

Report No:	REP12-09-04
File No:	C301
Date:	7 September 2012
Information Only - no decision required	

REPORT SUMMARY

Report to: Environment & Planning Committee
Meeting Date: Thursday, 20 September, 2012
Report Author: Trevor James, Resource Scientist
Subject: **Air Quality in Richmond - An Update 2012**

EXECUTIVE SUMMARY

Over the last winter the national standards were exceeded sixteen times for 24-hour average particulate matter smaller than 10 microns (PM₁₀). This is more than double the total for 2010, and the highest for three years. The maximum 24-hour concentration was 87 µg/m³ which was also the highest for three years.

While the overall real trend in PM₁₀ concentrations over the ten years of continuous record, corrected for wind speed and ambient air temperature, is improving (declining PM₁₀), median concentrations this winter were 14% higher (worse) than last year. This may be due to relatively limited effective compliance effort over the previous two winters, particularly with respect to the rule preventing “objectionable and offensive discharges beyond the property boundary where the bulk of the problem could be arising from. This compliance effort was stepped up this winter but there is likely to be a lag effect in air quality improvement because actions by landowners/tenants will not be immediate. Trends at Nelson’s St Vincent St monitor show a much more dramatic improvement in air quality over the past ten years than Richmond and this winter had only two exceedences and a maximum of 54 µg/m³.

RECOMMENDATION/S

That the report be received.

DRAFT RESOLUTION

THAT the Environment & Planning Committee receives the Air Quality in Richmond - an Update 2012 - Report REP12-09-04.

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1. Purpose

1.1 The purpose of this report is to present results for air quality monitoring in Richmond for the 2012 year-to-date and compare these results to previous years.

2. Results from Richmond Central Site

- 2.1 At the Richmond Central site there were sixteen measured exceedences of the National Environmental Standard (NES) for air quality for 24-hour average PM₁₀ this last winter (see Figure 1 & 2). Figure 1 shows a plot of 24-hour average PM₁₀ for the year to date. The maximum concentration this winter was 87 µg/m³ recorded on 11 July. The number of exceedences and concentrations of PM₁₀ in Richmond this winter were much higher than the previous two winters.
- 2.2 As is typical, poor air quality this winter correlated with periods of colder, calm weather. Significant cold snaps were experienced in late May, and through several episodes in June as well as early July (Figure 5). This year there were no exceedences of the standard after July 22, unlike last year after this time when there were five exceedences, with the last one being on 23 August. The monthly average temperature at Nelson Airport this August was the warmest on record (10°C).
- 2.3 The mean PM₁₀ 24-hour average for days when there was an exceedence was 61.3, which is very consistent with the mean over the past five years. This analysis includes only those days when there was an exceedence.
- 2.4 A representation of the spread of the data is shown in Figure 4 with data grouped into the following categories: good, acceptable, alert and exceeding the NES limit (from Ministry for the Environment). This data is presented for the whole year and shows a very similar pattern to last year apart from a greater percent of NES exceedences.

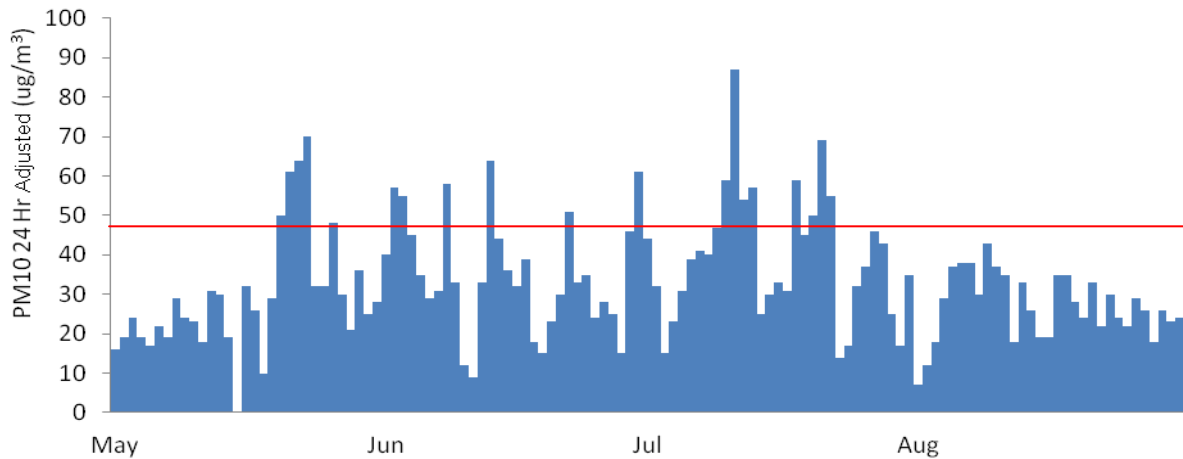


Figure 1: PM₁₀ 24-hour Average for Richmond Central - May-August 2012. Red line shows the National Environment Standard. Data from BAM and adjusted by 16%, as per Wilton et al 2007).

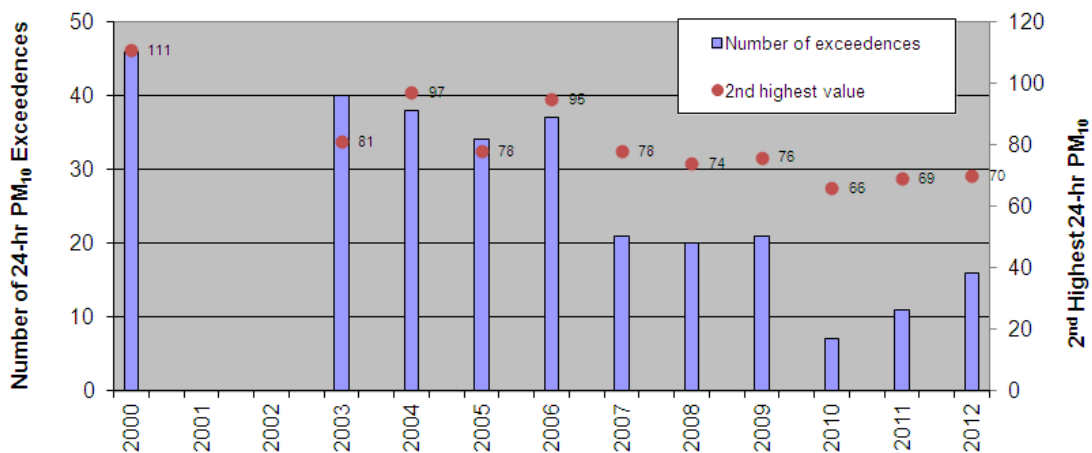


Figure 2: Total number of days per year that the NES was exceeded and second-highest exceedence (Note: no monitoring occurred in 2001-02).

2.5 The **annual average** 24-hour average concentration for 2012 was 19 $\mu\text{g}/\text{m}^3$. Which was the same as last year and below the national guideline of 20 $\mu\text{g}/\text{m}^3$ (see Figure 3). Over the last nine years of record, there appears to be a slight downward trend in this annual average. Note that annual averages are not part of the national standard for assessing PM₁₀.

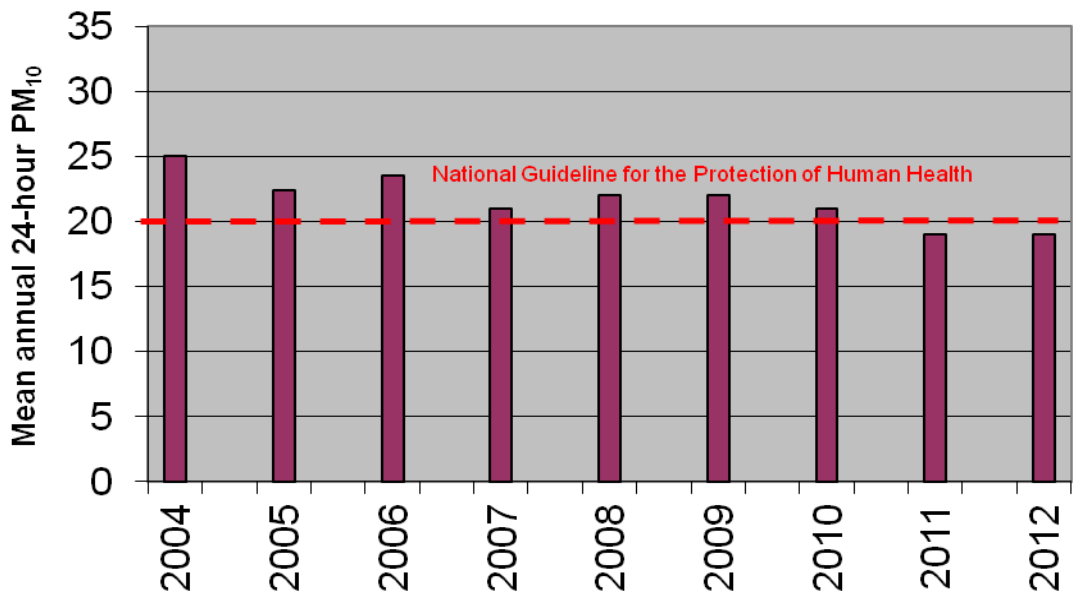


Figure 3: Annual (year-round) daily average PM₁₀ concentration (2004-2012)

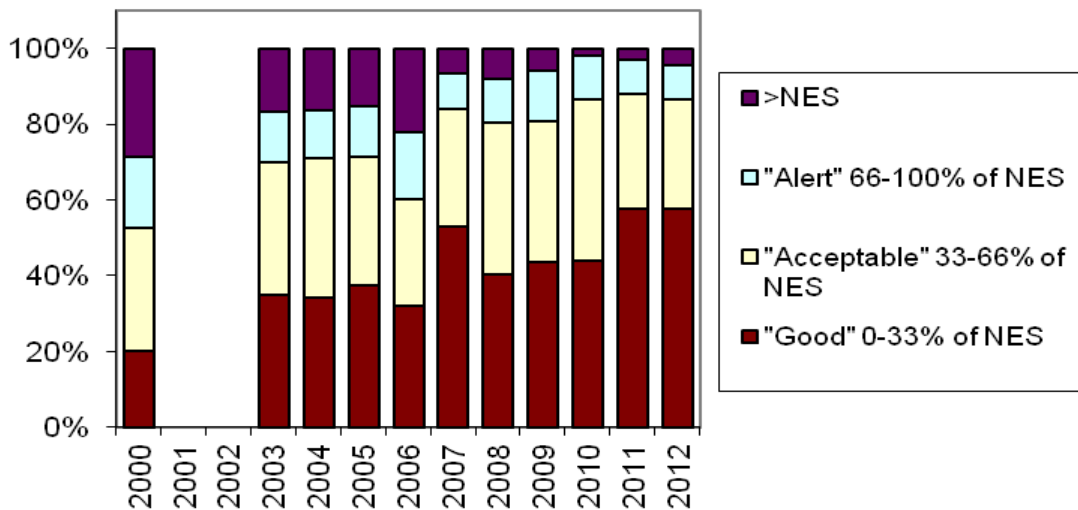


Figure 4: Ministry for the Environment indicator graphs (>NES = percent of samples breaching the National Environmental Standard for Air Quality).

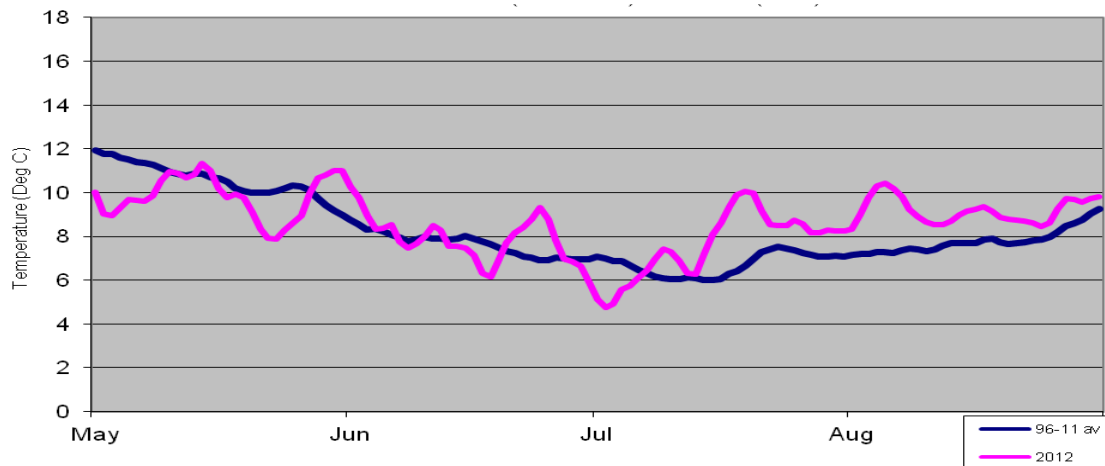


Figure 5: Ambient air temperature as a weekly moving average of daily averages; Historical (1996-2011) versus 2012. Data from Tasman District Council office.

True Trends in PM₁₀ over Time

- 2.6 Because of the variability of air quality from year to year due to different meteorological conditions, it is important to assess trends only for particular periods when the critical meteorological factors are similar. The most critical factors related to air pollution is wind speed (worst air quality generally occurs with wind speeds below 3.8m/sec) and air temperature (8.00 pm to midnight)¹. True (normalised) trends have been determined by adjusting PM₁₀ data in a particular pollution-potential meteorological range by the difference between the average PM₁₀ concentration for that range and the average PM₁₀ in the baseline for that range. This adjusted PM₁₀ data is presented as the median (middle number) and 75th percentile (the value below which 75% of the data falls) for each winter (May-August inclusive).
- 2.7 When plotted over the years of monitoring, median normalised PM₁₀ concentrations show a general downward trend except for this winter which was 12% up on last year (Figure 6). The 75th percentile normalised PM₁₀ concentration was similar to last year and only 4% above that in 2010.
- 2.8 PM₁₀ concentrations are predicted to continue to fall at a similar rate until 2014 when the rate of fall will ease and is likely to almost 'flat-line' after 2016 and not go below the AQNES in 2020. This is based on data up to August 2011. This information is similar to previous predictions.

¹ Wilton, E; Rijkenberg, M; Bluett, J: Assessing long-term trends in PM₁₀ emissions and concentrations in Richmond, 2009. NIWA Client report 2010-015.

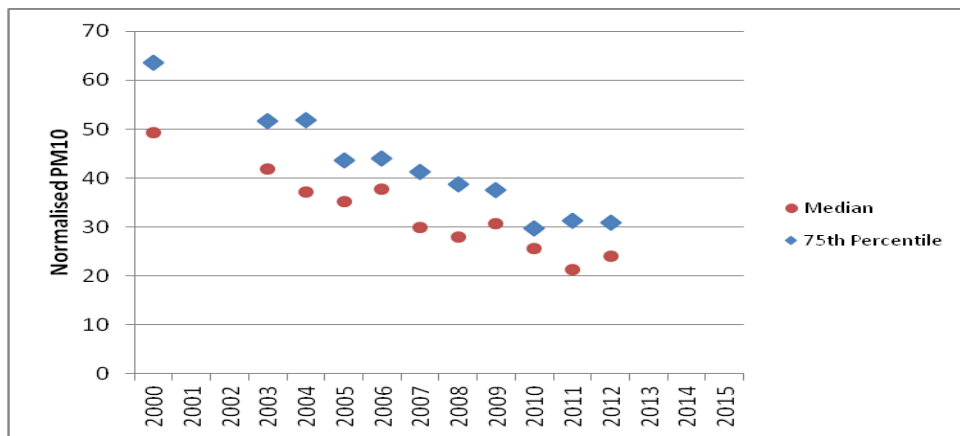


Figure 6: Trends in PM₁₀ metrics (median and 75th percentile) across the monitoring record for days of similar meteorological conditions.

Deviations from the National Standard Straight Line Path for Richmond

- 2.7 The revised national standard for air quality² requires that there are no more than three exceedences in any year from 31 August 2016, and from 31 August 2020 onwards there can only be a maximum of one exceedence per year.
- 2.8 The fourth-highest value is plotted on Figure 7 in respect of this standard because the NES allows for three breaches each year in 2016. For the Richmond Central site all results were below the straight line path (the solid line shown in Figure 7). It now seems likely that we would not have met the 2013 compliance date set by the previous NES (the dashed line in Figure 7).

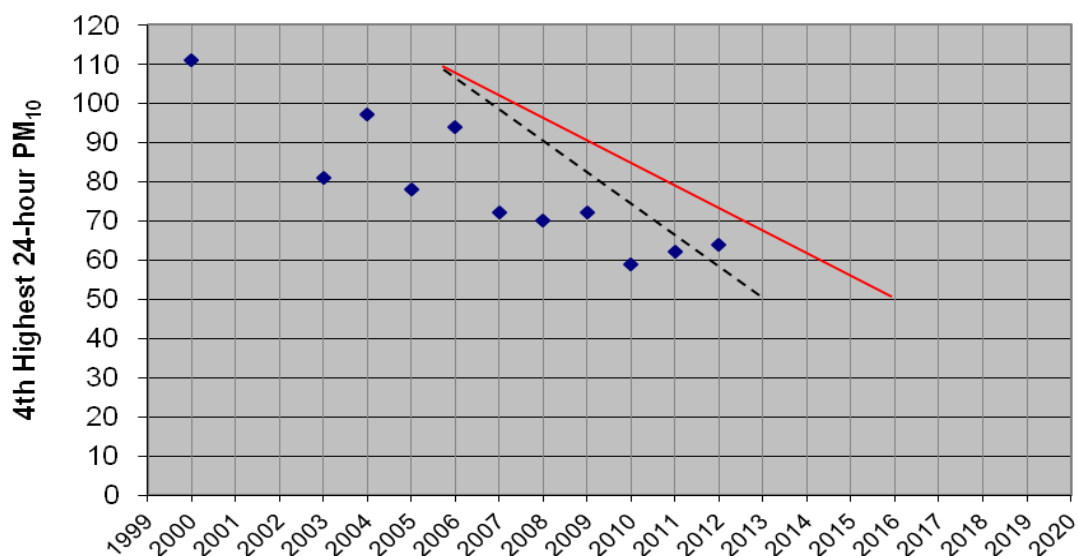


Figure 7: Fourth highest 24-hour concentrations compared to the straight line path set down by the now-revoked 2005 NES (dashed line) and 2016 target (solid red line).

² Resource Management (National Environmental Standards for Air Quality) Regulations 2004 (SR 2004/309) (as at 1 June 2011)

2.9 Over the past few winters prior to this winter trends for Richmond have been similar to Nelson, but this winter Nelson has improved dramatically with only two exceedences at the St Vincent St monitoring site and a maximum concentration of $54 \mu\text{g}/\text{m}^3$ (Figure 8a and b). The meteorological conditions at this Nelson site follow a relatively similar pattern to Richmond's. The improvement in Nelson City is likely to reflect the relatively high level of investment Nelson City Council has put into education and subsidies for replacement compliant home heating, as well as compliance and enforcement.

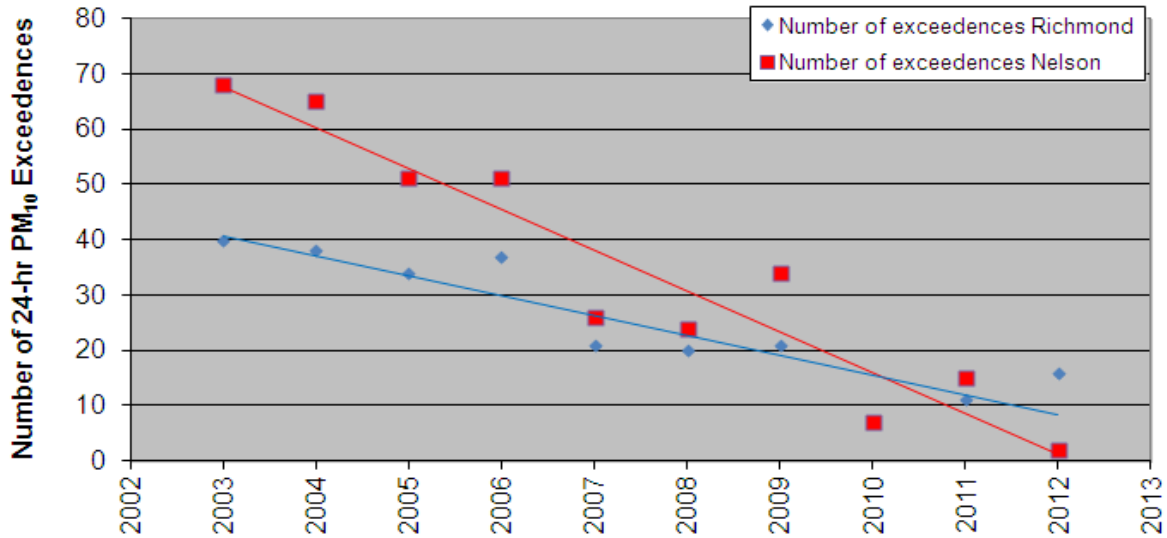


Figure 8a: Number of exceedences of 24-hour PM_{10} for Richmond (blue) compared to Nelson (red) from 2003-2012.

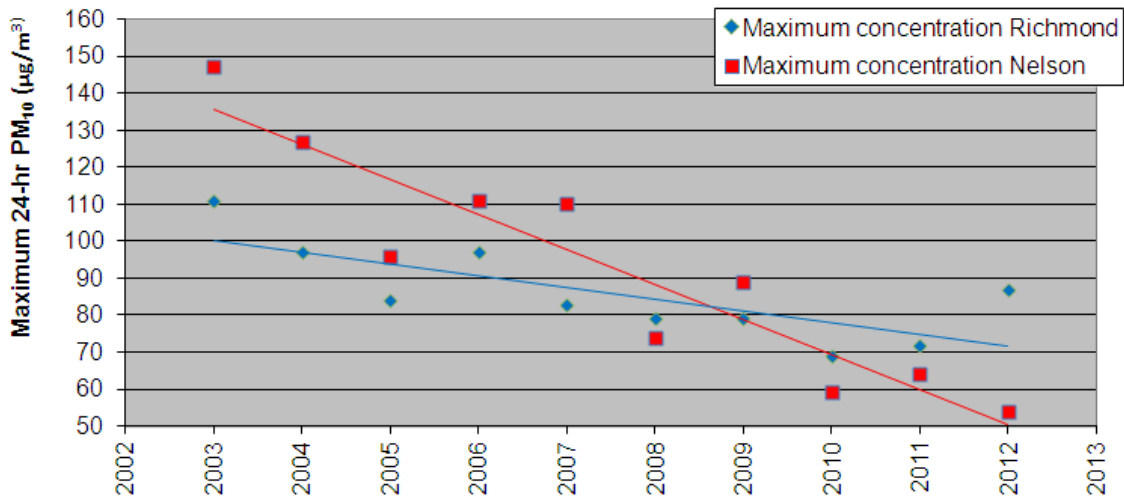


Figure 8b: Maximum concentrations of 24-hour PM_{10} for Richmond (blue) compared to Nelson (red) from 2003-2012.

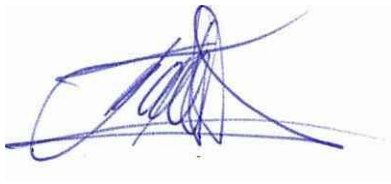
3. Actions to Improve Air Quality in Richmond

- 3.1 A full report by the compliance monitoring team about achieving compliance with Tasman Resource Management Plan rules for emissions from domestic home-heating burners is not available at this time. However, a number of surveys and communications have been undertaken this winter.
- 3.2 Staff undertook several late-evening visual surveys of domestic home emissions and assessed them as whether there was “objectionable or offensive smoke” moving beyond the property boundary (TRMP 36.3.2.2(e)). The surveys were carried in the later evening to ensure that start-up emissions were not included as this is usually short-term and unlikely to contribute greatly to air pollution. Some of the worst emissions tracked for over 200m beyond the property boundary.
- 3.3 Eighty-five property owners and tenants (where the property was rented) were found to have an excessive smoke discharge from their woodburner. Letters were sent to each property owner and tenant advising them of the issue and providing them with a Good Practice Guide for Operating Woodburners. As follow-up to the letters, compliance officer, Helen Dempster, spoke with dozens of the recipients of these letters to try and identify what they may be doing to cause all the smoke, and common themes were dampening down the fire, not regularly cleaning the chimney, burning damp wood or smothering the fire with too much wood.
- 3.4 While the exact statistics are not available, it is conservatively estimated that over 75% of those 85 properties have not sold since 13 January 2007 and therefore they can lawfully continue to use often very old burners. Only three of those properties were using burners that were believed to be non-compliant with rule 36.3.7.5, i.e. the property had sold since 13/1/07, and therefore any burner must be a compliant model. In respect to the latter, where the Council did not hold sufficient information about the burner to prove its compliance status, the owners were advised to prove to Council that the burners were compliant by a specified date. Where this proof is not forthcoming and the burner use continues, the Council would need to take enforcement action as necessary. With the vast majority of problem emissions being from burners that are compliant with rule 36.3.7.5, it appears that Council will have to rely much more on enforcing compliance with the rule relating to “offensive or objectionable” emissions. It is the opinion of officers that the 85 emissions that were recorded as being “offensive or objectionable” this winter were causing the majority of visual air pollution in Richmond and likely to be the cause of a large proportion of the high PM₁₀ concentrations in Richmond.
- 3.5 In order to meet compliance with the NES, it is critical that we continue to make progress with the compliance programme.

- 3.6 It was announced recently that there is an additional “clean air grant” available for replacement of 30 non-complying burners in homes in Richmond. It is suggested that an invitation be extended to the 82 owners of homes which had significant emissions and who were not caught by the house sale rule (rule 36.3.7.5) to apply for this funding and to come to a meeting to discuss the issue. The meeting may be a chance to get their ideas for how we can tackle the problem without needing so much enforcement effort.”

4. Draft Resolution

THAT the Environment & Planning Committee receives the report entitled Air Quality in Richmond - An Update 2012 - Report REP12-09-04.



Trevor James
Resource Scientist