Ministry for the Environment
Manatū Mō Te Taiao

OFFICE USE ONLY
Application no:
Date received:

Resource Management (National Environmental Standards for Air Quality) Regulations 2004 – Regulation 16A Exceptional Circumstances

APPLICATION FORM

Before completing this form please read section 3.8 of the 2011 User's Guide to the revised National Environmental Standards for Air Quality.

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Please send your completed application form and all attachments to info@mfe.govt.nz

1 Applicant details

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2 Details of exceedance event

Containment	PM_{10} (24-hour average)
Date of exceedance (*application must be received within 3 months from date of the exceedance*)	4 July 2025
Relevant airshed	Bay of Plenty Regional Airshed

Monitoring station and technical specifications of monitor	**Ranch Road, Mount Maunganui.** Opposite 89 Ranch Road on the northern boundary of the Mount Maunganui College sports fields. Located within the Bay of Plenty Regional Airshed. Instrument specifications: Thermo model 5014i Beta Attenuation Monitor (BAM) with PM_{10} size selective inlet.	
Summary of monitoring reading showing exceedance event	PM_{10} 65 µg/m^3 - 4 July 2025	
Analysis of baseline data	Refer to supporting documentation.	
Source speciation or other analysis	Refer to supporting documentation.	
Explanation of any previous exceedance event/s from this monitoring station in the past 5 years	Ranch Road: This is a recently installed site (recording commenced March 2024) within the Mount Maunganui residential area, adjacent to the Mount Maunganui Airshed (MMA). Three previous exceedance events have been recorded at this site, on: • 3 October 2024, • 17 April 2025, • 19 April 2025. Meteorological conditions conducive to elevated wave heights, and the transport and inland deposition of sea spray particles were responsible for the October 2024 exceedance, and deemed responsible for the two April 2025 exceedances, which have included in an exceptional circumstances application sent to the Minister on 11 June 2025. The Minister approved the Bay of Plenty Regional Council's (BOPRC) exceptional circumstances application for the October 2024 exceedance on 17 February 2025 and approved the April applications on 8 September 2025.	
Monitoring readings covering exceedance event	☒ Attached	☐ Not attached

3 Details of exceptional circumstances

Exceptional circumstances leading to exceedance	☐ Localised impact on a monitor	☐ Anthropogenic extreme event	☒ Natural disaster or natural extreme event	☐ Other
Explanation of circumstances leading to exceedance event	An increased presence of sea spray particles originating from an elevated sea state and onshore winds is considered to have been the cause of the exceedance occurring on 4 July 2025 at the Ranch Road air quality monitoring station within the Bay of Plenty regional airshed.			

Reasons why these circumstances were beyond the reasonable control of the regional council	Meteorological conditions conducive to elevated wave heights, and the transport and inland deposition of sea spray particles were responsible for the recorded exceedance. These conditions are well beyond the reasonable control of BOPRC. Page 43 of the "2011 Users' Guide to the revised National Environmental Standards for Air Quality 2011: Updated 2014 guide" (the Users' Guide) states: *"Generally, unforeseeable emergencies and natural disasters cannot be prevented or controlled and are likely to satisfy this criterion."*. All evidence that we have examined points to sea spray particles being the source of the PM_{10} exceedances on 4 July 2025. In reference to the requirements of page 44 of the Users' Guide, these exceedances can credibly be considered an unplanned circumstance that could not reasonably be predicted or planned. The events causing the exceedance of the PM_{10} air standard on 4 July can be considered exceptional due to their nature as a weather event responsible for the exceedance. The events created a situation where salt spray particles were formed in abundance and then transported under suitable wind patterns, so a conducive weather event that directly led to the exceedance. Page 45 of the Users' Guide states that: *"The majority of exceptional circumstances are likely to be related to a natural disaster or extreme weather event…".* These exceedances are considered to have been caused by sea salt from unusually high waves being transported by winds as part of a weather event. Weather events are cited in the Users' Guide as an example of exceptional events. The RMA framework is based on the principle of sustainable management when making resource management decisions. There is no evidence that this event is related to poor resource management of air as a resource. It is considered that the source of the PM_{10} exceedance on 4 July 2025 is an increased ratio of sea salt particles within the local profile. This was generated by the elevated sea state and wind patterns associated with a strong depression system located to the east of the North Island in the Tasman Sea, and then the presence of a sizable anticyclone system acting in a blocking fashion centred to the west of New Zealand. Both events pushed a north/north westerly wind flow into the western area of the Bay of Plenty. This connected series of meteorological events provided a means of particle generation and transportation and appears to be not uncommon as evidenced both by past external SEM analysis and our expanding data collection and consideration. It is unreasonable to expect BOPRC to control an emission when it originates from a specific weather pattern. The 2022 HAPINZ 3.0 report indicates that sea spray is a source of particulate matter within New Zealand. In the MMA, bordering Ranch Road (which is itself within the Bay of Plenty Regional Airshed) sea spray has been identified as a source through a variety of monitoring programmes and was a key contributor to two weather-related PM_{10} exceedances in June 2021, and further exceedances in April 2022, August 2022 (two) and April 2023, all six of which were considered exceptional circumstances by the Minister. The October 2024 and two April 2025 exceedances at the Ranch Road monitoring station in the Bay of Plenty Regional Airshed are further instances of a specific combination of meteorological events resulting in exceedances of the PM_{10} standard in the Mount Maunganui area. All three exceedances were considered exceptional circumstances by the Minister. BOPRC's monitoring of air quality has led to an increasing body of historical data within the MMA (and increasingly at Ranch Road, within the Bay of Plenty Regional Airshed). This indicates that specific weather conditions can lead to increased salt spray and elevated PM_{10} readings, sometimes resulting in exceedances of the NES PM_{10} standard. For several earlier exceedances at the Rata Street monitoring site, we commissioned Scanning Electron Microscope (SEM) analysis of filter samples to contribute to exceptional circumstances applications. In addition, because the October 2024 exceedance was the first at the Ranch Road site, SEM analysis of filter samples was undertaken as a matter of completeness. However, the cost to the ratepayer of this external analysis and the subsequent staff processing and evaluation is considerable. Therefore, given our growing datasets and understanding of the contributing causes of PM_{10} exceedances from specific meteorological events, we tend to commission such analysis only when the causes of an exceedance are more questionable. For the reasons outlined above we are requesting the exceedance be considered an exceptional event because the exceedance was not foreseeable, not likely to reoccur, beyond the reasonable control of the council and not within the intent of the RMA framework.

Supporting evidence (eg, ***meteorological report***)	☒ Attached	☐ Not attached

10 September 2025

Shane Iremonger

Principal Advisor, Science.

Reuben Fraser

General Manager, Regulatory Services.

Supporting documentation

Background

The Ranch Road monitoring station is the most recent addition to the Bay of Plenty Regional Council's (BOPRC) monitoring network and an integral part of the wider ambient air quality monitoring network adjacent to the Mount Maunganui Airshed (MMA). Like all the sites within this network, it is operated under contract by WaterCare Ltd. Quality assessed and controlled data is provided from WaterCare on a following month basis. The data used in this supporting document is part of that monthly delivery QA/QC data batch.

Located at the eastern-most position within the network (Figure 1) means that the Ranch Road site is fully exposed to a wide range of anthropogenic and natural sources.



Figure 1. Ambient air quality monitoring sites within the Mount Maunganui Airshed.

Table 1. Ranch Road PM10 exceedances.

Date	***Location***	***PM10 24-hour average***
3 October 2024	*Ranch Road*	*61µg/m³ **
17 April 2025	*Ranch Road*	*59µg/m³ **
19 April 2025	*Ranch Road*	*51µg/m³ **
4 July 2025	*Ranch Road*	*65µg/m³ †*

** Caused by an exceptional circumstance and approved by the Minister*

† Exceedance subject to exceptional circumstance application for consideration by the Minister

The PM_{10} exceedances can be seen in the full daily timeseries plot (Figure 2).

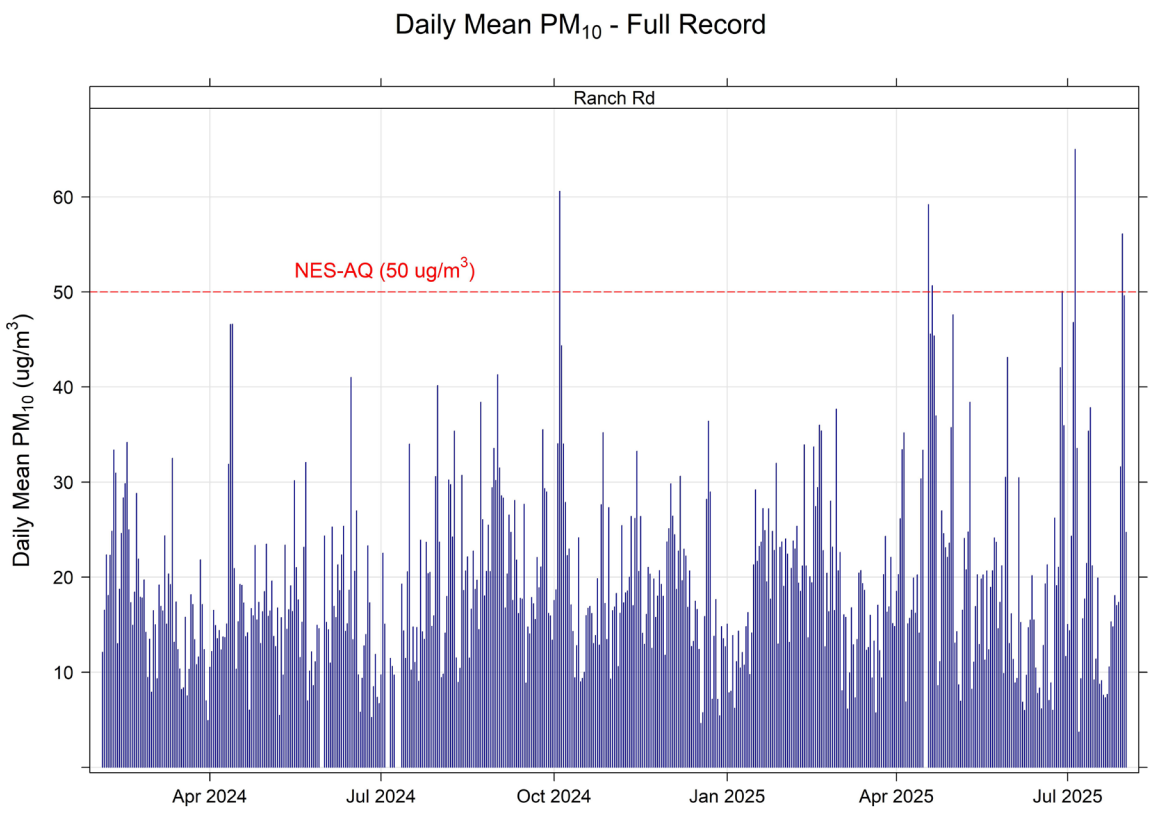


Figure 2. Ranch Road PM_{10} 24-hour timeseries, full record.

Like all ambient air quality monitoring sites located within urban areas, the full timeseries from the MMA exhibits considerable variability (Figure 3). The only real difference from other urban areas is the absence of a dominant wintertime domestic heating signature, such as that shown at the BOPRC monitoring site in Rotorua. Analysis shows that the opposite is often the case with the Mount Maunganui sites, where an elevated summer pattern can be statistically defined, which is a result of climatic/meteorological drivers, coupled with anthropogenic activity.

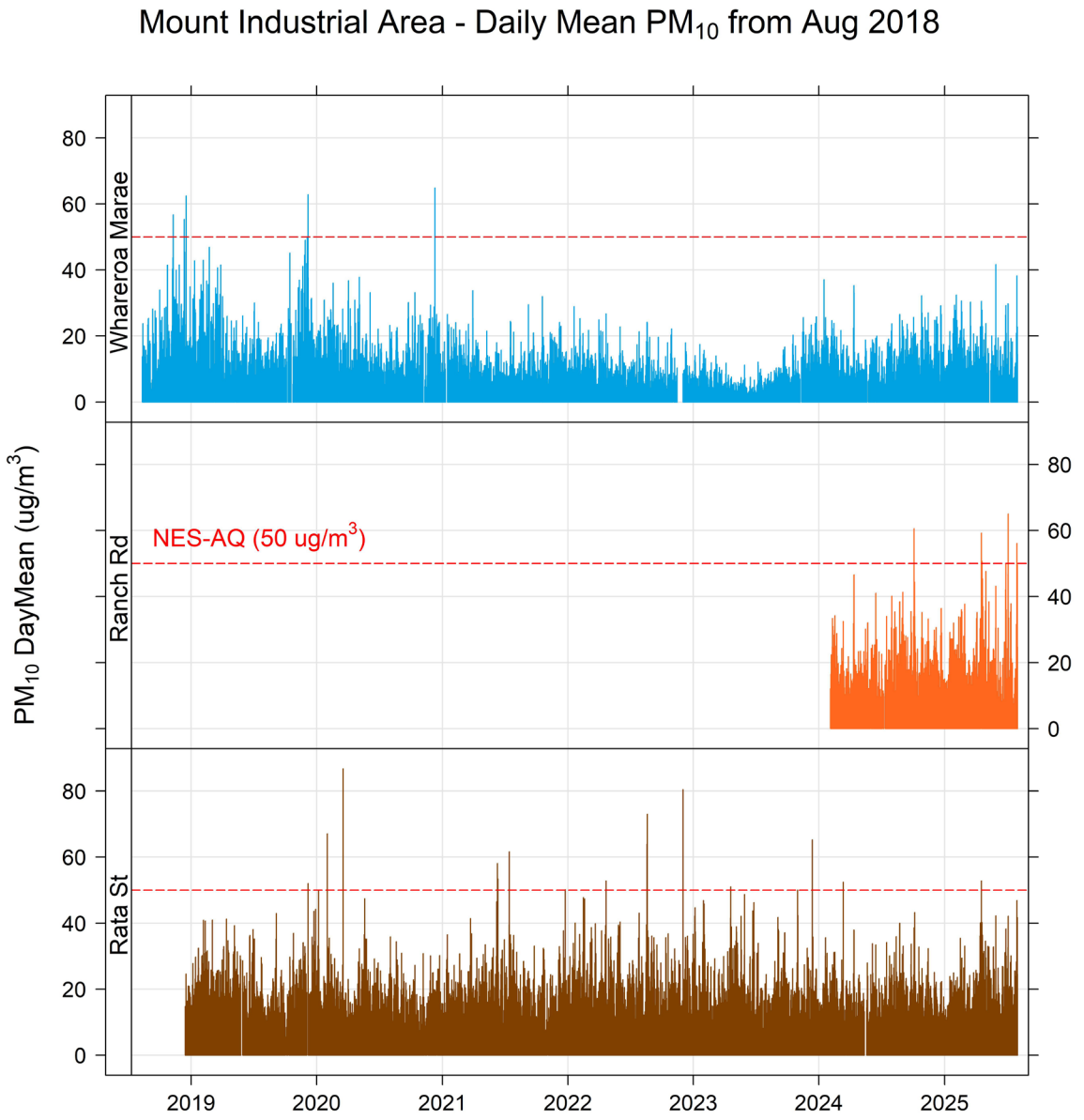
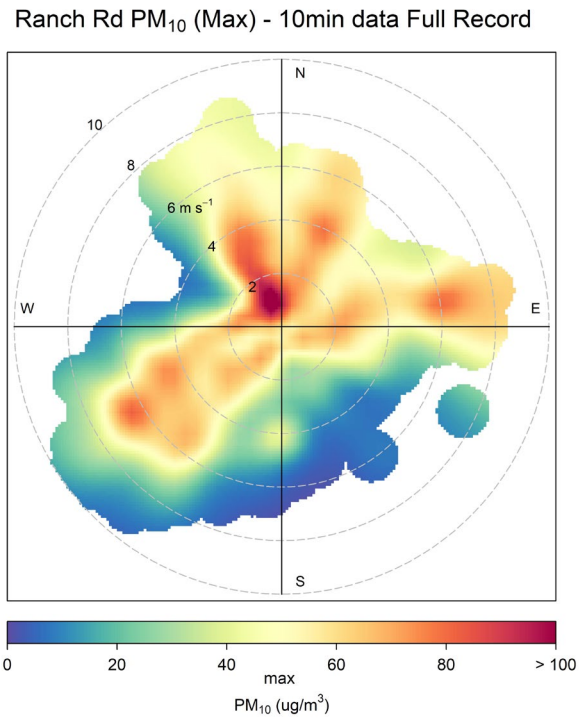


Figure 3. Full PM_{10} data for a selection of sites within the Mount Maunganui Airshed and Ranch Road.

The Ranch Road "Max" polar plot at Figure 4 shows several source patterns whereby higher PM_{10} concentrations are experienced at the site when winds are from the south-west, north-west and east. The eastern PM_{10} signature is when winds are stronger and, interestingly, there is a situation when very light conditions from the north-west result in high concentrations, which could be a local transport signature or even a home heating contribution. For the "Mean" polar plot, there is a strong signature for a range of windspeeds from the arc in which the coastal environment is situated. However, this signature is more prominent when the windspeeds increase. Other sectors of the compass do show instances of elevated PM_{10} values but winds from the coastal sector typically have high particle concentration loads in comparison.



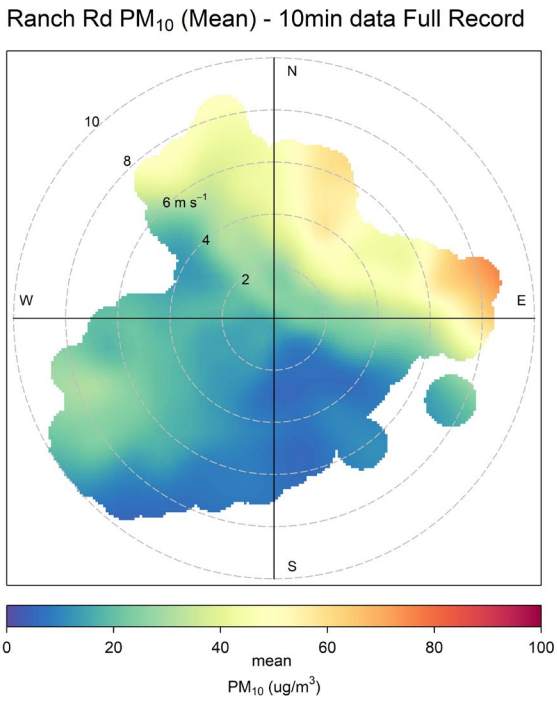


Figure 4. Full record polar plots for both the mean and maximum statistics for Ranch Road.

The spatial aspect can be seen in Figure 5 when the Ranch Road “Max” polar plot (from Figure 4) is overlaid on a recent aerial image. It shows industrial sites on the eastern-most boundary of the adjacent MMA to the left, with the Ranch Road monitor situated in the centre, within the residential land uses of this part of the Bay of Plenty Regional Airshed. Major anthropogenic particle sources are to the south/south-west and coastal sources are in an arc from the north through to the east.

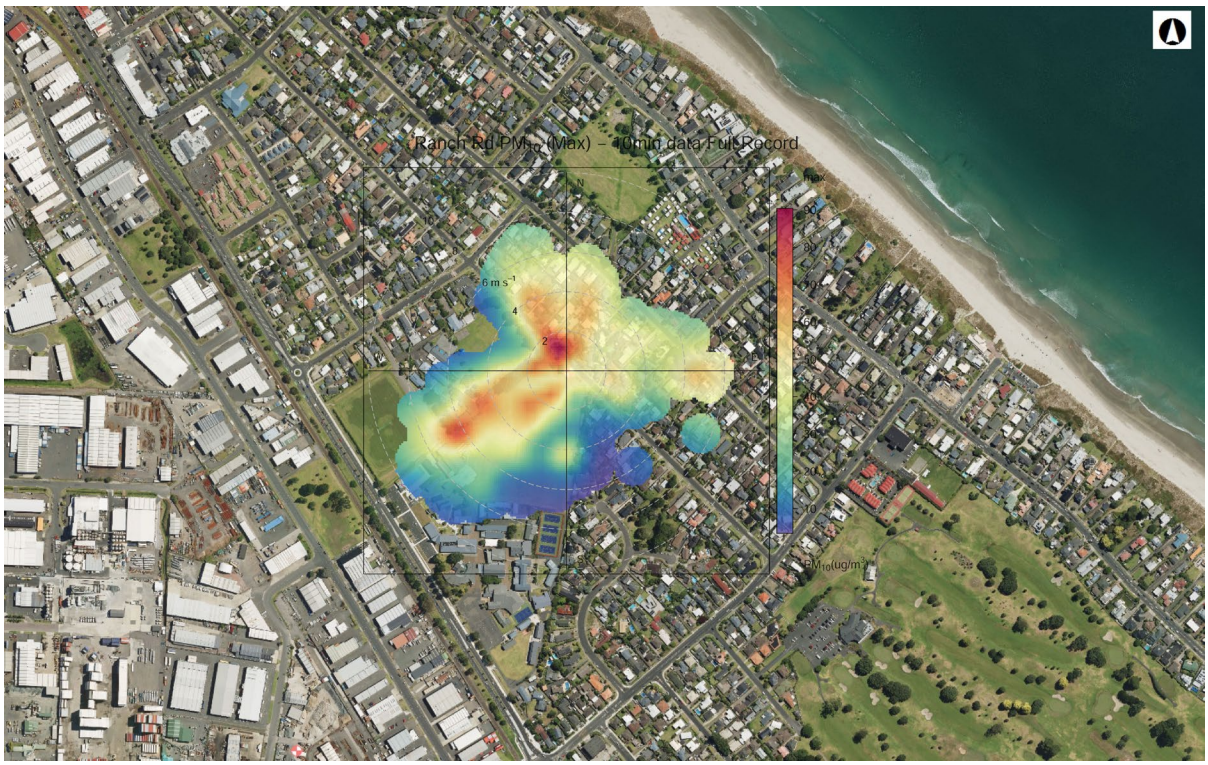


Figure 5. The Ranch Road “Max” polar plot overlaid on aerial imagery to show source locations.

4 July 2025 PM_{10} exceedance event

The following information builds on the background information in the previous section and is more specific to the PM_{10} exceedance events recorded at the Ranch Road monitoring station on 4 July 2025.

Wind direction was investigated and shown to be within the north-east quadrant (Figure 6). This is a band that is away from the industrial sources of PM_{10}, and potential upwind sources are traffic roadways, residential areas, and the Bay of Plenty coastal environment.

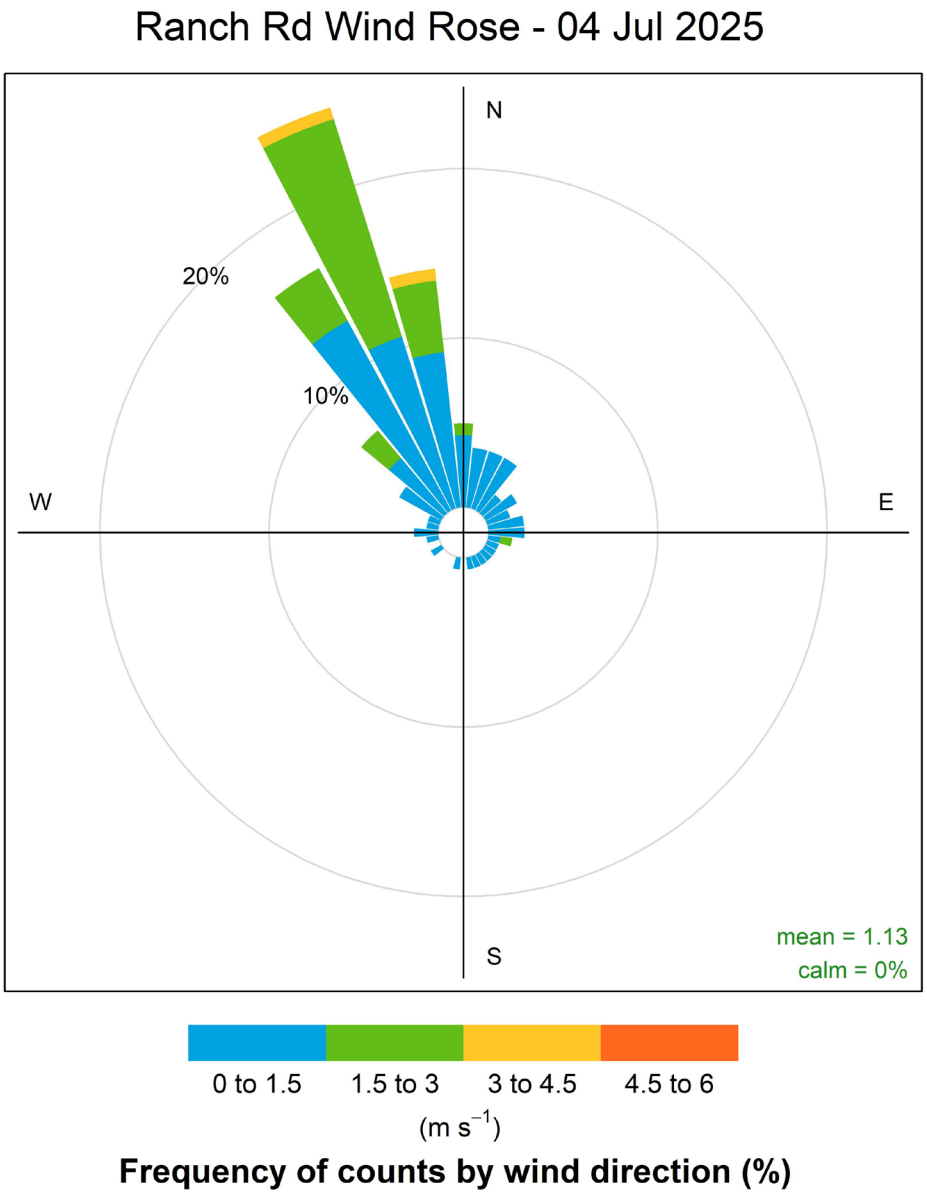


Figure 6. Wind rose for the period 4th July 2025

The wind flow over the Bay of Plenty is shown in the following image (Figure 7). It shows several important features and drivers related to the exceedance event. Firstly, the presence for several days of one depression located to the west in the Tasman Sea, and a substantial anticyclone to the east of the North Island. The resulting wind flow over the Bay of Plenty is a north/north-westerly one with a substantial fetch which creates

a sea state which will be discussed further in this section. The depression weakened after several days but the anticyclone's continued presence to the south saw a persistent northeast/easterly wind flow.

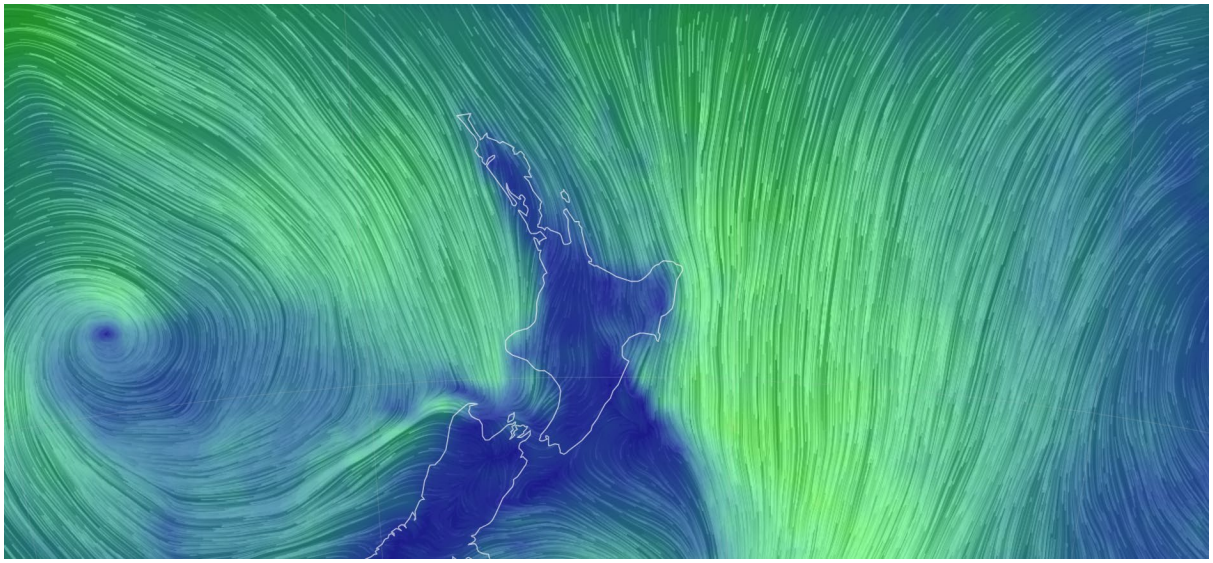


Figure 7. Modelled map for the period of interest.

PM_{10} 24-hour datasets from the MMA sites and Ranch Road (Figure 8) show an increase in PM_{10} concentration over a period leading up to and including the date of the exceedance. It should be noted that individual site locations are not equidistant from the coastline (as shown in Figure 1), therefore the same general patterns of increasing concentrations may apply to all datasets, but site-specific concentrations will vary, which is commonly seen in widespread particulate event such as those associated with sea spray events.

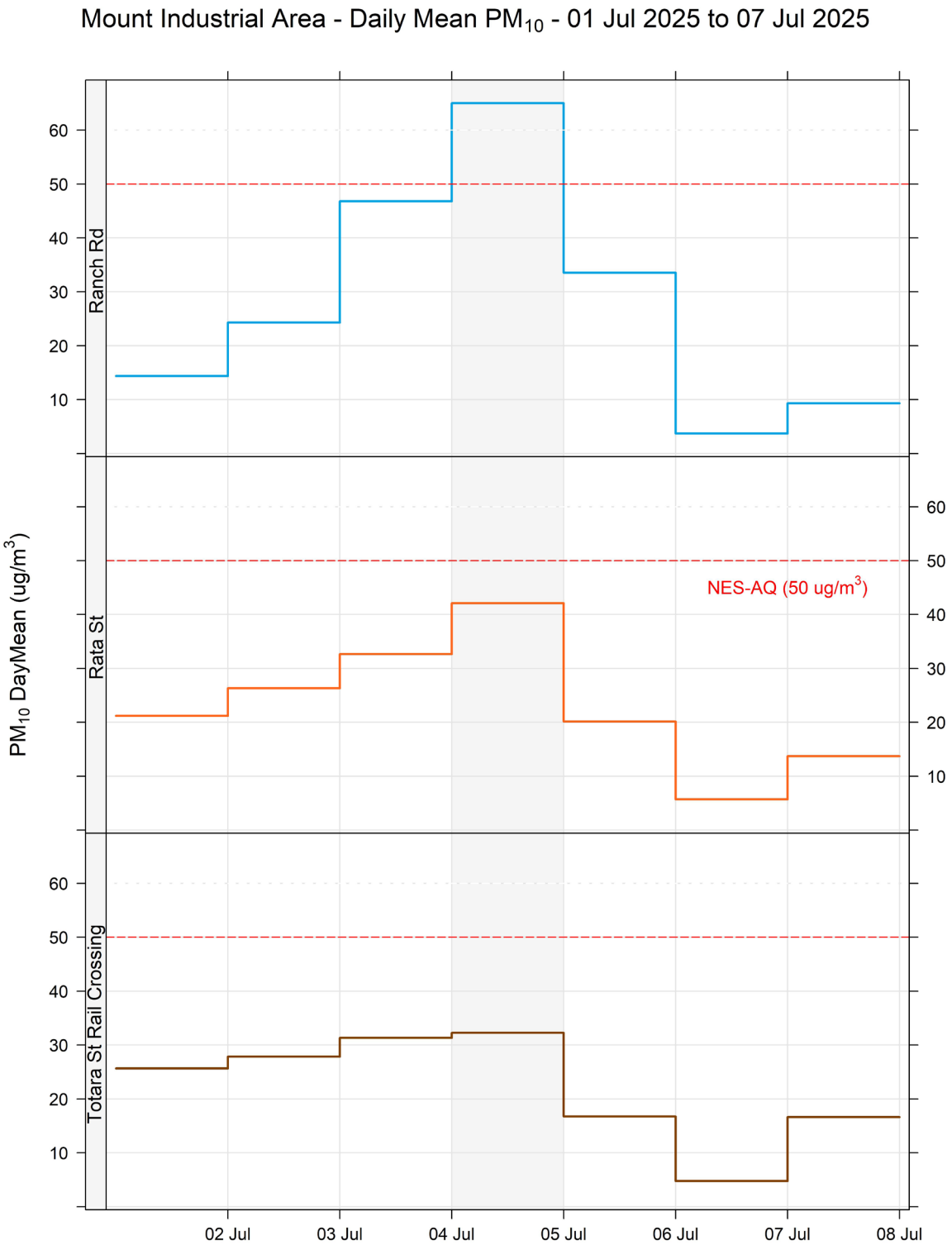


Figure 8. Daily PM_{10} plots for two MMA sites and Ranch Road.

The Ranch Road timeseries for the event is shown in Figure 9. The plot shows a developing level of particle concentrations which peak during the day of the exceedance and then decline during a period of subsequent south-westerly winds. The north/north-westerly wind direction relates well to the location of the coastal environment. This pattern is also evident at the Rata Street site (Figure 10). This north-easterly/increasing concentration relationship is further demonstrated with the polar plots in Figure 11, with high values recorded when the north-easterly wind flow is present.

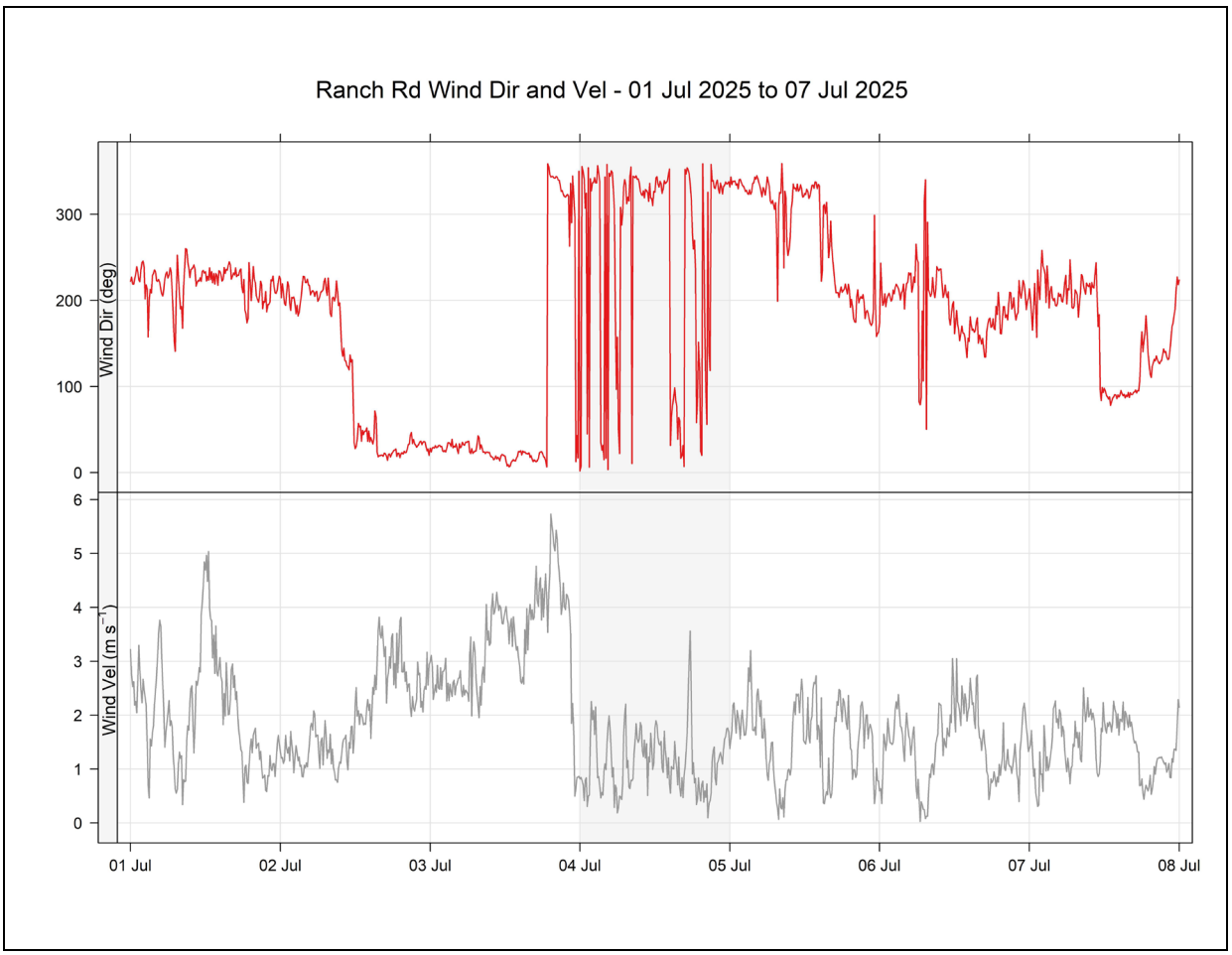


Figure 9. Wind speed and wind direction for 1 to 4 October 2024 at Ranch Road.

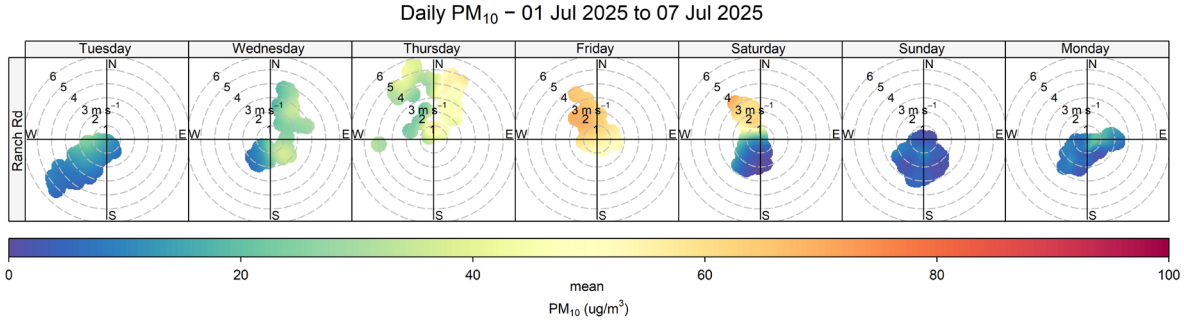


Figure 10. Polar plots for Ranch Road, for the 4 July 2025 event and preceding/following days.

In addition to traditional air quality datasets, several other parameters have been checked as part of this investigation. Wave parameters from a wave buoy located within the Bay of Plenty, approximately 12km off the coastline were also examined. As can be seen in Figure 11, during the time of the PM_{10} exceedance, an elevated sea state event was present within the Bay of Plenty. It is this elevated sea state that generated a source of natural sea spray particles that persisted and accumulated over several days leading up to and during the day of the exceedance.

Council officers didn't note any anthropogenic activities as possible causes for these exceedances within the nearby Mount Maunganui area, and furthermore the Council's Pollution Hotline received no calls that could be related to such activities either.

In the instance of this July 2025 exceedance, we believe that the meteorological conditions recorded prior and up to the period 4th July strongly resemble those that accompanied the earlier events at Rata Street and Ranch Road for which the Regional Council applied to the Minister (and received confirmation) as exceptional circumstances.

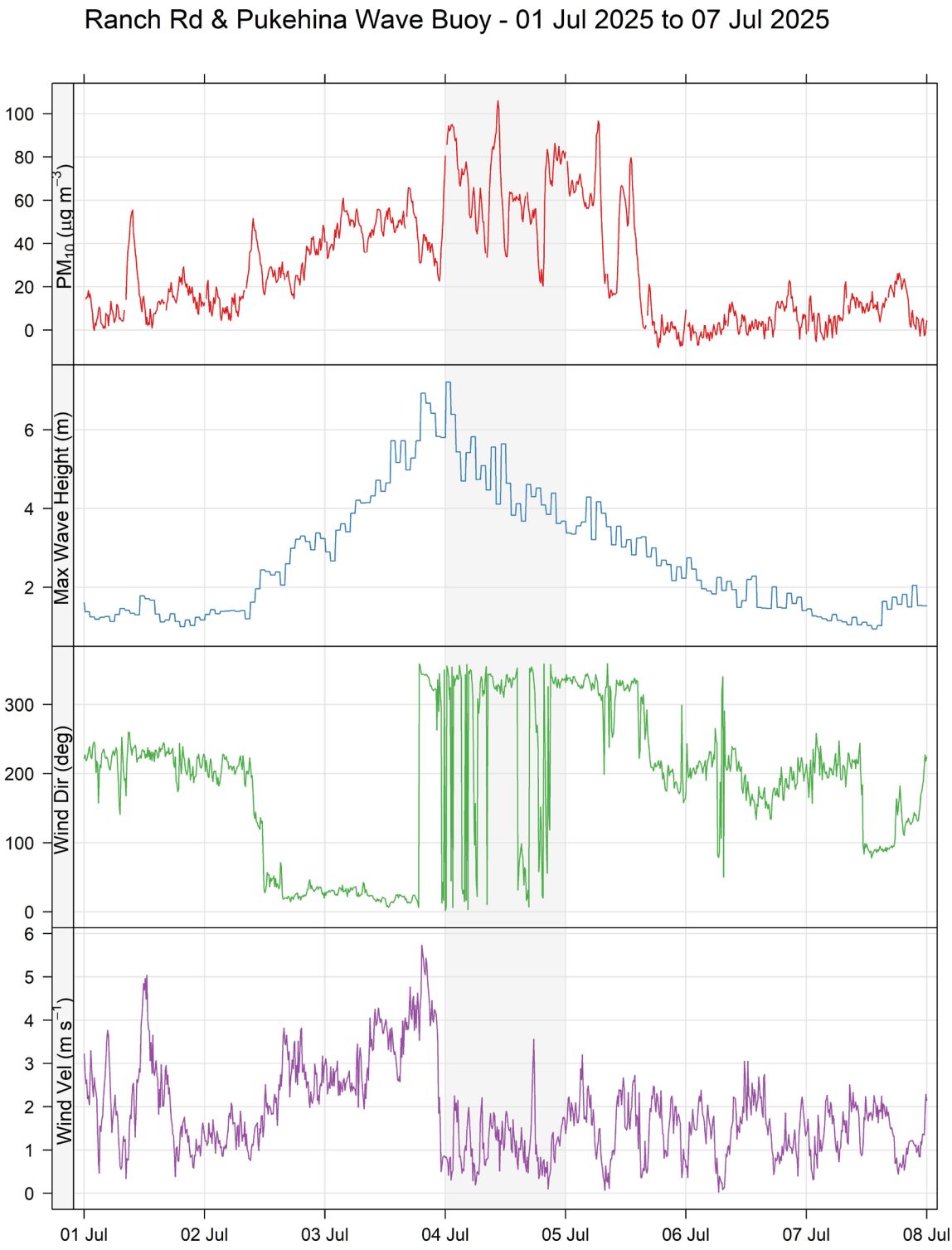


Figure 11. Ranch Road air quality and wave data for the event.

SEM analysis

As stated earlier in "3 - Details of Exceptional Circumstances", BOPRC did not commission SEM analysis for the BAM tape for the 4 July exceedance event. Due to the noted similarities identified between these exceedance events (in particular, wave height and wind direction) and those of earlier events deemed as exceptional circumstances events by the Minister, Council staff considered SEM analysis was an unnecessary expense.

However, Council staff believe that it is useful for this application to refer to SEM analysis carried out for earlier events to demonstrate the typical returns of exceedance events stemming from sea salt transported by weather events.

The following data relates to the 3 October exceedance event at the Ranch Road monitor in the Bay of Plenty Regional Airshed that received an exceptional circumstances decision from the Minister on 17 February 2025.

From Bay of Plenty Regional Council's 3 October 2024 Exceptional Circumstances application to Minister:

The section of tape from the BAM instrument was retrieved for the 3 October 2024 and analysed at the University of Waikato Engineering laboratory, where a SEM was used to further investigate the material collected on the tape.

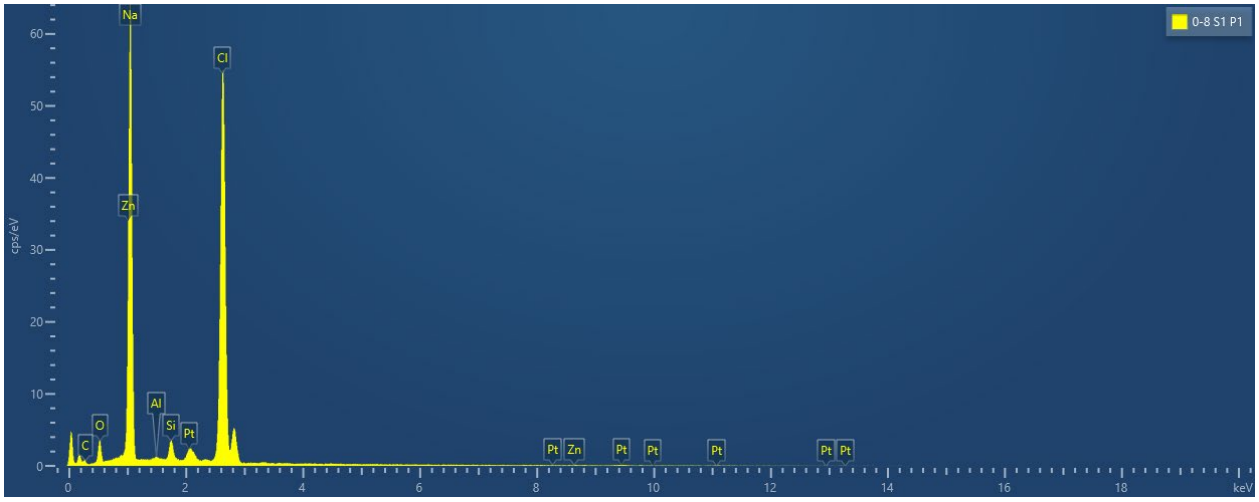
The images below and associated spectra show salt particles where the overwhelmingly common species of particles that were present, particularly on the 8:00 to 16:00 and 16:00 to 24:00 circles of exposed tape.

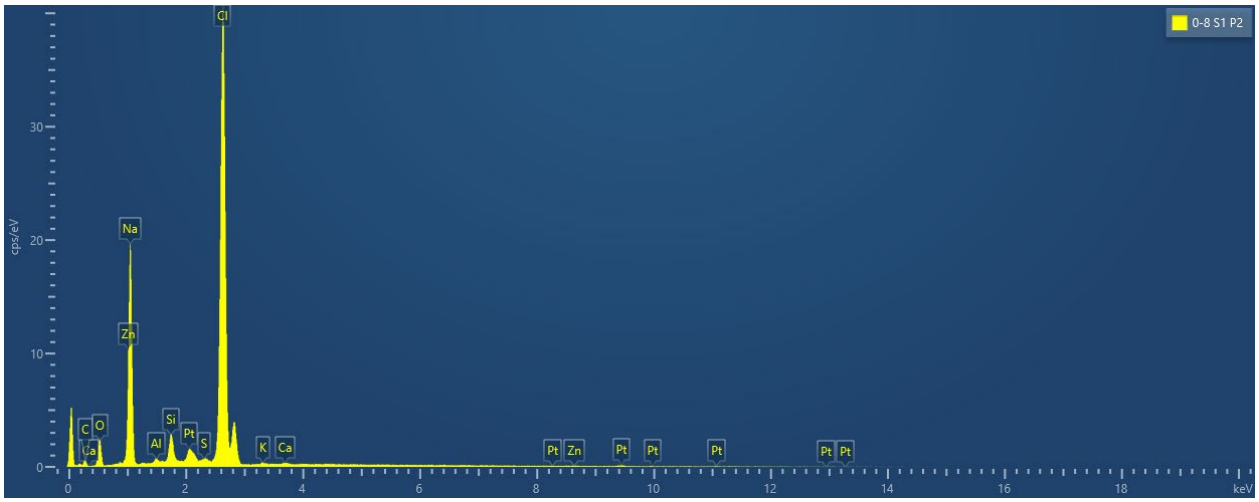
Sample 3/10/24 0-8

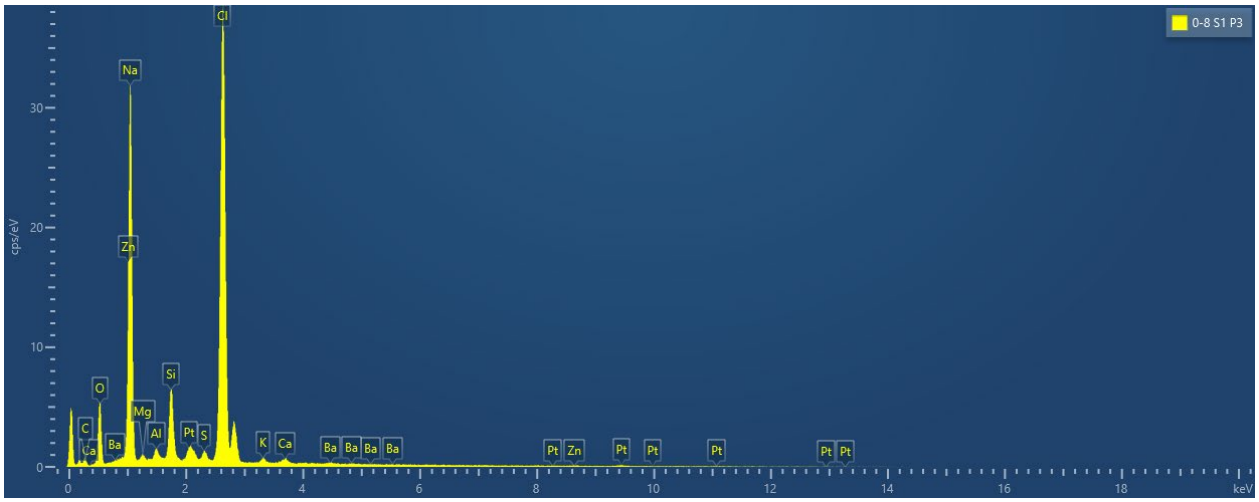


Back-scattered electron SEM image showing chosen particles for EDS analysis.

	0-8 S1 P1		0-8 S1 P2		0-8 S1 P3	
Element	**Wt %**	**Wt % Sigma**	**Wt %**	**Wt % Sigma**	**Wt %**	**Wt % Sigma**
C	7.61	0.95	11.73	1.32	10.33	1.16
O	7.43	0.24	10.72	0.29	15.62	0.35
Na	35.17	0.43	18.99	0.33	23.73	0.36
Mg	-	-	-	-	0.39	0.05
Al	0.20	0.05	0.35	0.04	0.67	0.05
Si	1.68	0.06	2.23	0.07	4.39	0.09
S	-	-	0.33	0.05	0.74	0.05
Cl	45.44	0.54	53.24	0.84	40.02	0.57
K	-	-	0.24	0.05	0.61	0.06
Ca	-	-	0.33	0.06	0.63	0.06
Zn	2.46	0.39	1.86	0.30	2.24	0.33
Ba	-	-	-	-	0.63	0.18
Total	100.00		100.00		100.00	


0-8 S1 P1
cps/eV
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0-8 S1 P2
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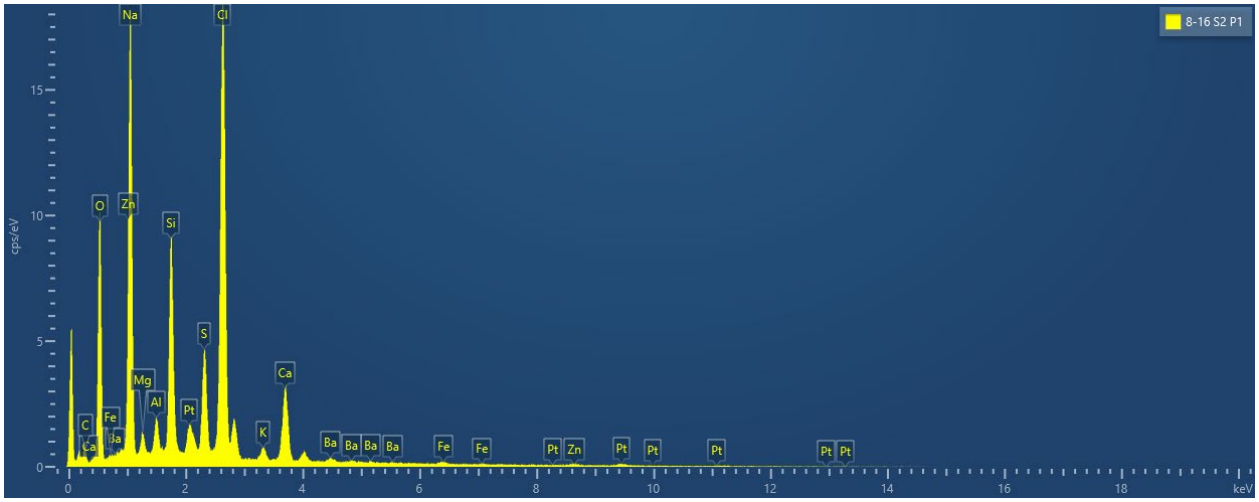
Sample 3/10/24 8-16

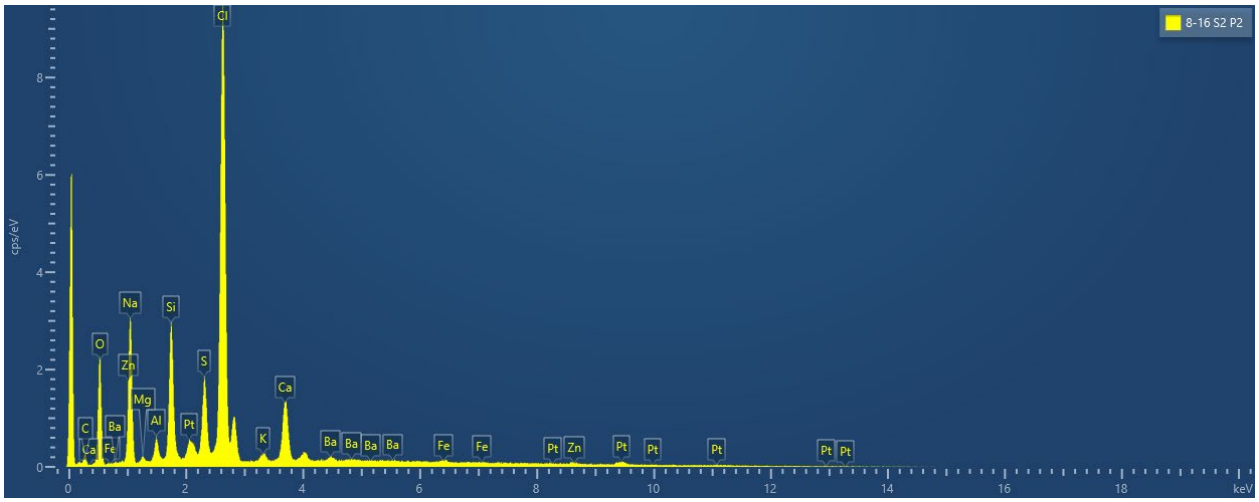
1) SITE 2



Back-scattered electron SEM image showing chosen particles for EDS analysis.

	8-16 S2 P1		8-16 S2 P2	
Element	**Wt %**	**Wt % Sigma**	**Wt %**	**Wt % Sigma**
C	7.25	0.93	9.79	1.06
O	29.27	0.42	23.66	0.43
Na	16.99	0.24	8.66	0.16
Mg	0.82	0.05	0.30	0.04
Al	1.21	0.05	1.10	0.05
Si	7.24	0.11	6.42	0.11
S	4.45	0.09	4.76	0.10
Cl	22.29	0.28	33.15	0.45
K	0.88	0.05	0.82	0.06
Ca	5.73	0.11	7.39	0.15
Fe	0.58	0.11	0.88	0.17
Zn	2.13	0.30	1.32	0.24
Ba	1.18	0.16	1.75	0.24
Total	100.00		100.00	


8-16 S2 P1
cps/eV
keV
Na
Cl
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S
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8-16 S2 P2
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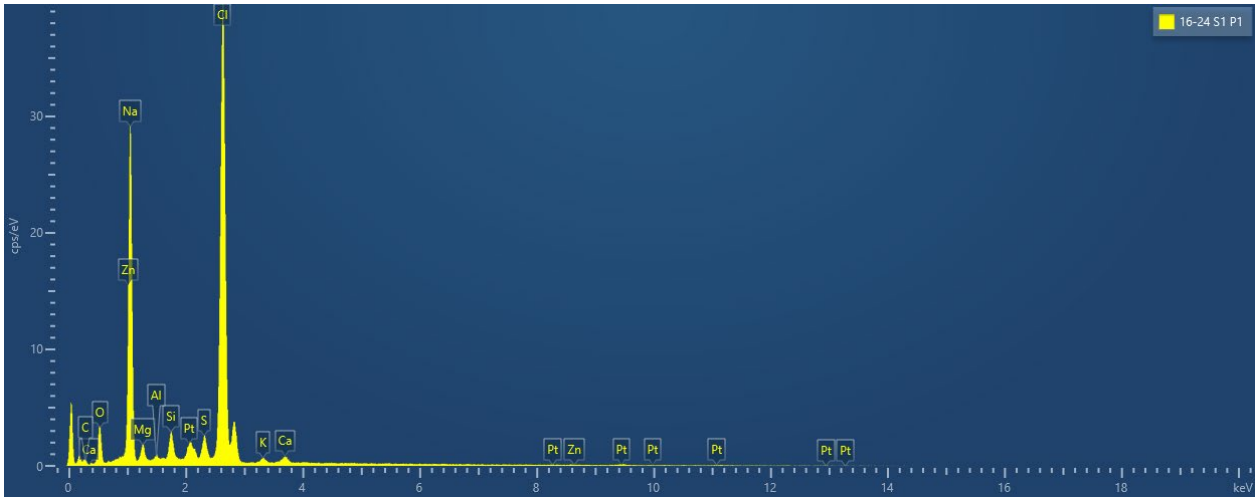
Sample 3/10/24 16-24

1) **SITE 1**



Back-scattered electron SEM image showing chosen particles for EDS analysis.

	16-24 S1 P1	
Element	**Wt %**	**Wt % Sigma**
C	5.89	1.46
O	12.27	0.33
Na	25.18	0.44
Mg	1.39	0.07
Al	0.34	0.04
Si	2.00	0.07
S	2.07	0.07
Cl	47.64	0.79
K	0.76	0.06
Ca	1.03	0.07
Zn	1.43	0.36
Ba	-	-
Total	100.00	



Conclusion

The information presented within this supporting document demonstrates a pattern of recorded ambient air quality and meteorological data for 4 July (and preceding days) that is in line with the influencing factor of a natural coastal environment source (sea spray-derived particles). This presence of natural particles resulted in concentrations of PM10 recorded at the Ranch Road monitoring site that exceeded the 24-hour standard of 50µg/m3 on 4 July and an increase in PM10 concentrations in the preceding days, with the entire PM10 "event" being the result of an elevated sea state. This phenomenon appears to be not uncommon as our datasets (and analysis) continue to grow and develop as BOPRC commits significant resources to managing the air quality within the Mount Maunganui area, especially within the MMA.

