NWSRG
NATIONAL WINTER SERVICE RESEARCH GROUP

nwsrg.org

IoT Sensor Adoption – Digital Winter Transition for Blackpool CC

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Dedicated to advancing understanding of best practice for winter service delivery

Section Twelve

Weather Forecasting and Road Weather Information Systems

Key check list:

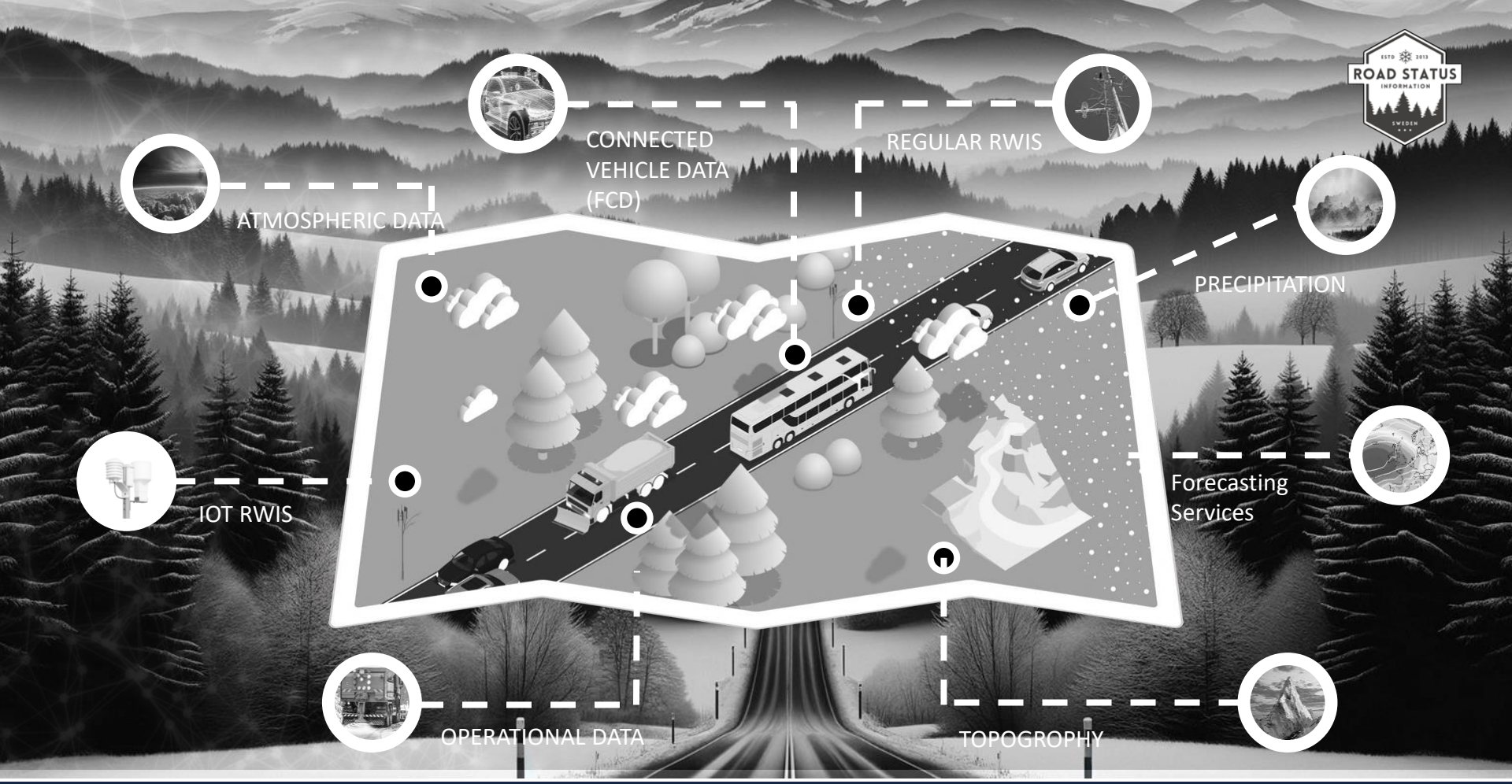
- Have decision makers undergone suitable training (such as the IHE/ NWSRG Winter Service Decision Makers Course and/or other training provided by forecast providers and sensor suppliers)
- Are the most appropriate weather forecasting services being procured?
- Have the potential benefits of increasing the granularity/resolution of forecasts been considered – i.e. domain or route-based forecasts?
- Are conditions being monitored appropriately throughout the forecasting period?

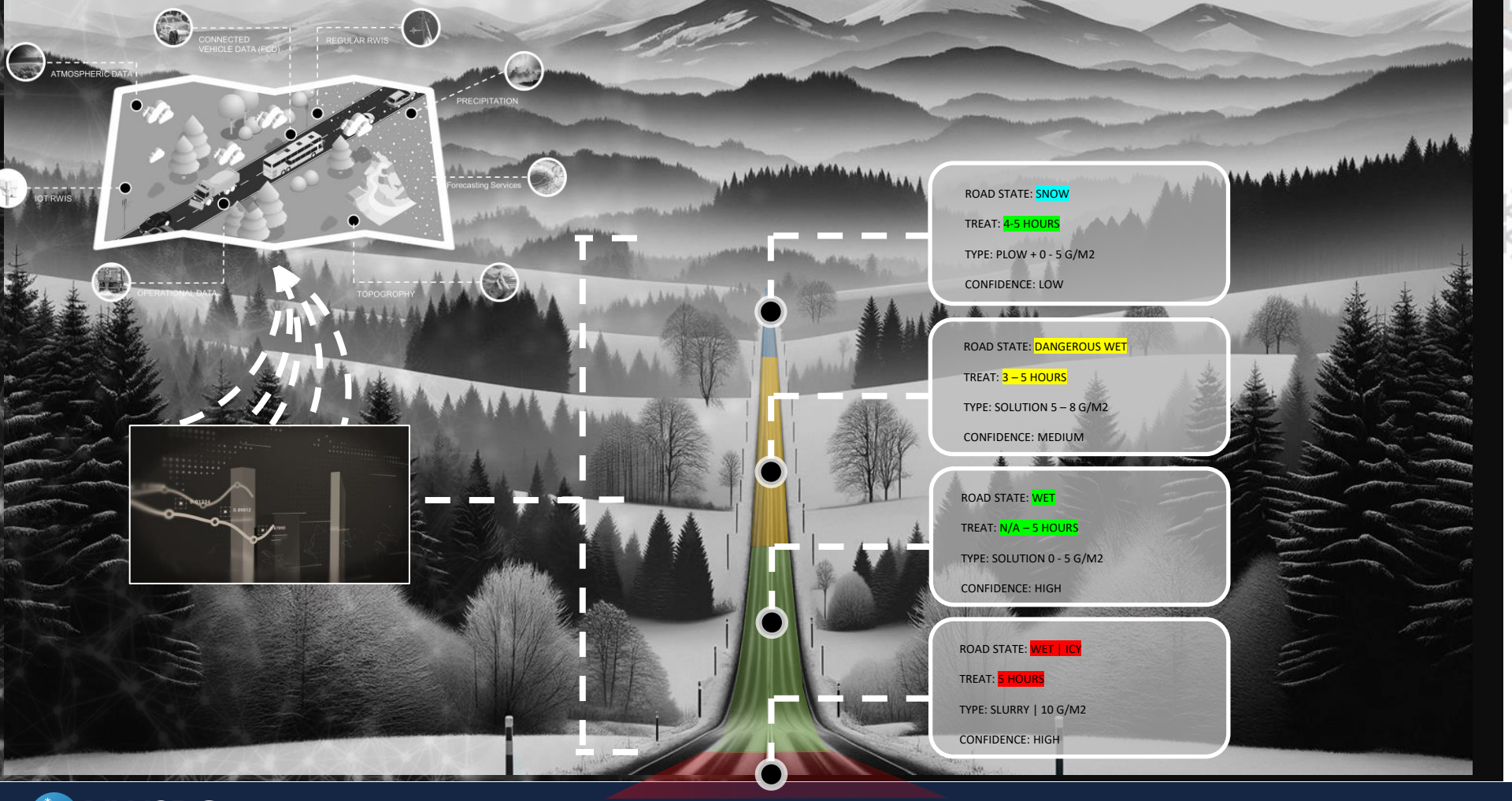
12.2.3 Internet of Things (IoT) Road Monitoring Sensors

12.2.7 Factors to Consider when Purchasing Weather Stations and Sensors

12.12.9 Where to Locate Sensors and Fixed Weather Stations

12.13 Emerging Trends and Technologies


ROAD STATUS
INFORMATION
ESTD 2013
SWEDEN
CONNECTED
VEHICLE DATA
(FCD)
REGULAR RWIS
ATMOSPHERIC DATA
PRECIPITATION
IOT RWIS
Forecasting
Services
OPERATIONAL DATA
TOPOGROPHY


CONNECTED VEHICLE DATA (FCD)
REGULAR RWIS
ATMOSPHERIC DATA
PRECIPITATION
IOT RWIS
Forecasting Services
OPERATIONAL DATA
TOPOGRAPHY
ROAD STATE: SNOW
TREAT: 4-5 HOURS
TYPE: PLOW + 0 - 5 G/M2
CONFIDENCE: LOW
ROAD STATE: DANGEROUS WET
TREAT: 3 – 5 HOURS
TYPE: SOLUTION 5 – 8 G/M2
CONFIDENCE: MEDIUM
ROAD STATE: WET
TREAT: N/A – 5 HOURS
TYPE: SOLUTION 0 - 5 G/M2
CONFIDENCE: HIGH
ROAD STATE: WET | ICY
TREAT: 5 HOURS
TYPE: SLURRY | 10 G/M2
CONFIDENCE: HIGH

Blackpool

Practitioner Learning

BASED ON EXPERIENCE TO DATE

Forecasted mutual benefits to the authority

- Confidence to move away from “one out, all out” process
- Embark on their digital workflow journey
- Targeted accurate treatments
- Opportunities to vary g/m2
- Optimise routes with integrated technology
- Reduce environmental impact with commercial benefits
- Reduced consumption of rock-salt
- Reduced driver hours
- Reduced fuel usage
- New Technology(Fleet) preparation

Laying the foundations

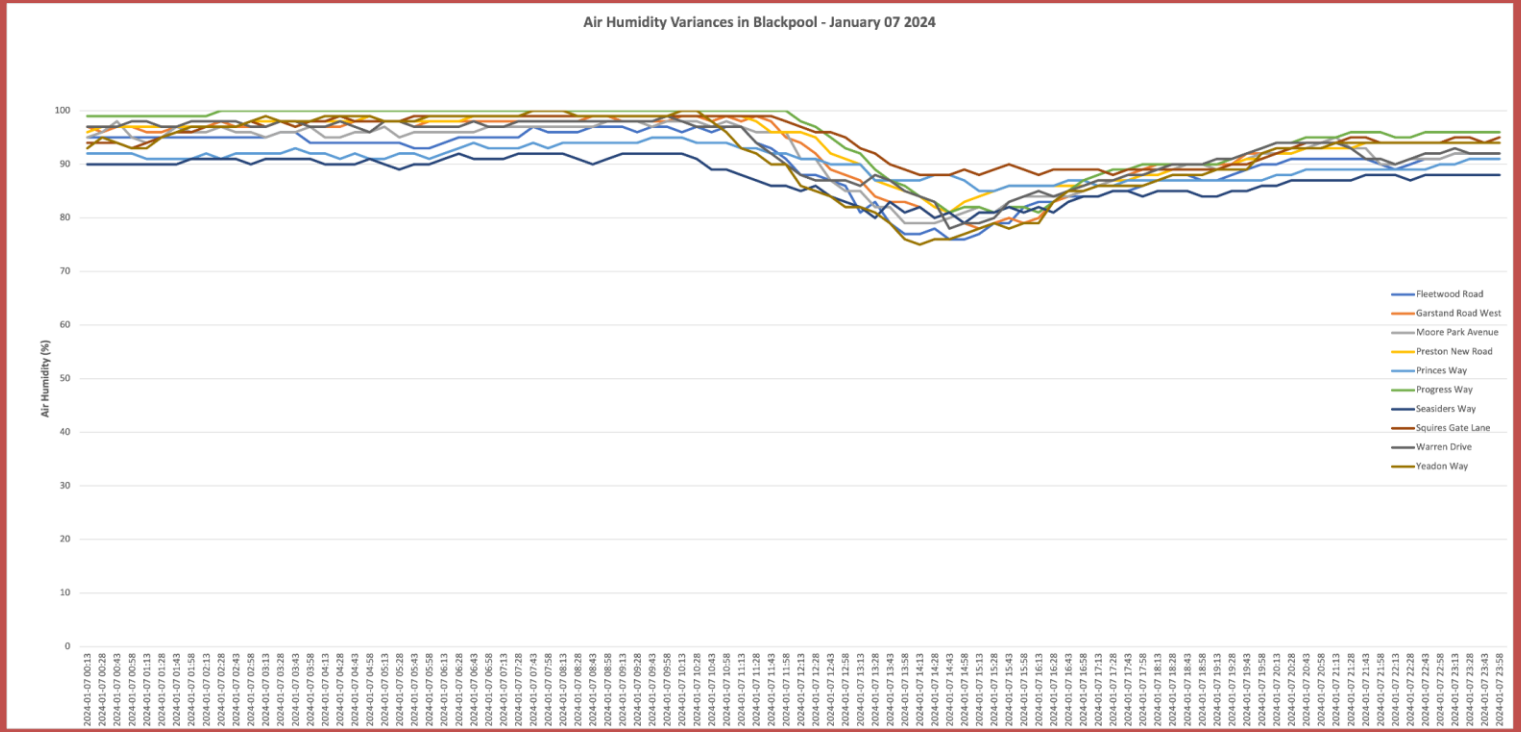
Climatology Report

The location of these sensors should be chosen according to the climatological conditions in the actual area reflecting the complexity in the regional, local and micro climate:

- High ground
- Low ground
- Rural environment
- Urban environment
- Beside water sources
- Beside / on structures
- Active travel scheme/footpath/bridleway etc
- Transport Hubs

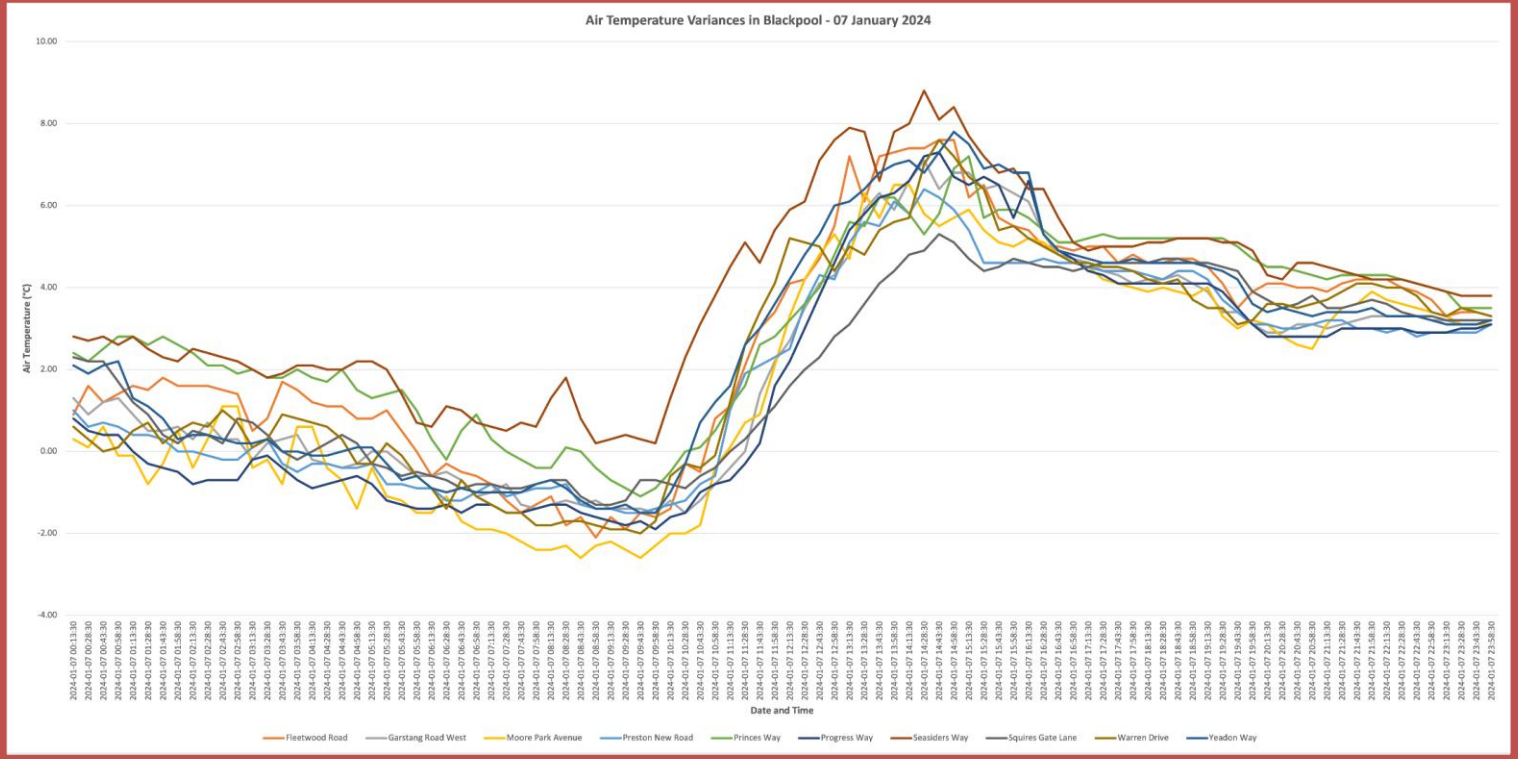
1	Southern part of area.	Screened S.	Radiative cooling during clear and calm nighttime conditions. Shded by vegetation during noon.	crucial	53.79283, -3.02209
2	South part.	Open fields, screening W.	Risk of icing/ hoarfrost due to humid/cold air and shade during the afternoon.	crucial	53.79158, -3.00147
3	E part.	Open.	Risk of icing/hoarfrost due to quick temperature change	crucial	53.80279, -2.99816

Air Humidity Sample Data



RENNICKS

Air Temperature Sample Data



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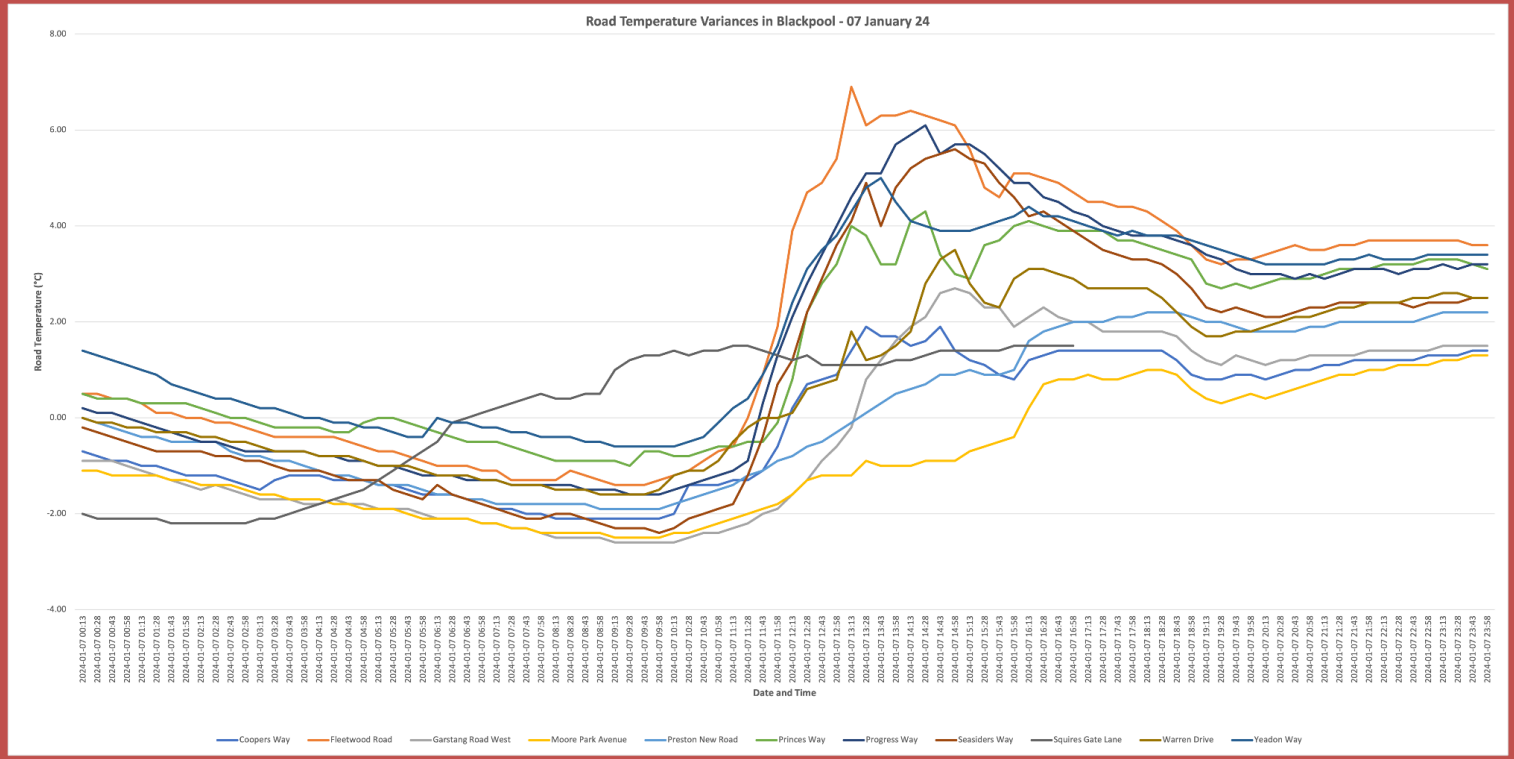
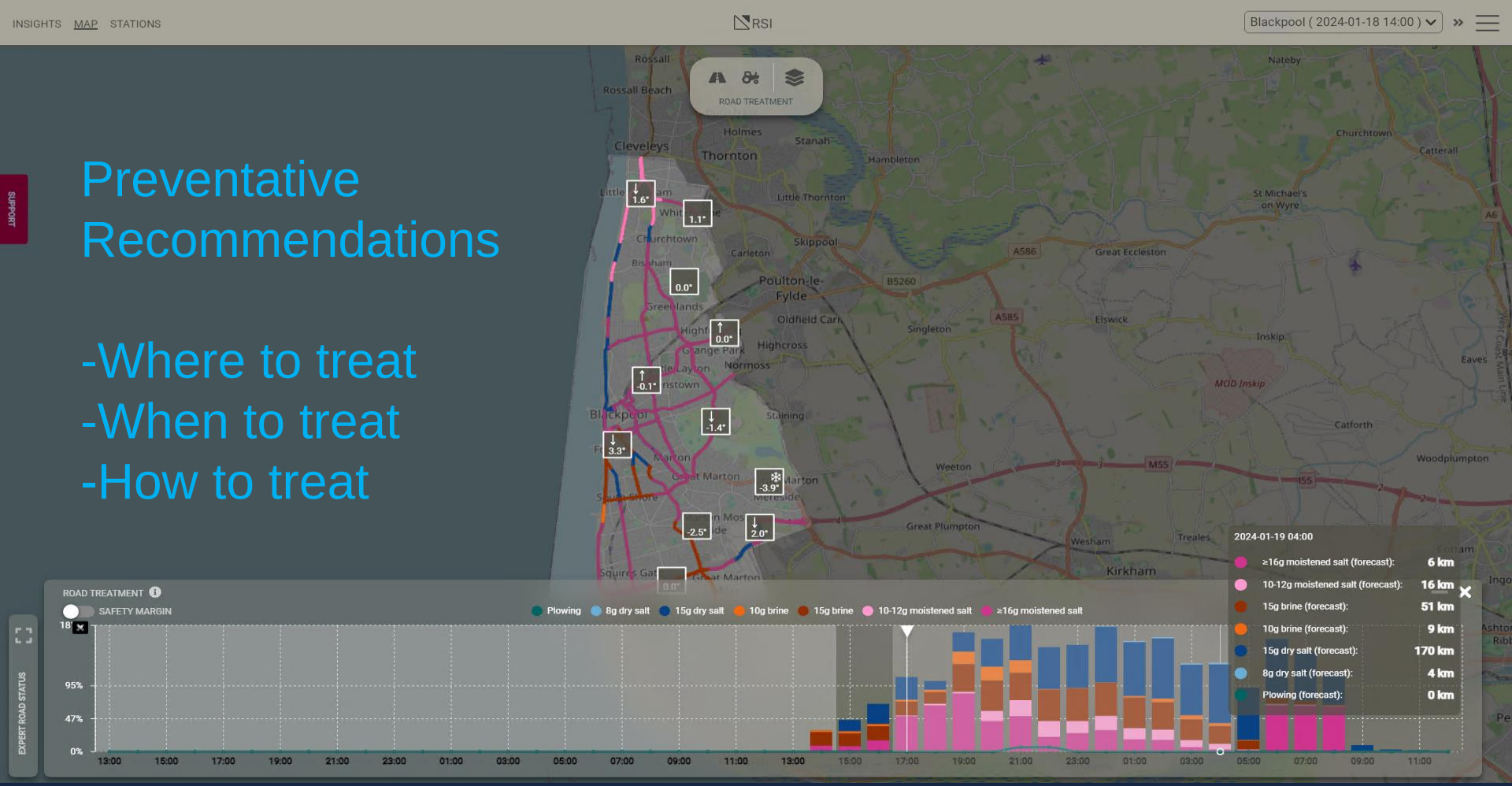
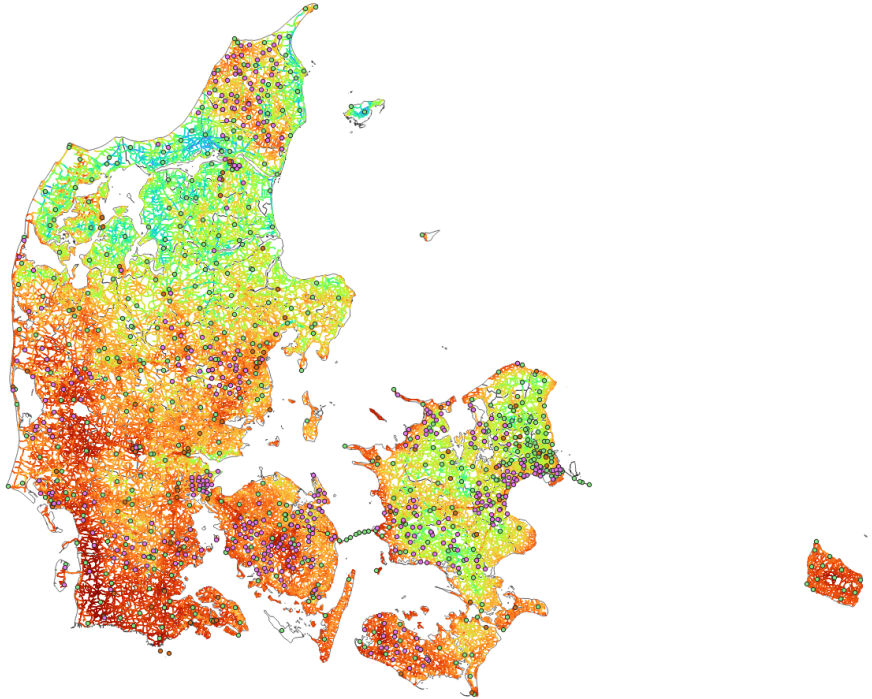
Road Temperature Sample Data



RENNICKS


INSIGHTS MAP STATIONS
RSI
Blackpool (2024-01-18 14:00)
ROAD TREATMENT
Preventative Recommendations
-Where to treat
-When to treat
-How to treat
SUPPORT
EXPERT ROAD STATUS
ROAD TREATMENT
SAFETY MARGIN
Plowing
8g dry salt
15g dry salt
10g brine
15g brine
10-12g moistened salt
≥16g moistened salt
95%
47%
0%
13:00 15:00 17:00 19:00 21:00 23:00 01:00 03:00 05:00 07:00 09:00 11:00
2024-01-19 04:00
≥16g moistened salt (forecast): 6 km
10-12g moistened salt (forecast): 16 km
15g brine (forecast): 51 km
10g brine (forecast): 9 km
15g dry salt (forecast): 170 km
8g dry salt (forecast): 4 km
Plowing (forecast): 0 km

Heatmaps



Creation of heat maps

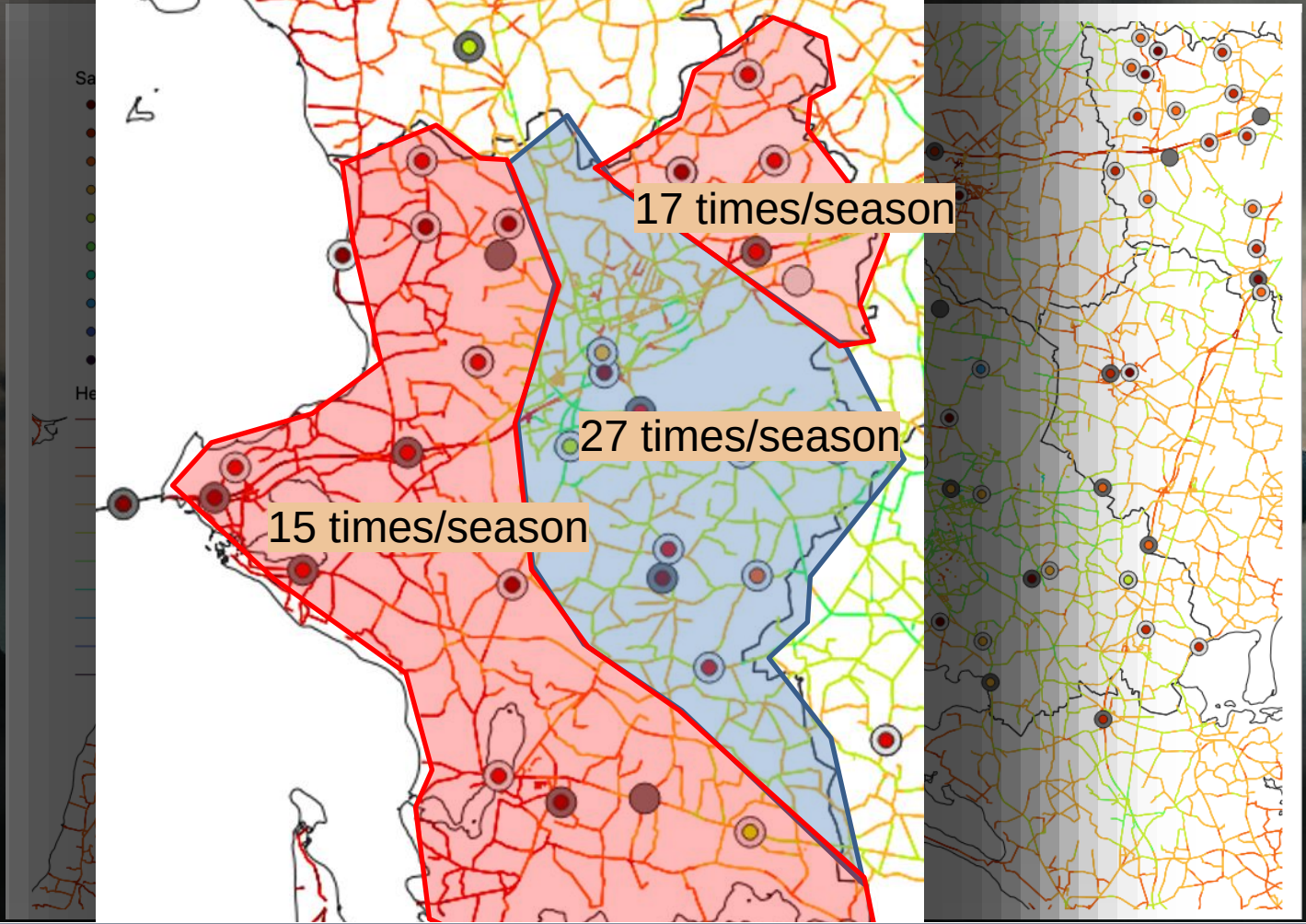
- Historic RSI data
- Variations across the authority
- Identify trends

Result

- NB of frost incidents (hours/km)
- NB of snow incidents (hours/km)

Heat Map

Route and budget planning etc.



Summary

IoT devices transformed learning

Increased competency through data provision

Underpins winter decision support system

Compliments/enhances existing technologies

Enables journey to digitalised workflow