9.1 2017 AIR QUALITY REPORT

Information Only - No Decision Required

Report To:	Environment and Planning Committee
Meeting Date:	9 November 2017
Report Author:	Anna MacKenzie, Resource Scientist – Contaminants, Environment & Planning
Report Number:	17-11-03

1 Summary

1.1 The Council is involved in monitoring air quality and has a fixed monitoring station within the Richmond Airshed set up under the National Environmental Standards for Air Quality 2004 (NESAQ). The 2017 monitoring data has shown the air quality for particulate matter has been acceptable for 80% of the time.

1.2 There were four exceedances of the National Environmental Standard for particulate matter (PM_{10}) over the winter of 2017, which is one more than the standards permit. Two of these exceedances were technical exceedances due to applied adjustment factors. The Richmond airshed is non-compliant with the National Standard from 9th July 2017. The trend in annual concentrations of PM_{10} has improved over the period 2000-2010, but daily PM_{10} concentrations have fluctuated over the last five years with no obvious improvement in air quality. The maximum daily PM_{10} concentration for 2017 was 60 µg/m^3.

1.3 There were 24 exceedances of the global world health organisation (WHO) daily guideline value for the finer fraction of particulate matter ($PM_{2.5}$) over the period from May to August 2017, with a peak concentration of 44 µg/m^3.

1.4 A source apportionment study on $PM_{2.5}$ data for Richmond has shown 75% of the finer particulate matter is from biomass combustion, attributed to solid fuel appliances in Richmond. The metals arsenic and lead were also found to be present in the particulate matter and associated with burning treated wood and painted timber as fuel for heating.

1.5 There has been over 100 complaints for the winter of 2017 about outdoor burning issues, with a large number related to the objectionable nature of smoke from rural and orchard burning.

1.6 The Resource Management (National Environmental Standards for Air Quality) Regulations 2004 (NES) are currently under review and Tasman District Council will need to review its air quality management provisions when the outcome is known. The modelling predictions on air quality suggest existing management measures would be sufficient to meet the current NES for daily PM_{10} concentrations and an annual $PM_{2.5}$ standard or guideline of 10 µg/m^3 if introduced. Stricter management measures than those currently in place would likely be required to meet a daily $PM_{2.5}$standard.

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2 Draft Resolution

That the Environment and Planning Committee

1. receives the 2017 Air Quality Report report REP 17-11-03

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3 Purpose of the Report

3.1 To update Council on the results for air quality monitoring for particulate pollution in Richmond undertaken during winter 2017 and assess compliance with the requirements of the Resource Management (National Environmental Standards for Air Quality) Regulations 2004 (NES).

4 Background and Discussion

4.1 Good air quality is important for people's health and well-being. Air Quality monitoring in the Richmond area is monitored for fine particles called particulate matter (PM). The tiny particles penetrate into the lungs and bloodstream and damage respiratory and cardiovascular systems and can cause a range of human health effects from minor irritation through to disease and death.

4.2 The National Environmental Standards for Air Quality (NES) are regulations made under the Resource Management Act 1991 which aim to set a guaranteed minimum level of health protection for all New Zealanders. The NES came into effect on 8 October 2004, and includes a standard for particulate matter for outdoor air quality of 50 µg/m3 based on a 24 hour averaging period. These regulations are under review, however no information on the review is publically available. The amendment to the NES is now due to be completed in 2018.

4.3 In order to achieve the National Environmental Standard, Tasman District Council regulates the use of solid fuel burners and outside burning through its Resource Management and Building Act requirements. It also undertakes education (good wood and good burner operation) and uses enforcement action (illegal and objectionable discharges) where necessary.

4.4 Particulate matter has been monitored in the Richmond airshed since 2000, and the New Zealand standard for PM has been exceeded every winter. Particulate matter consists of solid and liquid particles suspended in the air. PM is usually measured in two sizes:

- PM_{10} 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 PM_{10}

Concentrations of $PM_{2.5}$ have been measured in Richmond from October 2015.

4.5 This report presents data from the following:

- Annual air quality monitoring for $PM_{2.5}$ and PM_{10} for Richmond over the period 1 September 2016 to 31 August 2017, including meteorological information such as wind speed and air temperature.
- Further evaluation of the $PM_{2.5}$ air quality monitoring data collected over the period 1 October 2015 – December 2016, to assist with understanding of contributions of $PM_{2.5}$ to domestic home heating and impacts of the upcoming review of the NES (Environet report May 2017).

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- Particulate matter source apportionment study based on daily $PM_{2.5}$ data from Richmond collected over the period 1 October 2015 – 6 October 2016 and the PM_{10} data from June 2013 - October 2016 (GNS report June 2017).
- Air Pollution complaints for the period 1 April – 30 September 2017 and update on the prosecution regarding an industrial arsenic discharge to air which occurred over the period June 2013-August 2016, from burning treated timber.

4.6 Table 1 presents the current air quality standards and guidelines for PM concentrations. The air quality standards are concentration limits set to protect health and incorporate a number of allowable exceedances. The air quality guidelines are concentration limits recommended to protect health and the environment. There are currently no national standards for $PM_{2.5}$, so the World Health Organization (WHO) guidelines are used for assessing the results. It is anticipated that under the NES amendments, a new annual standard for $PM_{2.5}$ will be introduced.

Particle Size	Averaging Period	WHO Air Quality Guideline	Ambient Air Quality Guideline	National Environmental Standard	Permissable exceedances per year
PM_{10}	24-hour	50 µg/m^3	50 µg/m^3	50 µg/m^3	3 by 2016 1 by 2020
PM_{10}	annual	20 µg/m^3	20 µg/m^3		
$PM_{2.5}$	24-hour	25 µg/m^3			3
$PM_{2.5}$	annual	10 µg/m^3			

Table 1: Particulate Matter Standards and Guidelines

4.7 Based on the weather records from the Tasman District Council 189 Queen Street meteorological monitoring site, the winter of 2017 was fairly warm for air temperature with above average air temperatures. The monthly average temperature for August was the warmest on record (10.2 °C). The warmer air temperatures are likely to have resulted in less use of solid fuel heaters and may have increased vertical air movement. The months of May, July and August were also wetter than average in Richmond, and the wind speed was higher than average in July 2017, both conditions are likely to lead to particulate pollution being dispersed. The wind speed showed calmer conditions in the months of for May, June and August with below average speeds, being more conducive to a build-up of particulates.

4.8 The air quality monitoring equipment is located at the Plunket Rooms at 56 Oxford Street, central Richmond and comprises a Thermo FH62 Beta Attenuation Monitor (BAM) and two Partisol gravimetric air quality samplers (Thermo 2025i and R&P Model 2000). The air quality equipment is maintained by a local contractor (EIL). Watercare Services Limited undertake the quarterly audits, annual calibration on the instruments and analysis of the filters.

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Photo 1: Richmond PM_{10} and $PM_{2.5}$ Monitoring site

4.9 The BAM provides a continuous record of the PM_{10} air quality, and provides PM_{10} as half-hourly averages and is an equivalent method. The BAM instrument is due to be replaced in 2018, as the replacement parts for this machine are no longer supported by the manufacturer. The partisol samplers are reference methods, and are gravimetric, which means they are based on direct measurement of exposed filters by weight, and provide daily (24 hour) averages. The Partisol PM_{10} was operated on a one day in six cycle over the year. The Partisol $PM_{2.5}$ was operated on a daily basis over the months of September 2016 and winter (May–August 2017), and a one day in six for the remainder of the monitoring period.

4.10 Previous studies on the relationship between the partisol sampler and BAM sampler at Richmond shows the BAM under-reports by about 16%, when compared with the gravimetric reference method (Environet report "Comparison of BAM and gravimetric PM_{10} concentrations in Richmond-2013" dated October 2013). Correcting the data to gravimetric equivalent is not currently recommended under the "Good Practice Guide for Air Quality Monitoring and Data management 2009", however, the data in this report has been adjusted by 16%, in accordance with previous practice. The variation in the co-located instruments was partly attributed to the length of the BAM heated inlet (3m) which can cause loss of volatile and semi-volatile components.

The review of winter 2017 BAM versus Partisol data using Microsoft Excel Least Squares method trendline is shown in Figure 1. The plot suggests there is no requirement to adjust the current Winter 2017 (May- August) data sets. A comparison of the PM_{10} air quality datasets using the more robust Reduced Major Axis (RMA) regression analysis is recommended to determine the adjustment factors which need to be applied to the BAM data. The reason for this change in trend line and adjustment factor is unclear, as there have been no changes to the instrument set-up at the Richmond Air Quality monitoring site. In order to maintain consistency with previous datasets, the adjustment factor of 16% has been applied to data this year. The adjustment has resulted in two additional exceedances

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of the NES standard.

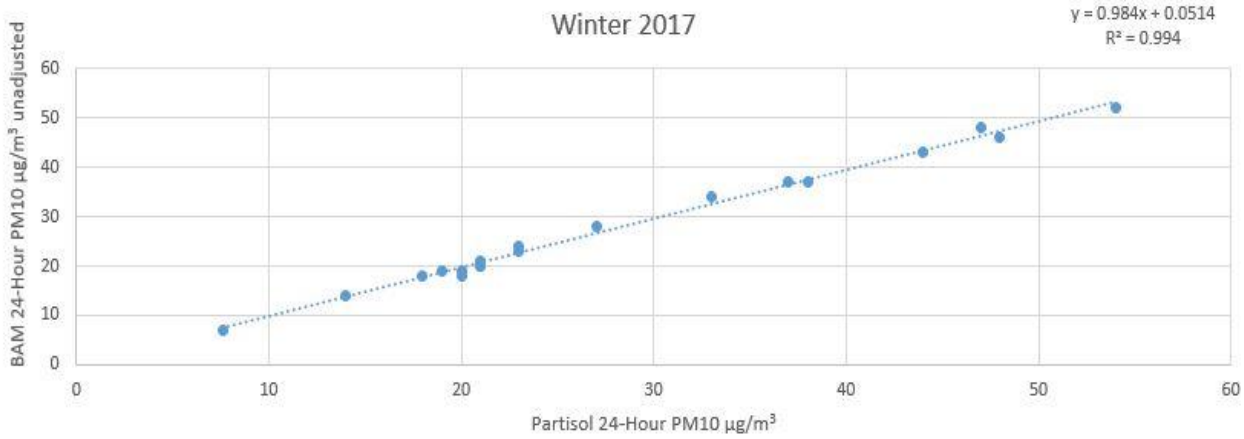

Figure 1 : Relationship between BAM and Partisol PM_{10} concentrations (4 May 2017-26 Aug 2017)

4.11 Daily 24-hour average PM_{10} concentrations measured using the BAM in Richmond over the monitoring year period (1 September 2016 to 31 August 2017) are shown in Figure 2. The data for 2017 shows the typical seasonal pattern, with peak PM concentrations, breaching the standard, occurring over the late autumn/winter period (May to August 2017).

4.12 Table 2 shows the annual average PM_{10} concentrations for Richmond for 2016/2017 is 18 µg/m^3, which meets the ambient air quality guideline value of 20 µg/m^3. The winter (May-Aug) average was 29 µg/m^3 and the average for the non-winter months (Sept – April) was 12.6 µg/m^3.

Richmond at Plunket Rooms												
01-09-2016 to 31-08-2017												
PM_{10} daily average												
Method:	BAM											
Valid Data:	97.8%											
Data Capture Rate:	98.6%											
Units	µg/m^3											
	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
Minimum	7	4	4	6	4	6	3	3	8	12	14	11
Mean	16	12	11	11	12	13	12	14	26	34	31	28
Maximum	29	23	19	22	22	26	21	25	53	60	55	48
Lowest								3				
Highest										60		
Exceedances (>50 µg/m3)	0	0	0	0	0	0	0	0	1	2	1	0
Annual Mean	18											

Table 2: Daily Average PM_{10} measured in Richmond in 2016/2017

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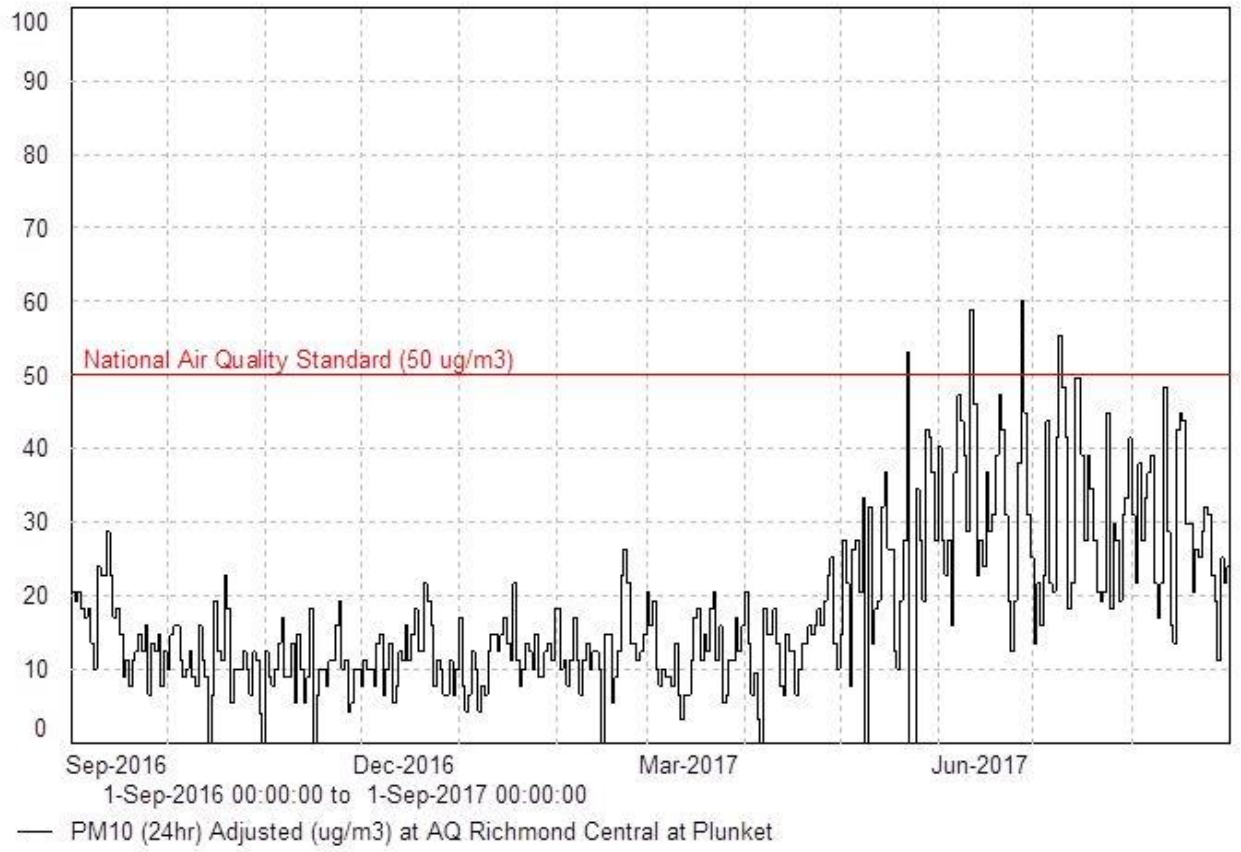

Figure 2: Daily average PM_{10} concentrations measured in Richmond (1 Sep 2016 – 31 Aug 2017)

4.13 Over the winter of 2017, the National Environmental Standard for PM_{10} of 50µg/m^3 was exceeded four times (See Table 2 and 3). This is one more than the three exceedances allowed by Regulation 16B. Of note, two of these breaches were under the standard in the unadjusted BAM dataset (i.e. BAM data not adjusted by 16%). The co-located partisol data showed the PM_{10} is marginally below the standard, as opposed to above the standard, in two out of these four breach events.

4.14 The NES requires the council to give public notice if the standard is breached. The notice of three of the breaches was given in July 2017, however the fourth breach in May was not noted until August 2017 during quality review of the data. The Richmond airshed is non-compliant with the National Standard. The implications of the breach are that certain applications for PM_{10} discharges within the airshed must be declined, and the Minister may investigate the performance of non-complying councils. An air shed action plan and/or a progress report to monitor whether councils are on track to meet their targets may be requested.

4.15 Table 3 summarises the data for the dates where the short term 24-hour PM_{10} exceedances occurred. The meteorological data on wind speed and air temperature collected from the Tasman District Council weather station are included. A previous air quality study on long term trends in PM_{10} in Richmond, 2010 has indicated that the worst air quality in Richmond generally occurs with 24-hour average wind speeds below 3.8 m/s and 4-hour average temperature (8.00 pm to midnight) of less than 6.8C. The four exceedances all occurred on days with low 24-hour wind speeds of less than 1.6 m/s, and evening temperatures of

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between 3.0 and 4.7 C. A review of photographic evidence identifies rural fires burning on the plains on each of these dates with exceedances.

Date	BAM 24-hour PM_{10} adjusted µg /m³	Partisol 24-hour PM_{10} µg /m³	24-hour wind speed m/s	24-hour temp ºC	4-hour Temp (8pm-12pm) ºC
22 May 2017	53	48	1.2	7.1	3.0
11 June 2017	59		1.0	7.7	3.2
27 June 2017	60	54	1.1	6.3	3.1
9 July 2017	55	47	1.6	9.1	4.7

Table 3: Exceedances of 24-hour PM_{10} in Richmond in 2016.

The maximum PM_{10} concentration for 2017 was 60 µg/m³ on the 27 June 2017 and the second highest PM_{10} concentration (used because by 2020 one exceedance is still allowed) was 59 µg/m³. Figure 3 shows the maximum concentrations of PM_{10} have decreased in Richmond since monitoring began. The gaps in the data are due to sampling at different locations and missing sample periods. The PM_{10} data has not been adjusted to account for impacts of variations in the weather. The data suggests there has been a significant reduction in peak concentrations between 2000 and 2010, and no significant difference in the second-highest values between 2013 and 2017.

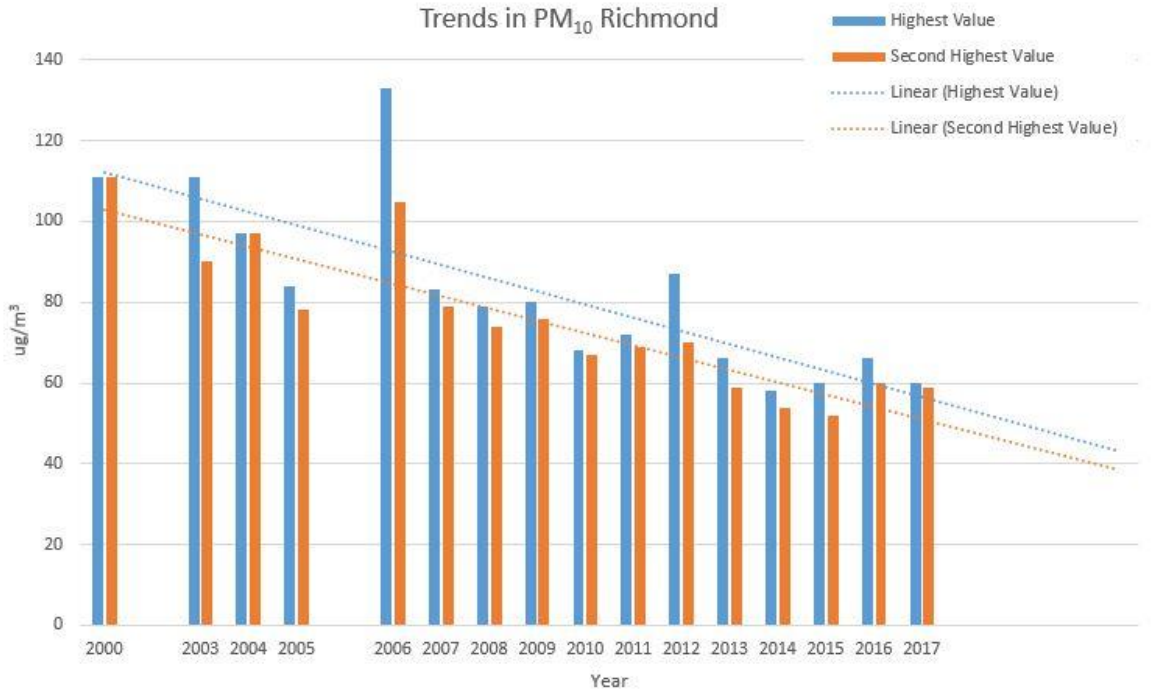

Figure 3 Trends in maximum and second highest PM_{10} concentrations from 2000 to 2017

4.16 The number of PM_{10} exceedances of the daily standard has reduced from 44 in 2000 to four in 2017. The number of exceedances measured in Richmond since 2000 and the value of the second highest PM_{10} concentration are shown in Figure 4. The second highest value indicates no difference over the last five years, which suggests predicted reductions in PM_{10} concentrations may not be occurring. This needs to be investigated further.

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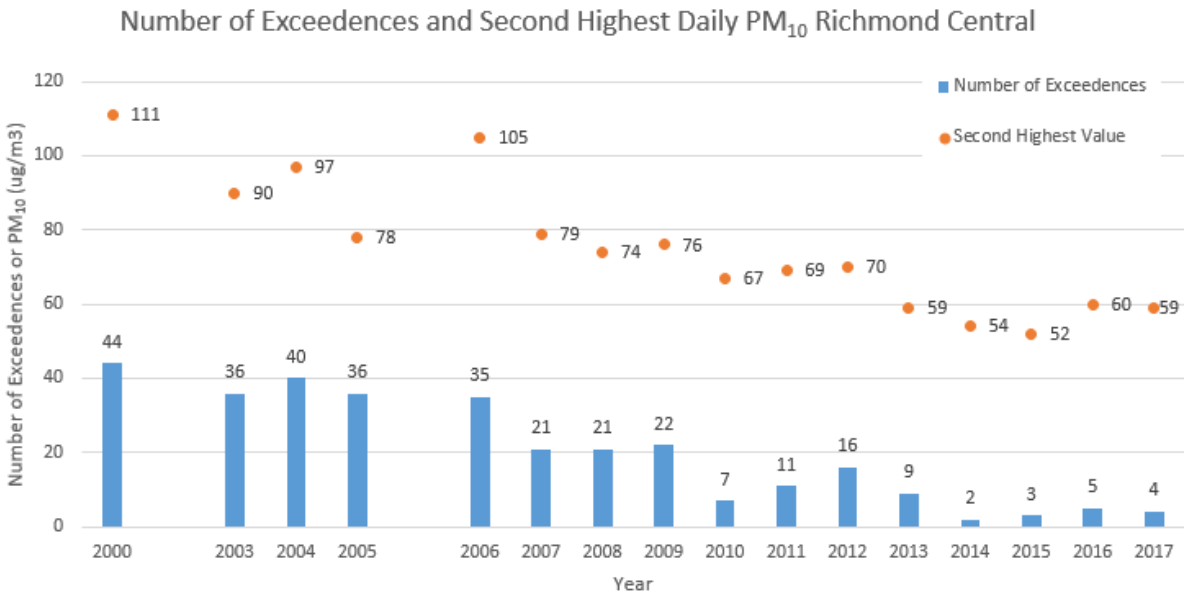

Figure 4: Number of Exceedances of 24-Hour PM_{10} for Richmond

4.17 The PM_{10} data has been categorized according to percentage relative to the standard of 50 µg/m^3, with less than 66% of the standard being considered “acceptable” air quality, and less than 33% as “good” air quality, in line with the Ministry for the Environment categories shown in the Good Practice Guide for Air Quality Management, 2009. The results in Figure 5 show that since 2007, the air quality has been good to acceptable for at least 80% or the time.

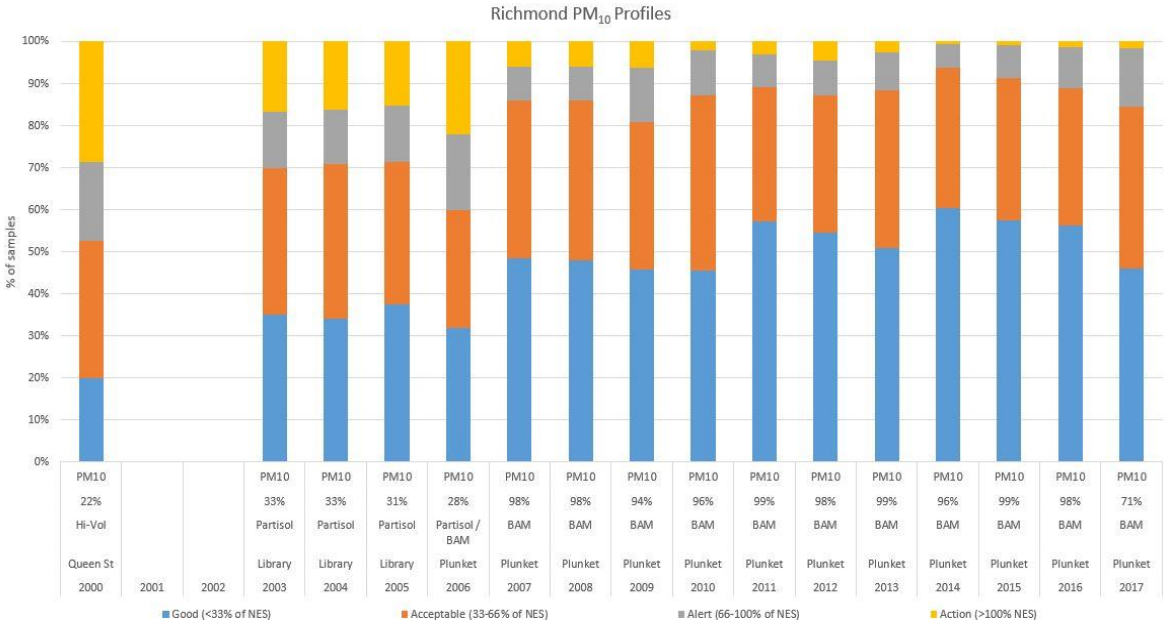

Figure 5: Proportion of PM_{10} belonging to different air quality categories

4.18 Daily average $PM_{2.5}$ concentration was measured during the period 1 September 2016 – 31 August 2017 (See Table 4 and Figure 6). The samples were collected daily over September 2016 and autumn/winter 2017 (6 May – 19 August 2017), and were on a one-day in six cycle for the remainder of the sampling period. The concentrations of $PM_{2.5}$ regularly breached the current WHO daily guideline value of 25 µg/m^3 over the period from May to

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August 2017, with 24 breaches of the guideline. Average concentrations of $PM_{2.5}$ over the winter months were between 17-23 µg/m^3 and lower concentrations over the summer of around 3 µg/m^3 (See Table 3). The maximum daily $PM_{2.5}$ concentration measured in Richmond during 2017 was 44 µg/m^3.

Figure 6: Daily average $PM_{2.5}$ measured in Richmond (1 Sep 2016-31 Aug 2017)

Richmond at Plunket Rooms												
01-09-2016 to 31-08-2017												
$PM_{2.5}$ daily average												
Method:	Partisol											
Valid Data:	93.4%											
Data Capture Rate:	94.0%											
	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
Minimum	3.6	2.8	1.9	2.1	2.2	2.6	2.2	2.2	4.9	7.5	3.8	3.3
Mean	8.4	3.9	4.6	2.9	3.0	3.4	4.1	5.0	18.2	22.9	20.6	17.0
Maximum	17	4.5	8.2	4.0	3.5	5.3	7.3	6.8	39.0	44.0	41.0	29.0
Lowest			1.9									
Highest										44		
Exceedances (>25)	0	0	0	0	0	0	0	0	2	11	9	2
Annual Mean	9.2											

Table 4: Daily Average PM_{10} measured in Richmond in 2016/2017

4.19 An annual mean for $PM_{2.5}$ cannot be calculated for 2017, as the "one-day in six" monitoring regime is not sufficient for assessing against a guideline. However, as an initial assessment, the data has been weighted for the summer/winter sampling pattern and the 2016/2017 annual mean estimated to be 9.2 µg/m^3. The annual WHO guideline for $PM_{2.5}$ is 10 µg/m^3, and this may be adopted in the revised NES.

4.20 Further assessment of the existing $PM_{2.5}$ data from the period 1 October 2015 to December 2016 was undertaken to evaluate the implications of the introduction of an annual $PM_{2.5}$ standard on the Air Plan. The Envirolink Report 1777-TSDC134 "Assessment of the impacts of regulatory measures targeting home heating on annual average $PM_{2.5}$ in Richmond", dated May 2017 is available. Key findings of the report are summarized:

- A relationship between $PM_{2.5}$ and PM_{10} was assessed for winter and non-winter months and is described using the following equations:

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Non-winter $PM_{2.5}$ = 0.54 PM_{10}-1.2
Winter $PM_{2.5}$=1.05PM_{10}-7.5

- A reduction of $PM_{2.5}$ concentrations of around 21% is required to meet a $PM_{2.5}$ annual average of 10 µg/m^3. This is less than the predicted reduction of around 30% in daily winter PM_{10} concentrations from 2012-2021, which is required to meet the current daily NES standard for PM_{10}. However, the assessment did not include consideration of a worst-case year in terms of meteorology. The frequency of calm stable conditions with low wind speeds is a key variable for an annual average.

- The previous projections analysis undertaken in 2010 was updated to include natural sources, the 2010 burner numbers and current emission factors. No allowance was made for Nelson Pine Industries (NPI) or new pellet burners. The current Air Plan management measures may be adequate to meet both the peak 24 hour average PM_{10} concentration and the possible $PM_{2.5}$ annual average.

- The projection analysis predicted that 30% reduction was required in daily winter PM_{10} concentrations to meet the standard by 2021, and requires a 35% reduction in PM_{10} from home heating. Over half of the reductions of PM_{10} was estimated to have occurred between 2012 and 2016. The PM_{10} data for this period between 2012 and 2016 does not show an obvious downward trend. There is a possibility of year to year variability in weather conditions which may be masking trends in terms of the reduction 2012 peak concentrations of PM_{10}. Further evaluation is recommended in terms of assessing trends in meteorology and associated elevated pollution events (trends analysis).

- The spatial distribution in annual average PM_{10} and $PM_{2.5}$ emissions was estimated based on the 2012 emission inventory adjusted for the increase in dwellings from the 2013 census. Potential hotspots were suggested on the western fringe of the town and in the east and northern ends of town (see Figure 7).

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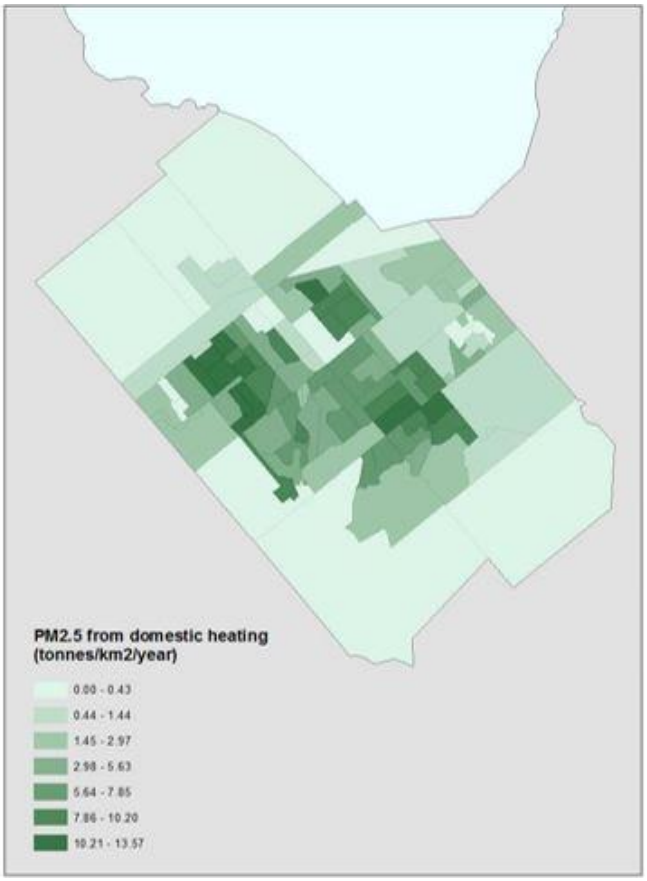

Figure 7: $PM_{2.5}$ emission density from domestic heating (tonnes/km^2/annum) for Richmond (from Envirolink report)

4.21 A report by the Institute of Geological and Nuclear Sciences Limited (GNS Science) was prepared for Tasman District Council in 2017 to determine the sources of $PM_{2.5}$ in the Richmond airshed and is available for review. A total of 360 $PM_{2.5}$ air quality filters which had been sampled over the period 1 October 2015 to 6 October 2016 were analysed using X-ray fluorescence spectroscopy to determine the elemental concentrations in the samples. The sources of $PM_{2.5}$ in the air were identified using mathematical models. The five main sources of the $PM_{2.5}$ for Richmond (see Figure 8) were biomass combustion (75%), motor vehicles (4%), marine aerosol (12%), secondary sulphate (8%), and copper chrome arsenate (CCA) (1%).

4.22 The source apportionment shows the main source of $PM_{2.5}$ in Richmond is from the biomass combustion profile, based on high black carbon and potassium in the results. Arsenic and lead were also strongly associated with the combustion profile, which shows copper chrome arsenate treated wood and lead painted timber is being burnt in domestic fires. The results were seasonal, with the majority of the $PM_{2.5}$ occurring in the months May to August, and no statistical difference due to day of the week was noted. A comparison of $PM_{2.5}$ filters with the coincident monitoring for PM_{10} showed the biomass burning is primarily a $PM_{2.5}$ source.

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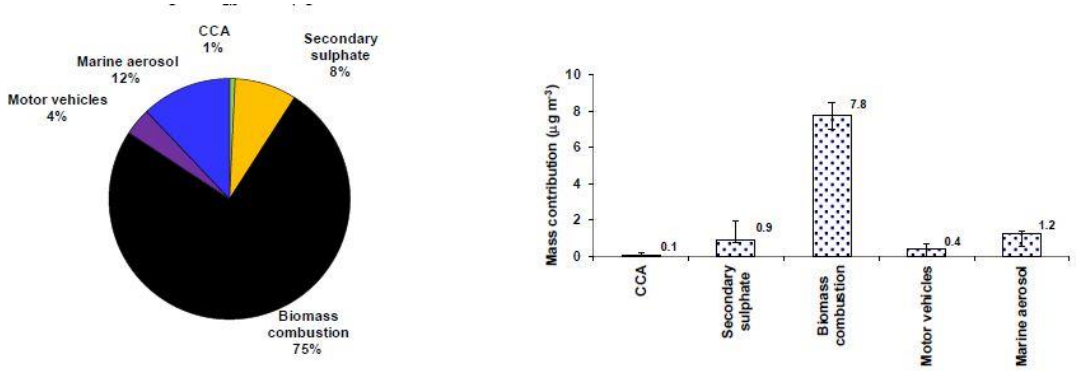

Figure 8: Average source contributions to $PM_{2.5}$ in Richmond (from GNS Science report)

4.23 An analysis of the contributions of various sources to peak particulate matter pollution events was undertaken by GNS Science. The results show that biomass combustion were the primary source for $PM_{2.5}$ exceedances of the daily ambient air quality guideline of 25 $\mu g/m^3$ as shown in Figure 9. Of the days where daily PM_{10} exceeded the NES, biomass combustion was responsible for an average of over 75% of PM_{10} concentrations exceedances. The focus on fire emissions which are responsible for NES exceedances will continue to be a priority for Council to control.

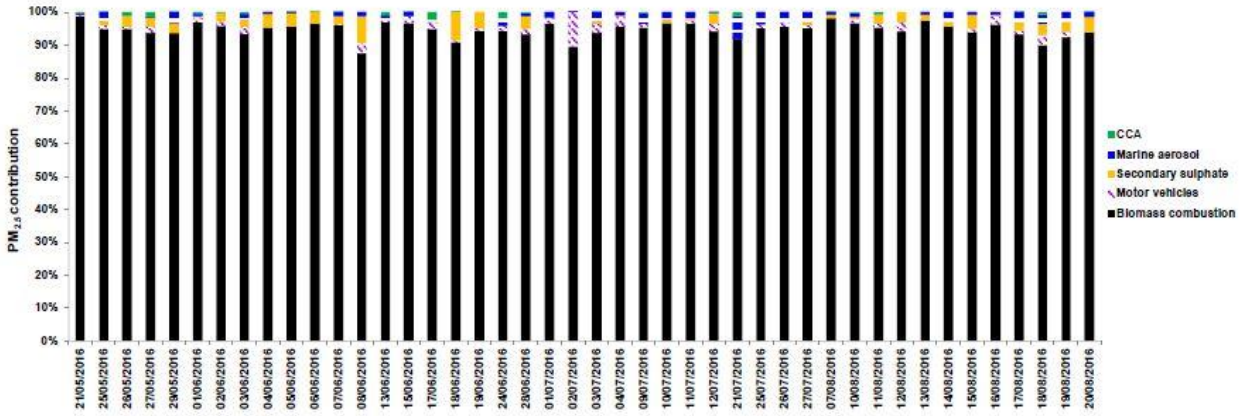

Figure 9:Mass contributions to daily $PM_{2.5}$ exceedance events in Richmond

4.24 During the 6 months 1 April to 30 September 2017 a large proportion of the Compliance Departments air quality monitoring hours were spent responding to smoke complaints relating to outdoor burning.

4.25 These complaints totaled 103 for this period and when broken down to Council wards they showed that the Motueka/Riwaka area received 39 complaints; 15 in neighbouring Moutere Waimea and 49 complaints in the Richmond area.

4.26 Responding to these complaints has provided the Compliance Department with some insight into the issues voiced by complainants and those found from our site inspections of the activities themselves.

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4.27 One of the obvious issues around the Richmond urban area is where the zones for fire sensitive and fire ban are now out of date, given the residential developments occurring, particularly in the south and east - this is currently being addressed in proposed plan amendments and will be resolved once those changes have been implemented.

4.28 A large number of the smoke complaints are about the objectionable nature of the smoke beyond the subject property . This past six months has seen entire blocks of apple trees removed for orchard replacement programmes and change of land use. The burning of these trees is during winter/early spring with often ideal conditions on the ground, however the inversion layer restricts the height smoke can rise holding the smoke low over urban and rural areas where it can often slowly descend affecting wide areas (see Photo 2).

Photo 2: Fire from orchard burning on 22 May 2017

4.29 Often each individual fire is compliant and it is the combined overall effect of many fires which is the issue – more so during the winter months with the lowered inversion layer present. As a whole,contractors controlling these large outdoor burns are doing their best to ensure the burning process is efficient, they are aware of weather conditions, the smoke being produced and are generally willing to follow direction from compliance staff. Despite this effort, it does not prevent the often aggregate effects of the smoke discharge into the wider catchments, particularly in the Motueka/Riwaka areas

4.30 Following on from this there has been a notable increase in complaints about the impact from the smoke - whereby the complainant is not personally affected but is concerned about the visual effect, the perceived decline in air quality and the subsequent effects on public health from the smoke. Complainants are also asking about the health impact of smoke from the burning of wood sprayed with pesticides. Rural residents are voicing their annoyance that we only monitor and appear to have restrictions for the Richmond Airshed and that their own air quality does not matter.

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4.31 Richmond residents again voiced their concerns around the strict rules imposed on them within the Richmond Airshed while adjoining rural properties outside the Richmond Airshed 'boundaries' are permitted to have outdoor burns. This smoke has a detrimental effect on the Airshed air quality, highlighting ongoing difficulties of managing air discharges when no physical boundaries exist and smoke movement is dependent on the wind.

4.32 A GNS Science analysis of air quality data for the period June 2013 to October 2016 identified two sources of arsenic. One of these was seasonal during winter, characteristic of home heating and the burning of copper chrome arsenate (CCA) treated timber in wood burners. This accounted for approximately half the arsenic present in the analysis. The characteristics of the second source indicated a single year round discharge point of CCA containing particles from an industrial emission.

4.33 Given this information, Compliance staff have undertaken a comprehensive investigation looking at the signature and the potential source. As a result a local company was found to be committing offences and charges have been laid under section 15(1)(c) of the Resource Management Act 1991 for the burning of treated timber . The company has pleaded guilty to the charge however, the matter is still before the Courts and no sentencing has taken place.

5 Options

5.1 The National Environmental Standard for PM_{10} along with its achievement dates of 2016 and 2020 is set by law and Tasman District Council is required to meet it. The NES review is due to be completed in 2018. Based on the best information available to it, Council has developed rules to manage air quality. Air quality monitoring to date suggests that there has been improvement in air quality between 2000 and 2010, however the current target of no more than three permissible exceedances from 1 September 2016 has not been met, and there is uncertainty if the target for 2020 can be achieved. The predictions model used to assess the air quality improvements required to meet the PM_{10} standard by 2020 estimated a fifty per cent improvement in air quality over the period from 2012 to 2016, and there has been no obvious downward trend since 2013 (Figure 4).

5.2 The uncertainty in the assumptions of the existing models should be addressed to check if existing management measures will be sufficient to meet the standard. The areas of uncertainty identified are:

- Adjustment factor for the BAM data should be checked, however the BAM instrument is due to be replaced next year.
- An update to the meteorological conditions associated with elevated pollution events (trends analysis) should be undertaken. The existing PM data can then be normalised to meteorological conditions and may give a clearer indication of trends for compliance with the standard.
- The predictions model should be updated to include contributions from Nelson Pine Industries (NPI) emissions and pellet fires in new dwellings.

5.3 The modelling predictions on air quality suggest existing management measures would be sufficient to meet the current NES for PM_{10} concentrations and annual $PM_{2.5}$ standard or guideline of 10 $\mu g/m^3$ was introduced, provided meteorological conditions more conducive to peak PM_{10} concentrations than 2012 do not occur. At this stage we are not suggesting any review of the existing TRMP provisions until we see the new NES.

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5.4 The main source of PM_{10} and $PM_{2.5}$ in Richmond is from biomass combustion. The existing rules relate to installation of domestic burners and require non-compliant appliances to be changed when a house is sold, and will continue to have an impact on reducing air pollution in Richmond. However, tighter restrictions on outdoor burning for areas in and around Richmond and Motueka should be considered once the new NES is released. This would be a separate discussion with Council via the Policy team. Enforcement of the current requirement to operate without causing a nuisance for neighbours will need to be maintained.

5.5 Based on the data for $PM_{2.5}$, Richmond may require more stringent management to reach a daily guideline of 25 µg/m^3 for $PM_{2.5}$ (as recommended by WHO) than to reach a target of 50 µg/m^3 for PM_{10}. At this stage we are not suggesting any changes to present rules, although this needs to be addressed once the revised NES is released. The information gathered on source apportionment of $PM_{2.5}$ will enable Tasman District Council to be well positioned to engage with the Central Government during the NES review process

6 Strategy and Risks

6.1 Tasman District Council has not achieved the current requirements of the NES and there is uncertainty if the 2020 target can be achieved. Weather influences the levels of air pollutants and in a worse case year, the targets are likely to be exceeded.

7 Policy / Legal Requirements / Plan

7.1 This report provides the results of the air quality monitoring undertaken in Richmond over the winter 2017, as required by the NES and Section 35 of the Resource Management Act.

7.2 The Richmond airshed is non-compliant with the National Standard. An investigation may be undertaken for non-complying Councils and an air shed action plan and/or a progress report to monitor whether councils are on track to meet their targets may be requested by the Minister.

7.3 The Council may need to reconsider its rules in relation to outdoor burning in winter in order to comply with the legal target of no more than three exceedances which came into effect on 1 September 2016. Further advice on this will be provided to Council when the results of NES review are known.

8 Consideration of Financial or Budgetary Implications

8.1 The current air quality monitoring equipment for PM_{10} (BAM) is planned for replacement in this financial year. The unit is over 10 years old and is no longer supported by the manufacturer with either parts or software upgrades. This equipment replacement cost has been approved in the Annual Plan budget.

8.2 The outcome of the NES review may have implications on the air quality budget if additional monitoring for $PM_{2.5}$ is required for compliance purposes. Currently the Partisol equipment

is run on a one day in six cycle and changes to daily sampling will have additional filter, analysis, audit and calibration costs which may need to be considered.

9 Significance and Engagement

9.1 At this stage while there is a high public interest in the air quality of Richmond the receipt of this report is of low significance and no public consultation is required, although the monitoring results are publicly available.

10 Conclusion

10.1 The 2017 monitoring data has shown that air quality for particulate matter has been acceptable for 80% of the time. There were four exceedances of the NES daily PM_{10} standard of 50 µg/m^3 for particulate matter over the winter of 2017, which is one more than permissible by 1 September 2016. Two of these exceedances may be technical breaches due to applied adjustment factors to data in line with previous practices. The Richmond airshed is non-compliant with the National Standard.

10.2 There were 24 exceedances of the global world health organisation (WHO) daily guideline value for the finer fraction of particulate matter ($PM_{2.5}$) over the period from May to August 2017, with a peak concentration of 44 µg/m^3. Richmond may require more stringent management to reach a daily guideline of 25 µg/m^3 for $PM_{2.5}$ (as recommended by WHO) than to reach a target of 50 µg/m^3 for PM_{10}.

10.3 The modelling predictions on air quality suggest existing management measures would be sufficient to meet the current NES for PM_{10} concentrations by 2020. They should also be sufficient to meet an annual $PM_{2.5}$ standard or guideline of 10 µg/m^3, if it is introduced, provided meteorological conditions more conducive to peak PM_{10} concentrations than 2012 do not occur. However uncertainties in the model assumptions need to be investigated.

10.4 A source apportionment study for $PM_{2.5}$ for Richmond has shown 75% of particulate matter is from biomass combustion, attributed to solid fuel appliances in Richmond. The metals arsenic and lead were also found to be present in the particulate matter and are associated with burning treated wood and painted timber as fuel for heating.

10.5 The Resource Management (National Environmental Standards for Air Quality) Regulations 2004 (NES) are currently under review and Tasman District Council will review its air quality management provisions at this time. The Richmond Airshed is currently non-compliant with the standard. Any changes to present rules will be suggested once the revised NES is released.

11 Next Steps / Timeline

11.1 Staff will maintain the continuous record of PM_{10} concentrations in Richmond with the calibration measurement of both PM_{10} and$PM_{2.5}$ to be recorded on a one day in six rotation. Staff will work to see that Tasman's interests are represented in the review of the NES.

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11.2 Existing uncertainty in models will be updated to check if additional management measures are needed to achieve the 2016 and 2020 targets. The trends in daily PM_{10} over the period 2010-2017 will be investigated and the technical breach of the standard will also be confirmed.

11.3 A temporary monitoring site is planned for measuring air quality in Motueka over the next autumn/winter.

12 Attachments

Nil