



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

United Kingdom



Did you know we help over 100 highway authorities in Great Britain maintain more than 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 leads to congestion, accidents, and even potential fatalities. However, on the flip side, treating roads when it's not necessary results in additional costs and causes avoidable environmental damage.

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

What we did to help.

It's a balance the team at DTN knows well. Working with over 100 highway authorities across Great Britain gives unparalleled insight into the unique and challenging conditions that maintenance teams work through to keep the country moving and prevent road traffic incidents.

Read on to discover how the DTN weather experts have supported four different authorities across the UK to keep the roads open and traffic moving during winter months.

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." 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 modeled with extreme accuracy. Effectively, by capturing the interplay between high-resolution weather forecasts, topography, and highly-localized variations in site characteristics (e.g., buildings, trees, and bridges), a prediction can be generated every few meters 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 route level rather than 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 while minimizing unnecessary gritting treatments.

For Northamptonshire County Council, the acid test was to run the DTN unique 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.



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

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.

About the DTN advanced route-based forecasting

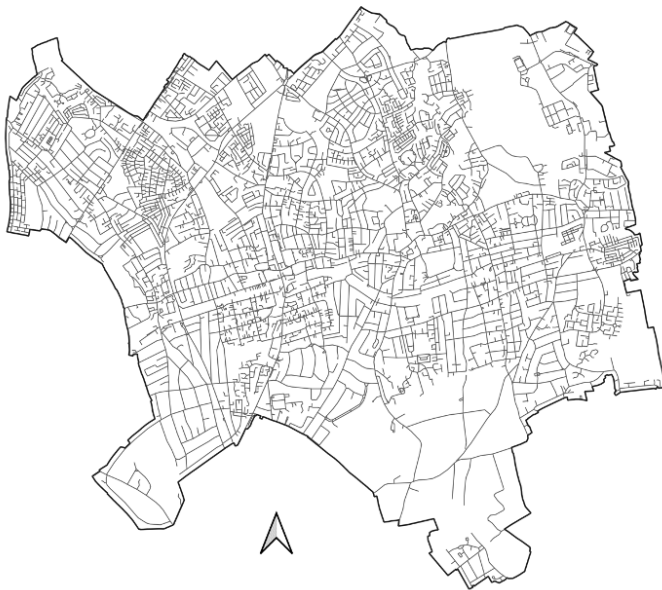
The DTN Route-Based Forecast model was built and fine-tuned based on years of experience in working for the road weather industry. It is a physical model, designed to calculate forecasts for road surface temperatures and conditions for predefined gritting networks (or routes). RoadMaster customers with Route-Based Forecasts can now view them on the RoadMaster Dashboard map, without having to go to the classic pages.

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 Roads Maintenance. The DTN forecasts help us to confidently make the right decision to minimize unnecessary applications of grit." 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, while also controlling costs and protecting 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 the contract.



London Borough of Sutton Road Network – Contains Ordnance Survey data © Crown copyright.

Getting the team up and running

London Borough of Sutton now utilizes RoadMaster - the specialist highways forecasting solution. To help the team get up and running, DTN delivered RoadMaster familiarization training. These sessions included highways meteorology training to ensure a swift and smooth mobilization.

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

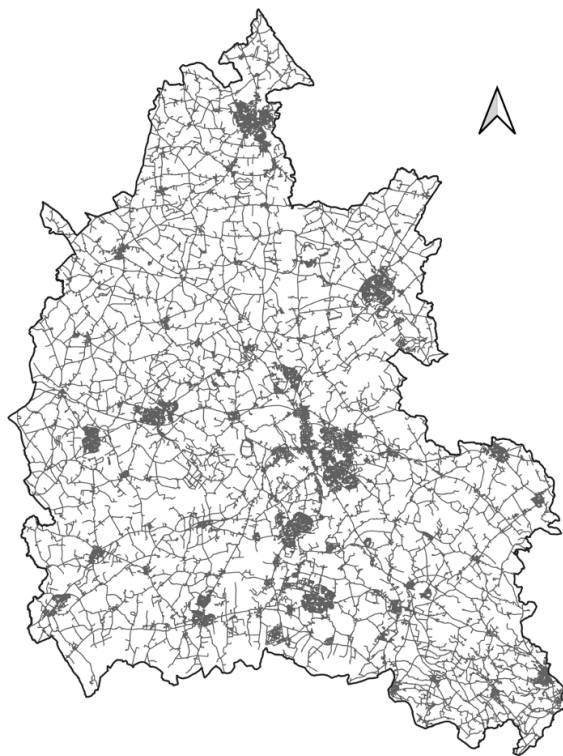
RoadMaster has already proven its value to Sutton, as the forecasts help the council to make the right calls on Winter Roads Maintenance. Lloyd Tilbury, Grounds Maintenance Supervisor, says: "The DTN forecasts help customers to confidently make the right decision to minimize unnecessary applications of grit."

He adds that "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." Paul Wilson, Group Manager Area Operations

Oxfordshire County Council is responsible for gritting the main roads across Oxfordshire and Paul Wilson, Group Manager Area Operations, is responsible for coordination and delivery of the Winter and Adverse Weather Service in Oxfordshire, both in terms of operational delivery and customer service delivery. 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.

The winter roads challenges facing Oxfordshire County Council

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

Often it is a straightforward judgment, but occasionally there are complications. Sometimes the forecast might be telling customers 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 snowplows to the front of the gritters.

How DTN helps support the maintenance team

A computerized 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 judgment as to when to best carry out precautionary salting.

For many years the Met Office was the provider of bespoke winter weather forecasting service 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 3-year agreement, commencing October 2017 rather than 2019.

"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

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, each domain usefully linked to the static weather stations around the county. This information is enhanced with color-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 decision for each forecast," Paul Wilson continues. "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 the out of hours emergency calls, thus giving a complete daily picture of events. This approach has proved beneficial for the defense 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 utilizing 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

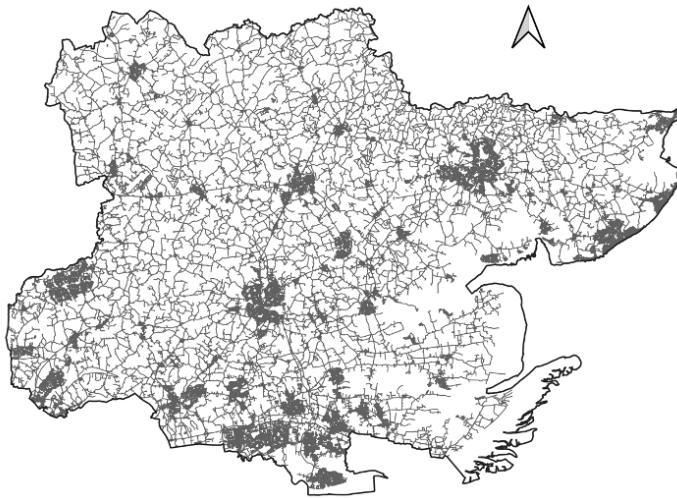
RoadMaster users enjoy regular updates to the tool, and suggestions for improvement made by Oxfordshire County Council's duty officers have led directly to product updates. Feedback from Oxfordshire County Council Decision Officers is that they have found RoadMaster to be a sound system and like its 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." Robbie Jamieson, Essex Highways Winter Service Manager

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



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

"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 percent rock salt and 30 percent brine". Drivers have to expect the unexpected because we are dealing with the elements. Conditions can change rapidly, for the public and us." Robbie Jamieson – Essex Highways Winter Service Manager.

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, 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 do their best.

Gritting operations in action

Road gritting prioritizes the most critical routes first. Highways England deals with the A12, A120, and motorways; Essex Highways deal with the next level of main roads and vital local roads, divided over five "climatic weather zones," based around the current weather forecast. In total, there are 57 different gritting routes, designed to be the most effective in terms of optimization 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 continues. "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 (frost, black ice, snow, etc.). From this, Essex can make the best-informed decision whether to treat the County's Priority network and the optimum time to do this. Pretreatment 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 Twitter account.

The power of technology...

Modern road gritting is a highly technical business. From the forecasting by DTN, using data from a series of ten 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," says Jamieson. "Gritter lorry drivers are essentially trained operatives, who do other road maintenance or similar jobs, while some are kept on a retainer. They are split into morning and evening shifts, geared around pretreatment in advance of rush hours. The morning team usually completes its treatment prior to 7 a.m., the evening team starting after 7 p.m.

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 to be able to share this with our neighboring authorities and road managers. Now, in RoadMaster, this has been included.

Like much of the UK, 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 exceeding the annual budget, but road safety is their top priority.

Of course, Essex Highways always try 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°C instead of +1.0°C. 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 that are under pressure to guarantee traffic safety during the winter months. It's a web portal that shows past, present, and forecasted road hazards in your maintenance area. The dashboard features give teams an actionable overview of observations, forecasts, and hazard warnings. RoadMaster supports winter road maintenance, by providing road managers peace of mind, securing road safety, and supporting operational efficiency through informed gritting decisions.

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