

9.5 2015 AIR QUALITY REPORT

Information Only - No Decision Required

Report To:	Environment and Planning Committee
Meeting Date:	4 February 2016
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Report Number:	REP16-02-07

1 Summary

- 1.1 Over the last winter the National Environmental standard for Air Quality (NESAQ) was exceeded three times for 24 hour average particulate matter smaller than 10 microns (PM₁₀). This is the second best result on record since air quality monitoring began in Richmond in 2001 and much lower than the total number of exceedences recorded during 2013 (9), although one more exceedance than that recorded during 2014 (2). The maximum 24-hour concentration recorded was 57 µg/m³ which was the lowest annual maximum on record. The annual average concentration was 18 µg/m³. Slightly above last years of 17 µg/m³.
- 1.2 While the overall trend in PM₁₀ concentrations over the ten years of continuous record, is for improving (declining) PM₁₀ concentrations, median concentrations for the winter of 2015 were not as low as during 2014 (17 µg/m³). This is likely to be partially due to the 2015 winter air temperature being lower than 2014 combined with an unusually windy winter
- 1.3 Central Government has announced a review of the NESAQ during 2016. At this stage there is no clear statement on what changes may occur as part of that review although a move towards the use of annual averages rather than daily peaks and measurement of smaller smoke particles (PM_{2.5}) has been recommended by the Parliamentary Commissioner for the Environment.
- 1.4 Given the timing of the NESAQ review Council staff propose to compile information to assist assessing the implications of any proposed changes to the NESAQ on Tasman District Council air quality management and not to consider any changes to the Tasman District Council air quality management provisions themselves until the outcome of the NESAQ review is known.

2 Draft Resolution

That the Environment and Planning Committee

1. **receives the 2015 Air Quality Report report REP16-02-07.**

3 Purpose of the Report

- 3.1 To update Council on results of air quality monitoring in Richmond undertaken during the winter of 2015 and compliance with the requirements of the Resource Management (National Environmental Standards for Air Quality) Regulations 2004 (NESAQ) and to update Council on the review of the NESAQ currently underway.

4 Background and Discussion

- 4.1 The NESAQ requires that Tasman District Council to achieve no more than three breaches of the standard for PM₁₀ (mainly smoke) per year by 2016 and no more than one breach by 2020. In order to achieve this requirement 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.
- 4.2 Over the last winter the NES for PM₁₀ was exceeded three times which is the maximum number permitted the NESAQ for the 2016 target. An exceedence occurs when the concentration of smoke (PM₁₀) is greater than 50 micrograms per cubic meter (50 µg/m³) when averaged over a 24 hour period. The 2015 monitoring result of three exceedences in Richmond is an acceptable result in terms of the 2016 NESAQ target of no more than three exceedences and also in terms of the long term downwards trends (See Figure 1) but is one exceedence of the NES more than occurred during 2014 (2). The 2015 results however is six exceedences fewer than 2013 when nine exceedences occurred.

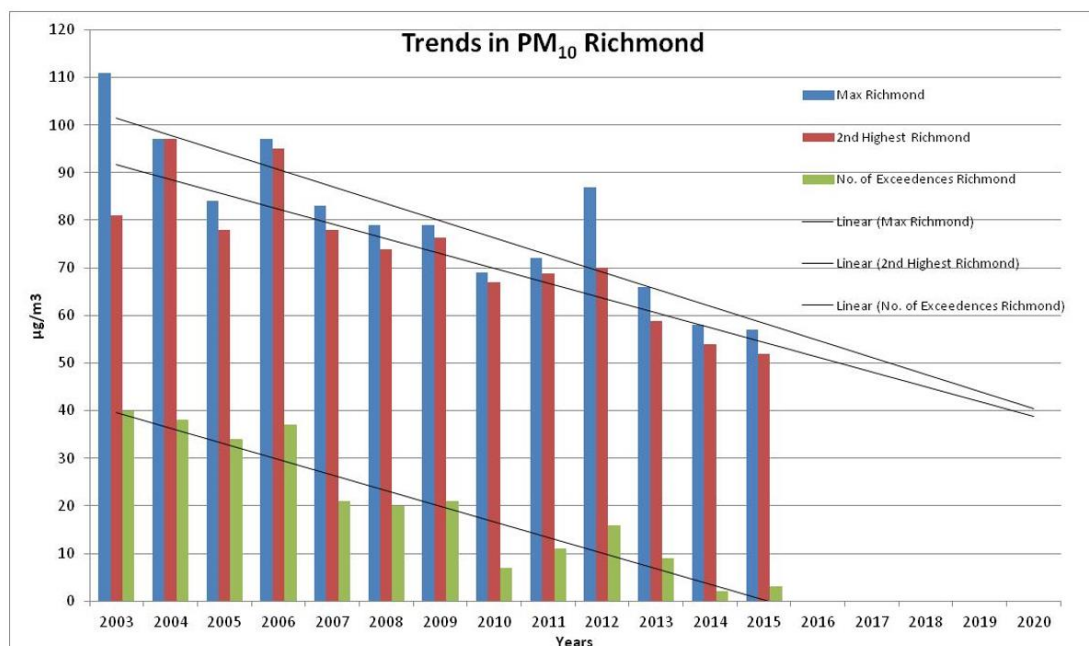


Figure 1: Trends in PM₁₀ Richmond Airshed

- 4.3 The maximum PM₁₀ concentration for 2015 was 57 µg/m³ and the second highest PM₁₀ concentration (used because by 2020 one exceedence is still allowed) was 52 µg/m³. The highest and second highest concentrations are the lowest on record since monitoring began

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in 2000 showing a trend of ongoing improvement. Results for the last 15 years are shown in Figure 2 below.

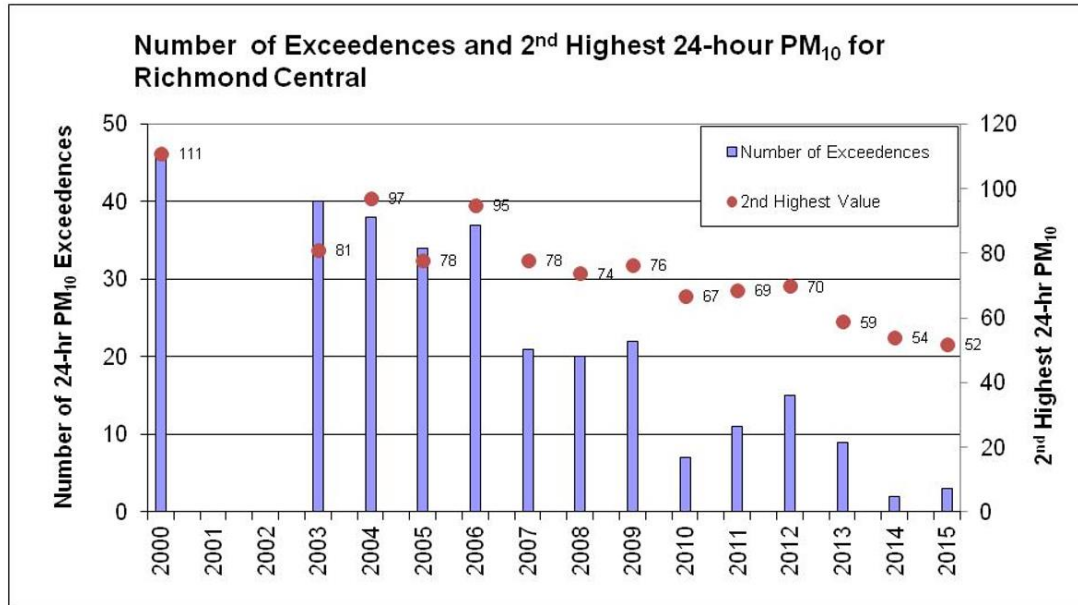


Figure 2: Total number of NES exceedences per year and second highest PM10 concentration per year

4.4 Richmond and Nelson City are both part of a wider regional airshed. They are both subject to similar climatic influences, to similar smoke sources and to leakage between the airsheds. Comparable records exist for the two areas for the past 12 years (between 2003 and 2015). During 2003 Richmond Airshed had 40 exceedences of the NESAQ while Nelson A Airshed had 68 exceedences. By 2013 Richmond had dropped to 9 exceedences while Nelson A had also dropped to nine exceedences. Over this past year (2015) Richmond had three exceedences while Nelson A also had one exceedence (See Figure 3 below).

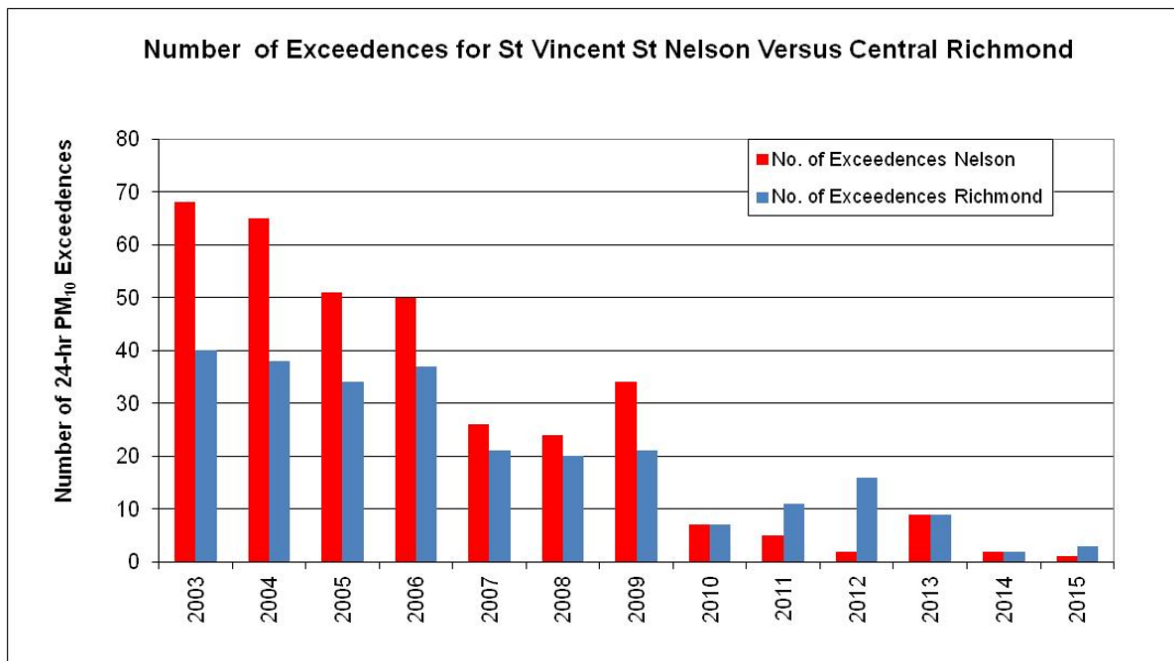


Figure 3: Comparative number of exceedences Richmond and Nelson A airsheds

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- 4.5 The ground level PM₁₀ concentration recorded by the monitoring equipment are strongly influenced by a number of factors and not just the rate of discharge of smoke and other small particles emitted into the air due to combustion activities such household solid fuel heaters, vehicles and industry. Sources of viability include the concentration of small particles present from natural sources such as dust, sea salt, and pollen and the amount of turbulent mixing and removal as a result of wind, rain and weather.
- 4.6 Weather conditions influence smoke concentrations by encouraging greater home heating discharges (cold weather), mixing or trapping discharges through variations in both horizontal and vertical wind speed and removal of smoke particles in water droplets during rain. This means that even where the rate of smoke discharge is constant or falling differing winter weather between years can result in significant variations in the smoke concentrations measured. During still, cold, dry winters smoke levels tend to be much higher than windy, warm, wet winters.
- 4.7 The NESAQ does not concern itself about why an exceedence occurs, only that it occurred and therefore deals with the worst case situation. However, for Council to manage air quality effectively, it needs to understand how the differing influences relate to each other on a year to year basis so that any interventions to improve air quality are well targeted and effective even in a worse case year.
- 4.8 Based on the meteorological record from the Tasman District Council 189 Queen Street meteorological monitoring site, the winter of 2015 was fairly normal for air temperature although it was colder than the year before (See Figure 4). The lower air temperatures are likely to have resulted in a greater use of solid fuel heaters than occurred during the same months of 2014 and may have reduced vertical air movement.

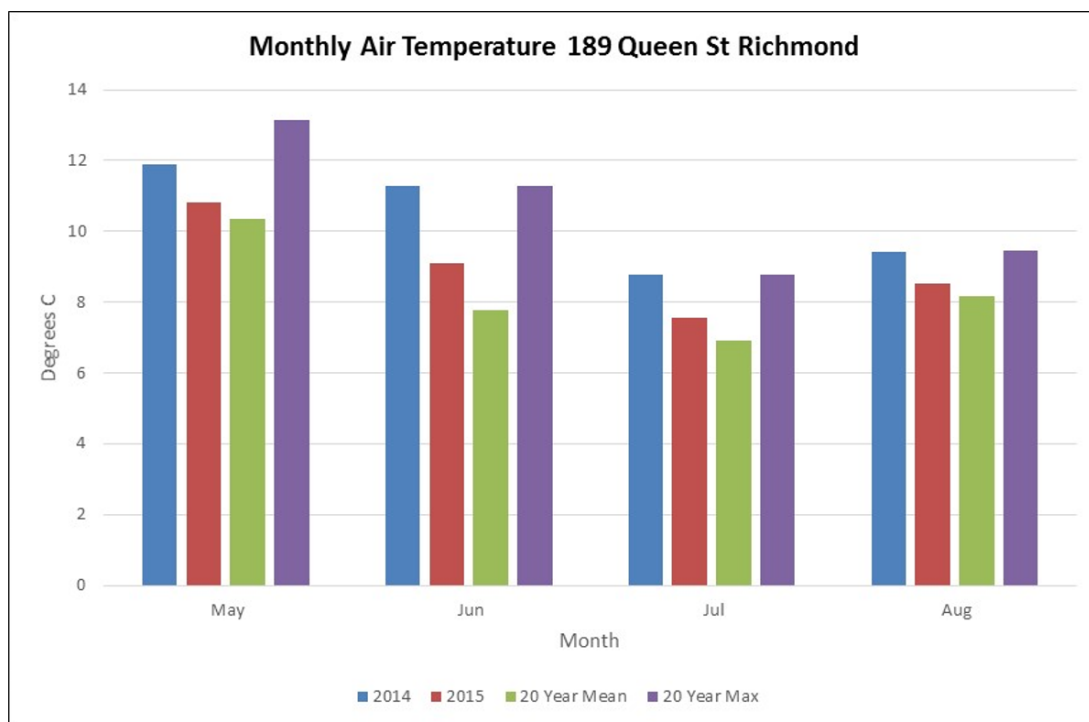


Figure 4: Average Monthly Air Temperature 189 Queen St Richmond

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- 4.9 However, the winter of 2015 was also characterised by well above average horizontal wind. During June 2015 average wind speed was 1.4 km/hr higher than the long term average (See Figure 5). The higher wind speed is likely to have been a result of the El Nino weather pattern which was predicted to cause a wind speed increase across the top the South Island during the winter of 2015 (See Figure 6). The higher than average wind speed is likely to have decreased concentrations of PM10 as the smoke tends to blow away rather than building up overnight. Without the above average wind it is probable that more exceedences of the NES would have occurred during the winter of 2015.

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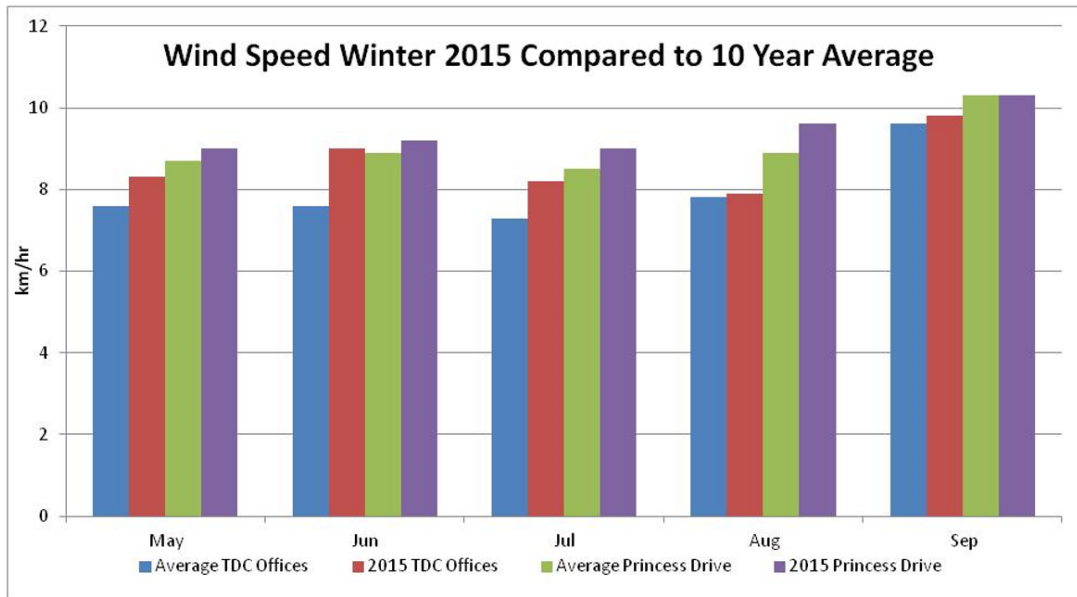


Figure 5: Wind Speed comparison 2015 to average.

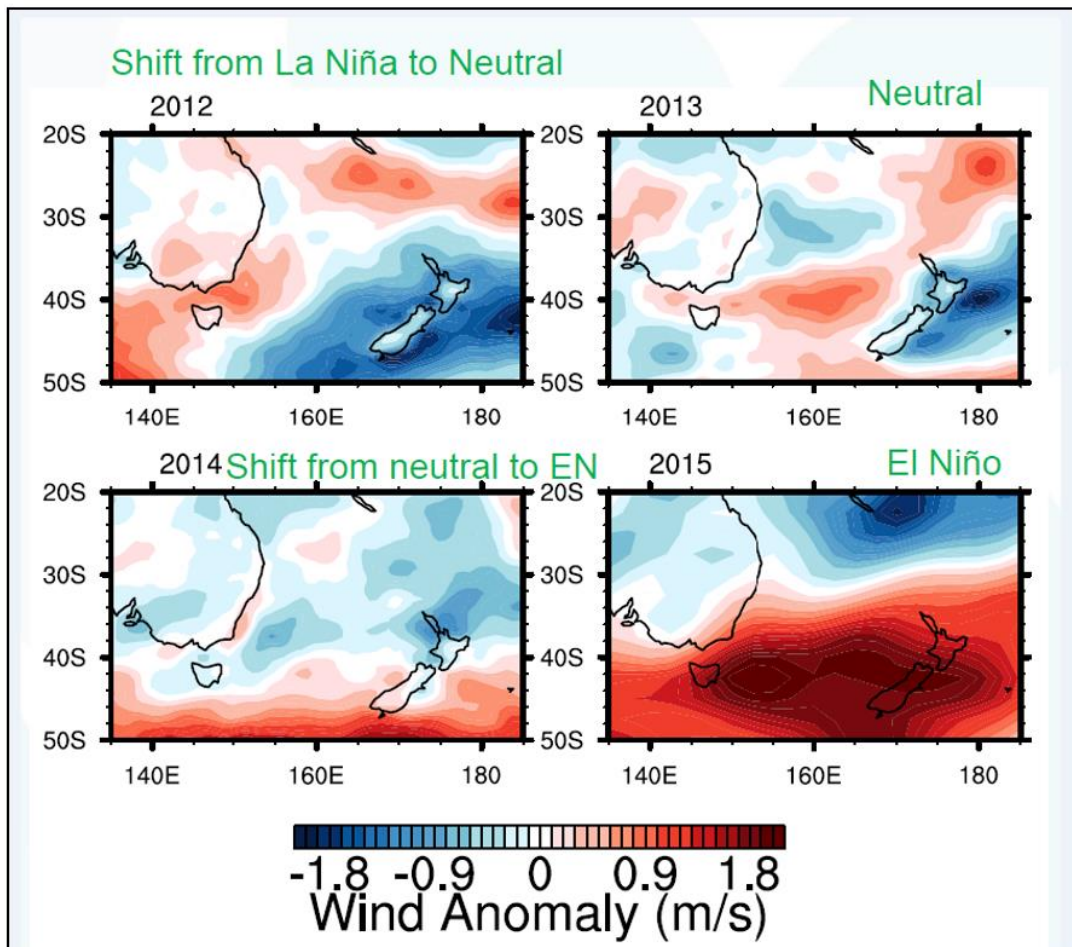


Figure 6: Wind anomaly winter 2012-2015 as a result of El Niño effect

4.10 Air particles (PM₁₀) measured by the Tasman District Council air quality monitoring equipment is not limited to those created by human activity but also include contributions

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from natural sources such as sea salt and dust. The NESAQ currently does not distinguish between natural and human induced sources and only considers total concentrations. In order to quantify the contribution of these natural sources towards Tasman air quality monitoring results filters were collected during 2014 and 2015 to be analysed by Geologic and Nuclear Sciences (GNS). This analysis will allow the relative contribution of different materials collected on the filters to be assessed for different seasons and will provide a better understanding of the contribution of particulate sources outside Council's ability to control. This work has been mainly funded by central government though an Environlink grant and the results should be complete early in 2016.

- 4.11 During 2015 Nelson City Council undertook a review of the Nelson Air Plan woodburner provisions. As part of this review the regional airshed model including both Nelson and Richmond was updated. That update required the updated Emissions Inventory data (adding up smoke sources) and this was done based on information derived from the 2013 Census of population and Dwellings. Tasman District Council staff took this opportunity to update the Richmond Emissions Inventory at the same time. The updated Richmond emissions data will assist with projecting future changes in smoke concentrations for Richmond.
- 4.12 During 2015 central government announced that during 2016 it will undertake a review of the NESAQ under which air quality in New Zealand is managed. The decision to undertake this review followed the release of a national state of the environment report that included air quality which was followed by a critique of that report by the Parliamentary Commissioner for the Environment (PCE). The PCE report recommended that some changes to the NESAQ should be considered including a greater focus on long term exposure to air pollution (annual averages) rather than counting daily peaks and a move from managing PM₁₀ to managing PM_{2.5} which is much smaller in size and internationally has been shown to more highly correlated with adverse health effects due to its ability to pass through the human lungs directly into the blood stream. At this stage central government has not indicated the content of its NESAQ review.
- 4.13 Following the recommendations of the Parliamentary Commissioner related to air quality management in New Zealand, many Councils have now commenced PM_{2.5} monitoring in their regions to be better positioned to assess the local implications of the adopting the PCE recommendations. A PM_{2.5} record has now been commenced for the Richmond Airshed for this reason.
- 4.14 During the winter of 2015 Tasman District Council compliance staff were actively promoting good woodburner operation and following up complaints. Twelve smokey chimney complaints were processed within the Richmond Airshed. The low number suggests that a large proportion of the Richmond population are now operating their wood burners efficiently and are using "good wood", therefore minimising smoke emissions and complaints.
- 4.15 The majority of smoke related complaints related to outdoor burning, with 15 complaints in the Richmond area, 12 in the Moutere Waimea area and 36 within the Motueka area. Motueka residents were particularly hard hit in 2015 with a large number of orchards burning diseased canker wood through the winter months. Weather conditions were often perfect for burning, however the inversion layer resulted in the smoke being kept low over Motueka township.

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- 4.16 Smoke complaints during spring and early summer arose from the starting of rural fires early morning under perfect conditions with a sea breeze then coming in late morning blowing smoke over rural and urban residents alike. Complaints of smoke and ash fall were received from Motueka residents, generally in relation to multiple fires burning in the Riwaka area.
- 4.17 A number of Richmond residents voiced 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 highlights ongoing difficulties of managing air discharges when no physical boundaries exist and smoke can be blown in any direction depending on the wind.

5 Options

- 5.1 The National Environmental Standard for PM₁₀ along with its achievement date of 2020 is set by law and Tasman District Council is required to meet it. Based on the best information available to it, Council has developed rules to manage air quality. Air quality monitoring to date suggests that the current rules have achieved a significant improvement in air quality however it is uncertain if the necessary improvement in air quality required can be achieved by 2020 as required by the current provisions of the NESAQ, particular during a cold, dry and still winter.
- 5.2 Currently the NESAQ is under review. Central Government has not given any indication what changes are being considered as part of that review. Therefore, it appears premature for Tasman District Council to consider reviewing its air quality management provisions until issues with the national legislation are resolved. It is more useful to compile management information including emissions profiles, quantify natural sources and measure concentrations of PM_{2.5} so that Tasman District Council is well positioned to engage with the Central Government during the NESAQ review process.
- 5.3 If Central Government makes substantive changes to the National Environmental Standards for air quality, Tasman District council will need to review its air quality management provisions at that time.

6 Strategic Challenges / Risks

- 6.1 Based on current trends, during normal winter weather Tasman District Council is on track to achieve the current requirements of the NESAQ. However, during a particularly cold, dry and still winter Tasman District Council may not be able to meet these requirements.
- 6.2 Central Government has commenced a review of the NESAQ and at this stage we do not have any indication how extensive that review will be or what outcome is likely.
- 6.3 The current trends in part rely on replacement of older wood burners as house ownership changes. If market conditions reduce the number of property sales the rate of air quality improvement could slow down.

7 Policy / Legal Requirements / Plan

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- 7.1 The current TRMP rules related to discharges from small scale solid fuel burning appliances strike a balance between achieving the requirements of the NESAQ and the costs involved. Any increased stringency of rules such as requiring faster phase out of older wood burners will increase these costs. That additional cost will need to be met by either the landowner, Council or by Central Government. There currently does not appear to be sufficient justification to change these rules particularly given the current Central Government review of the NESAQ.

8 Consideration of Financial or Budgetary Implications

- 8.1 There is no additional budgetary requirement proposed however it should be noted that the current improvements in air quality are likely to be dependent on the current budgets for air quality monitoring and for education/enforcement of TRMP rules being maintained.

9 Significance and Consultation

- 9.1 This is not significant as no decisions to change TRMP rules are required.
- 9.2 There is no consultation required as no changes are proposed.

10 Conclusion

- 10.1 Based on current trends in PM₁₀ concentrations (smoke), air quality in Richmond should meet the requirements of the National Environmental Standard by 2020 for a normal winter provided that the current levels of education and enforcement are maintained. However, it may not meet these standards during a cold, dry, and still winter.
- 10.2 As Central Government is reviewing the provisions of the NESAQ Tasman District Council activity for 2016 should concentrate on collecting information to assess the implications of potential changes to the NESAQ.

11 Next Steps / Timeline

- 11.1 Using the updated emissions inventory data obtained during 2015 prepared reviewed air pollution projections and compare them against the current NESAQ provisions in order to better understand current Richmond Airshed compliance and capacity.
- 11.2 Complete the GNS assessment of Richmond Airshed air quality filters in order to quantify the contribution of natural sources to Richmond air pollution.
- 11.3 Monitor PM_{2.5} concentrations in order to assess compliance against NESAQ revisions recommended by the Parliamentary Commissioner for the Environment.
- 11.4 Continue compliance, education and enforcement activity arising from the provisions of the Tasman Resource Management Plan related to air quality management.

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11.5 Work closely with Central Government during the NESAQ review process to ensure that the values and needs of Tasman District residents are well represented.

11.6 Report activities and outcomes for the 2016 calendar year to the Environment and Planning Committee of Council at its first meeting in 2017.

12 Attachments

Nil