



CASE STUDY



Keeping Britain Moving: Supporting Effective Winter Road Maintenance with Accurate Weather Data

The United Kingdom

Did you know we help more than 100 highway authorities in Great Britain maintain over 160,000 miles of public roads? That's enough road to wrap around the Earth 6.5 times!

What they were up against

Winter road maintenance is a balancing act. Treating roads too late can lead to congestion, accidents, and even potential fatalities. However, on the flip side, treating roads when unnecessary can result in additional costs and cause avoidable environmental damage.

For local authorities, municipalities, and highway agencies, the challenge is knowing when to act. They need the right weather data to know when to treat roads, be able to plan their resources, and validate their decisions. It comes, then, as no surprise that they need a partner they can trust.



What we did to help

It's a balance the DTN[®] team knows well. Working with over 100 highway authorities across Great Britain provides them with unparalleled insights into the unique and often challenging conditions maintenance teams face to keep the country moving and to help prevent road traffic incidents.

Read on to discover how DTN weather experts support four different authorities across the U.K. to help keep roads open and traffic moving during winter.

Advanced route-based forecasting helps Northamptonshire County Council achieve results

"With route-based forecasting for Northamptonshire County Council, it's looking like we saved around 9.2% of the total winter maintenance budget. Out of the 63 actions we undertook last season, 15 were through RBF – meaning that not all of the gritting fleet went out. The preparation for the season was very good. We sent the routes to DTN, and they input them into the system. The overall experience with Route-Based Forecasting has been very good," said Richard Woodhouse, senior maintenance and innovation manager at Northamptonshire County Council.

The Northamptonshire County Council Highways team wanted to upgrade their approach, replacing their traditional area-based weather forecasting service with a more modern route-based forecasting approach.

Recent advances in highway-specific weather forecasting technology, pioneered by DTN, allow hyper-local variations in road temperature and conditions to be modelled with extreme accuracy. Effectively, by capturing the interplay between high-resolution weather forecasts, topography, and highly localised variations in site characteristics (e.g., buildings, trees, and bridges), a prediction can be generated every few metres along a gritting route.



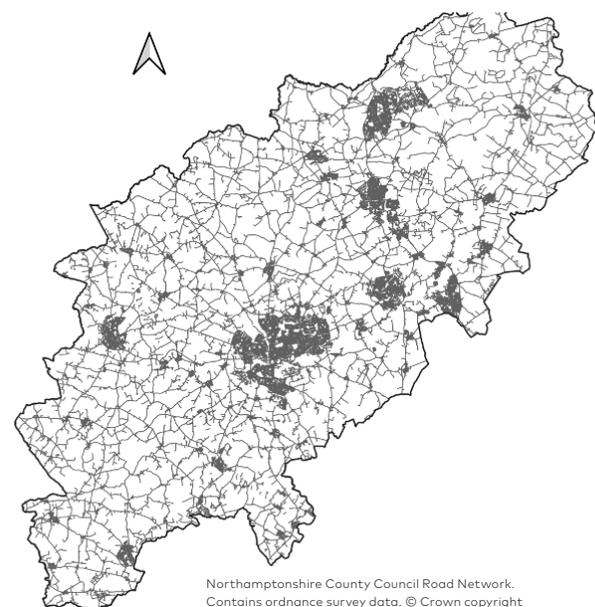
The impact of route-based forecasting

For winter maintenance decision-makers, it results in precise, effective, and efficient decisions — and at the route level rather than the area level. For example, on marginal nights, if only higher (and therefore colder) parts of the gritting network are forecast to fall below zero, then only these routes need to be treated. This detail ensures public safety whilst minimising unnecessary gritting treatments.

For Northamptonshire County Council, the acid test was to run the unique DTN route-based forecasting service alongside its traditional forecast and to perform an objective comparison. DTN supported this trial during the 2018-19 winter season, and the results were striking.

Route-based forecasting proves its value

With the DTN Route-Based Forecasting service, Northamptonshire's highway's team demonstrated a significant reduction in the number of gritting actions across the highway network. For the 2018-2019 season, this represented an overall saving of 9.2% of the total budget for winter maintenance.

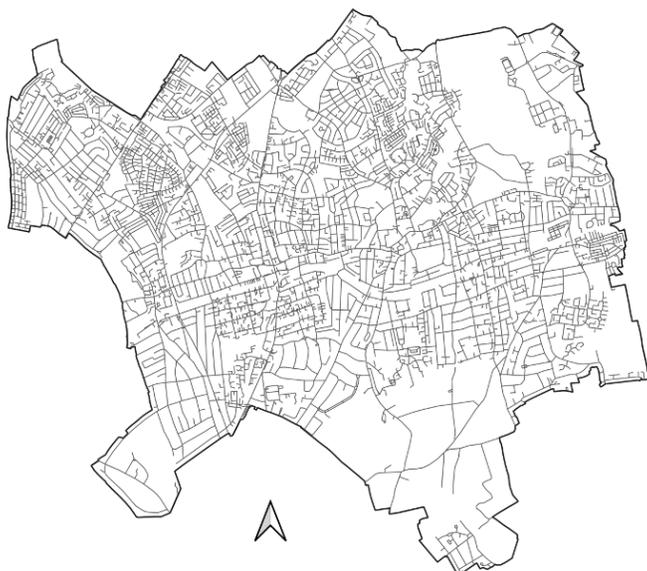


Northamptonshire County Council Road Network.
Contains Ordnance Survey data. © Crown copyright

About the advanced DTN route-based forecasts

The DTN route-based forecast model was built and fine-tuned based on years of experience in working for the road weather industry. It is a physical model designed to calculate forecasts for road surface temperatures and conditions for predefined gritting networks or routes. RoadMaster customers with route-based forecasts can view them on the RoadMaster dashboard map.

London Borough of Sutton Road Network. Contains
ordnance survey data. © Crown copyright.



True grit: London Council gets to grips with winter roads

"RoadMaster has already proven its value to Sutton, as the forecasts help the council to make the right calls on winter road maintenance. The DTN forecasts help us to confidently make the right decision to minimise unnecessary applications of grit," said Lloyd Tilbury, grounds maintenance supervisor.

The London Borough of Sutton has an explicit promise to the local community: to keep highways safe during winter weather whilst also working to control costs and protect the environment. To keep their word, it's essential that they only grit roads when necessary.

When their long-term provider withdrew from the market, they needed a new weather forecast partner. The council, as part of a consortium of London Boroughs, issued a tender for highway maintenance involving several forecast providers. After a rigorous technical and commercial assessment, they selected DTN as the preferred bidder and subsequently awarded them the contract.

Getting the team up and running

London Borough of Sutton now utilises RoadMaster — the specialised highway forecasting solution. To help the team get up and running, DTN delivered RoadMaster familiarisation training. These sessions included highway meteorology training to ensure a swift and smooth mobilisation.

Alongside this, the DTN in-house meteorological experts support decision-making through forecast consultancy. The blend of the right solution combined with expert support has dramatically assisted Sutton's ability to deliver on its promise to the community.

Measuring the value and impact

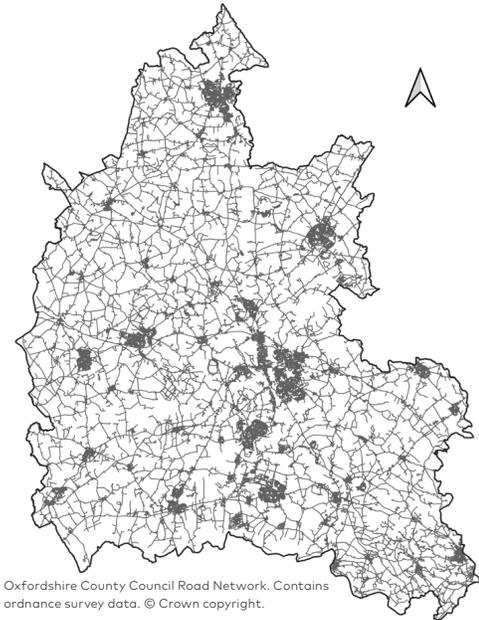
RoadMaster has already proven its value to Sutton, as the forecasts help the council to make the right calls on winter road maintenance. Tilbury explained, "The DTN forecasts help customers to confidently make the right decision to minimise unnecessary applications of grit."

He added, "Forecast consultancy via the IVR call-backs has been great. We get call-backs within 10 minutes and speak to an expert meteorologist who is fully briefed on the weather for our patch, meaning we're never left hanging or wondering. You get that reassurance that you're making the right call.

Oxfordshire County Council winter road management successfully transferred to DTN

"The DTN system, RoadMaster, looked very different than our old system. At the same time, due to having experienced decision officers, the information was unsurprisingly similar. The RoadMaster system presented the team with some useful additional functionality, including rainfall and precipitation type graphs spanning seven days," said Paul Wilson, group manager area operations.

Oxfordshire County Council is responsible for gritting the main roads across Oxfordshire, and Wilson is responsible for coordination and delivery of the Winter and Adverse Weather Service in Oxfordshire, both in terms of operations and customer service. He explains the decision-making process to hire DTN for the winter weather forecasts.



Oxfordshire County Council Road Network. Contains Ordnance Survey data. © Crown copyright.

“It’s obvious that to do this in a safe and efficient manner, we need continuous availability of accurate and up-to-date weather forecasts.”

Paul Wilson,
group manager,
area operations

The winter road challenges facing Oxfordshire County Council

Oxfordshire County Council makes daily decisions to send out gritters based on a detailed weather forecast. The crucial factor is whether the road surface temperature will be 0.5 degrees or below. That’s the temperature at which frost will form and surfaces can become slippery. Many other factors are also taken into consideration by decision officers.

Often, it is a straightforward judgement, but occasionally there are complications. Sometimes, the forecast might be telling them that the night will start very cold, and frost will form, but it’ll later warm up and that there’ll be rain coming in. And on other occasions, there might be snow in the forecast. Oxfordshire County Council wants to time the gritting run just right and know when it needs to fit the snow ploughs to the front of the gritters.

How DTN helps support the maintenance team

A computerised ice prediction system informs decisions to salt or not. It compares forecast conditions against actual road temperatures measured at five weather stations around the county. Also, there is a through-the-night watch on conditions. The local knowledge of staff contributes a lot to the final judgement as to when to best carry out precautionary salting.

For many years, the Met Office was the provider of bespoke winter weather forecasting services to Oxfordshire. However, Oxfordshire County Council terminated this arrangement in June 2017. The council was already in discussion with potential providers for the 2019-20 season and contacted DTN to see if they were able to accelerate the arrangements for a three-year agreement commencing October 2017 rather than 2019.

Coaching the team to support decisions

After placing the order, a series of coaching sessions are arranged for the decision officers. The weather information provided by DTN is very accessible, with expanding insight for each weather domain, usefully linked to the static weather stations around the county. This information is enhanced with colour-coded symbols to identify likely weather hazards.

"The forecasts were, in the main, delivered accurately at the prescribed times during the day, chosen by Oxfordshire County Council, enabling the decision officers to make their action decisions for each forecast," Wilson continued. "The action log would then be completed and sent out to those requiring it."

Creating a complete picture of daily events

Oxfordshire has taken the action log one stage further by also using the facility to record out-of-hours emergency calls, thus giving a complete daily picture of events. This approach has proved beneficial for the defence of third-party claims. All archived information is easily retrievable by amending the date/date range on the front page of RoadMaster. It was also very convenient to access data from other authorities immediately surrounding Oxfordshire, who were also utilising RoadMaster, to support this complete picture.

One additional benefit to Oxfordshire County Council is RoadMaster provides forecasts throughout the year — not just over the winter period. It's useful information for the highway maintenance scheme teams, particularly now that there is an eight-day forward forecast available on the main page.

RoadMaster grows with the team

RoadMaster users enjoy regular updates to the tool, and suggestions for improvement made by Oxfordshire County Council's duty officers have led directly to product updates. Feedback from Oxfordshire County Council decision officers is that they have found RoadMaster to be a sound system, and they like its functionality. Oxfordshire County Council now has a three-year contract in place and will work with DTN to continue to seek improvements.

Managing Essex highways in winter with the support of DTN

"Our source of weather information is from DTN. They provide us with a weather forecasting service on a 24/7 basis, with all the relevant information and warnings, mainly through their RoadMaster platform and app. In addition, the road weather stations and the (gritter) drivers also provide feedback to us about conditions on their run. They are our eyes on the ground," said Robbie Jamieson, Essex Highways winter service manager.

The county of Essex has one of the largest winter gritting road networks in the U.K. For its winter road management, managed by Essex Highways (a partnership between Essex County Council and Ringway Jacobs), it uses 57 gritting lorries with ploughs, plus two mini gritters and five spare machines — all deployed based on weather conditions, forecast and monitored by DTN.

Essex Highways treats over 2,000 miles of roads with a mixture of salt and brine (pre-wet). A typical treatment (10 g/m²) uses approximately 200 tonnes of salt, and the council maintains 15,000 tonnes of salt at seven depots around the county.

"As well as the standard rock salt, our gritters also use a brine solution. This so-called pre-wet system is more cost-effective. Gritters typically spread 70% rock salt and 30% brine. Drivers have to expect the unexpected because we are dealing with the elements. Conditions can change rapidly, for the public and us," explained Jamieson.



Essex County Council Road Network.
Contains Ordnance Survey data. © Crown copyright.

Making the decision to grit

A decision to treat is made around midday each day based on the latest forecast. Essex Highways' policy is to deploy the gritters if the road surface temperature — not the air temperature — is expected to drop close to freezing. During the winter season, from October to April, Essex Highways maintains a constant state of readiness.

The absolute priority is public safety on the network. The expense of treatment is low compared to the human impact and cost of a fatal crash. Essex Highways can't make guarantees though; drivers must still drive to the conditions, but Essex Highways always does their best.



Gritting operations in action

Road gritting prioritises the most critical routes first. Highways England deals with the A12, A120, and motorways, and Essex Highways deals with the next level of main roads and vital local roads, divided over five climatic weather zones that are based on the current weather forecast. In total, there are 57 different gritting routes designed to be the most effective in terms of optimisation of resources. There are two mini-gritter routes serviced by adapted pick-up trucks that cover areas the heavy lorries cannot access, such as weight-restricted bridges.

The target is to treat all routes within three hours. "Unfortunately, this is not as simple as it sounds," Jamieson continued. "On major routes with multiple slip-roads or roundabouts with filter lanes, gritters may treat each part of the treated road network."

Essex decision-makers receive every day, four emailed forecasts from DTN and have access to the updated information via the web portal. This information shows the minimum temperatures along with any hazards expected (e.g., frost, black ice, snow, etc.). From this, Essex can make the best-informed decisions on whether to treat the county's priority network and the

optimum times to do this. Pre-treatment takes place on the priority network before frost/ice forms. When the county of Essex has made the decision, usually at lunchtime, it's communicated via SMS text, email, the Essex Highways website, and X (formerly Twitter) account.

The power of technology...

Modern road gritting is a highly technical business. From the DTN forecasts, using data from a series of 10 weather stations across Essex to the gritting lorries themselves, which can adjust how quickly the salt is spread depending on wind speed and use of gritter GPS tracking and recording the treatment settings.

...supported by the human element

"But despite all this technology, the importance of the skill and knowledge of drivers cannot be underestimated," said Jamieson. "Gritter lorry drivers are essentially trained operatives who do other road maintenance or similar jobs, whilst some are kept on a retainer. They are split into morning and evening shifts, geared around pre-treatment in advance of rush hours. The morning team usually completes its treatment prior to 07:00, and the evening team starts after 19:00.

Developing and innovating for the future

There have been lots of changes since Essex Highways started with DTN 18 years ago. The 2017/2018 winter season was the first time Essex Highways entirely relied on RoadMaster.

After DTN collaborated with Essex Highways to develop the product, the team felt confident it met their requirements. Among the improvements was the possibility to see all graphs and forecasts on one single screen without having to flip through pages. Another enhancement was the introduction of action logs. Essex Highways wanted to be able to keep track of actions taken and share this with neighbouring authorities and road managers. This capability is included in RoadMaster.

Like much of the U.K. in 2018-19, Essex Highways experienced many snow events due to the Beast from the East weather phenomenon. The team completed 108 treatments — over double the average for a winter season. As a result, Essex Highways exceeded the annual budget, but road safety is their top priority.

Of course, Essex Highways always tries to be more efficient and save money — that's why they're evaluating and trailing the DTN route-based forecasts. Essex Highways is also tweaking the trigger temperature for gritting, lowering the trigger temperature to +0.5 degrees Celsius instead of +1.0 degrees. It could make a positive difference to the budget under certain circumstances.

"Overall, the services Essex Highways receives from DTN form a critical and essential element for our day-to-day operations and decision-making. We have found DTN to be reliable, flexible, professional, and committed to innovation. The DTN performance and accuracy have always been of a high industry standard."

About RoadMaster

DTN developed RoadMaster to address the challenges facing operations teams under pressure to deliver traffic safety during the winter months. The web portal shows past, present, and forecast road hazards for a specific maintenance area, and its dashboard gives teams an actionable overview of observations, forecasts, and hazard warnings. RoadMaster supports winter road maintenance by providing road managers peace of mind, helping them make decisions to support road safety and operational efficiencies through better-informed gritting decisions.

See RoadMaster for yourself

Take a tour with a trusted DTN expert.

[Request a demo](#)

