West Berkshire

Winter Road Services

Period 01/10/2023 to 30/04/2024

RoadMaster Report

Prepared by DTN

Summary - West Berkshire

The autumn and winter seasons were overall mild and wet in Central Southern England, with England and Wales combined seeing the second warmest winter on record, and several named storms passing through. Throughout the seasons, temperatures were around 1.5 to 2C above average, and it was slightly wetter than average, with around 150% of the expected rainfall, locally higher.

October was mild and wet with mean temperatures 1.5 to 2.0C above average, and 200% of the expected rainfall (the highest, near the English Channel). RSTs stayed above zero throughout. October started off very mild, with high pressure over north-western mainland Europe bringing largely dry and very warm conditions. On the 11th - 12th, temperatures fell below average as a passing front brought a northerly flow followed by high pressure. Into the 18th, low pressure in the Atlantic brought a brisk and milder south-easterly/southerly flow, turning wetter and windier with lows moving in including Storm Babet. From the 21st to the end of the month, temperatures returned to around average with a broader area of low pressure moving in, followed by a showery south-westerly airflow. On the 29th, wind gusts reached 86mph on the Isle of Wight.

November saw average temperatures but was a little wetter than average with 125% of the expected rainfall. There was a south-westerly flow to start with a series of lows moving in, including Storm Ciaran, bringing rain and strong winds. On the night of the 10th, low pressure moved away to leave a transient ridge, with RSTs falling locally marginal in West Berkshire. It turned milder for a few days with low pressure to the north, resulting in a brisk westerly flow. Around the 15th a brief ridge moved in causing RSTs to fall away but then low pressure returned and temperatures recovered over the following few days.

Towards the end of the month, low pressure cleared to the east to leave a chillier northerly flow followed by high pressure. This caused RSTs to dive down, falling below zero widely overnight, starting the first real cold spell of the season. They stayed mainly marginal to below zero for the rest of the month, as after a low briefly passed, the flow turned slack with winds falling away and clear spells often developing overnight.

December was quite mild, despite the cold start, with mean temperatures 1.5-2.5C above average. Rainfall was above average at 125 – 150%. The month started cold, with a slack flow bringing clear spells and light winds, so RSTs fell below zero in places for the first 2 nights, mainly towards the north of the region. It then turned milder with low pressure drifting in from the south-west to bring milder air and cloud, and RSTs above zero. After a brief dip marginal to below zero in spots on the night of the 5th once this low moved away, a deeper low developed to the west of the UK, bringing south-westerly winds and cloudy conditions. This eventually moved away too but a series of lows swept in from the west soon after, including storms Elin and Fergus. Temperatures through this time rose above average, and RSTs widely above zero.

A brief ridge moved in on the night of the 13th, leading to lower RSTs in spots, but then a rather persistent westerly to south-westerly flow developed, with high pressure to the south and low pressure to the north including storm Gerrit on the 27th. This led to breezier, cloudier and milder conditions, with RSTs above zero for the rest of the month.

January was overall average for temperatures and was around average in terms of rainfall too. It continued briefly mild, windy and wet to start to the month, with Storm Henk sweeping in, but this cleared east to leave a slack flow followed by high pressure building to the north-east bringing a chilly easterly flow. This brought about a dry and cold period, with RST minimums gradually falling, becoming below zero in places by the night of the 7th, and more widely for a time around the 10th. An area of precipitation managed to drift in on the 8th however, bringing a light covering of snow in places, mainly on the hills. The high pressure then started to drift slightly westwards, dragging in more cloud from the North Sea which held RSTs above for a few nights. As the winds backed northerly in its wake, temperatures dived back down, becoming colder than before and RSTs falling widely and far below 0C for a time. From the 16th to the 20th, the lowest RSTs of the season were recorded.

On the 20th, low pressure swept back in from the west to bring milder, breezier, and wetter conditions for the end of the month, including storms Isha and Jocelyn from the 21st to 24th. RSTs above zero, only marginal locally on the 23rdduring a gap between systems. On the 26th, high pressure building to the south-east brought more settled conditions and RSTs were able to fall below zero for a time, mainly further inland. A weak low brought some cloud for the final few nights of the month, with RSTs holding above zero.

February was very wet and mild, with over 200% of the expected rainfall and temperatures 2.5-3C above average. On the first night, high pressure was close to the south-eastern UK, but soon after, a persistent and brisk westerly flow developed, bringing RSTs even higher above zero for a while under cloud and milder air. This was disrupted by a front moving in from the north, although temperatures remained mild as an Atlantic low swept in on the 8th. This brought a similarly mild south-westerly and unsettled pattern with further lows moving in through much of the rest of the month. RSTs remained above zero, although they did fall marginal in West Berkshire on the nights of the 11th -12th in the wake of a front, and with high pressure close to the near continent.

On the 22nd, the flow became more slack, allowing for more clear spells to develop overnight, temperatures drifting closer to average, and RSTs to fall marginal to below zero overnight. A passing low kept them above on the 25th, however after this, high pressure developed from the north and RSTs fell again marginal to below zero overnight. For the final few days of the month, it turned more unsettled and milder again as lows moved in from the west, and RSTs returned above zero.

March continued generally mild and wet, albeit to a lesser degree than February. Temperatures were around 1.0-1.5C above average, and most areas saw around 175-200% of the expected rainfall. Through the start of the month, a low pressure system drifted slowly across the UK, with strong winds on the 1st, up to 81mph on the Isle of Wight. This system weakened on the 2nd, meaning that winds became relatively light and with clear spells overnight, however RSTs managed to hold above zero. As high pressure built to the east and with a low to the west, the following few days saw a rather dry south-easterly flow. Despite clear skies in some nights, RSTs remained above zero.

Past this point, the winds gradually turned more westerly, with low pressure sliding to the south of the UK, before a more south-westerly unsettled Atlantic influenced pattern developed. Temperatures gradually rose further above average into the mid-month, and RSTs rose further above zero. One of these systems brought strong winds for a time on the 28th in the morning, with gusts reaching 81mph once more on the Isle of Wight.

April set off to a mild start, with some shallow lows about bringing cloud and keeping RSTs above zero. A deep low and developing south-westerly flow continued the mild conditions. On the night of the 9th, a ridge developed with lower RSTs, but staying above zero. Into the mid-month, there were some clearer skies and lighter winds from high pressure over the near continent, and a passing low bringing a briefly northerly flow, followed by high pressure developing more broadly and temperatures falling below seasonal average. Despite this, RSTs remained above zero throughout. For the end of the month, a milder south-westerly to southerly developed and temperatures rose above average.

West Berkshire

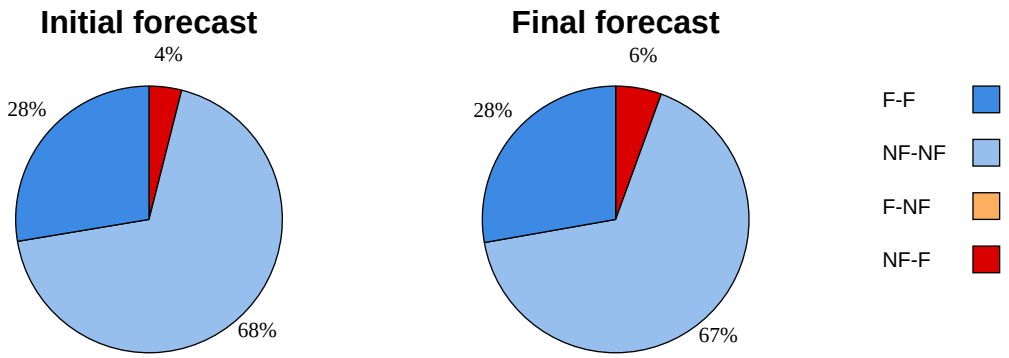
Analysis of Site Forecasts and Performance

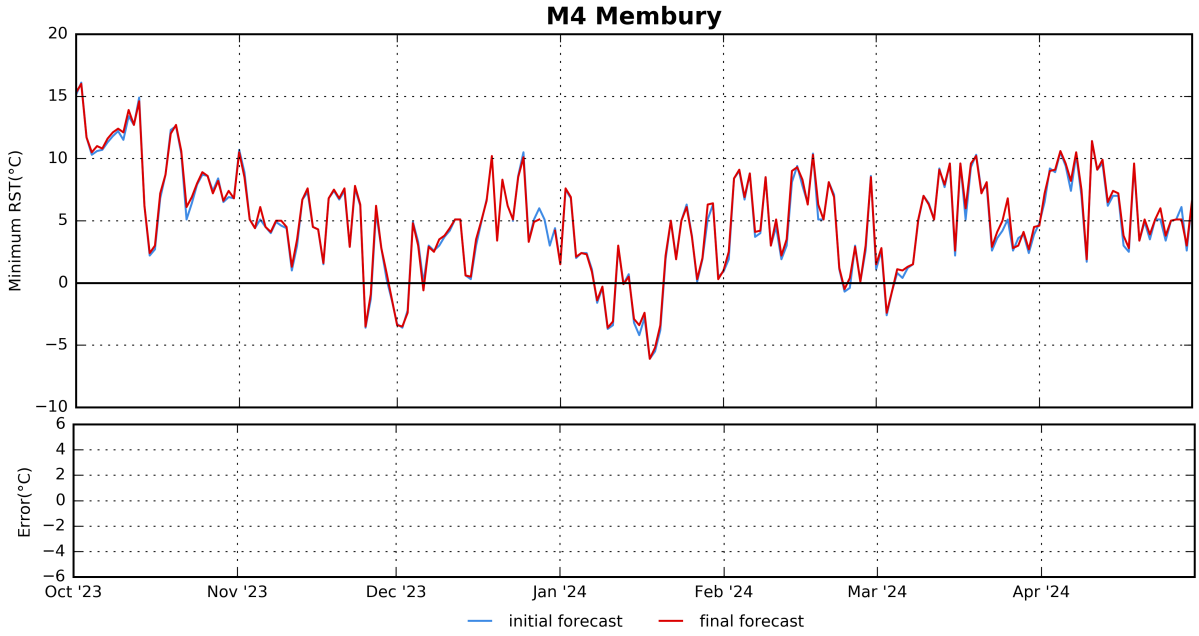
Critical nights at or below 3°C

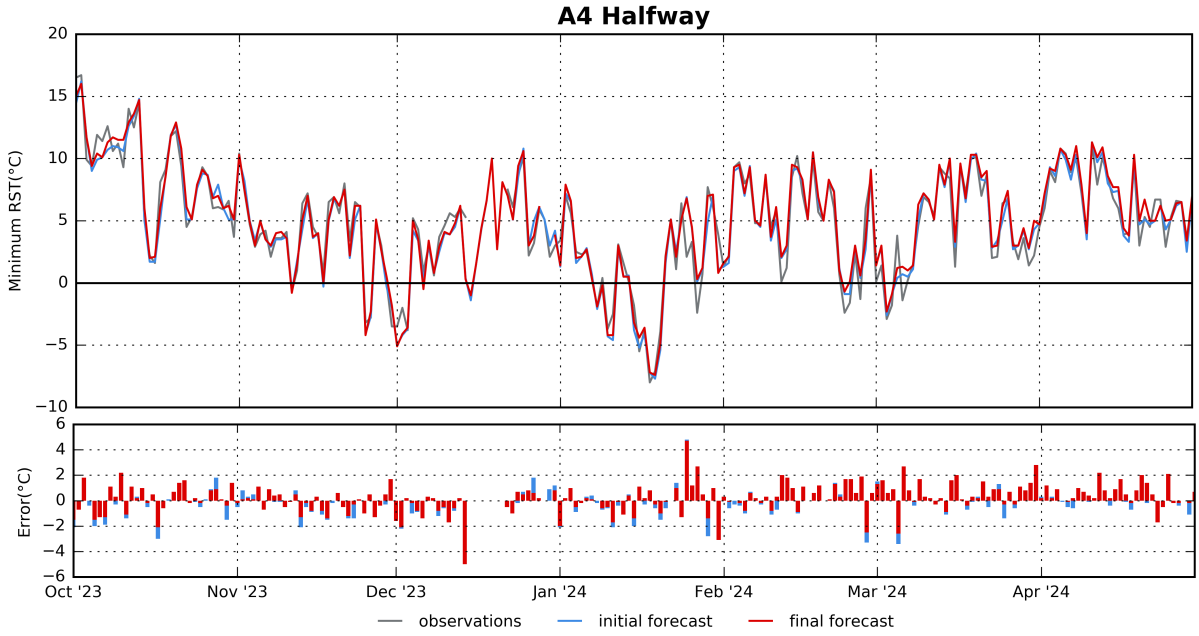
01/10/2023 to 30/04/2024

Site		Initial forecast					Final forecast				
	No Data	**Critical Nights**	**NF-NF**	**F-F**	**NF-F**	**F-NF**	**Critical Nights**	**NF-NF**	**F-F**	**NF-F**	**F-NF**
M4 Membury	213	0	0	0	0	0	0	0	0	0	0
A4 Halfway	8	76	52	21	3	0	72	48	20	4	0
TOTAL	**221**	**76**	**52**	**21**	**3**	**0**	**72**	**48**	**20**	**4**	**0**

Site	Initial forecast					Final forecast				
	Perc. Correct	**Miss Rate**	**FA Ratio**	**Bias**	**RMSE**	**Perc. Correct**	**Miss Rate**	**FA Ratio**	**Bias**	**RMSE**
M4 Membury	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
A4 Halfway	96%	12%	0%	0.05	1.48	94%	17%	0%	0.27	1.49
TOTAL	**96%**	**12%**	**0%**	**0.05**	**1.48**	**94%**	**17%**	**0%**	**0.27**	**1.49**




M4 Membury
Minimum RST(°C)
Error(°C)
Oct '23
Nov '23
Dec '23
Jan '24
Feb '24
Mar '24
Apr '24
initial forecast
final forecast


A4 Halfway
Minimum RST(°C)
Error(°C)
Oct '23
Nov '23
Dec '23
Jan '24
Feb '24
Mar '24
Apr '24
observations
initial forecast
final forecast

Performance Indicators

At DTN we have set out targets that we think are not only achievable, but also surpass-able. Below we set out performance targets that we will monitor against over the course of a customer's contract, including them in monthly and annual performance reports.

Following the recommendations of UK's Institution of Civil Engineers, we judge the value of our forecasts by looking at the road frost status. Using a 2 x 2 contingency table we compare the forecast against the actual:

	Frost Forecast (F)	**No Frost Forecast (NF)**
Frost occurred (F)	Correct forecast - frost (F/F)	Missed event (NF/F)
No frost occurred (NF)	False alarm (F/NF)	Correct forecast - no frost (NF/NF)

Only critical nights with a minimum road surface temperature below 3.0 °C are considered in the quality monitoring. The table allows the computation of the performance indicators below.

Percentage Correct (PC): Suggested target is 92% or higher
The percentage correct is the number of correct forecasts, divided by the total number of forecasts issued for critical nights:
PC = [(F/F + NF/NF) / Total number of critical nights] x 100 %

Miss rate (MR): Suggested target is < 8%
This indicates how many of the observed frosts were not forecasted, divided by the total number of nights with observed road frost:
MR = (NF/F) / (F/F + NF/F) x 100 %

False Alarm Ratio (FAR): Suggested target is < 9%
This looks at the frequency of nights with road frost forecasted while the road surface temperature stayed above 0 °C. We divide this number of nights with a false alarm by the total number of nights with frost forecasted:
FAR = (F/NF) / (F/F + F/NF) x 100 %

Bias: Suggested target is -0.25 °C
The bias is the mean over all differences between forecast and observation, in our case applied to the minimum road surface temperature. A negative bias indicates too pessimistic forecasts. Conversely, a positive bias suggests too warm forecasts.

Root Mean Squared Error (RMSE): Suggested target is < 1.40 °C
By squaring the differences between forecasted and observed temperature minima we remove the direction of the forecast error. The RMSE penalizes higher errors, it must not be compared with the mean absolute error.