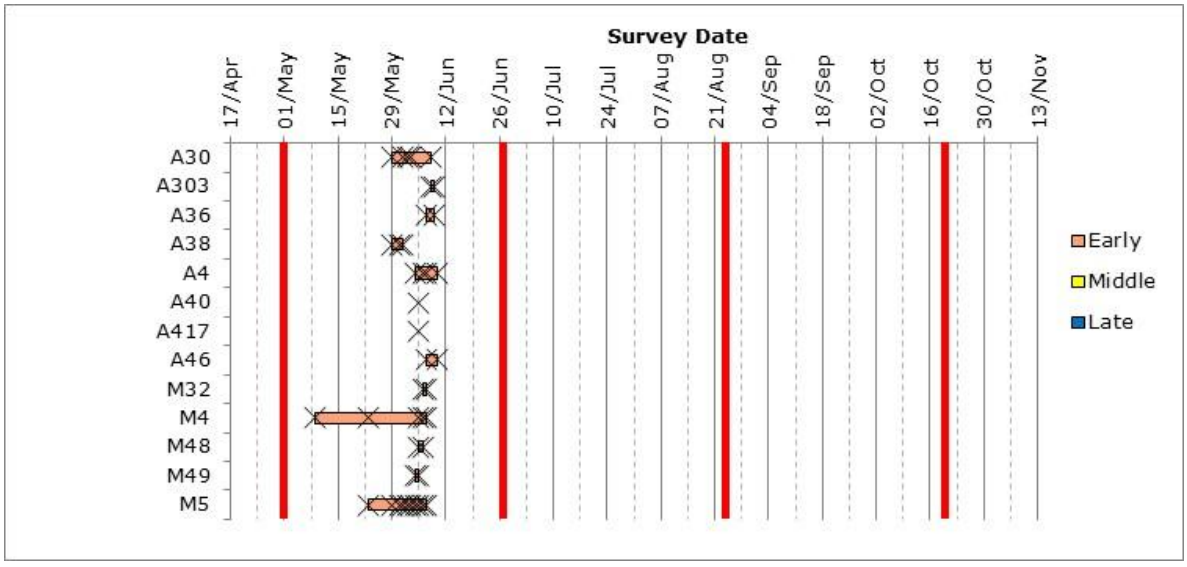

Figure 2.2: Spread of survey dates in 2024 for South West by road (Lane 1 surveys)

3 LECF Calculation and visual analysis

3.1 Early Period LECFs

An examination of the survey rotation for the past three years of surveys found that all Areas with a target of an Early survey in 2024 had a suitable combination of survey periods for calculation of the LESCs. However, the 2023 survey for Area 10 continued a day after the end of the late period. As such the date range for this 2023 late period data was extended by one day to include this data.

Visual analysis conducted on the early survey data identified a number of sections that needed to be removed from the LECF analysis due to anomalies (localised differences between the survey data from different years, for example, as a result of maintenance). The length of data removed and the length with skid resistance data remaining is shown in Table 3.1.

Table 3.1: Data removed as a result of visual analysis for early surveys (lane 1)

Area	Length removed by analysis (km)	Remaining length with data (km)
South West	58.34	1299.49
Area 6	66.42	1688.78
Area 7	40.69	1594.84
Area 10	55.03	1253.24
Second Severn Crossing	0.00	22.21

Six localities which had early surveys in 2024 had a significant length of data removed (>10km). These were:

- A30, A38, M4 and M5 in South West
- A12 and A47 in Area 6

All localities that had sufficient data to calculate a road LECF prior to the visual analysis still had enough data for a road LECF calculation after the removal of anomalies identified by the visual analysis.

The estimate of the remaining length of the second Severn crossing DBFO was lower than the threshold for a road LECF. However, this DBFO also had surveys in lane 2 and lane 3 (and corresponding data in the past years) and as such exceeded the threshold when this data was included. This is further discussed in Section 3.4.1.

3.2 Middle Period LECFs

As with the early period surveys, the past years' survey rotation was examined prior to calculation of the mid period LESCs. It was found that the standard past years' survey rotation was suitable for all Areas.

The visual analysis of the middle period surveys identified a number of sections for removal from the analysis, spread over the Areas as shown in Table 3.2.

Table 3.2: Data removed as a result of visual analysis for middle surveys (lane 1)

Area	Length removed by analysis (km)	Remaining length with data (km)
Area 4	46.49	979.61
Area 13	92.40	723.00
Area 14	81.85	582.47
A1 Darrington to Dishforth DBFO	2.36	121.32
M25 DBFO	181.60	759.04

Thirteen localities had a significant length of data removed (>10km). These were:

- M20 in Area 4
- A590, A66 and M6 in Area 13
- A1, A1M and A66 in Area 14
- A3, M1, M11, M23, M25 and M4 in M25 DBFO

Most localities that had sufficient data to calculate a road LECF prior to the visual analysis still had enough data for a road LECF calculation after the removal of anomalies identified by the visual analysis. The exceptions to this were the A282 and A3 in M25 DBFO.

3.3 Late Period LECFs

An examination of the survey rotation for the past three years of surveys found that all Areas with a late 2024 survey had a suitable combination of survey periods for calculation of the LESCs.

The visual analysis conducted on the late period surveys identified a number of sections for removal. The lengths removed and the remaining lengths used in the LECF calculation, by Area, are shown in Table 3.3.

Table 3.3: Data removed as a result of visual analysis for late surveys (lane 1)

Area	Length removed by analysis (km)	Remaining length with data (km)
Area 3	167.27	1119.41
Area 8	180.69	616.76
Area 9	92.24	1547.81
Area 12	73.40	1113.20

Eighteen localities had significant lengths of data removed (>10km). These were:

- A3, A34, M27, M3 and M4 in Area 3
- A1, A14, A421, A428, A5, M1 and M11 in Area 8

- M40 and M6 in Area 9
- M1, M18, M180 and M62 in Area 12

All but two localities that had sufficient data to calculate a road LECF prior to the visual analysis still had enough data for a road LECF calculation after the removal of anomalies identified by the visual analysis. These localities were the A50 in Area 9 and A1 in Area 12.

3.4 DBFOs

LECFs are calculated, where possible, for any DBFOs that have data loaded into P-AMS. No issues were identified for the A1 Darrington to Dishforth, and M25 DBFOs. The other DBFOs are discussed below.

3.4.1 Second Severn Crossing DBFO

The Second Severn Crossing DBFO contains just over 25km of main carriageway and approximately 2km of slip roads. This is only just over the threshold for a road LECF which would suggest that in most years (due to maintenance or anomalous data) this DBFO would not have sufficient data for the calculation of a LECF (if the rules are applied strictly). However, the survey of this DBFO includes surveys of lanes 2 and 3 on some lengths which increases the overall survey length.

The DBFO is wholly contained within the South West Area (which is surveyed in the same survey period) and other lengths of the two roads which make up the DBFO are also present in this Area. Therefore, in years where the data for the Second Severn crossing DBFO is below the threshold the LECFs calculated for the South West can be used for this DBFO.

In 2024 the data available exceeded the threshold, in part due to lane 2 and 3 surveys which were suitable for use in the calculation. Therefore, the LECFs calculated from the survey data for the Second Severn crossing DBFO were applied to this DBFO.

3.4.2 A249 DBFO

Data for the A249 DBFO has been loaded into P-AMS for the 2024 and 2023 surveys. Unfortunately, there is no 2022 data and therefore it is not possible to calculate LECF values for the 2024 surveys of this DBFO. If 2022 data was available then LECFs could be calculated by using the current year as part of the past years' dataset.

The surveys in 2023 were in the Middle period, and the 2024 surveys were in the Early period. Therefore, if the 2025 surveys are carried out in the late period (and this rotation continued) it would be possible to calculate LECFs for this DBFO in 2025 onwards. Alternatively, if this DBFO gets migrated back into National Highways' management then the survey rotation should be changed to match the corresponding Area.

3.4.3 A417/A419 DBFO

Data for the A417/A419 DBFO was loaded into P-AMS for the 2024 survey season. However, data was loaded for each survey period which suggests that this DBFO is being managed via

a Mean Summer Skid Coefficient (MSSC) style calculation (i.e. the average of the values for all three survey periods). Therefore, the data has not been used to calculate LECF values.

3.5 Surveys in lanes other than lane 1

Surveys were loaded into P-AMS for lanes other than lane 1 for some Areas and DBFOs. These surveys were all undertaken in the same survey period targeted for the lane 1 surveys. Therefore, this data was used in the calculation of the LECF (where valid past years data was present). The calculated LECF values were applied to survey data in all lanes (regardless of whether it was included in the calculation or not).

4 Additional observations and further work

4.1 Applying LECFs on concrete sections

During the calculation of the 2007 LECFs (Donbavand & Brittain, 2007; Brittain, 2007) it was identified that concrete surfaces did not appear to experience seasonal variation to the same degree as other surface types. Therefore, an LECF of 1.000 (i.e. no correction) was applied to concrete sections. To determine if this assumption remains valid an additional investigation has been undertaken in parallel to the calculation of the LECF values in subsequent years.

The effectiveness of the LECF correction can be determined by comparing the current year's SC data (i.e. the data prior to being corrected for seasonal variation) and the current year's CSC data (i.e. seasonally corrected data) to the average of the past years' SC data. The process of applying the LECF correction should make the average of this year's CSC data match the average of the past three years. Therefore, in this data set, the past years' average is effectively the expected value. If the LECF is reducing seasonal variation then the difference between the CSC data and this expected value should be less than the difference between the SC data and the same expected value. This can be visualised by plotting the distribution of these differences. In these plots a data set which has low seasonal effects would have a mean close to zero (i.e. on average the value of the data set is the same as the average of the past years' data). In addition, a seasonally corrected data set should have a lower standard deviation for these differences (i.e. more of the data set is closer to the past years' data).

This analysis was undertaken for Hot Rolled Asphalt (HRA) sections (approx. 1,800km), Thin Surfacing (TSCS) sections (approx. 10,000km) and concrete sections (approx. 400km), and the results are presented in Figure 4.1, Figure 4.2 and Figure 4.3 respectively. For the concrete sections (Figure 4.3), the CSC value shown is the value that would have been generated if the LECF calculated for that road/Area was used rather than the factor of 1.000 that was actually applied.

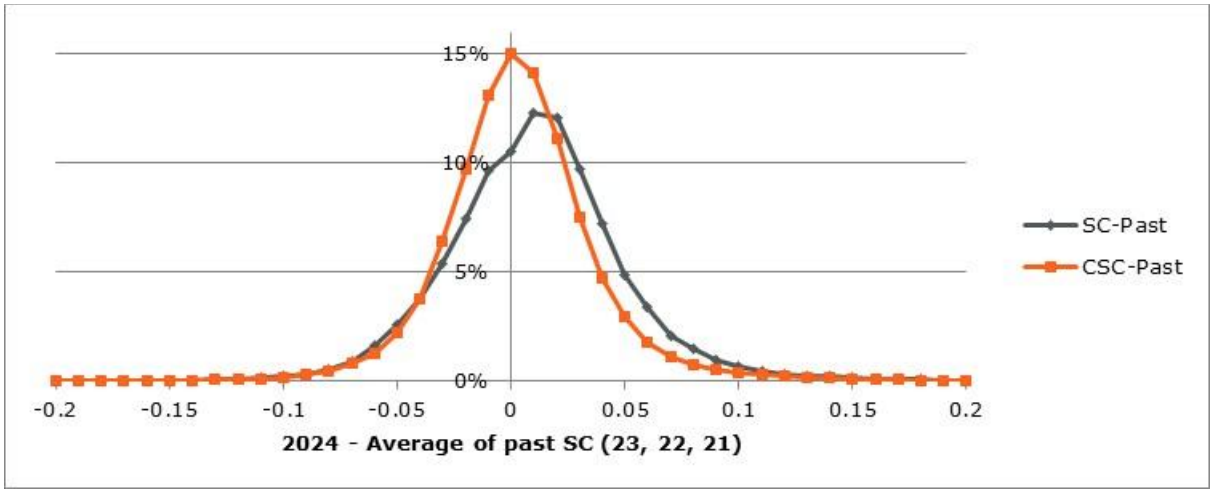

Figure 4.1: 2024 data – Past year average for HRA surveys

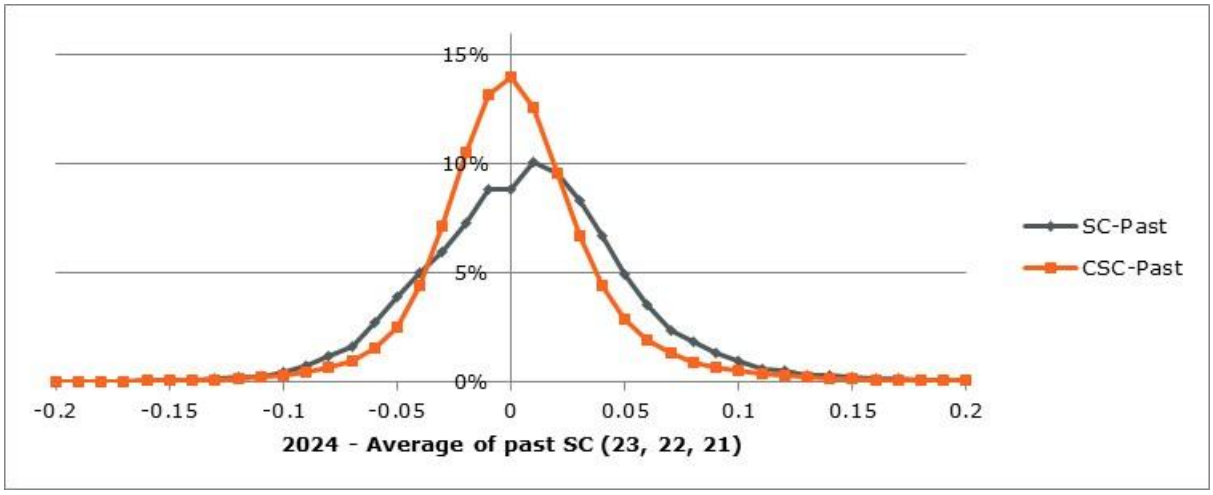

Figure 4.2: 2024 data – Past year average for TS surveys

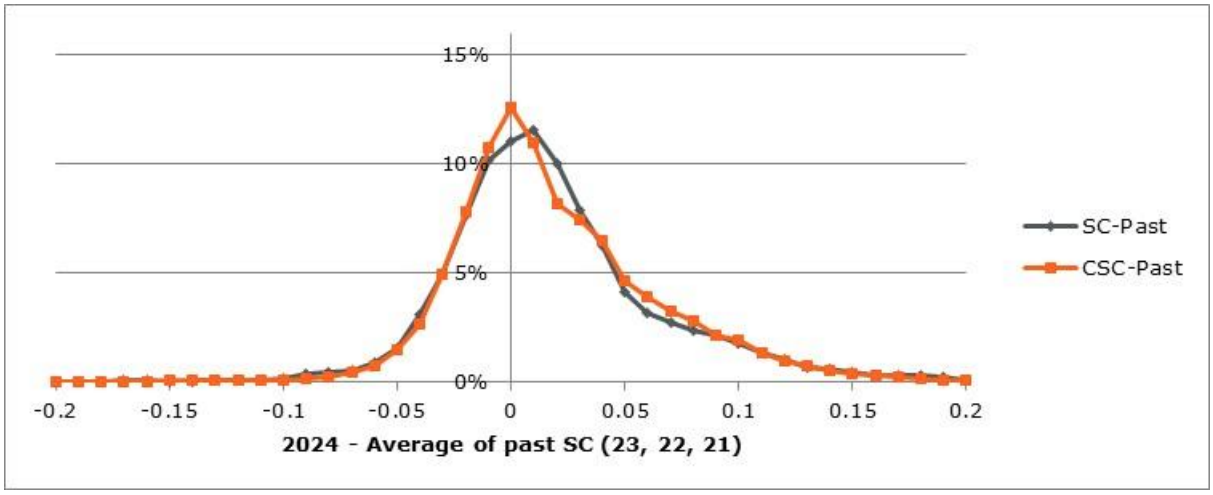

Figure 4.3: 2024 data – Past year average for concrete surveys

As expected, the LECFs reduce the seasonal variation for the HRA and TSCS sections. This can be seen by the narrower distribution/higher mid peak (with mean close to zero) in Figure 4.1 and Figure 4.2 for the 2024 CSC minus the average of past SC values in comparison to the same distribution for the 2024 SC data. The concrete sections (Figure 4.3) show no significant improvement in terms of the spread of the data and both have a mean of 0.02. This verifies the assumption that concrete sections do not experience the same seasonal variation as HRA and TSCS sections.

It is also noted that for HRA and TSCS sections the SC-Past plots are slightly offset to the right, signifying that 2024 was a slightly high skid resistance year (in comparison to the previous three years).

4.2 LECF Distribution by date

As stated previously, the levels of skid resistance vary during the course of the year. To investigate this effect and to monitor the suitability of the survey dates, the spread of LECF values was plotted. This investigation has been conducted at the same time as the LECF calculation since 2008 and is discussed further in the annual reports on the LECF calculation for each year.

The first part of this analysis is to plot the LECF values by date (2024 data shown in Figure 4.4), which gives an impression of the spread of values. However, this can be hard to interpret in terms of SC data and therefore a second plot is generated. This second plot is created by taking a typical value for CSC (0.5 is used in this case) and dividing by the LECF to determine an estimated SC value (2024 data shown in Figure 4.5).

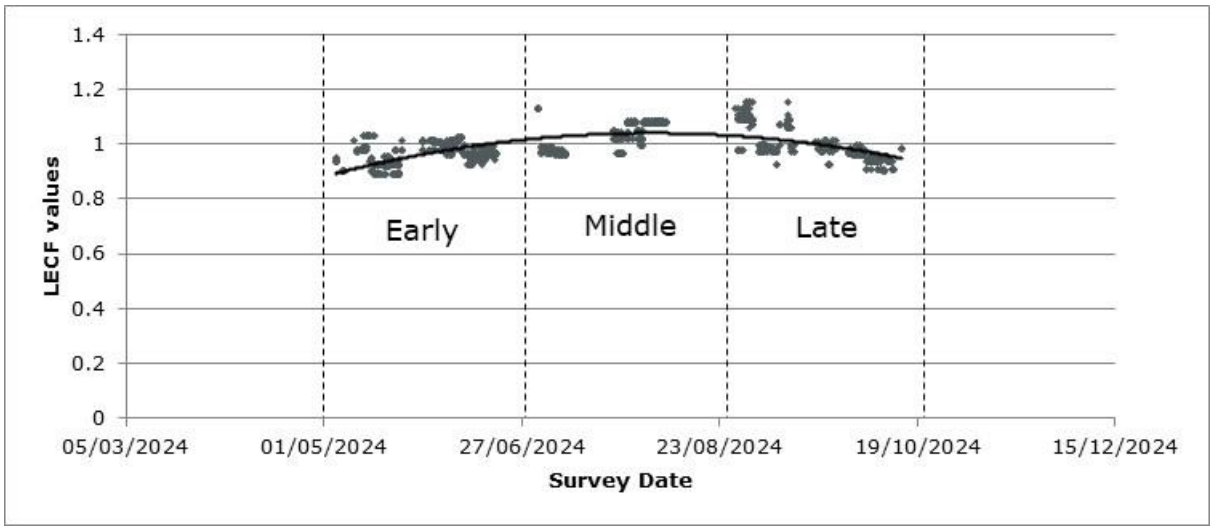

Figure 4.4: Distribution of LECF values by date from SASS analysis

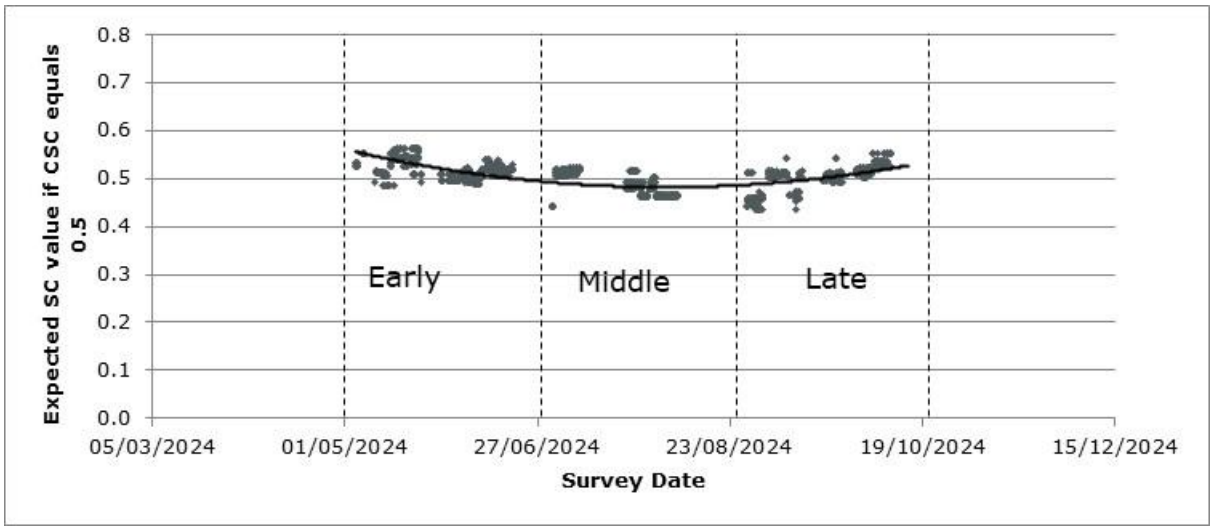

Figure 4.5: Expected SC if CSC equals 0.5 from SASS analysis

From the analysis of the 2024 data, it can be seen that the typical shape of skid resistance over the survey season (see Figure 1.1) does appear to be present, with the minimum value (based on the trend line) positioned towards the end of the middle period (i.e. slightly later than expected).

It is noted that this slightly later than expected minimum value has also been seen in recent years. This suggests that it is possible that changes in weather patterns/climate are causing the minimum value to occur later. However, the potential shift is subtle and does not suggest that it is necessary to change the dates of the surveys season. It is recommended that the suitability of the survey periods should continue to be reviewed on an annual basis.

4.3 Usage of LECF values by length

Figure 4.6 shows the length of the network to which each LECF value was applied (excluding concrete sections). The weighted average of the LECF for 2024 is 0.990 which corresponds to an average to slightly higher skid resistance year compared to the previous three years (similar to the observations noted in Section 4.1).

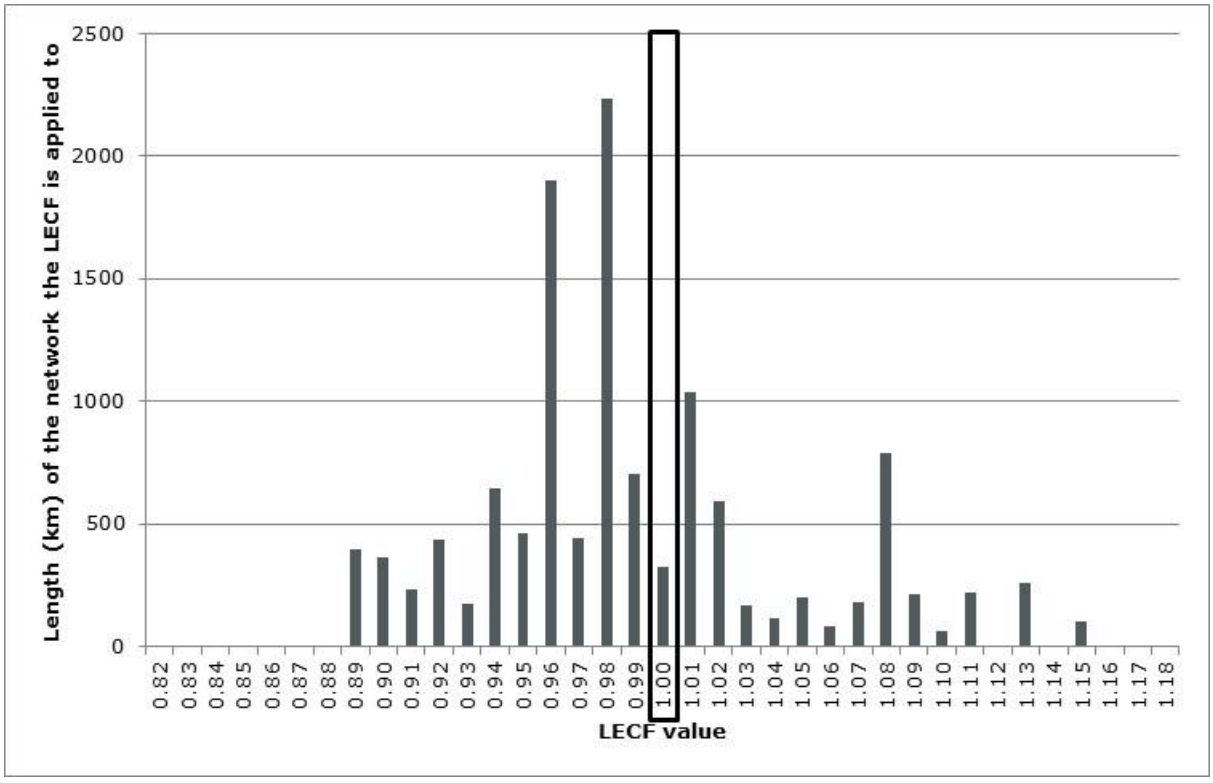

Figure 4.6: Length to which each LECF was applied

4.4 Seasonal trend and the skid resistance benchmark sites

In addition to the work done in analysing the SASS network data and resulting LECFs, National Highways also commissions annual surveys of benchmark sites to examine long term trends in skid resistance on the network. The analysis of the 2024 data (Brittain, 2025)

identified that the minimum value appeared to occur on the boundary of the middle and late periods. It also identified that 2024 was an average to slightly higher skid resistance year compared to the previous three years.

The seasonal trend analysis discussed in this report provides an estimate of ongoing trends of the overall seasonal variation of the network, however it is complicated by the fact it uses data from different areas for each period to perform the analysis. Therefore, the trend seen from the benchmark sites work is generally the more reliable of the two when considering the overall trend in skid resistance over time. However, in terms of estimating future CSC values for the network, the results from the LECF analysis should be used (as it is using the same data that would be used in future LECF calculations).

5 Summary

5.1 Lane 1 survey coverage

When combined together, 97.4% of the length of the National Highways Areas had data coverage. Individually each of the National Highways Areas had at least 95.1% data coverage.

Survey coverage for the M25 DBFO was slightly lower at 91.8%. However, the remaining DBFOs loaded into P-AMS with defined survey rotations for LECF calculation (A1 DD and Second Severn crossing) also had high survey coverage.

Data was also loaded into P-AMS for the A249 DBFO for the 2024 survey. Data was also previously loaded for the 2023 survey. However, no data has been loaded for this DBFO for the 2021 or 2022 surveys therefore, it was not possible to calculate LECF values for the 2024 surveys for this DBFO. The surveys in 2023 were in the Middle period, and the 2024 surveys were in the Early period. Therefore, if the 2025 surveys are carried out in the late period (and this rotation continued) it would be possible to calculate LECFs for this DBFO in 2025 onwards. Alternatively, if this DBFO gets migrated back into National Highways' management then the survey rotation should be changed to match the corresponding Area.

A reasonable percentage of data was loaded into P-AMS for the A417/A419 DBFO. However, data was loaded for all three survey periods suggesting that the MSSC approach is being used for this DBFO. Therefore, this data is unsuitable for LECF calculation.

The skid resistance survey contract states that survey data should be loaded into National Highways pavement management system, pass independent checks and be ready for further analysis (i.e. the LECF calculation) by specified dates. In 2024 it was found that a high percentage of the data was available at the target date.

5.2 Suitability of data loaded

During the processing of the data for the LECFs a few anomalies were found with the data. The types of anomalies identified were:

1. Very high SC values
2. Large changes in SC values including low values

The lengths identified by this analysis were supplied to National Highways and the survey contractor for review and where necessary amendment.

5.3 Lane 1 survey dates and timescales

All of the surveys of the National Highways Areas were surveyed within the target survey period. All of the DBFOs with data loaded into P-AMS with defined LECF compatible survey rotations were also surveyed within the target survey period.

With the exception of South West, the spread of survey dates was 28 days or less for all Areas/DBFOs where a LECF was calculated. In the South West Area, only the M4 exceeded the 28 day target.

5.4 Calculation of LECF

The modified LECF procedure used since 2007 (Brittain, 2007) was used again for the 2024 data. To aid the visual analysis of the data the automated analysis developed during 2008 (Brittain, 2009) was also used.

The survey rotation pattern established for the National Highways Areas meant that, for the lane 1 surveys, all of the Areas had valid past years' data in the standard years (2023, 2022 and 2021).

Visual analyses of the survey data were carried out which identified several sections for removal. All but four localities that had sufficient data to calculate the more robust road LECF prior to the visual analysis still had enough data for that calculation following removal of lengths identified during the visual analysis.

As with previous years, LECFs were calculated for DBFOs with sufficient data loaded into P-AMS. This year LECFs were calculated for the A1DD, M25 and Second Severn Crossing DBFOs.

5.5 Surveys of lanes other than lane 1

Surveys were loaded into P-AMS for lanes other than lane 1 for some Areas and DBFOs. In the locations where LECFs were calculated, these additional surveys were completed in the same period as the lane 1 surveys. Therefore, the LECFs calculated are suitable for use for the additional lane surveys.

5.6 Seasonal variation of concrete sections

An investigation into the application of LECFs on concrete sections confirmed the findings from previous studies that concrete sections do not experience the same seasonal variation as asphalt sections.

5.7 Variation of LECF values during the survey season

As with previous years, the spread of LECF values (by date) was investigated. This analysis suggests that for 2024 the minimum value of skid resistance occurred towards the end of the middle period (i.e. slightly later than expected). In addition, the weighted average LECF value for the network was 0.990 which corresponds to an average to slightly high skid resistance year compared to the previous three years. The benchmark sites analysis (Brittain, 2025) drew similar conclusions.

References

Note: this list of references contains both unpublished reports (UPR) and client project reports (CPR) produced for National Highways. Please make a personal application to National Highways if you wish to obtain a copy of either a UPR or CPR.

Brittain, S. (2007). *Task 1 Methodology for deriving Local Equilibrium Correction Factors for the 2007 SCRIM surveys (UPR/IE/213/06).* Wokingham: TRL.

Brittain, S. (2009). *Task 1: Methodology for deriving Local Equilbrium Correction Factors for the 2008 SCRIM surveys (CPR 215).* Wokingham: TRL.

Brittain, S. (2023). *Skid resistance benchmark surveys 2023 (PPR2036).* Wokingham: TRL.

Brittain, S. (2025). *Skid resistance benchmark surveys 2024 (PPR2058).* Wokingham: TRL.

DMRB CS 228. (n.d.). *Design Manual for Roads and Bridges Volume 7 Section 1, CS 228 Skidding resistance*. London: The Stationery Office.

Donbavand, J., & Brittain, S. (2007). *Task 3: Review of Correction Factors (UPR/IE/213/06).* Wokingham: TRL.

Donbavand, J., & Kennedy, C. (2010). *Task 2: Benchmark Surveys 2009 (UPR/IE/07/08).* Wokingham: TRL.

Appendix A Calculating the LECF

A.1 Derivation of LECF

The following equation is used to calculate an LECF:

$$LECF = \frac{Local\ Equilibrium\ Skid\ Coefficient\ (LESC)}{Local\ Mean\ Skid\ Coefficient\ (LMSC)} \quad \textbf{A.1}$$

where LESC is the estimate of the local, long term skid resistance obtained from the average of the previous 3 years' surveys and LMSC is the average of the current year's survey in the same locality as the LESC.

The LESC incorporates one survey from each of the 3 survey periods to avoid bias in the estimate of long term skid resistance. Table A.1 shows all possible combinations of early (E), middle (M) and late (L) survey periods for the past years and current year that were used to calculate a LECF. For each current year survey period a length-weighted average[1] LECF was calculated for three localities: each road individually within each Area, for all roads within each Area, and for all roads in all Areas.

Table A.1: Possible combinations of survey period for LECF Calculation

Current year	One year into the past	Two years into the past	Three years into the past
Early	Early	Middle	Late
Early	Early	Late	Middle
Early	Middle	Early	Late
Early	Middle	Late	Early
Early	Late	Early	Middle
Early	Late	Middle	Early
Middle	Early	Middle	Late
Middle	Early	Late	Middle
Middle	Middle	Early	Late
Middle	Middle	Late	Early
Middle	Late	Early	Middle
Middle	Late	Middle	Early
Late	Early	Middle	Late
Late	Early	Late	Middle
Late	Middle	Early	Late
Late	Middle	Late	Early
Late	Late	Early	Middle
Late	Late	Middle	Early

[1] An Average of all six valid combinations of past and current surveys, weighted by the length of road that each individual combination was based on.

The LECFs are applied by locality because the influence of climate and the type of road could affect the within year skid resistance variation and hence the LECF. Table A.2 shows the order of LECF allocation that is applied to each road. If an LECF by road does not exist or the length of road data is less than 25km[2], the Area LECF is applied; this also occurs when a given road is surveyed but does not have a valid combination of past years' data. If an LECF by road or by Area does not exist, an LECF by survey period is applied; in practice this has only occurred in 2005 on a few sections where there was no valid past years' data for any road in a given Area and survey period. There has been no occurrence of this since then.

Table A.2: Allocation of LECFs

Order of allocation	Calculation type	Description
1	Road	Calculation by individual road within an Area
2	Area	Calculation by all roads within an Area
3	Survey Period	Calculation by all roads and all Areas

A.2 Survey period boundaries

The current survey period boundaries for skid resistance surveys are given in Table A.3.

Table A.3: Survey period boundaries from the 2010 survey season onwards

Survey Period	Start Date	End Date
Early	1 May	27 June
Middle	28 June	24 August
Late	25 August	20 October

These dates were developed based on work carried out on the National Highways benchmark sites, which are used to monitor long term trends in skid resistance, (Donbavand & Kennedy, 2010). Prior to 2010 the survey periods were the dates shown in Table A.4.

Table A.4: Survey period boundaries prior to the 2010 survey season

Survey Period	Start Date	End Date
Early	1 May	20 June
Middle	21 June	10 August
Late	11 August	30 September

[2] This was implemented to ensure that the LECFs by road were not based on small lengths that could have been unrepresentative of the overall road length that it was applied to. It was originally set at 50km, however after investigation into the effects during the 2007 LECF calculation it was reduced to 25km.

To help smooth the transition from the MSSC (Mean Summer Skid Coefficient) approach to the SASS (Single Annual Skid Survey) method, introduced in 2005, extended survey period boundaries were used when extracting the data. This approach was taken to maximise the lengths upon which the LECF was calculated. This was originally required due to the smaller time scales allowed for the survey season, which on occasion resulted in surveys conducted outside of the planned dates. Due to the extension of the survey season in 2010, extending the dates for extraction of data is no longer necessary. The dates for these extended survey periods are shown in Table A.5.

Table A.5: Extended survey period boundaries for data before 2010

Survey Period	Start Date	End Date
Early	1 May	27 June
Middle	14 June	17 August
Late	4 August	7 October

A.3 Construction cut-off

Data from roads re-surfaced during the 5-year period covering the current year, 3 past years and a wear in year were excluded from the analysis because a comparison in skid resistance between past years and the current year was not valid. To ensure that these sections were not included in the analysis a construction cut-off date was employed to ignore any such maintenance. For the 2024 LECFs this meant that the construction cut off was 1st May 2020. Employing an extra gap of one year before the first year of the past years' data means that new surfaces will have had time for the skid resistance level to stabilise; therefore, the within year skid resistance variation for the data will not be influenced by early life skid resistance changes.

A.4 Concrete sections

It was observed in 2007 (Donbavand & Brittain, 2007; Brittain, 2007) that concrete sections do not experience seasonal variation in the same manner as asphalt sections. National Highways therefore decided that concrete sections would have an LECF of 1.00 applied (i.e. no correction). Given this, it is therefore necessary to exclude all sections which include concrete from the LECF analysis.

A.5 Visual Analysis

A visual analysis of the survey data is carried out in order to identify data which do not conform with the general pattern; these data can then be investigated further and, where appropriate, removed from the LECF calculation. The visual analysis process consists of an inspection of line charts of the current and historic data, and can be used to identify sections which appear to have been resurfaced (but do not have appropriate construction records) and other anomalies (e.g. negative skid resistance values). Once a section has been identified it is removed if more than 20% of the section is deemed to be unrepresentative.

A.6 Management of data from different lanes

Prior to the transition to P-AMS in 2023, the LECF calculation was restricted to only use data from lane 1. The process since 2023 has been to calculate the LECF based on the data from all lanes that were surveyed which meet the requirements given above.

A.7 Verification of LECF values

Once the LECF values have been calculated they are then verified in order to identify any inconsistencies. Two processes are used to do this:

1. The difference (absolute value) between the past years' SC values (values which have not had the LECF correction applied) and the current year's CSC values are compared to the difference between the past years' SC values and the current year's SC values. If there is an issue with the LECF then the current year's SC values will be closer to the past years' SC values than the current year's CSC values.
2. The line charts for the current year's CSC values against the past years' SC values are inspected and compared to the line chart for the current year's SC values against the past years SC values. If an LECF value is unsuitable then the lines seen in these charts would have similar shapes, i.e. they are representative of the same surface, but the average values would be different.

The verification processes were found to be particularly useful during the calculation of the Early 2007 LECFs. During the survey period, one of the survey machines underwent a repair. The verification process identified that the skid resistance values were found to be characteristically different before and after the repair. This was particularly relevant to the M25 which had surveys carried out with the machine in both states. This was resolved by producing two LECF values for the M25 (along with two "Area" LECFs), one for before the repair and one for after.

A.8 Example detail of LECF calculation – Area 3 (Late 2005 surveys)

The tables below show the LECF calculation process for 2005 late period surveys in Area 3. Table A.6 shows the length weighted LECF calculated for each road that had valid combinations of current year and past years' data. These values were applied as the preferred option.

Table A.7 shows the LECF calculated for all roads in the Area, which was applied as a secondary option where there were roads with insufficient valid data for a LECF to be calculated or if the LECF was based on less than 25km of data. These two options would provide a LECF for the majority of roads. The final option was to apply a national LECF calculated by survey period, which is shown in Table A.8. This is based on all roads and Areas and reflects the seasonal variation experienced for England as a whole for the late period survey in comparison to the surveys in the previous years.

The LECF method applied to Area 3 2005 late surveys is shown in Table A.9. Seven of the road based LECFs were applied, with four roads requiring the Area LECF; two of which were due to the application of the minimum 25km data rule.

Table A.6: LECF calculated by road

Area	Road	Calculation Length (km)	LESC	LMSC	LECF
Area 3	A27	83	0.565	0.577	0.980
Area 3	A3	112	0.516	0.492	1.049
Area 3	A303	138	0.523	0.519	1.008
Area 3	A308M	0	-	-	-
Area 3	A31	101	0.543	0.495	1.097
Area 3	A34	139	0.530	0.535	0.991
Area 3	A3M	0	-	-	-
Area 3	A404	37	0.576	0.574	1.004
Area 3	A404M	16	0.565	0.575	0.982
Area 3	M27	3	0.532	0.519	1.026
Area 3	M271	28	0.499	0.500	0.998
Area 3	M3	288	0.522	0.520	1.003
Area 3	M4	77	0.524	0.521	1.005

Table A.7: LECF calculated by Area

Area	Calculation Length (km)	LESC	LMSC	LECF
Area 3	1023	0.530	0.523	1.013

Table A.8: LECF calculated by survey period

Area	Calculation Length (km)	LESC	LMSC	LECF
All Areas	5423	0.496	0.481	1.031

Table A.9: Application of LECF to 2005 surveys (Area 3 – late season surveys)

Area	Road	LECF	Calculation Type
Area 3	A27	0.979	Road
Area 3	A3	1.049	Road
Area 3	A303	1.007	Road
Area 3	A308M	1.013	Area
Area 3	A31	1.097	Road
Area 3	A34	0.991	Road
Area 3	A3M	1.013	Area
Area 3	A404	1.004	Road
Area 3	A404M	1.013	Area
Area 3	M27	1.013	Area
Area 3	M271	0.998	Road
Area 3	M3	1.003	Road
Area 3	M4	1.005	Road

Appendix B 2024 LECF values

Note: the dates shown here refer to the cut off (applied at midnight) for the surveys, i.e. a survey end date of 28th June here would include all of the surveys on the 27th but none of the surveys on the 28th.

Table B.1: Early season surveys

Area	Road	LECF	Type	Survey period start date	Survey period end date
South West	A30	1.01	AREA & ROAD	01/05/2024	28/06/2024
South West	A303	1.025	AREA & ROAD	01/05/2024	28/06/2024
South West	A36	0.98	AREA & ROAD	01/05/2024	28/06/2024
South West	A38	1.011	AREA & ROAD	01/05/2024	28/06/2024
South West	A4	0.998	AREA	01/05/2024	28/06/2024
South West	A40	0.998	AREA	01/05/2024	28/06/2024
South West	A417	0.998	AREA	01/05/2024	28/06/2024
South West	A46	0.998	AREA	01/05/2024	28/06/2024
South West	M32	0.998	AREA	01/05/2024	28/06/2024
South West	M4	1.013	AREA & ROAD	01/05/2024	28/06/2024
South West	M48	0.998	AREA	01/05/2024	28/06/2024
South West	M49	0.998	AREA	01/05/2024	28/06/2024
South West	M5	0.981	AREA & ROAD	01/05/2024	28/06/2024
Area 6	A1	0.97	AREA	01/05/2024	28/06/2024
Area 6	A11	0.992	AREA & ROAD	01/05/2024	28/06/2024
Area 6	A12	0.903	AREA & ROAD	01/05/2024	28/06/2024
Area 6	A120	0.95	AREA & ROAD	01/05/2024	28/06/2024
Area 6	A14	1.029	AREA & ROAD	01/05/2024	28/06/2024
Area 6	A47	0.976	AREA & ROAD	01/05/2024	28/06/2024
Area 6	M11	0.939	AREA & ROAD	01/05/2024	28/06/2024
Area 7	A1	0.954	AREA & ROAD	01/05/2024	28/06/2024
Area 7	A14	0.893	AREA & ROAD	01/05/2024	28/06/2024
Area 7	A38	0.981	AREA & ROAD	01/05/2024	28/06/2024
Area 7	A42	0.943	AREA & ROAD	01/05/2024	28/06/2024
Area 7	A43	0.923	AREA	01/05/2024	28/06/2024
Area 7	A45	0.928	AREA & ROAD	01/05/2024	28/06/2024
Area 7	A453	0.923	AREA	01/05/2024	28/06/2024
Area 7	A46	0.919	AREA & ROAD	01/05/2024	28/06/2024
Area 7	A5	0.898	AREA & ROAD	01/05/2024	28/06/2024
Area 7	A50	0.923	AREA	01/05/2024	28/06/2024
Area 7	A5111	0.923	AREA	01/05/2024	28/06/2024
Area 7	A516	0.923	AREA	01/05/2024	28/06/2024
Area 7	A52	0.923	AREA	01/05/2024	28/06/2024
Area 7	A6	0.923	AREA	01/05/2024	28/06/2024
Area 7	M1	0.891	AREA & ROAD	01/05/2024	28/06/2024
Area 7	M45	0.923	AREA	01/05/2024	28/06/2024

Area	Road	LECF	Type	Survey period start date	Survey period end date
Area 7	M6	0.923	AREA	01/05/2024	28/06/2024
Area 7	M69	0.923	AREA	01/05/2024	28/06/2024
Area 10	A41	0.962	AREA	01/05/2024	28/06/2024
Area 10	A483	0.962	AREA	01/05/2024	28/06/2024
Area 10	A494	0.962	AREA	01/05/2024	28/06/2024
Area 10	A5036	0.962	AREA	01/05/2024	28/06/2024
Area 10	A5103	0.962	AREA	01/05/2024	28/06/2024
Area 10	A5117	0.962	AREA	01/05/2024	28/06/2024
Area 10	A55	0.978	AREA & ROAD	01/05/2024	28/06/2024
Area 10	A550	0.962	AREA	01/05/2024	28/06/2024
Area 10	A556	0.962	AREA	01/05/2024	28/06/2024
Area 10	A56	0.962	AREA	01/05/2024	28/06/2024
Area 10	A57	0.962	AREA	01/05/2024	28/06/2024
Area 10	A580	0.962	AREA	01/05/2024	28/06/2024
Area 10	A59	0.962	AREA	01/05/2024	28/06/2024
Area 10	A627M	0.962	AREA	01/05/2024	28/06/2024
Area 10	A628	0.962	AREA	01/05/2024	28/06/2024
Area 10	A663	0.962	AREA	01/05/2024	28/06/2024
Area 10	M53	0.98	AREA & ROAD	01/05/2024	28/06/2024
Area 10	M56	0.987	AREA & ROAD	01/05/2024	28/06/2024
Area 10	M57	0.962	AREA	01/05/2024	28/06/2024
Area 10	M58	0.962	AREA	01/05/2024	28/06/2024
Area 10	M6	0.962	AREA & ROAD	01/05/2024	28/06/2024
Area 10	M60	0.945	AREA & ROAD	01/05/2024	28/06/2024
Area 10	M602	0.962	AREA	01/05/2024	28/06/2024
Area 10	M61	0.928	AREA & ROAD	01/05/2024	28/06/2024
Area 10	M62	0.965	AREA & ROAD	01/05/2024	28/06/2024
Area 10	M65	0.965	AREA & ROAD	01/05/2024	28/06/2024
Area 10	M66	0.962	AREA	01/05/2024	28/06/2024
Area 10	M67	0.962	AREA	01/05/2024	28/06/2024
Second Severn Crossing	M4	0.958	AREA & ROAD	01/05/2024	28/06/2024
Second Severn Crossing	M48	0.963	AREA	01/05/2024	28/06/2024

Table B.2: Middle season surveys

Area	Road	LECF	Type	Survey period start date	Survey period end date
Area 4	A2	1.041	AREA & ROAD	28/06/2024	25/08/2024
Area 4	A20	1.019	AREA	28/06/2024	25/08/2024
Area 4	A2070	1.019	AREA	28/06/2024	25/08/2024
Area 4	A21	1.023	AREA & ROAD	28/06/2024	25/08/2024
Area 4	A23	1.018	AREA & ROAD	28/06/2024	25/08/2024
Area 4	A249	1.019	AREA	28/06/2024	25/08/2024
Area 4	A259	1.019	AREA	28/06/2024	25/08/2024

Area	Road	LECF	Type	Survey period start date	Survey period end date
Area 4	A26	1.019	AREA	28/06/2024	25/08/2024
Area 4	A27	1.047	AREA & ROAD	28/06/2024	25/08/2024
Area 4	M2	1.018	AREA & ROAD	28/06/2024	25/08/2024
Area 4	M20	0.969	AREA & ROAD	28/06/2024	25/08/2024
Area 4	M23	0.994	AREA & ROAD	28/06/2024	25/08/2024
Area 13	A585	0.965	AREA	28/06/2024	25/08/2024
Area 13	A590	0.981	AREA & ROAD	28/06/2024	25/08/2024
Area 13	A595	0.965	AREA	28/06/2024	25/08/2024
Area 13	A66	0.981	AREA & ROAD	28/06/2024	25/08/2024
Area 13	A69	0.965	AREA	28/06/2024	25/08/2024
Area 13	A7	0.965	AREA	28/06/2024	25/08/2024
Area 13	A74M	0.965	AREA	28/06/2024	25/08/2024
Area 13	M55	0.965	AREA	28/06/2024	25/08/2024
Area 13	M6	0.958	AREA & ROAD	28/06/2024	25/08/2024
Area 14	A1	0.991	AREA & ROAD	28/06/2024	25/08/2024
Area 14	A167	0.984	AREA	28/06/2024	25/08/2024
Area 14	A168	0.984	AREA	28/06/2024	25/08/2024
Area 14	A177	0.984	AREA	28/06/2024	25/08/2024
Area 14	A184	0.984	AREA	28/06/2024	25/08/2024
Area 14	A19	0.984	AREA	28/06/2024	25/08/2024
Area 14	A194M	0.984	AREA	28/06/2024	25/08/2024
Area 14	A195M	0.984	AREA	28/06/2024	25/08/2024
Area 14	A1M	0.965	AREA & ROAD	28/06/2024	25/08/2024
Area 14	A6055	0.984	AREA	28/06/2024	25/08/2024
Area 14	A61	0.984	AREA	28/06/2024	25/08/2024
Area 14	A66	0.974	AREA & ROAD	28/06/2024	25/08/2024
Area 14	A66M	0.984	AREA	28/06/2024	25/08/2024
Area 14	A68	0.984	AREA	28/06/2024	25/08/2024
Area 14	A689	0.984	AREA	28/06/2024	25/08/2024
Area 14	A690	0.984	AREA	28/06/2024	25/08/2024
Area 14	A696	0.984	AREA	28/06/2024	25/08/2024
A1 DD DBFO	A1M	1.13	AREA & ROAD	28/06/2024	25/08/2024
A1 DD DBFO	A63	1.13	AREA	28/06/2024	25/08/2024
M25 DBFO	A1	1.076	AREA	28/06/2024	25/08/2024
M25 DBFO	A10	1.076	AREA	28/06/2024	25/08/2024
M25 DBFO	A1001	1.076	AREA	28/06/2024	25/08/2024
M25 DBFO	A1023	1.076	AREA	28/06/2024	25/08/2024
M25 DBFO	A1089	1.076	AREA	28/06/2024	25/08/2024
M25 DBFO	A12	1.076	AREA	28/06/2024	25/08/2024
M25 DBFO	A127	1.076	AREA	28/06/2024	25/08/2024
M25 DBFO	A13	1.076	AREA	28/06/2024	25/08/2024
M25 DBFO	A1M	1.076	AREA	28/06/2024	25/08/2024
M25 DBFO	A2	1.076	AREA	28/06/2024	25/08/2024
M25 DBFO	A20	1.076	AREA	28/06/2024	25/08/2024
M25 DBFO	A21	1.076	AREA	28/06/2024	25/08/2024
M25 DBFO	A23	1.076	AREA	28/06/2024	25/08/2024

Area	Road	LECF	Type	Survey period start date	Survey period end date
M25 DBFO	A282	1.076	AREA	28/06/2024	25/08/2024
M25 DBFO	A3	1.076	AREA	28/06/2024	25/08/2024
M25 DBFO	A30	1.076	AREA	28/06/2024	25/08/2024
M25 DBFO	A3113	1.076	AREA	28/06/2024	25/08/2024
M25 DBFO	A312	1.076	AREA	28/06/2024	25/08/2024
M25 DBFO	A316	1.076	AREA	28/06/2024	25/08/2024
M25 DBFO	A40	1.076	AREA	28/06/2024	25/08/2024
M25 DBFO	A405	1.076	AREA	28/06/2024	25/08/2024
M25 DBFO	M1	1.076	AREA	28/06/2024	25/08/2024
M25 DBFO	M11	1.076	AREA	28/06/2024	25/08/2024
M25 DBFO	M20	1.076	AREA	28/06/2024	25/08/2024
M25 DBFO	M23	1.076	AREA	28/06/2024	25/08/2024
M25 DBFO	M25	1.082	AREA & ROAD	28/06/2024	25/08/2024
M25 DBFO	M26	1.076	AREA	28/06/2024	25/08/2024
M25 DBFO	M3	1.08	AREA & ROAD	28/06/2024	25/08/2024
M25 DBFO	M4	1.076	AREA	28/06/2024	25/08/2024

Table B.3: Late season surveys

Area	Road	LECF	Type	Survey period start date	Survey period end date
Area 3	A27	0.935	AREA	25/08/2024	21/10/2024
Area 3	A3	0.959	AREA & ROAD	25/08/2024	21/10/2024
Area 3	A303	0.904	AREA & ROAD	25/08/2024	21/10/2024
Area 3	A308M	0.935	AREA	25/08/2024	21/10/2024
Area 3	A31	0.956	AREA & ROAD	25/08/2024	21/10/2024
Area 3	A34	0.908	AREA & ROAD	25/08/2024	21/10/2024
Area 3	A346	0.935	AREA	25/08/2024	21/10/2024
Area 3	A3M	0.935	AREA	25/08/2024	21/10/2024
Area 3	A404	0.935	AREA	25/08/2024	21/10/2024
Area 3	A404M	0.935	AREA	25/08/2024	21/10/2024
Area 3	M27	0.935	AREA & ROAD	25/08/2024	21/10/2024
Area 3	M271	0.935	AREA	25/08/2024	21/10/2024
Area 3	M3	0.954	AREA & ROAD	25/08/2024	21/10/2024
Area 3	M4	0.935	AREA & ROAD	25/08/2024	21/10/2024
Area 8	A1	0.996	AREA & ROAD	25/08/2024	21/10/2024
Area 8	A1081	0.972	AREA	25/08/2024	21/10/2024
Area 8	A11	0.972	AREA	25/08/2024	21/10/2024
Area 8	A14	0.96	AREA & ROAD	25/08/2024	21/10/2024
Area 8	A1M	0.972	AREA	25/08/2024	21/10/2024
Area 8	A414	0.972	AREA	25/08/2024	21/10/2024
Area 8	A421	0.982	AREA & ROAD	25/08/2024	21/10/2024
Area 8	A428	0.977	AREA & ROAD	25/08/2024	21/10/2024
Area 8	A5	0.959	AREA & ROAD	25/08/2024	21/10/2024

Area	Road	LECF	Type	Survey period start date	Survey period end date
Area 8	A5183	0.972	AREA	25/08/2024	21/10/2024
Area 8	M1	0.964	AREA & ROAD	25/08/2024	21/10/2024
Area 8	M11	0.981	AREA & ROAD	25/08/2024	21/10/2024
Area 9	A34	0.985	AREA	25/08/2024	21/10/2024
Area 9	A38	0.994	AREA & ROAD	25/08/2024	21/10/2024
Area 9	A38M	0.985	AREA	25/08/2024	21/10/2024
Area 9	A40	0.985	AREA	25/08/2024	21/10/2024
Area 9	A4097	0.985	AREA	25/08/2024	21/10/2024
Area 9	A41	0.985	AREA	25/08/2024	21/10/2024
Area 9	A4123	0.985	AREA	25/08/2024	21/10/2024
Area 9	A423	0.985	AREA	25/08/2024	21/10/2024
Area 9	A435	0.985	AREA	25/08/2024	21/10/2024
Area 9	A446	0.985	AREA	25/08/2024	21/10/2024
Area 9	A449	0.985	AREA	25/08/2024	21/10/2024
Area 9	A45	0.985	AREA	25/08/2024	21/10/2024
Area 9	A4510	0.985	AREA	25/08/2024	21/10/2024
Area 9	A452	0.985	AREA	25/08/2024	21/10/2024
Area 9	A456	0.985	AREA	25/08/2024	21/10/2024
Area 9	A458	0.985	AREA	25/08/2024	21/10/2024
Area 9	A46	1.015	AREA & ROAD	25/08/2024	21/10/2024
Area 9	A483	0.985	AREA	25/08/2024	21/10/2024
Area 9	A49	1.01	AREA & ROAD	25/08/2024	21/10/2024
Area 9	A5	0.984	AREA & ROAD	25/08/2024	21/10/2024
Area 9	A50	0.985	AREA	25/08/2024	21/10/2024
Area 9	A500	0.923	AREA & ROAD	25/08/2024	21/10/2024
Area 9	A5127	0.985	AREA	25/08/2024	21/10/2024
Area 9	A5148	0.985	AREA	25/08/2024	21/10/2024
Area 9	M40	0.985	AREA	25/08/2024	21/10/2024
Area 9	M42	0.996	AREA & ROAD	25/08/2024	21/10/2024
Area 9	M5	0.971	AREA & ROAD	25/08/2024	21/10/2024
Area 9	M50	0.994	AREA & ROAD	25/08/2024	21/10/2024
Area 9	M54	0.989	AREA & ROAD	25/08/2024	21/10/2024
Area 9	M6	0.975	AREA & ROAD	25/08/2024	21/10/2024
Area 9	M69	0.985	AREA	25/08/2024	21/10/2024
Area 12	A1	1.092	AREA	25/08/2024	21/10/2024
Area 12	A1033	1.092	AREA	25/08/2024	21/10/2024
Area 12	A160	1.092	AREA	25/08/2024	21/10/2024
Area 12	A162	1.092	AREA	25/08/2024	21/10/2024
Area 12	A180	1.092	AREA	25/08/2024	21/10/2024
Area 12	A1M	1.092	AREA	25/08/2024	21/10/2024
Area 12	A58	1.092	AREA	25/08/2024	21/10/2024
Area 12	A61	1.092	AREA	25/08/2024	21/10/2024
Area 12	A616	1.092	AREA	25/08/2024	21/10/2024
Area 12	A62	1.092	AREA	25/08/2024	21/10/2024
Area 12	A628	1.092	AREA	25/08/2024	21/10/2024
Area 12	A63	1.097	AREA & ROAD	25/08/2024	21/10/2024

Area	Road	LECF	Type	Survey period start date	Survey period end date
Area 12	A631	1.092	AREA	25/08/2024	21/10/2024
Area 12	A638	1.092	AREA	25/08/2024	21/10/2024
Area 12	A64	1.074	AREA & ROAD	25/08/2024	21/10/2024
Area 12	M1	1.13	AREA & ROAD	25/08/2024	21/10/2024
Area 12	M18	1.153	AREA & ROAD	25/08/2024	21/10/2024
Area 12	M180	1.061	AREA & ROAD	25/08/2024	21/10/2024
Area 12	M181	1.092	AREA	25/08/2024	21/10/2024
Area 12	M606	1.092	AREA	25/08/2024	21/10/2024
Area 12	M62	1.106	AREA & ROAD	25/08/2024	21/10/2024
Area 12	M621	0.977	AREA & ROAD	25/08/2024	21/10/2024

Calculation of Local Equilibrium Correction Factors for the 2024 skid resistance surveys

National Highways manages skid resistance on its network by carrying out single annual skid resistance surveys. This data is used to identify sites where there is a need for an investigation to identify if a resurfacing treatment would help mitigate the risk of skidding collisions. This data also feeds into the KPI for Pavement Condition. This document discusses the calculation of the correction factors to seasonally correct the 2024 surveys.

Other titles from this subject area

PPR 2035	Calculation of Local Equilibrium Correction Factors for the 2023 Skid resistance surveys. S Brittain. 2024
PPR 2024	Calculation of Local Equilibrium Correction Factors for the 2022 Skid resistance surveys. S Brittain. 2024
PPR 1031	Calculation of Local Equilibrium Correction Factors for the 2021 Skid resistance surveys. S Brittain. 2022
PPR 990	Calculation of Local Equilibrium Correction Factors for the 2020 Skid resistance surveys. S Brittain. 2021

TRL
Crowthorne House, Nine Mile Ride,
Wokingham, Berkshire, RG40 3GA,
United Kingdom
T: +44 (0) 1344 773131
F: +44 (0) 1344 770356
E: enquiries@trl.co.uk
W: www.trl.co.uk

ISSN 2514-9652

DOI 10.58446/cyda6126

PPR2057