

Annual Air Quality Report

1 September 2022 – 31 August 2023



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1. Introduction

- 1.1. This report summarises the air quality work programme undertaken between 1 September 2022 and 31 August 2023. This includes the winter 2023 results for air quality monitoring for particulate pollution in the Richmond Airshed against compliance with the requirements of the Resource Management (National Environmental Standards for Air Quality) Regulations 2004 (Air Quality NES). Temporary particulate monitoring results from Motueka during winter 2023 (May-September 2023) are also presented. The work programme also includes compliance and enforcement action, our non-regulatory programme (e.g. education and supporting communications), and discharges to air policy planning.
- 1.2. The report is structured as follows:
 - **Section 2** – provides information on why air quality is important.
 - **Section 3** – sets out the legislative framework for air quality.
 - **Section 4** – provides the winter 2023 monitoring results and analysis for the Richmond Airshed and Motueka.
 - **Section 5** – summarises research reports commissioned by Council over 2023.
 - **Section 6** – summarises the complaints received in relation to discharges to air and compliance actions undertaken between 1 April to 30 September 2023.
 - **Section 7** – sets out the non-regulatory work programme including education and supporting communications.
 - **Section 8** – sets out policy planning work completed to inform future review of our resource management plan.

2. Why is Air Quality Important?

- 2.1. Good air quality is fundamental to our wellbeing and is a taonga to be protected, restored or improved. The presence of contaminants in the air can have adverse health and nuisance effects on people, property and the environment.
- 2.2. Small particles of pollution are known as Particulate Matter (PM) as shown in Figure 1. They consist of solid and liquid particles suspended in the air and are usually measured in two sizes:
 - PM₁₀ refers to particles that have a diameter of less than 10 microns (coarse component).
 - PM_{2.5} refers to particles that have a diameter of less than 2.5 microns (fine component) and is a subset of PM₁₀.
- 2.3. Particulate matter comes from:
 - Human activities such as burning of fuels for home heating, outdoor burning to dispose of green waste, car exhaust emissions, road dust and quarrying activities; and
 - Natural sources such as wind-blown dust, plant pollen, sea salt and volcanic eruptions.

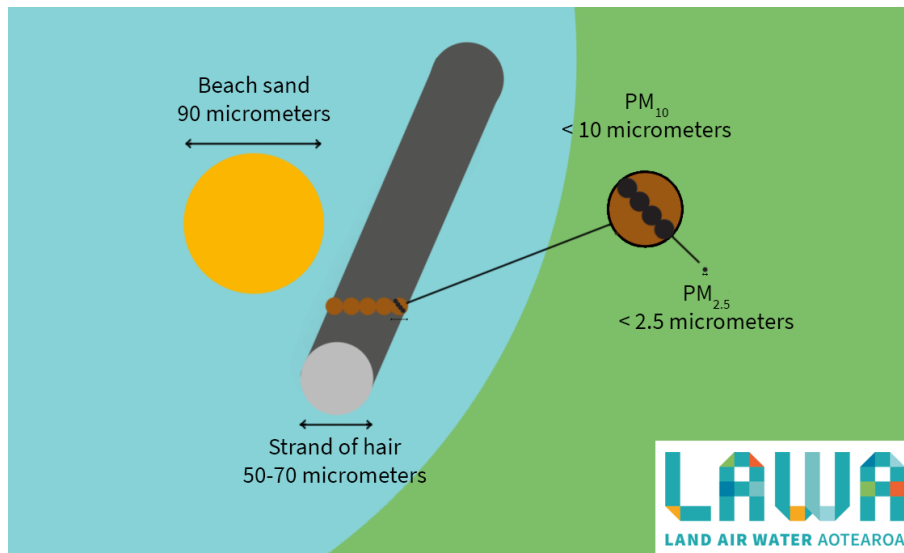


Figure 1: Relative size of PM₁₀ and PM_{2.5} (Source: Land, Air, Water Aotearoa)

2.4. There is a substantial body of evidence – both internationally and in Aotearoa New Zealand – relating to the adverse health impacts of particulate matter pollution. People with pre-existing respiratory and heart conditions, diabetes, the young, and older people are particularly vulnerable to air pollution. These tiny airborne particles of pollution can cause a range of health effects as shown in Figure 2.

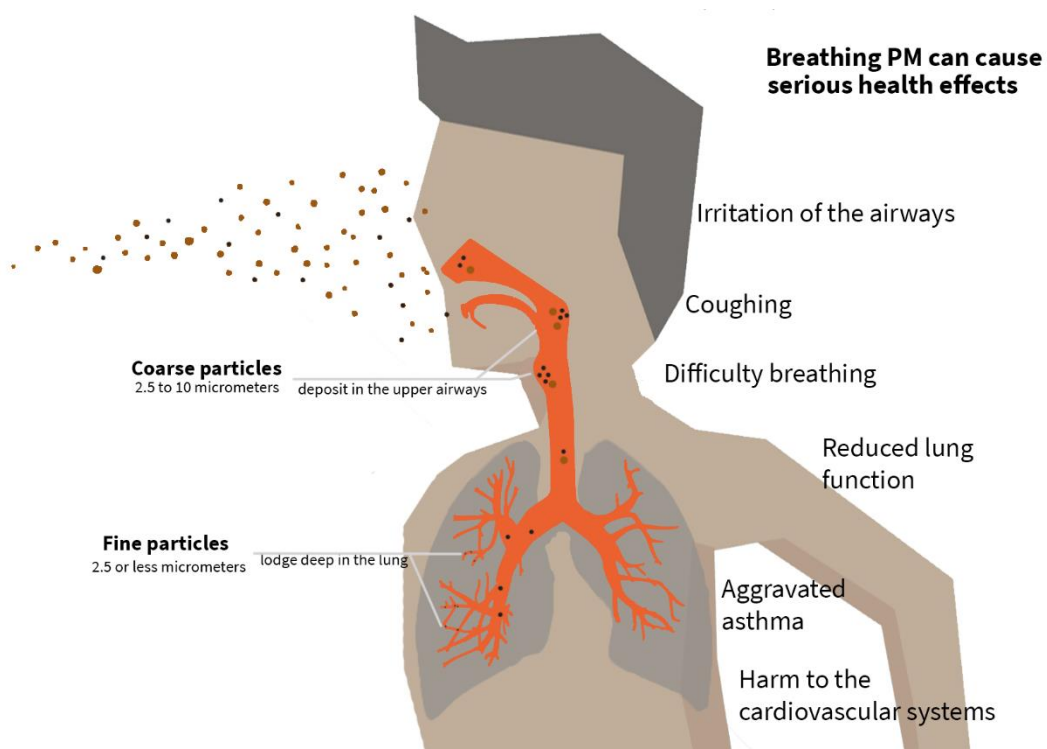


Figure 2: Examples of health effects of PM pollution (Source: Land, Air, Water Aotearoa)

2.5. Air pollution can also affect our day-to-day activities and quality of life. It can be a hazard or nuisance by:

- Smoke blown towards roads can reduce visibility and create traffic hazards.

- Smoke and odour make the air unpleasant and unhealthy to breathe.
- Particulates such as ash are a nuisance by landing on houses, cars, washing, and play areas.
- Particulates can contaminate garden soil, fruit and vegetables, and drinking water collected from roofs.

3. Legislative Framework and Guidance

This section sets out the legislative framework for managing air quality in New Zealand under the Resource Management Act 1991 (RMA 1991). Legislative changes and the wider resource management system reform will have implications for the management of discharges to air in the Tasman District as outlined below.

3.1 National Environmental Standards for Air Quality

- 3.1.1 The National Environmental Standards for Air Quality (Air Quality NES) are regulations made under the RMA 1991 which aim to set a guaranteed minimum level of health protection for all New Zealanders. The Air Quality NES came into effect in 2004 and was amended in 2011. It includes a standard for PM₁₀ for outdoor air quality, being 50 µg/m³ (micrograms per cubic metre) calculated over a daily (24-hour) period (see Section 4.1, Table 1). The Air Quality NES does not apply to indoor air quality and currently does not have a standard for PM_{2.5}.
- 3.1.2 Under the Air Quality NES, the geographic boundary of each regional council or unitary authority is defined as an 'airshed', within which each council is responsible for monitoring and managing air quality. In addition, a council may apply to the Minister for the Environment to partition off a part of their region as a separate airshed for air quality management. These sub-airsheds are specified by notice in the Gazette and are commonly known as 'gazetted airsheds'. In the Tasman District there are two airsheds – the gazetted Richmond Airshed and the 'rest of district' airshed. Under the Air Quality NES, airsheds are only allowed one permissible exceedance of 50 µg/m³ over 24-hours, in any 12-month period.
- 3.1.3 While the Air Quality NES provides a level of health protection from air pollution, it should be noted that the 50 µg/m³ concentration limit for PM₁₀ is not a 'no-effect' threshold. Council has a regulatory obligation to comply with this limit but achieving even lower concentrations of particulate matter will ultimately result in improved health outcomes for the community.
- 3.1.4 Over the last two decades, the focus on particulate matter pollution under the Air Quality NES has been to manage short-term exposure to PM₁₀. More recent international investigations suggest that greater focus should be placed on the management of smaller particles, PM_{2.5}, as these are typically more harmful and are more controllable, given their greater apportionment to anthropogenic sources relative to PM₁₀. Evidence also supports management of longer-term exposure to particulate matter given the additional health effects arising.

3.2 National Environmental Standards for Greenhouse Gas Emissions from Industrial Process Heat

- 3.1.1 Changes were made to the RMA 1991 in November 2022 to enable councils to consider the effects of greenhouse gas emissions (GHG) on climate change, including when consenting discharges to air. Prior to this, councils were not required to exercise such a function, and

therefore rules in existing plans were non-existent or not fit-for-purpose to address GHG emissions. To partially address this policy gap, the Ministry for the Environment (MfE) has developed a National Policy Statement (NPS-IGHG) and National Environmental Standards (NES-IGHG) for Greenhouse Gas Emissions from Industrial Process Heat.

3.1.2 This national direction came into force at the end of July 2023 and aims to support councils in their decision-making on discharges to air of GHG emissions from industrial sectors using process heat. Industrial process heat is defined as thermal energy used in industrial processes, including in the manufacturing of products and the processing of raw materials, and in horticulture when industrial heat is used to grow plants indoors such as glasshouses. Key provisions of the national direction include:

- Discharges of GHGs from new low-to-medium temperature coal boilers are prohibited (from July 2023), and from existing coal boilers after 2037 (e.g. no further consents can be issued after this date).
- Require a resource consent to be held for new and existing fossil fuel boilers that emit 500 tonnes and above of CO₂-e per year, per site.
- Require resource consent applicants to prepare and implement greenhouse gas emission plans that set out emission reduction actions.

3.1.3 Locally, horticulture is a key primary industry and there are several consented and unconsented (permitted) coal boilers used in commercial glasshouses. The NES-IGHG requirements only apply once existing consents have expired (provided the consent was granted before the NES was enacted). No further consents can be granted for existing coal devices used to generate low-to-medium temperature heat (e.g. includes glasshouses) after 2037 (the phase out date for coal). Operators of existing permitted activity boilers will need to determine if they breach the threshold with the new NES rules and will need to apply for a discharge consent by 25 January 2025. In these circumstances the NES only allows for limited duration resource consents of 10 years as a means to contribute to decarbonizing the sector.

3.1.4 Given MfE's focus on process heat, there are likely to be gaps in the policy framework of the Tasman Resource Management Plan (TRMP) to address GHG emissions. Staff will deal with this on a case-by-case basis in the absence of specific guidance from MfE via the resource consenting process.

3.2 Air Quality NES Under Review and Wider RMA 1991 Reform

3.2.1 The Air Quality NES has been under review for a number of years with a key focus on the monitoring and management of PM_{2.5}. However, more recently this review has stalled as a result of the wider RMA 1991 reforms.

3.2.2 The previous government started the process to replace the RMA 1991 with three new pieces of legislation¹, with the Natural and Built Environment Act 2022 (NBE Act) being the core replacement act to the RMA 1991. The NBE Act was enacted in August 2022 and is intended to be phased in over the next 10+ years. The NBE Act requires the development of a 'National Planning Framework' (NPF) which sets out the integrated strategic direction on the management of the environment. Existing national direction prepared under the RMA 1991

¹ The Natural and Built Environment Act 2022, Spatial Planning Act 2022, and development of a Climate Adaptation Act.

(e.g. national policy statements and national environmental standards) is to form the basis of the NPF with updates necessary to ensure alignment with the new Act. Under the new system, national direction included in the NPF is to be implemented through Regional Spatial Strategies (long-term spatial plans) made under the Spatial Planning Act 2022, and Natural and Built Environment (NBE) Plans (property-level rules and direction)². The legislation requires Tasman District Council and Nelson City Council to jointly prepare a regional spatial strategy and NBE plan for the Nelson Tasman region. However, the result of the 2023 General Election and the forming of a new government is likely to cause further changes to the resource management legislation.

3.2.3 At the time of writing, MfE is currently undertaking targeted engagement³ on the draft transitional NPF which was released prior to the General Election. In relation to air quality matters, the draft transitional NPF includes the following:

Air

- Part of the Air Quality NES is included in the NPF and has been redrafted. The existing wood burner provisions have been amended (in accordance with the 2020 proposed Air Quality NES amendments) to (a) update the design standard for solid fuel burner discharge and (b) broaden prohibited discharges from wood burners to apply to solid fuel burners (including open fires, wood, coal, pellet and multifuel burners, cookers and water boilers). Additionally, an outcome statement for air quality has been added, articulating the existing policy intent of the Air Quality NES.
- The draft transitional NPF does not carry over the Air Quality NES existing ambient air quality consenting provisions, as these are proposed to be provided for in later NPFs (in time to inform NBE plans).

Greenhouse Gas Emissions (from industrial process heat)

- Redrafted NPS-IGHG and NES-IGHG. A new framework outcome for greenhouse gas emissions has been added, articulating existing policy intent. Restricted discretionary activities have been redrafted as anticipated activities. Thirdly, emissions plans have been renamed 'greenhouse gas reduction plans'.

3.2.4 Council staff are currently preparing a submission in response to the NPF targeted stakeholder engagement which closes mid-December 2023. It is highlighted that the NPF is silent on any consideration of monitoring and management of PM_{2.5}, with MfE suggesting that this will be considered in a later version of the NPF. In terms of the new legislation/overall review of the Air Quality NES, it is currently a case of 'wait and see' with the new government who are likely to have differing priorities compared to the previous government. However, any future changes to the legislation which may result in the Council being required to monitor and manage PM_{2.5} will likely have significant implications for management of the Richmond Airshed, and potentially other townships, given the results of monitoring to date.

² More information on the RMA 1991 reform is available on the Ministry for the Environment website: [Ministry for the Environment — Manatū Mō Te Taiao](#).

³ Targeted engagement includes the following groups: the National Māori entity; iwi authorities, groups that represent hāpu, and groups that represent Māori (other than iwi and hāpu), and individuals or organisations that the Minister for the Environment considers representative of the local government sector.

4 Air Quality Monitoring and Assessment

This section provides an overview of how air quality is monitored in the Tasman District, with focus on the Richmond Airshed’s compliance under the Air Quality NES and more recent research monitoring in Motueka. It includes the results of the winter air quality monitoring in these townships for 2023.

4.1 Air Quality Standards and Guidelines

4.1.1 Table 1 illustrates the current Air Quality NES standards for particulate matter concentrations along with MfE’s 2002 ambient air quality guidelines and 2021 World Health Organization (WHO) guidelines. The current daily standard is PM₁₀ and there is also an annual New Zealand guideline for PM₁₀. The PM₁₀ particulate matter standard under the Air Quality NES is a concentration limit set to protect human health and incorporates one allowable exceedance per 12-month period. There are currently no standards or guidelines in New Zealand for PM_{2.5} although a monitoring value of 25 µg/m³ was proposed in 2002 for assessing monitoring results.

Table 1: Particulate Matter Standards and Guidelines⁴

Particle size	Averaging period	NES standard*	MfE 2002 guideline [‡]	WHO 2021 guideline [§]
PM ₁₀	24-hour	50 µg/m ³	50 µg/m ³	45 µg/m ³
PM ₁₀	Annual	-	20 µg/m ³	15 µg/m ³
PM _{2.5}	24-hour	-	25 µg/m ³ (monitoring value)	15 µg/m ³
PM _{2.5}	Annual	-	-	5 µg/m ³

* [Resource Management \(National Environmental Standards for Air Quality\) Regulations 2004 - Schedule 1 Ambient air quality standards for contaminant.](#)

[‡] [Ambient air quality guidelines: 2002 update, Ministry for the Environment.](#)

A monitoring value of 25 µg/m³ (24-hour average) can be used for assessing monitoring results

[§] [WHO global air quality guidelines: particulate matter \(PM2.5 and PM10\), ozone, nitrogen dioxide, sulfur dioxide and carbon monoxide.](#)

4.1.2 The WHO guidelines include both short term (daily) and long-term (annual) averages of pollutant concentrations. These guidelines were revised in 2021 and have more stringent criteria for particulate matter and other pollutants than previously. The guidelines represent the most up-to-date scientific understanding of the effects of key pollutants on human health. MfE will need to consider these updated guidelines as part of the Air Quality NES review/development of the NPF.

4.1.3 The Air Quality NES currently does not include a national standard for PM_{2.5}. However, it is anticipated that future Air Quality NES amendments/development of the NPF will introduce one or more standards for PM_{2.5}. MfE’s consultation document, ‘Proposed Amendments to the National Environmental Standards for Air Quality (2020)’, provided an indication of likely

⁴ µg/m³ = micrograms per cubic meter. For example, 50 µg/m³ refers to the weight of the particles in micrograms contained in one cubic meter of air.

amendments. However, that document precedes the more recent 2021 WHO guidelines and for councils there is now some uncertainty about the substance of the Air Quality NES review/development of the NPF as a result.

- 4.1.4 The National Environmental Monitoring Standards (NEMS) has released an air quality Continuous Particulate Monitoring standard in November 2022. The standard represents the best practice guidelines for cross-council standards for the consistent collection, processing and archiving of long term PM₁₀ and PM_{2.5} data. The standard will be used going forward for air quality data and will require quality coding of datasets as well as a recommendation that all continuous instruments undergo equivalency testing in New Zealand.

4.2 Monitoring Instruments

Richmond Airshed

- 4.2.1 Particulate matter has been monitored in the Richmond Airshed since 2000 and the Air Quality NES standard for PM₁₀ has been exceeded every winter until 2021 (where results are available). Concentrations of PM_{2.5} have been measured in Richmond since October 2015. The Richmond air quality monitoring equipment is located at the dedicated air quality portacom building at 56 Oxford Street, central Richmond.
- 4.2.2 One instrument, a beta attenuation monitor (Thermo Scientific Model 5028i instrument), which measures PM₁₀ (channel A) and PM_{2.5} (channel B) simultaneously is used for monitoring Particulate Matter (PM) air quality in Richmond. This has been the main instrument for recording PM₁₀ from January 2019 and complies with Schedule 2 of the Air Quality NES regulations. The PM₁₀ has been collected in general accordance with Australian/New Zealand Standard AS/NZS 3580.9.11:2022 titled “Methods for sampling and analysis of ambient air—determination of suspended particulate matter—PM₁₀ beta attenuation monitors”.
- 4.2.3 Watercare Services Limited carried out the annual calibrations on these instruments in May 2023. Calibration audits on the instruments were undertaken by Council staff in December 2022, March 2023 and September 2023.

Motueka

- 4.2.4 An air quality monitoring program to better understand if there are air quality issues in Motueka and surrounding areas has been underway for several years, with data for wintertime particulate matter available from 2006. The programme involves temporary monitoring of PM₁₀ and/or PM_{2.5} to collect baseline data.
- 4.2.5 In 2020, a temporary monitoring site was established at Ledger Goodman Park with one instrument set up for PM₁₀ using an Air Quality NES approved monitoring instrument (Thermo Partisol 2025i) over the winter period. In January 2022, the instrument was adapted to monitor the smaller size fraction PM_{2.5} and one year’s continuous monitoring was completed. Further analysis of the PM_{2.5} filters collected over 2022 were sent to GNS Science for source apportionment study and is reported in Section 5.2. Over winter 2023, temporary monitoring of PM_{2.5} was completed during the period 5 May to 12 September, using both Council’s Partisol

2025 monitor, co-located with a low-cost air quality sensor (called a 'dustmote') which is suitable for research purposes⁵. The results from winter 2023 are reported in Section 4.5.

Murchison

4.2.6 Through the 2021 Long Term Plan, budget was allocated for winter-time temporary monitoring of smaller towns in the District as a 'surveillance' work programme. Staff were able to bring forward this work and complete monitoring earlier than originally planned. Locations included Brightwater/Wakefield in winter 2022 (was programmed for 2023) which was reported in the 2022 Air Quality Report, and Murchison in winter 2023 (was programmed for 2026). Between May and August 2023, Mote Ltd monitored PM_{2.5} in Murchison using a network of three dustmote sensors and a meteorological monitoring station. At the time of writing, the report detailing the monitoring results and analysis for Murchison was not yet completed. Staff will make the results of this study public once the report is available.

Future Monitoring and Instruments

4.2.7 There is budget available for this 2023/24 financial year to purchase a new Air Quality NES monitoring instrument. It is anticipated that the existing survey instrument will be replaced. A gravimetric reference instrument is required for equivalency testing and for source apportionment work for Richmond. Budget was also planned in the 2021 Long Term Plan for new survey equipment for Motueka, however, staff are delaying purchasing a new monitor until there is more certainty regarding PM_{2.5} monitoring and if a standard method is prescribed nationally for all councils to use.

4.2.8 Through the 2024 Long Term Plan, staff are proposing new budget for:

- Takaka temporary monitoring in winter 2027. This would complete our PM_{2.5} surveillance air quality monitoring of smaller towns in the District.
- Research monitoring of nitrogen dioxide (NO₂) focusing on the larger urban areas of Richmond and Motueka. As reported in the 2022 Air Quality Report, this is in response to the Health and Air Pollution in New Zealand 2022 (HAPINZ) report which highlighted that nationally NO₂ from transport emissions has a much larger contribution to air pollution health impacts and associated social costs than previously thought.

4.2.9 The Air Quality NES only requires the identification and monitoring of airsheds where air quality standards are likely to be breached. Council has undertaken winter-time monitoring in Motueka in 2006, 2014, and consecutively between 2018 and 2023 (inclusive) for PM₁₀ and/or PM_{2.5}. This monitoring has included a full year of PM_{2.5} data in 2022. The results have shown that PM₁₀ is not likely to be breached which is the current Air Quality NES standard. Given budget constraints, Council staff are considering stopping winter-time temporary monitoring of PM in Motueka until such time that a new standard for PM_{2.5} is introduced. However, staff acknowledge that the PM standard is not a 'no-effect' threshold and that any level of particulate matter can cause a range of health effects across the whole community, particularly the young, old and those with existing health conditions. Therefore, it is

⁵ 'Dustmote' sensors (Met One ES642 near-forward nephelometers) are easily locatable, low-cost air quality monitoring devices which are suitable for research purposes but are not an Air Quality NES approved instrument.

important to focus on non-regulatory programmes such as education and best practice advice to support the community to reduce smoke pollution.

4.3 Richmond Airshed 2023 Monitoring Results and Analysis

4.3.1 This section summarises the air quality monitoring undertaken between 1 September 2022 and 31 August 2023 in the Richmond airshed. The Richmond Airshed is monitored continuously because it is currently classified as 'polluted' under the Air Quality NES for PM₁₀. The key source of pollution in the airshed is biomass combustion (burning of wood) over the cooler winter months, primarily associated with home heating.

Richmond Airshed PM₁₀ Results and Meteorology

4.3.2 Based on weather records from the Tasman District Council, 189 Queen Street meteorological monitoring site, the winter of 2023 had above mean temperatures for winter compared to the long-term average. In 2023, August was the coolest month with a monthly mean of 8.8 degrees recorded. Above average monthly wind speeds have been recorded for May and July, with slightly lower speeds in June and August compared to the ten-year average. The conditions in winter 2023 were favourable in terms of air quality, as these warmer and windier conditions allow pollutants to dilute and disperse.

4.3.3 Daily 24-hour average PM₁₀ concentrations measured using the BAM monitoring instrument in Richmond over the monitoring year period (1 September 2022 to 31 August 2023) are shown in Figure 3. The data capture rate for the Richmond BAM was 100% with valid daily PM₁₀ data recorded for 99.2% of the monitoring period. The data for winter 2023 shows peak particulate matter concentrations coinciding with periods of cool and calm weather in July. There were no exceedances of the Air Quality NES observed. Previous source apportionment work has shown smoke in the Richmond airshed is mainly associated with biomass combustion (wood smoke) primarily from the use of wood burners for home heating.

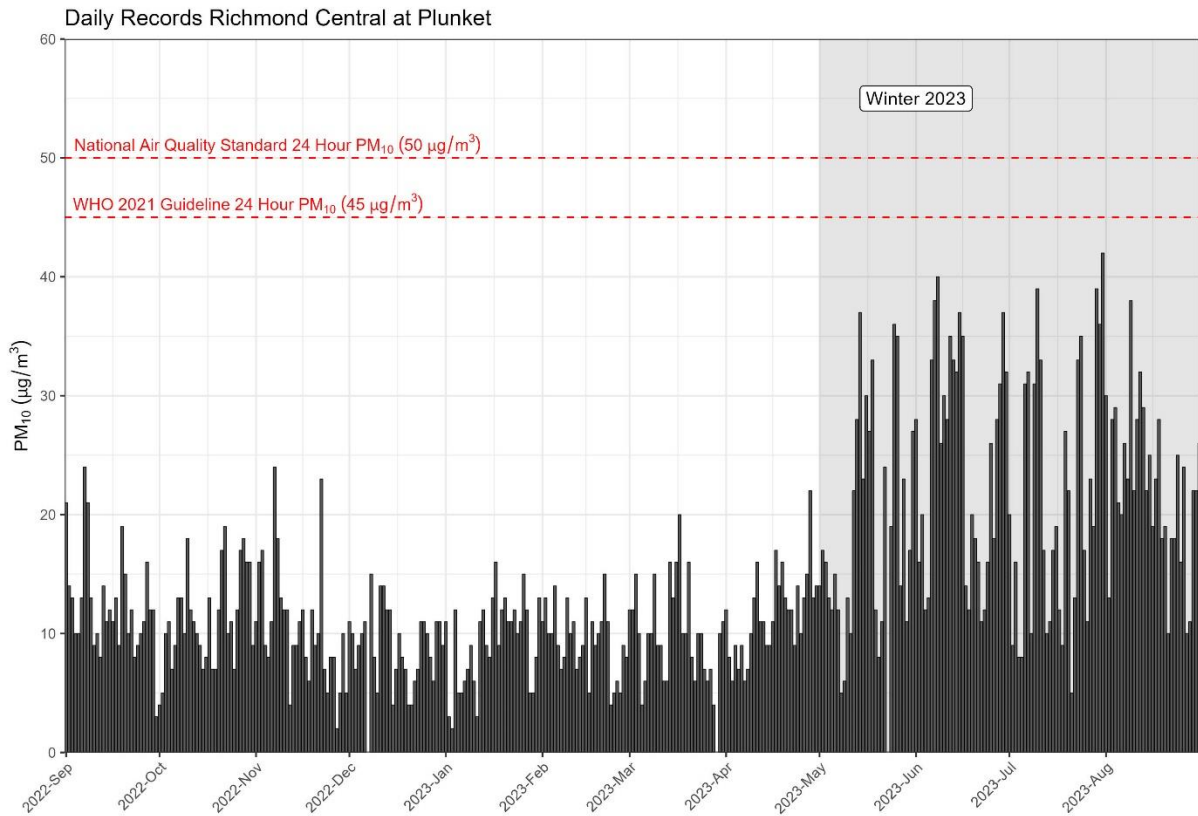


Figure 3: Richmond daily PM₁₀ concentrations in µg/m³ (1 Sep 2022 – 31 Aug 2023)

Table 2 shows the PM₁₀ daily average data for the year, starting 1 September 2022. The annual average PM₁₀ concentrations for Richmond for 2022/2023 is 14 µg/m³, which does not exceed the current MfE annual ambient air quality guideline value of 20 µg/m³ and is less than the 2021 WHO annual guideline of 15 µg/m³. The winter (May-August 2023) average was 22 µg/m³ and the average for the non-winter months (September 2022 – April 2023) was 10 µg/m³.

Table 2: Richmond Daily Average PM₁₀ concentrations in µg/m³ in 2022/2023

Valid Data:	99.2%												
Data Capture Rate:	100%												
	2022				2023								
	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	
Minimum	3	4	2	4	2	4	4	6	5	11	5	10	
Mean	12	11	11	9	9	9	10	12	19	25	21	22	
Median	12	11	10	10	10	10	10	12	17	27	19	22	
Maximum	24	19	24	15	16	15	20	22	37	40	42	38	
Air Quality NES Exceedances (>50 µg/m ³)	0	0	0	0	0	0	0	0	0	0	0	0	
WHO 2021 Guideline Exceedances (>45 µg/m ³)	0	0	0	0	0	0	0	0	0	0	0	0	
Annual Mean	14												

4.3.4 Over the monitoring period, the maximum PM₁₀ daily average was 42 µg/m³ which is below both the Air Quality NES PM₁₀ standard of 50 µg/m³ and the 2021 WHO daily guideline value of 45 µg/m³.

4.3.5 PM₁₀ has been measured in Richmond since 2000, with gaps in the data for 2001/2002 and continuous monitoring using a BAM from 2006. Figure 4 shows the number of exceedances of the daily particulate matter standard since monitoring began in Richmond. In 2023, the Richmond airshed had no exceedances of the Air Quality NES. Figure 5 shows the winter PM₁₀ trend normalised to consider seasonal variations in wind speed and temperature and includes the number of estimated days in which meteorological conditions are comparable to historic records where exceedances were observed. Note that these “high pollution potential days” have only been calculated from 2006 onwards due to data availability. There were no high pollution potential days in 2023. The normalised median value for winter PM₁₀ has remained steady around 21 µg/m³ between 2011 and 2023.

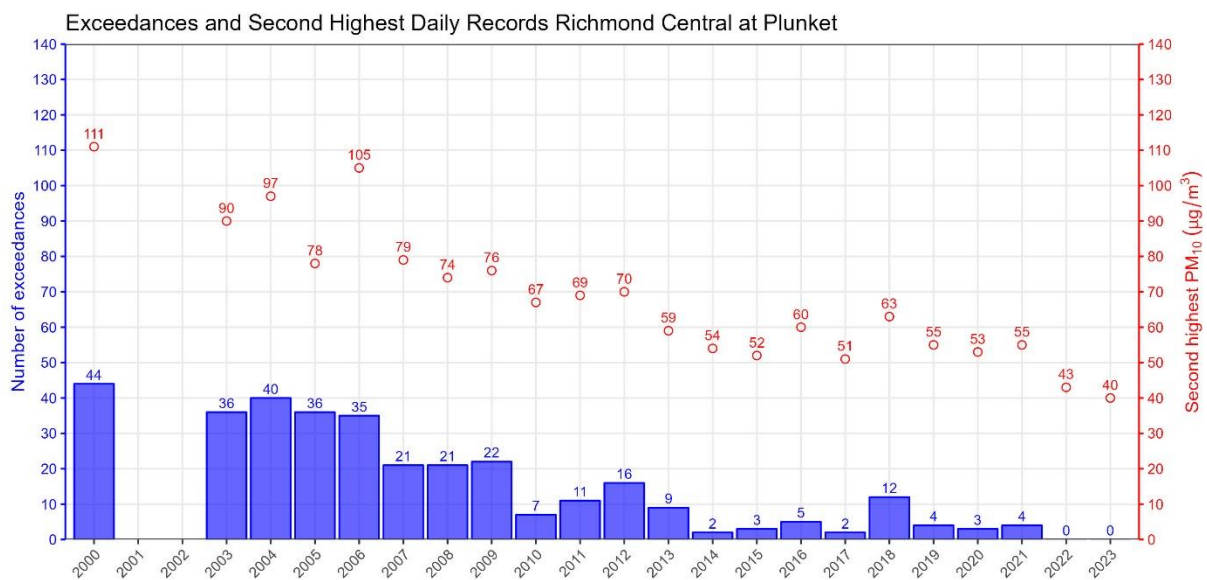


Figure 4: Number of Exceedances of 24-Hour PM₁₀ (Richmond, 2000 to 2023)

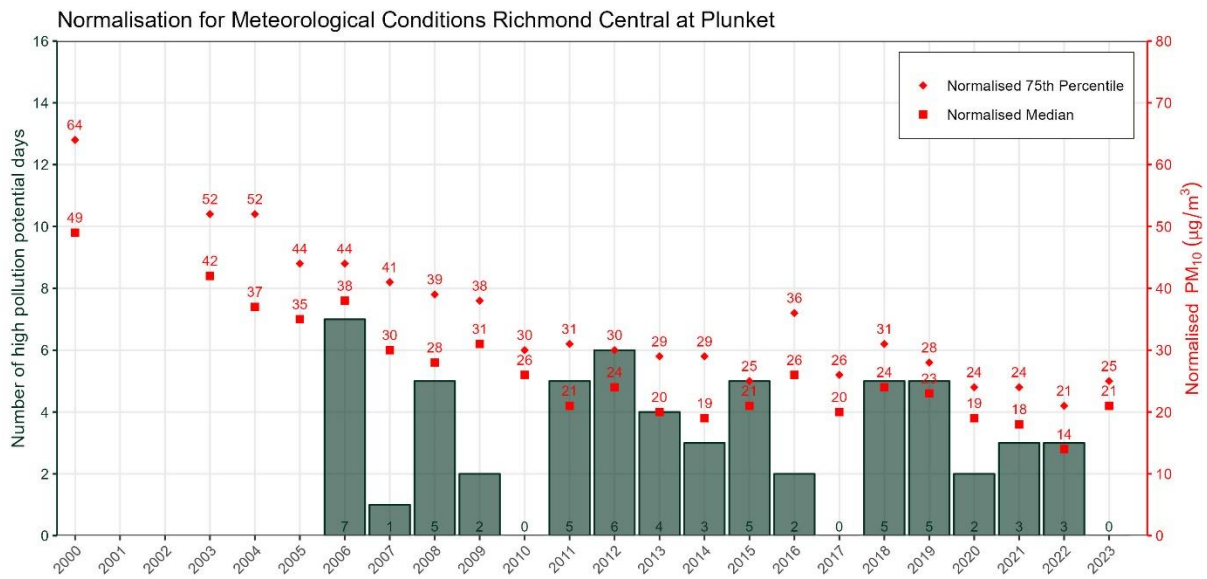


Figure 5: Number of high pollution days and winter PM₁₀ normalised for meteorological conditions (Richmond, 2000 to 2023)

4.3.6 Despite the Richmond Airshed having no exceedances over 2023, the Airshed still remains ‘polluted’ and non-compliant with the Air Quality NES. This is because the Air Quality NES’s Regulation 17(4)(b) states that an airshed stops being a polluted airshed when the PM₁₀ standard is not breached for 5 years.

Richmond Airshed PM_{2.5} Results

4.3.7 The daily 24-hour average PM_{2.5} concentrations available for Richmond from the continuous BAM is shown in Figure 6. Daily PM_{2.5} was recorded for 99.2% of the monitoring period. The PM_{2.5} exceeded the 2021 WHO daily guideline value of 15 µg/m³ a total of 64 days (compared with 58 days in Winter 2022). The data for winter 2023 shows the typical seasonal pattern, with peak PM concentrations occurring in winter which is typically associated with the use of wood for home heating.

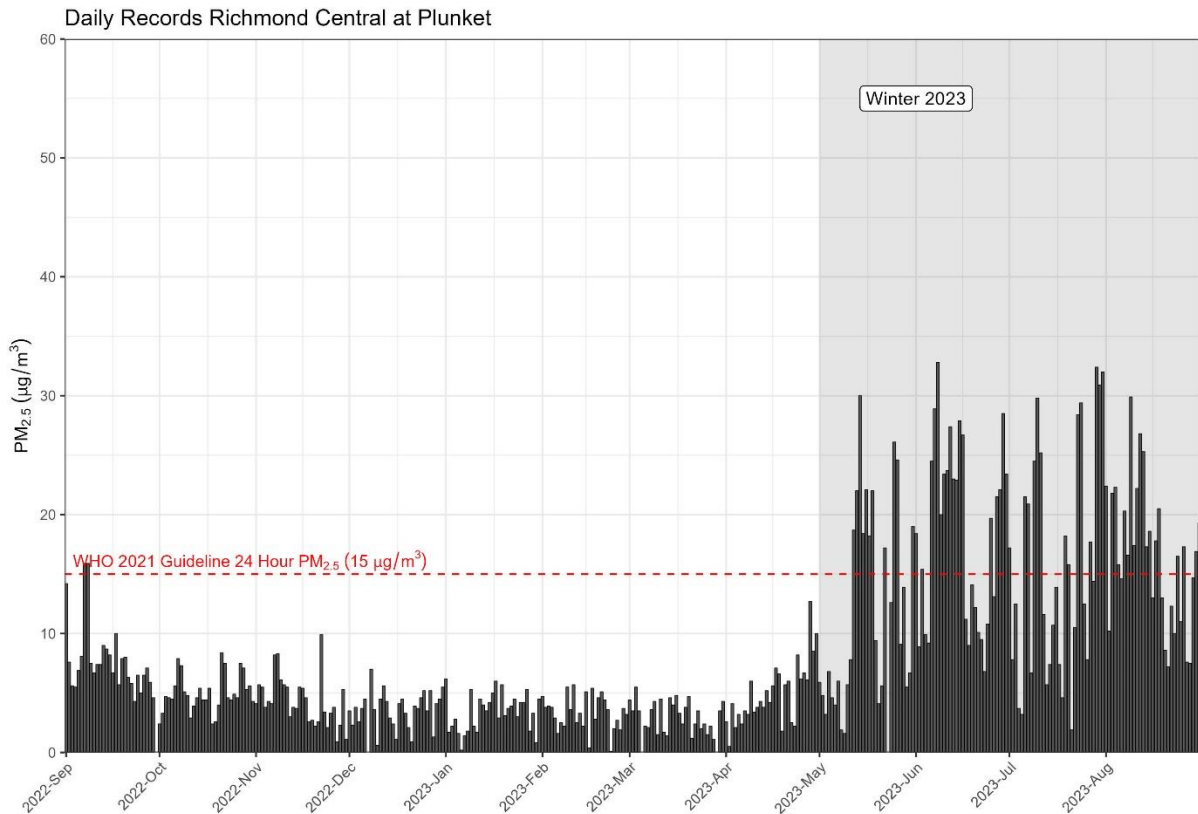


Figure 6: Richmond Daily PM_{2.5} concentrations in µg/m³ (1 Sep 2022 – 31 Aug 2023)

4.3.8 Table 4 summarises the PM_{2.5} daily average data for the year, starting 1 September 2022, with highlighted cells exceeding the 2021 WHO daily guideline (15 µg/m³).

Table 4: Daily Average PM_{2.5} measured in Richmond in 2022/2023

Valid Data:	99.2 %											
Data Capture Rate:	100.0 %											
	2022				2023							
	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
Minimum	4.3	2.4	0.9	0.6	0.2	0.1	1.1	0.5	1.6	6.8	1.9	7.2
Mean	7.8	5.0	4.3	3.6	3.4	3.3	3.1	4.9	11.9	18.5	15.7	16.6
Median	7.1	4.6	4.0	3.8	3.5	3.5	3.5	4.3	8.5	19.9	13.9	16.9
Maximum	15.9	8.4	9.9	7.0	6.2	5.7	5.5	12.7	30.0	32.8	32.4	29.9
Previously reported WHO 2005 Guideline Exceedances (>25 µg/m ³)	0	0	0	0	0	0	0	0	2	6	7	3
WHO 2021 Guideline Exceedances (>15 µg/m ³)	2	0	0	0	0	0	0	0	11	18	14	19
Annual Mean	8.2											

4.3.9 The annual average PM_{2.5} concentrations for Richmond for 2022/2023 is 8.2 µg/m³, which is above the 2021 WHO annual air quality guideline value of 5 µg/m³. The winter (May-August) average was 15.7 µg/m³ and the average for the non-winter months (September – April) was 4.4 µg/m³.

4.3.10 The 2021 WHO daily guideline value of $15 \mu\text{g}/\text{m}^3$ was exceeded five months of the year, with most exceedances occurring over the months of June-August. The maximum daily $\text{PM}_{2.5}$ concentration measured in Richmond was $32.8 \mu\text{g}/\text{m}^3$ on 8 June 2023. This is nearly double the 2021 WHO daily guideline value. There has been an average of 63 exceedances of the WHO $\text{PM}_{2.5}$ daily guideline value over the last five years, with an average maximum concentration of $43 \mu\text{g}/\text{m}^3$ in recent years.

Richmond Airshed Summary

4.3.11 The trend in PM_{10} since monitoring records began in 2000 has shown a significant improvement (i.e. decrease in number of exceedances) up until 2010 and then a tapering of reductions from 2010 to 2023. The PM_{10} normalised median has remained similar for the last ten years. Winter 2023 was the second year in a row of no exceedances of the PM_{10} standard, however there were no 'high pollution potential days' this winter which would be conducive to causing exceedances.

4.3.12 There is insufficient data to calculate a trend in $\text{PM}_{2.5}$ for Richmond since monitoring records began in 2016. For the last five years, the continuous monitoring suggests an improvement in air quality with the daily $\text{PM}_{2.5}$ maximum of $50.4 \mu\text{g}/\text{m}^3$ in 2021 to $32.8 \mu\text{g}/\text{m}^3$ in 2023. Nonetheless, if the Air Quality NES required councils to monitor and manage $\text{PM}_{2.5}$, this would have significant implications for the Richmond Airshed. Based on the average of the last five years fourth highest value of $\text{PM}_{2.5}$, a reduction in daily winter $\text{PM}_{2.5}$ of around 60% would be required to meet the 2021 WHO daily guideline value⁶.

4.4 Motueka Temporary $\text{PM}_{2.5}$ Monitoring Results and Analysis

4.4.1 Staff have completed a winter monitoring programme of $\text{PM}_{2.5}$ (5 May 2023 – 12 September 2023) in Motueka using a Partisol gravimetric sampler (Thermo 2025i) monitoring $\text{PM}_{2.5}$ on a daily basis until mid-June and then changed to a one day in three basis. A co-located 'dustmote' (MetOne ES642) was also sampling daily over the winter, although data has not been received at the time of writing this report. The daily $\text{PM}_{2.5}$ data is presented in Figure 7. Daily $\text{PM}_{2.5}$ was sampled for 50% of the period from May to August. The $\text{PM}_{2.5}$ exceeded the 2021 WHO daily guideline value of $15 \mu\text{g}/\text{m}^3$ a total of at least 9 days. Given the sampling was on a one day in three regime, additional $\text{PM}_{2.5}$ exceedances in Motueka are likely to have occurred. The data for winter 2023 is consistent with the use of wood for home heating.

⁶ The 2021 WHO $\text{PM}_{2.5}$ daily guideline allows for 3 exceedance days per year (based on the 99th percentile), hence the fourth highest daily $\text{PM}_{2.5}$ value for Richmond is considered for this analysis.

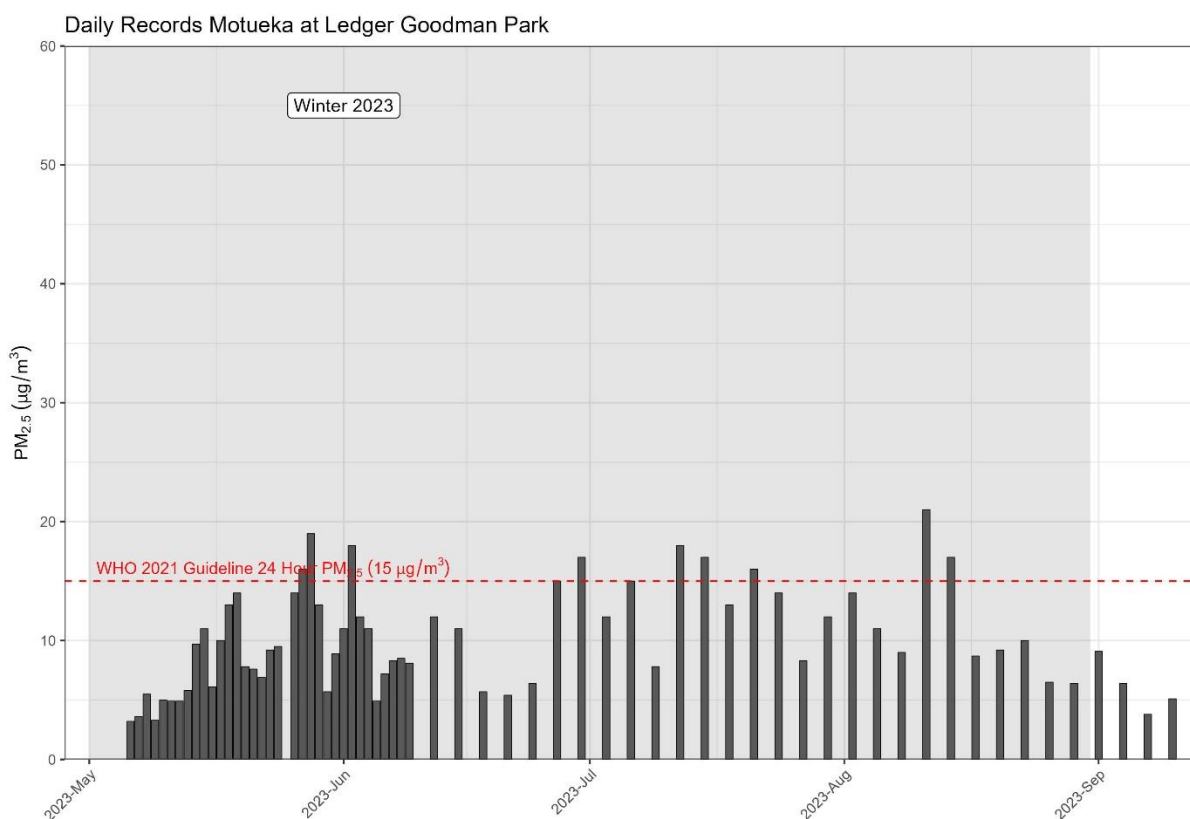


Figure 7: Daily average PM_{2.5} concentrations measured in Motueka (5 May – 12 Sep 2023)

4.4.2 Table 5 summarises the Motueka PM_{2.5} daily average data. The 2023 winter (May-September) average PM_{2.5} concentration for Motueka is 9.6 µg/m³, with the highest value being 21 µg/m³. Cells are highlighted exceeding the 2021 WHO daily guideline (15 µg/m³).

Table 5: Daily Average PM_{2.5} measured in Motueka in Winter (5 May – 12 September 2023)

Valid Data (May – September):	50%				
Data Capture Rate (May – September):	100%				
	2023				
	May	Jun	Jul	Aug	Sep
Minimum	3.2	4.9	7.8	6.4	2.9
Mean	8.8	10.0	13.3	11.1	4.6
Median	8.4	8.5	13.5	9.2	4.5
Maximum	19.0	18.0	18.0	21.0	6.4
2021 WHO Guideline Exceedances (>15 µg/m ³)	2	2	3	2	0
Days measured (Total days)	26 (27)	15 (30)	10 (31)	11 (31)	4 (12)
May to September Mean	9.6				

4.4.3 A review of the top two values recorded from short term winter monitoring for particulates in Motueka is presented in Figure 8. PM₁₀ data was monitored from 2006 to 2021. During this time, the highest PM₁₀ recorded was 56µg/m³ in June 2020, however this was an outlier, and monitoring data suggests the current Air Quality NES standard is not likely to be breached in

Motueka. The values from 2022 and 2023 are PM_{2.5} data and show the 2021 WHO daily guideline value (15ug/m³) was exceeded over winter.

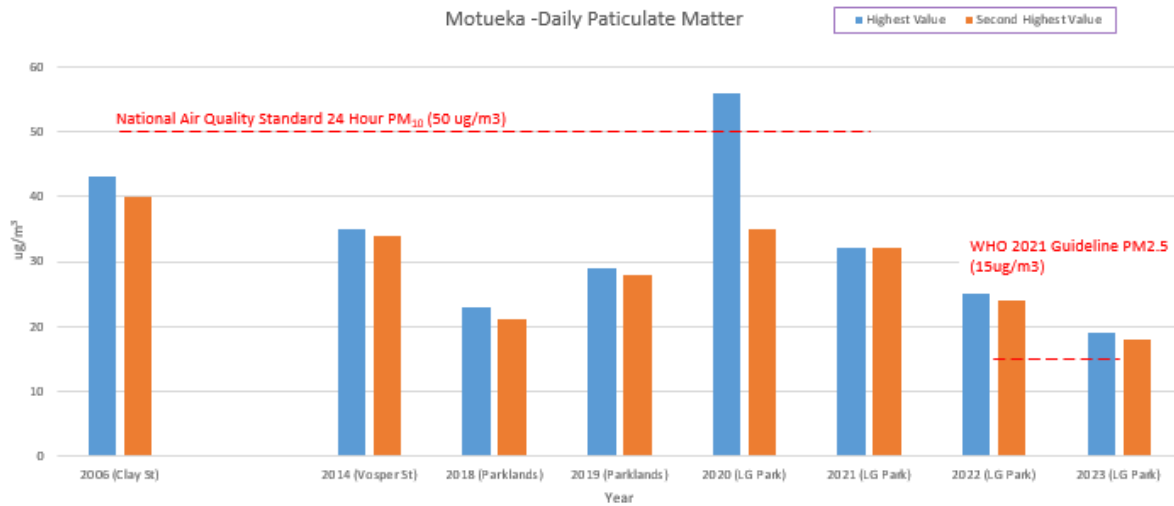


Figure 8: Winter Daily PM for Motueka (PM₁₀ 2006-2021) and PM_{2.5} (2022-2023)

5. Research

This section summarises research work that the Council has commissioned over the last year to inform our understanding of air quality in Tasman.

5.1 Air Emission Inventories – Motueka, Wakefield, Brightwater (2023)

5.1.1 Emission inventories are used internationally by decision makers to provide an estimate of the quantities of contaminants from anthropogenic sources that are emitted into the air and the relative contribution of sources to total emissions. Within New Zealand, emission inventories are used by councils to help inform air quality management, including discharge to air provisions in resource management plans.

5.1.2 Following the temporary 2022 winter monitoring undertaken in Motueka, Wakefield and Brightwater, the Council commissioned Environet Ltd to complete emission inventories for these areas. The study areas were based on the NZ Census Statistical Area (SA2) boundaries and included each town and surrounding rural land.

5.1.3 The inventories provide an estimate of emissions of particles (PM₁₀ and PM_{2.5}), carbon monoxide, nitrogen oxides and sulphur oxides from domestic heating, transportation, industrial and commercial activities and outdoor burning and identifies the relative contribution of different sources to contaminant emissions for these areas. A summary of results for each town is presented in the following paragraphs.

5.1.4 The methodology also included a domestic home heating and outdoor burning survey to determine heating methods and fuels and the prevalence and characteristics of outdoor burning as well as the use of braziers, pizza ovens and wood fired barbeques. The phone

survey was not well received in the Motueka area, with a number of residents believing it was a scam. Council staff and the consultant have taken on board the feedback provided which will be used to improve the survey and surveying process when we undertake our fifth Richmond Emission Inventory in 2024/25.

Motueka Air Emission Inventory 2023 - Summary

5.1.5 For Motueka, around 215 kilograms of PM₁₀ and 201 kilograms of PM_{2.5} is discharged per day during the winter (for all sources). Domestic heating was the most significant contributor to annual and daily winter PM₁₀ in Motueka contributing 68% and 85% respectively (as shown in Figure 9). Industrial activities were the next highest contributor at around 21% of the annual and 9% of the daily winter PM₁₀ and 16% and 7% of the PM_{2.5}. Industrial activities were also the main source of the SO_x and motor vehicles were the main source of NO_x emissions in Motueka in 2023.

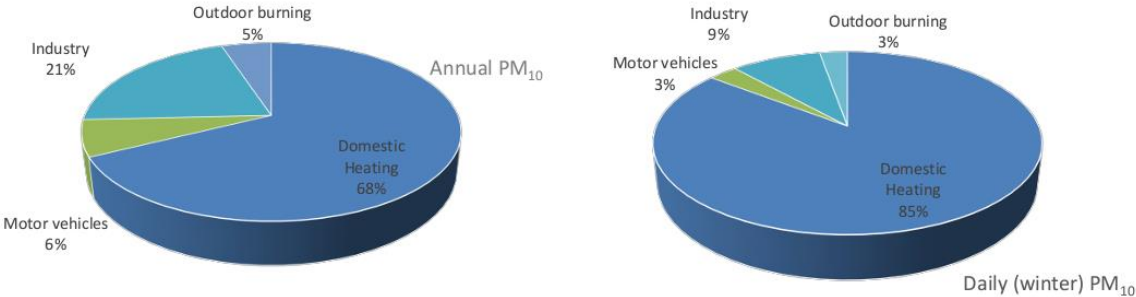


Figure 9: Relative contribution of sources to annual PM₁₀ and daily winter PM₁₀ emissions in Motueka.

5.1.6 In relation to home heating, electricity was found to be the most common method of heating the main living area. Of the 71% of households using electric heating, 81% of these reported using heat pumps. Wood burners were used by 49% of households and around 29 tonnes of wood was burnt on an average winters night. Around 4% of households use wood fired cookers in Motueka.

Wakefield Air Emission Inventory 2023 - Summary

5.1.7 For Wakefield, around 101 kilograms of PM₁₀ and 100 kilograms of PM_{2.5} was discharged per day during winter of 2023 (all sources). Domestic heating and cooking was the most significant contributor to annual and daily winter PM₁₀ in Wakefield contributing 76% and 88% respectively (as shown in Figure 10). Outdoor burning was the next highest contributor at around 17% of the annual and 9% of the daily winter PM₁₀ and 18% of the annual and 9% of the PM_{2.5}. Motor vehicles were the main source of NO_x in Wakefield in 2023.

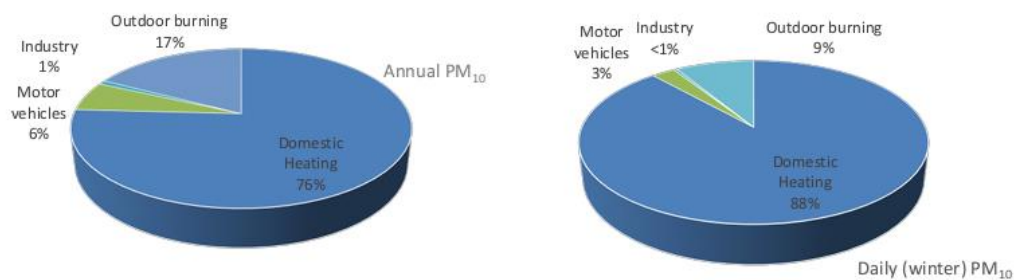


Figure 10: Relative contribution of sources to annual PM₁₀ and daily winter PM₁₀ emissions in Wakefield.

5.1.8 As part of the inventory methodology, the domestic home heating survey was combined for Wakefield and Brightwater (given the size of the areas). Wood burners were found to be the most common method of heating the main living area in Wakefield/Brightwater with 67% of households in these two towns using this heating method. Electricity was used by 52% of households in Wakefield/Brightwater and the majority (82%) of these used heat pumps. Wood fired cookers were also included in the evaluation and were found to be used by 5% of households in Wakefield and Brightwater. Around 14 tonnes of wood was burnt on an average winters night for heating and cooking in Wakefield.

Brightwater Air Emission Inventory 2023 - Summary

5.1.9 For Brightwater, around 91 kilograms of PM₁₀ and 90 kilograms of PM_{2.5} is discharged per day during the winter (all sources). Domestic heating was the most significant contributor to annual and daily winter PM₁₀ in Brightwater contributing 66% and 83% respectively (as shown in Figure 11). Outdoor burning and industry contributed 16% and 14% to the annual PM₁₀ and 8% and 7% of the daily winter PM₁₀. Motor vehicles were the main source of NO_x in Brightwater in 2023.

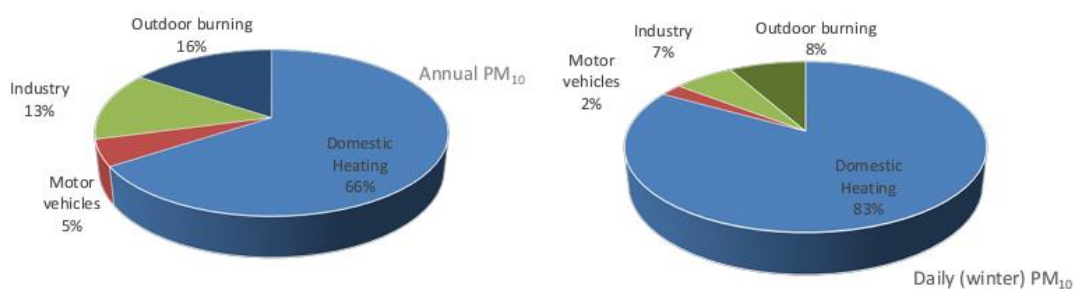


Figure 11: Relative contribution of sources to annual PM₁₀ and daily winter PM₁₀ emissions in Brightwater.

5.2 Motueka: Composition and Sources of PM_{2.5} (source apportionment study)

5.2.1 As previously reported, the Council undertook a full year's monitoring of daily PM_{2.5} at Ledger Goodman Park, Motueka, from January 2022 to January 2023. The Council commissioned GNS Science (Geological and Nuclear Sciences Limited) to analyse the composition of the

particulate matter samples collected and identify and apportion the emission sources (through a receptor modelling study)⁷. Key results from the study (as shown in Figure 12) are:

- Fine particle concentrations were highest during winter and this was indicative of the sources contributing to particulate matter concentrations at Motueka.
- Five distinct source types were extracted from the data, these were biomass combustion, motor vehicles, secondary sulphate, marine aerosol (sea salt), and soil.
- Biomass combustion was the primary source of fine particulate matter in Motueka contributing to 64% of PM_{2.5} over the monitoring period and most of this occurred during winter. The contribution from this source on peak pollution days was found to be 87% of PM_{2.5} concentrations. Trace amounts of arsenic and lead were found to be associated with the biomass combustion source, most likely due to the use of treated or painted wood as fuel for domestic fires during winter.

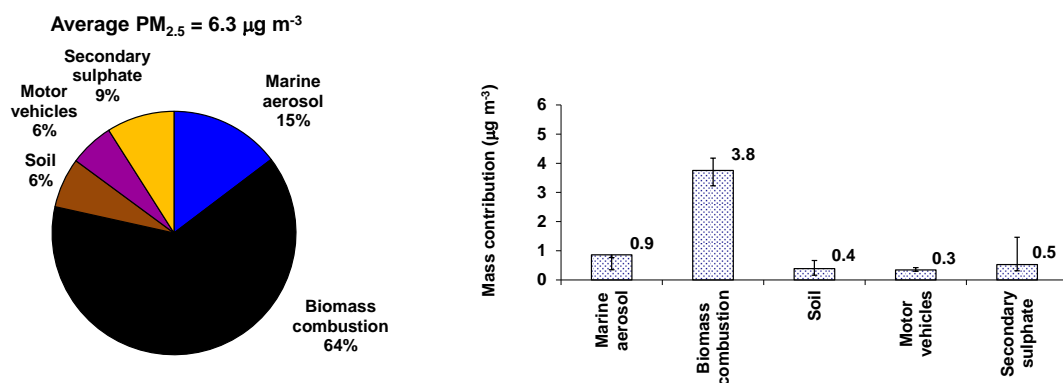


Figure 12: Average source contributions to PM_{2.5} at Motueka over the monitoring period (January 2022 to January 2023).

5.2.2 During other time periods, marine aerosol, secondary sulphate and crustal matter contributions can be significant in Motueka. The motor vehicle source contributed low levels of PM_{2.5} during the monitoring period most likely due to the minimal level of traffic activity nearby the Motueka monitoring site.

6. Complaints and Enforcement

During the six-month period from 1 April to 30 September 2023, the Council received 113 air quality related complaints, 15 of these related to odour; 4 were dust related; 3 were discharge of pesticide/herbicide complaints and 91 complaints related to smoke.

6.1 Odour

6.1.1 Odour complaints can be broken down into different odour sources as follows:

- Wastewater/sewerage: 6
- Industrial: 4
- Rural: 5

⁷ Davy, P.K., Trompetter, W.J. 2023. Motueka: Composition and sources of PM_{2.5}. Lower Hutt (NZ): GNS Science. 58 p. Consultancy Report 2023/77.

6.2 Smoke

6.2.1 91 complaints related to smoke and the cross-boundary effect of smoke were received. The cross-boundary complaints can be broken down by area:

Golden Bay	<ul style="list-style-type: none">• 4 rural outdoor burn
Murchison	<ul style="list-style-type: none">• 1 rural outdoor burn
Motueka, Lower Moutere and Riwaka	<ul style="list-style-type: none">• 31 rural outdoor burning• 5 urban outdoor burning• 2 household smokey chimney• 1 industrial smoke complaints
Waimea, Wakefield, Upper Moutere, Māpua	<ul style="list-style-type: none">• 23 rural outdoor burn
Richmond	<ul style="list-style-type: none">• 4 household smokey chimney• 8 urban outdoor burning• 12 rural outdoor burning

6.2.2 Staff conducted three evening Richmond Airshed 'non-compliant wood burner' patrols over winter 2023 (6 July, 20 July and 9 August). A total of 174 homes were monitored and as a result two were found to be operating non-compliant wood burners. The Compliance Officer provided education in relation to the TRMP rules. One resident has since made inquiries to install new a wood burner.

6.2.3 On one patrol, a very smoky chimney was observed. It was established that the wood burner is compliant, however the wood they were using was Old Man Pine which emits black smoke when burnt. After discussion with owner, alternative fuel will be used in future.

6.2.4 Staff followed up on smokey chimney complaints and educational advice was provided regarding best practice wood burner use, wood moisture levels and storage of wood. Property owners generally took this positively as they did not wish to annoy neighbours or contribute unduly to the overall smoke in Richmond. The suggestion that they physically check their chimney to ensure they were 'doing it right' gave them some ownership of the positive changes they could make with their wood burner use. A common practice is that older wood burner models can 'bank down' overnight. However, national information and tests have shown that it does not add to the warmth of a house and also greatly increases air pollution.

6.3 Enforcement (smoke related)

6.3.1 Staff undertook the following enforcement action during the 6-month period:

- 0 abatement notices were issued.
- 3 infringement notices issued for breach of the TRMP outdoor burning rules.
- 26 warnings/educational advice given.

- Education and best practice advice was given in most instances where a burn was confirmed.

6.3.2 On 26 June 2023, CJ Industries and Rapid Ridge Trust were convicted and sentenced in the Nelson District Court in relation to outdoor burning offending that took place on a property near Motueka, on 3 June 2021. They were fined \$33,000 for breaching the TRMP discharge to air rules after burning a mixture of green waste and house demolition materials.

6.3.3 The photos below illustrate outdoor fires that resulted in enforcement action during the April to September 2023 period.



Photo 1(left) Dairy Farm, Murchison; Photo 2 (Right) Horticultural property, Edens Road, Hope.

6.4 Richmond Airshed

6.4.1 The Richmond airshed contains a total of 7,032 properties (at October 2023). Of these properties, Council records identify that there are 5,854 properties that have either a compliant wood burner; a compliant wood pellet burner; a cooker; or an alternative heating source. These figures are based on current available information at October 2023.

6.4.2 Within the airshed, 253 properties are currently known to be subject to TRMP Rule 36.3.7.5. This means the property has on-sold since January 2007 and the owners are required to upgrade their wood burner if they have a non-compliant model and wish to use a wood burner. Of these properties, a total of 120 property owners have advised Council staff that they do not use their wood burner and have alternative heating (however they do wish to keep the option of wood burner replacement open as the TRMP rules do not require removal of non-compliant burners in these circumstances).

6.4.3 That leaves 133 properties that Council staff believe are potentially using non-compliant wood burners within the Richmond Airshed. These properties will be sent a follow-up letter before next winter to request an update on the status of their wood burner and will also be checked as part of the Richmond Airshed 'non-compliant wood burner' patrols over winter 2024.

6.4.4 Complaints relating to smokey chimneys resulted in education and advice to property owners to ensure the wood burner was being used correctly and burning compliant dry wood. Properties that do not fall within the rules, i.e. have not sold since 2007, are provided

education around efficient use of these old burners, utilizing best practice methods and dry wood to minimize smoke discharge. Those that are breaching discharge rules are given education and enforcement action taken if necessary.

7. Non-Regulatory Programmes

This section sets out the Council's non-regulatory air work programme which includes the Good Wood scheme and education via the Council's communications. Alongside implementation of the TRMP's discharges to air rules, these non-regulatory programmes can contribute to reducing winter-time air pollution through a number of often simple actions undertaken by residents and land managers in our District.

7.1 Good Wood Scheme

- 7.1.1 The Council continues to implement the Good Wood Scheme in partnership with Nelson City Council (NCC). The voluntary scheme requires wood merchants to supply firewood according to specified best practice performance standards. Wood merchants are required to sign the Good Wood Supplier Agreement annually and adhere to a number of conditions. In return, both Councils promote these wood merchants as Good Wood suppliers on our websites and in Council communications (e.g. social media and advertisements in local newspapers). Five wood merchants have signed on as Good Wood suppliers for 2023/2024.
- 7.1.2 For the second year in a row, the Council is currently offering a 'good wood' discount off the price of firewood per household (20 x \$50 vouchers per merchant funded by TDC for Tasman residents, and the same number funded by NCC for Nelson residents) until mid-December (or when the vouchers run out). The purpose of the promotion is to encourage households to purchase their wood early and from a Good Wood supplier, ready for next winter.

7.2 Community Firewood Initiative

- 7.2.1 As part of managing Council's forests, the Council's contractor PF Olsen transported a large volume of eucalyptus and macrocarpa forestry slash to Moturoa/Rabbit Island earlier this year. This wood was cut into firewood rounds and offered to the community for pick up on Saturday 28 October, to tie in with a 'Step Out' community event also being held at Moturoa. Council staff, a representative from the NZ Home Heating Association, along with staff from PF Olsen, Aspect Forestry and Reed Contracting were present to assist with loading and handing out educational pamphlets on wood storage and best practice wood burner use. Approximately 450 trailer-loads of wood were distributed. There was a lot of interest in the best practice wood burner information, particularly the 'upside down fire' concept, with 200 of these flyers distributed. This event was very effective for getting targeted educational information to the public.
- 7.2.2 Interest in the event was overwhelming with demand exceeding what was expected, causing significant traffic congestion. Council staff and PF Olsen staff have debriefed on the event and have identified several areas for improvement if it was to be held again. For any future events planning would focus on reducing traffic congestion, increased health and safety, and pre-registration.

7.3 Warmer Healthier Homes Te Tau Ihu Charitable Trust

- 7.3.1 Since 2014, Warmer Healthier Homes Te Tau Ihu Charitable Trust (WHH) has operated across the top of the south assisting homeowners and community members most in need to improve insulation measures, heating and overall efficiency by retrofitting into existing owner-occupied homes. WHH administers central government funding from the Energy Efficiency and Conservation Authority (currently at 80% funding) and local third-party funding (20% funding) to 100% subsidise home insulation to residents who meet the required criteria. The positive effects of improved insulation in homes are well documented – better insulation means a warmer, drier and healthier home that will be easier and cheaper to heat. This results in improved air quality outcomes as less wood is required to be burned for home heating, resulting in reduced levels of smoke.
- 7.3.2 In May 2021, the Council contributed \$60,000 to WHH that is directly being used to retrofit insulation into qualifying households in the Tasman District (to be used over the following three-year period). Over the 2022/2023 financial year, Council’s funding (along with other 3rd party funders) enabled insulation of 71 houses in the Tasman District. Staff promote the programme via the Council’s communication channels and are currently developing further promotion opportunities. This includes a direct advertising campaign for approximately 300 Tasman households who may be eligible under the ‘low-income area’ criteria (Deprivation Index 9 and 10) and a joint promotion video with Nelson City Council for digital media platforms.

7.4 Air Quality Education and Advice

- 7.4.1 Council staff have an ongoing work programme to educate and promote better burning to reduce air pollution over autumn and winter months. Staff continued to utilise social media and Newline to promote home heating and rural outdoor burning best practice advice. This supplements the wealth of information provided on the Council’s air quality website pages, including best practice guides for home heating and outdoor burning.
- 7.4.2 Following completion of temporary air quality monitoring in Brightwater and Wakefield in winter 2022, staff presented the results of these studies to the respective community associations in May 2023 (Wakefield) and July 2023 (Brightwater). At the invitation of Council staff, a representative of the NZ Home Heating Association also attended the Wakefield meeting and gave a ‘dry’ demonstration of how to build an ‘upside down fire’ for wood burners. This was well received, and staff are scoping opportunities to partner with the Home Heating Association in Autumn 2024 to provide in-person education on wood burner use.

8. Discharges to Air Policy Planning

- 8.1 Since 2019, work has been underway to review Tasman’s resource management plans, with the replacement plan called Aorere ki uta, Aorere ki tai – Tasman Environment Plan. An initial ‘discharges to air’ issues and options paper was drafted and workshopped with Councillors in November 2021. The identified issues included:
- smoke from domestic home heating;
 - outdoor rural burning;
 - agrichemicals;

- odour, dust and other nuisances;
 - large scale combustion; and
 - greenhouse gas emissions.
- 8.2 More recently, detailed work was completed to further understand issues and options to manage the Richmond Airshed and outdoor rural burning, and this was workshopped with Councillors in June 2023.
- 8.3 However, given the RMA system reform, combined with the uncertain political climate (as set out in Section 3.3), means that the Environmental Policy team has refocused its work programme. The whole of plan review to produce a new Tasman Environment Plan is currently on hold and the short-term focus will be on progressing a smaller number of policy topics of importance to Tasman (including freshwater, growth and natural hazards). Air quality issues (outdoor burning and Richmond airshed management) is also identified as a second-tier priority but is subject to availability of resources over 2024/2025.
- 8.4 Once the new government has established and the direction of the resource management system reform is known, the Council will be able to respond and identify the medium to long-term work programme. It is important to note that the Council is currently in a good position in relation to its air work programme as staff have undertaken background work/evidence base relating to the identification of issues and options and technical work/research. This work is required to inform review of our resource management plan, regardless of the legislative framework it may be prepared under.
- 8.5 Nationally, councils would welcome confirmation from MfE on the anticipated requirements to monitor and manage PM_{2.5} sources and what the standard may be (e.g. daily standard of 25 µg/m³ as proposed by MfE in 2020, or the 2021 WHO guideline of 15 µg/m³). The potential requirement to monitor and manage PM_{2.5} will potentially have significant implications for the management of Tasman's air resource. For example, the requirement to monitor and manage PM_{2.5} sources could result in the establishment and targeted management of new airsheds. Council staff are cognisant of the issues and have ensured that our air quality work programme considers the likelihood of a PM_{2.5} monitoring and management framework in the future. It is likely that such a new framework would have significant resourcing implications for Council, linked to additional monitoring, compliance and behaviour change actions required to meet a more stringent regulatory framework.