Extending the coverage of the network and delivering targeted treatments using Internet Of Things road sensors.

Nick Johnson

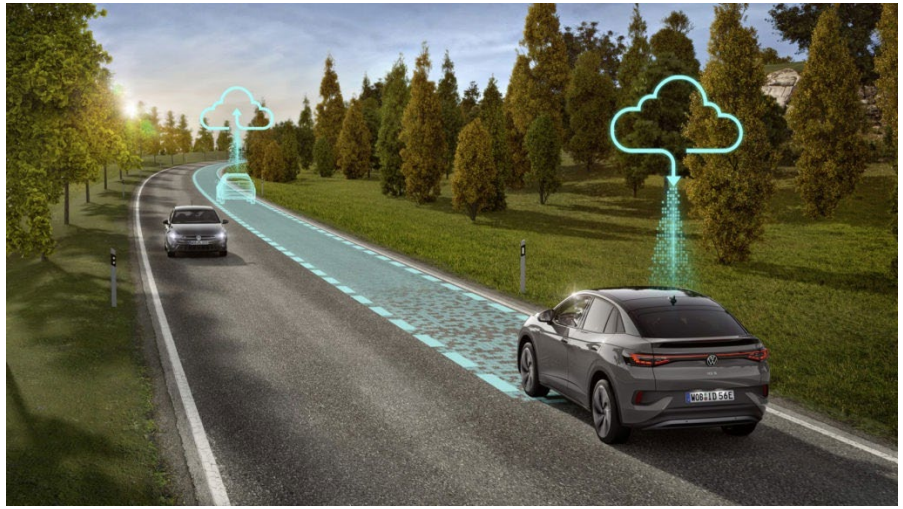
VAISALA Xweather

Key Trends

- Increasing amount of data from the road network
- AI/Cloud computing
- Financial pressures
- Environmental and sustainability expectations
- Stakeholder expectations
- Comply with best practice guidance

Restricted

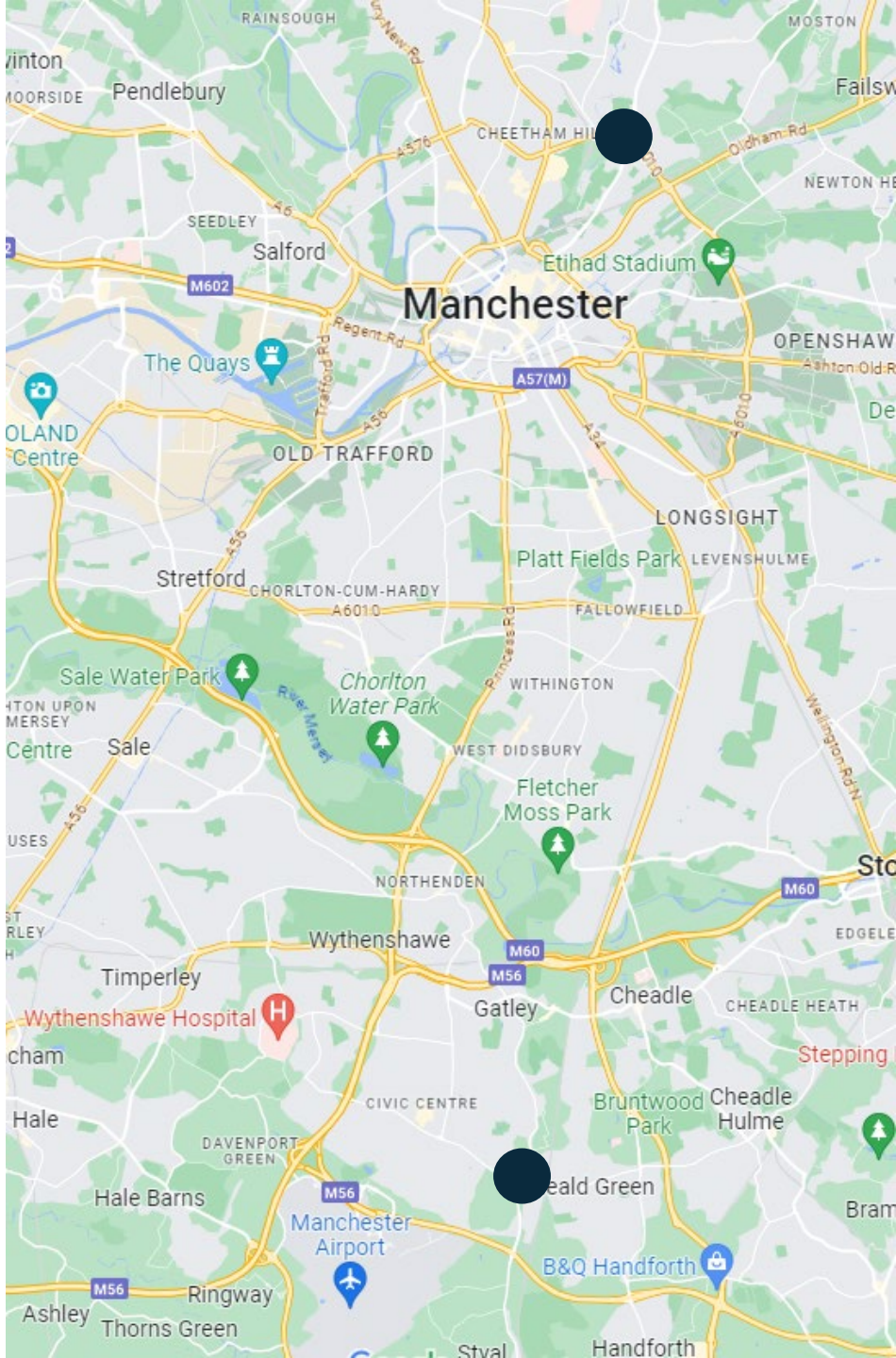
Data sources now available



Restricted

Challenge

- 2 RWS200, which drive their winter service decision-making process
- All or nothing
- Identified area colder than the rest of the network that may need treating when rest does not



Restricted

Mancunian Way

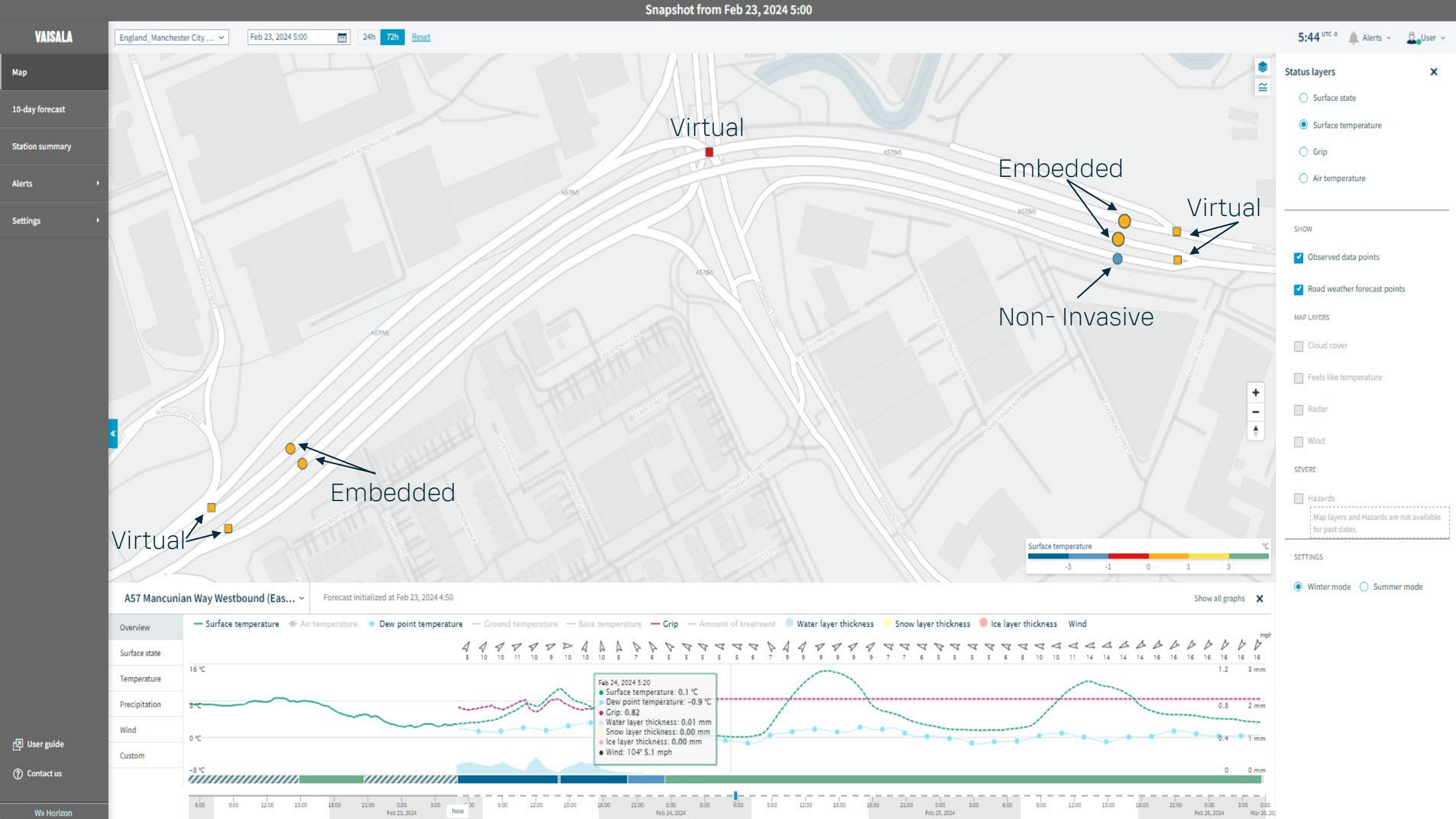
- Accidents have occurred on this section during nights where no action was taken on the general network

Restricted

IoT Sensor Choices

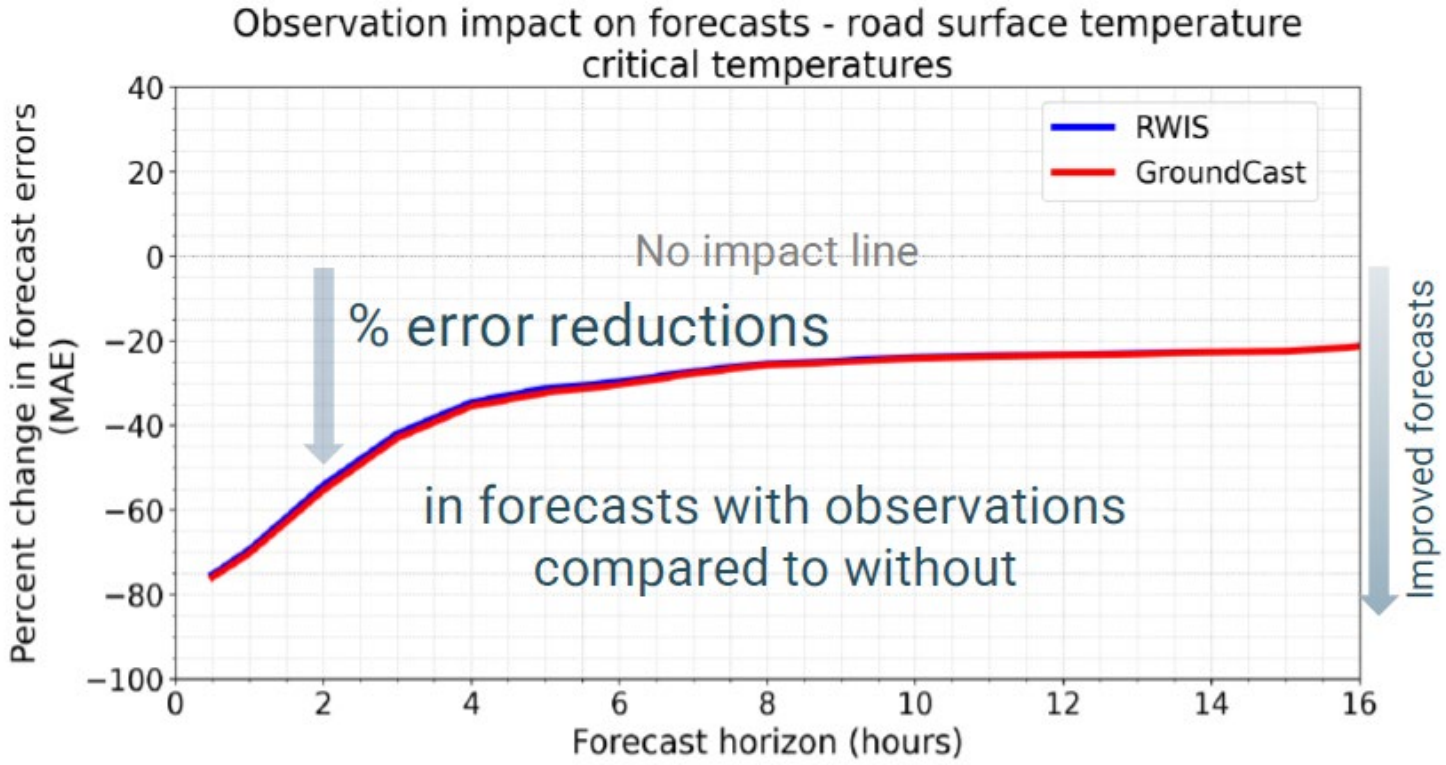
- Embedded IoT sensor cannot be installed in elevated sections
- No columns or suitable infrastructure on which to attach remote IoT sensor

Restricted


Snapshot from Feb 23, 2024 5:00
VAISALA
Map
10-day forecast
Station summary
Alerts
Settings
User guide
Contact us
Wx Horizon
England_Manchester City ...
Feb 23, 2024 5:00
24h
72h
Reset
5:44 UTC -0
Alerts
User
Virtual
Embedded
Virtual
Non- Invasive
Embedded
Virtual
Status layers
Surface state
Surface temperature
Grip
Air temperature
SHOW
Observed data points
Road weather forecast points
MAP LAYERS
Cloud cover
Feels like temperature
Radar
Wind
SEVERE
Hazards
Map layers and Hazards are not available for past dates.
SETTINGS
Winter mode
Summer mode
Surface temperature °C
-3 -1 0 1 3
A57 Mancunian Way Westbound (Eas...
Forecast initialized at Feb 23, 2024 4:50
Show all graphs
Overview
Surface state
Temperature
Precipitation
Wind
Custom
Surface temperature
Air temperature
Dew point temperature
Ground temperature
Base temperature
Grip
Amount of treatment
Water layer thickness
Snow layer thickness
Ice layer thickness
Wind
mph
16 °C
8 °C
0 °C
-8 °C
3 mm
2 mm
1 mm
0 mm
1.2
0.8
0.4
0
Feb 24, 2024 5:20
Surface temperature: 0.1 °C
Dew point temperature: −0.9 °C
Grip: 0.82
Water layer thickness: 0.01 mm
Snow layer thickness: 0.00 mm
Ice layer thickness: 0.00 mm
Wind: 104° 5.1 mph
Now
Feb 23, 2024
Feb 24, 2024
Feb 25, 2024
Feb 26, 2024

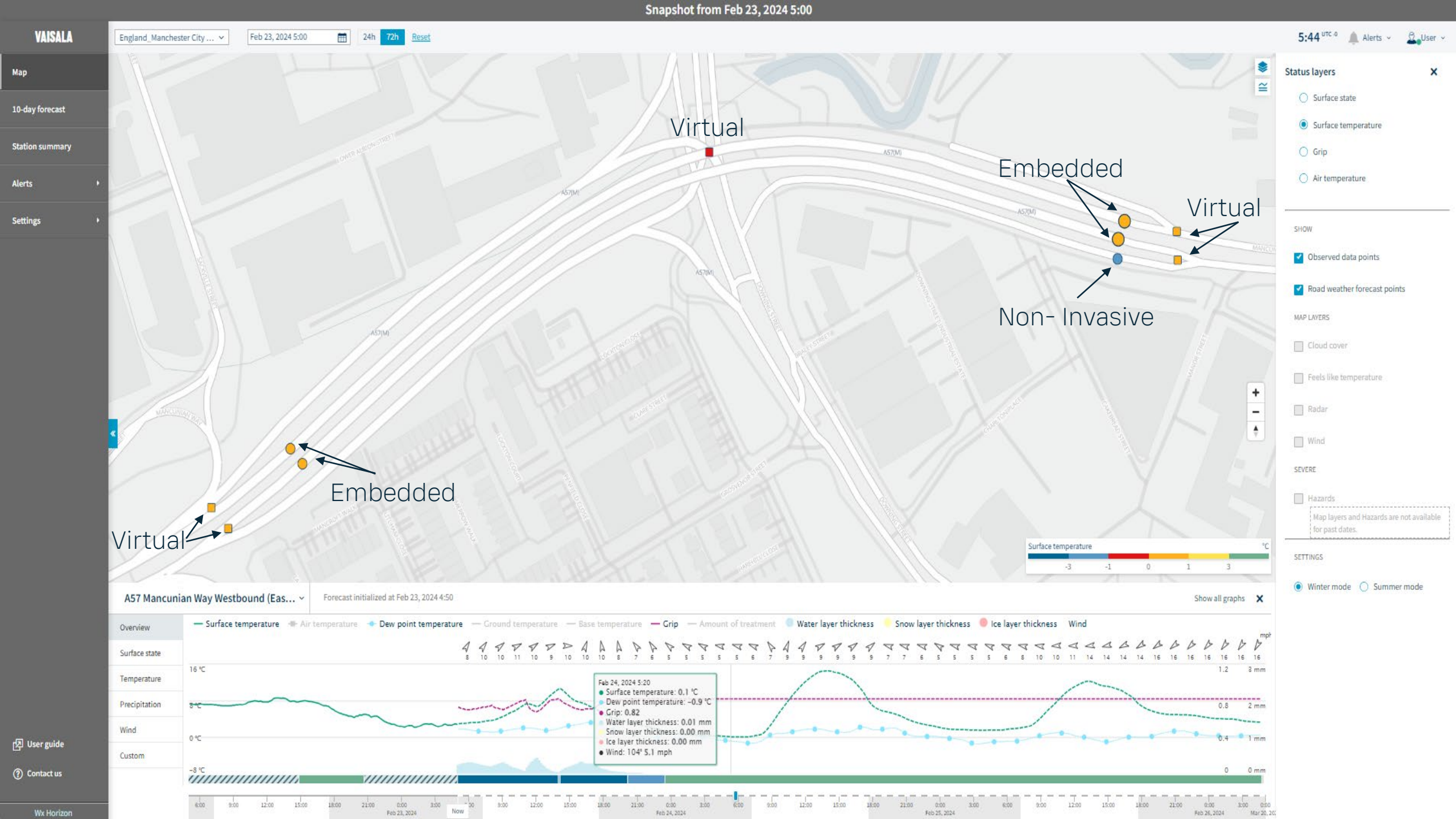
Impact of observations on forecasts of RST

- Forecast initialized with observations have reduced mean absolute errors (MAE) by
  - 70%+ in 1st hour
  - 35% - 45% 3 hours
  - 25% - 35% 6 hours
  - 20% to 25% for longer horizons
- Same for RWS and IoT GroundCast Sensor



Reference: R Tardif, R. Honkanen, J. McCaa. The impact of embedded IoT sensor road observations on road weather forecasts. Piarc 2023

Restricted


Snapshot from Feb 23, 2024 5:00
VAISALA
Map
10-day forecast
Station summary
Alerts
Settings
User guide
Contact us
Wx Horizon
England_Manchester City ...
Feb 23, 2024 5:00
24h
72h
Reset
5:44 UTC -0
Alerts
User
Virtual
Embedded
Virtual
Non- Invasive
Embedded
Virtual
Status layers
Surface state
Surface temperature
Grip
Air temperature
SHOW
Observed data points
Road weather forecast points
MAP LAYERS
Cloud cover
Feels like temperature
Radar
Wind
SEVERE
Hazards
Map layers and Hazards are not available for past dates.
SETTINGS
Winter mode
Summer mode
Surface temperature °C
-3 -1 0 1 3
A57 Mancunian Way Westbound (Eas...
Forecast initialized at Feb 23, 2024 4:50
Show all graphs
Overview
Surface state
Temperature
Precipitation
Wind
Custom
Surface temperature
Air temperature
Dew point temperature
Ground temperature
Base temperature
Grip
Amount of treatment
Water layer thickness
Snow layer thickness
Ice layer thickness
Wind
mph
16 °C
8 °C
0 °C
-8 °C
3 mm
2 mm
1 mm
0 mm
1.2
0.8
0.4
0
Feb 24, 2024 5:20
Surface temperature: 0.1 °C
Dew point temperature: −0.9 °C
Grip: 0.82
Water layer thickness: 0.01 mm
Snow layer thickness: 0.00 mm
Ice layer thickness: 0.00 mm
Wind: 104° 5.1 mph
Now
Feb 23, 2024
Feb 24, 2024
Feb 25, 2024
Feb 26, 2024