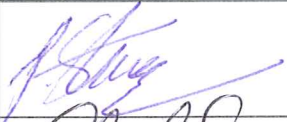
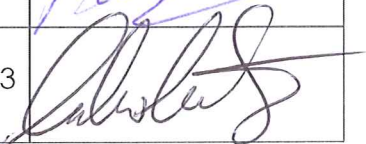


29 October 2013

AIR QUALITY

Dust and Meteorological Monitoring Report – Oct 12 to Oct 13

Rev.	Status	Prepared by	Checked by	Date
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1. INTRODUCTION

As part of the Memorial Park Alliance (MPA) project an air quality monitoring station was installed to continuously measure total suspended particulate (TSP), wind direction and speed. This monitoring station was installed on the southern boundary of Mt Cook School on 17 October 2012, and this report presents the results of the monitoring up to 16 October 2013.

On the 21 December 2012 two dust deposition gauges were installed; one located next to the air quality monitoring station and the other on the corner of Buckle Street and Tasman Street. The results from these gauges are also presented in this report.

The location of the monitoring equipment is illustrated in Figure 1.

Figure 1 – Monitoring locations

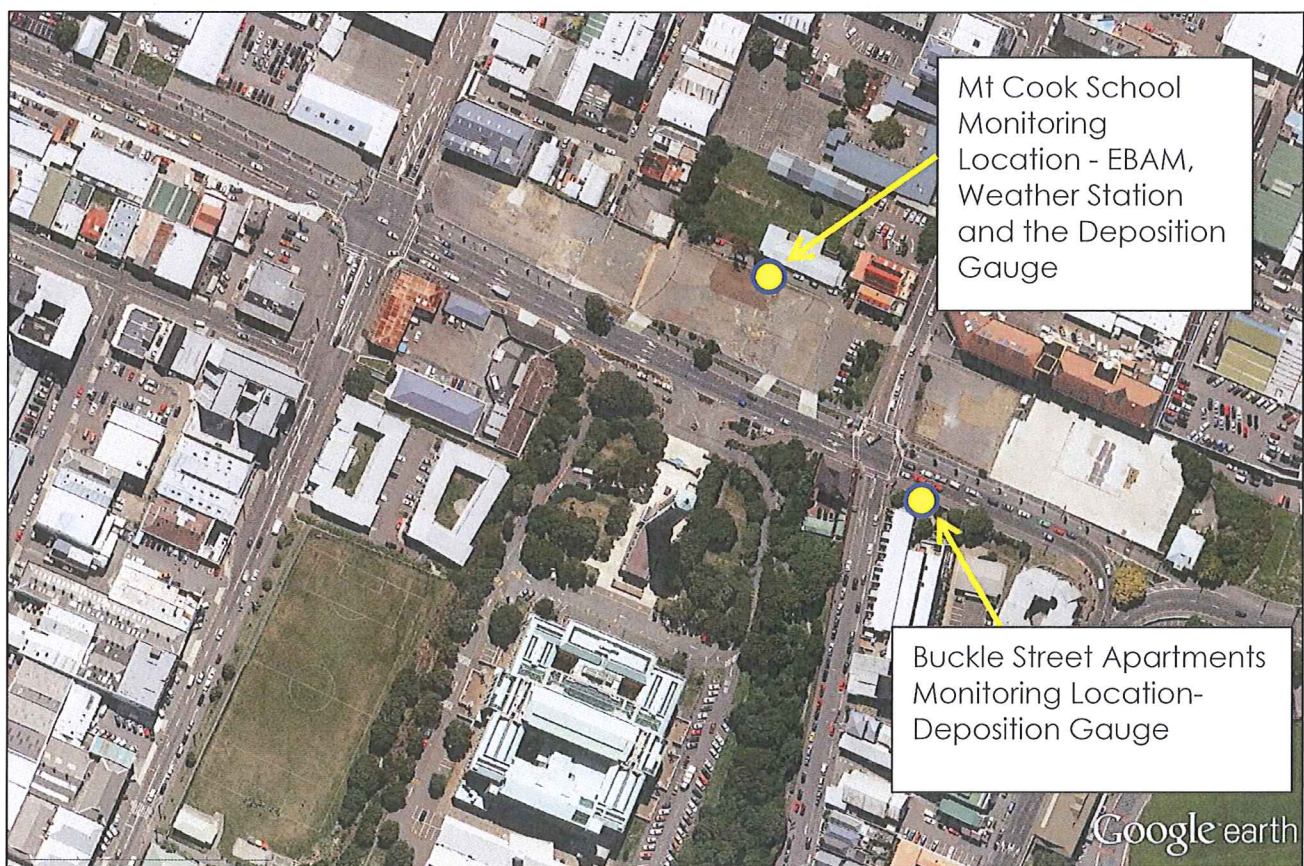


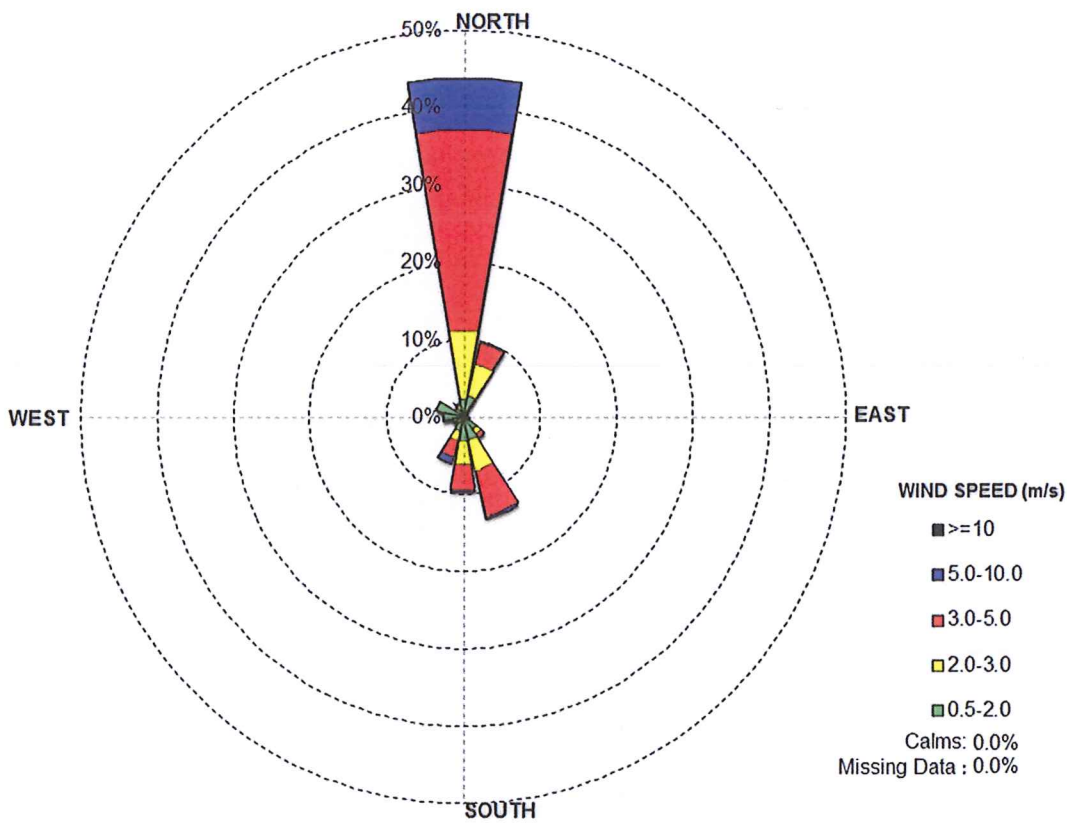
Image sourced from Google Earth on 16/10/13.

2. RESULTS

2.1 Meteorological Data

Average wind speed data for the period 17 October 2012 to 30 June 2013 is presented in Figure 2.

Figure 2 - Windrose Showing Average Wind Speeds (17 October 2012 – 16 October 2013)



The predominant wind direction is from the north at this location due primarily to the topographical features surrounding the monitoring location. The north-south valley between Mount Victoria and the hill range directly to the west of Wellington Central dictates the wind patterns at the monitoring location and is illustrated in Figure 3.

Figure 3 – Topographical influences



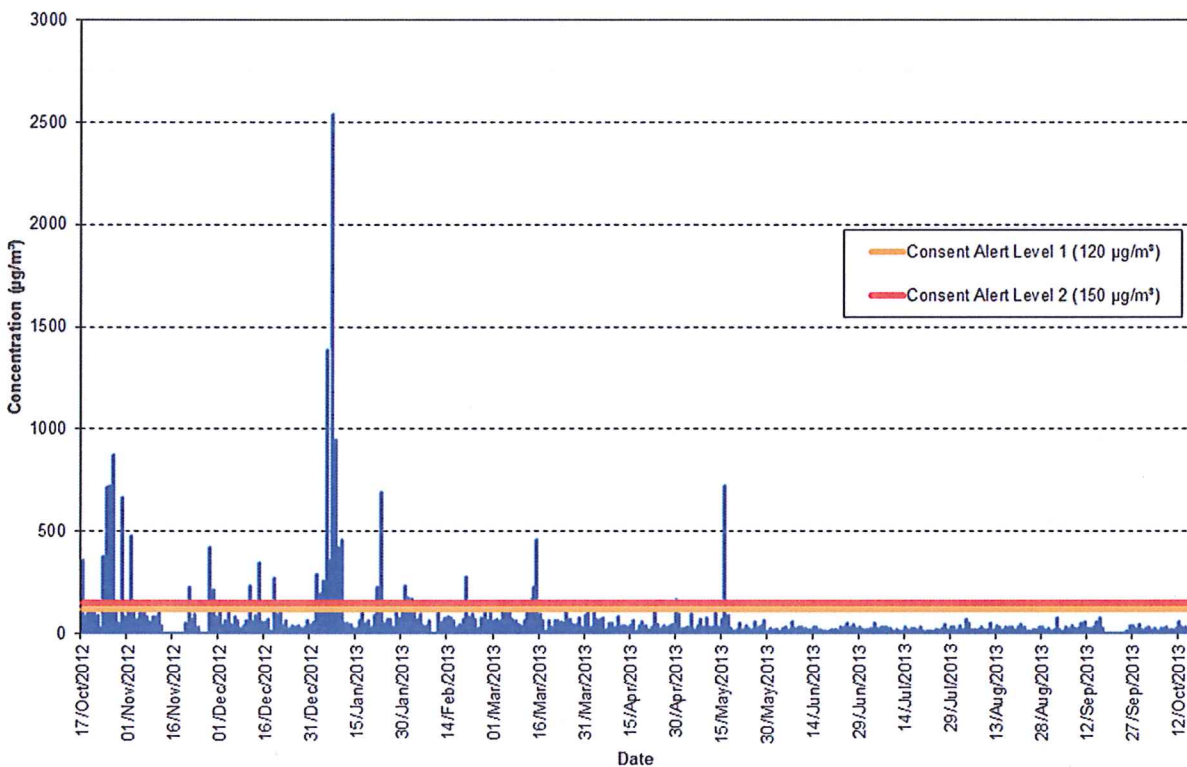
Image sourced from Google Maps October 3013

2.2 TSP Monitoring Results

The 1-hour and 24-hour average TSP concentrations measured during the period 17 October 2012 to 16 October 2013 have been presented in Figures 3 and 4, respectively. These results have been compared against the alert trigger levels contained in the Construction Air Quality Management Plan – Underpass (CAMPU). Generally there has been good compliance with the trigger levels. However some high concentrations were measured in October 2012 and January 2013. The high concentrations measured in October were associated with the unsealed parking area adjacent to the monitor. This issue was resolved in November when the car parking area was sealed. High concentrations measured in January were most likely due to construction activities relating to the opening of the Buckle Street diversion.

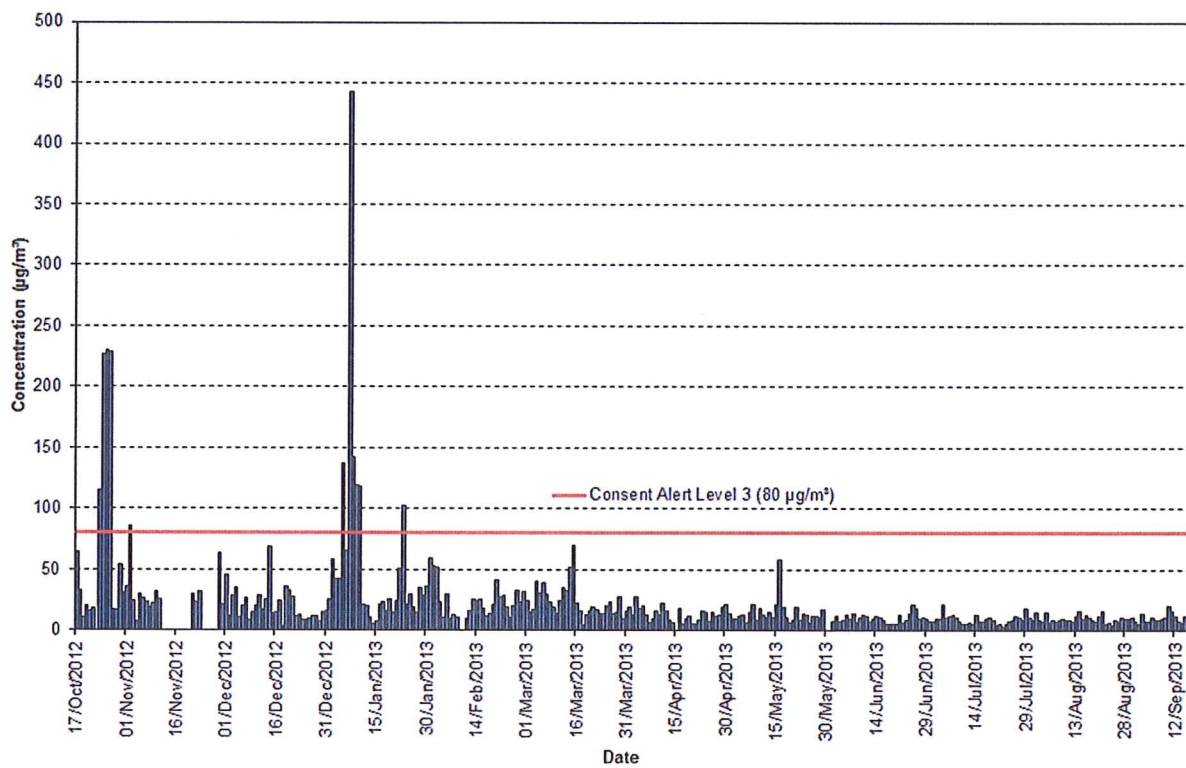
Since these early elevated concentrations TSP levels, in general, have returned back to typical background concentrations well below the consent alert levels.

Figure 4 – 1 Hour Average TSP Concentrations (17 October 2012 – 30 June 2013)



Note: During the period 17 Sept 2013 to 25 Sept 2013) data was not able to be collected due to a fault with the instrument.

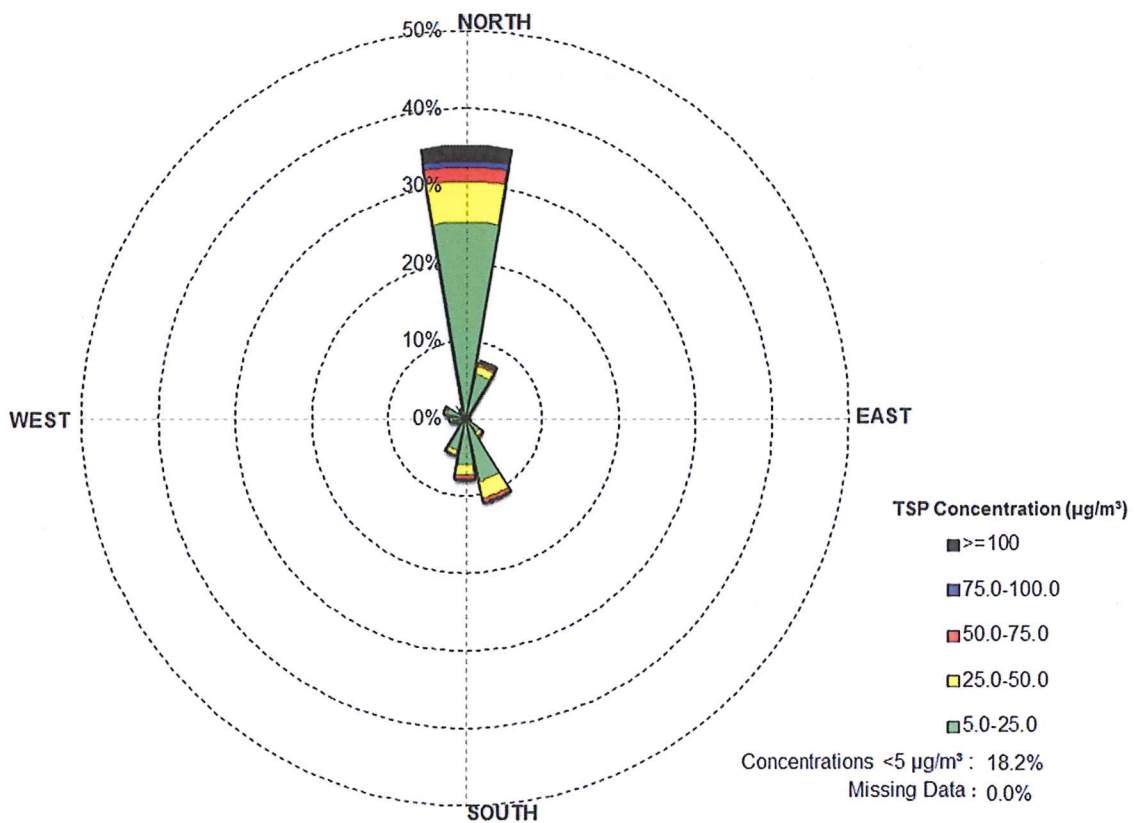
Figure 5 – 24 Hour Average TSP Concentrations (17 October 2012 – 30 June 2013)



A pollution rose of the TSP data collected between October 2012 and October 2013 is presented in Figure 6. A pollution rose is a visual representation of the wind direction and TSP concentration data. Each segment represents the percentage of time that TSP concentrations were detected from that wind direction. Within each segment are coloured bands which indicate the percentage of time that various concentrations of TSP were detected in winds blowing from that direction. Pollution roses are very useful tools for ascertaining the primary contributors to pollutant levels measured in any given location as the highest frequency of elevated concentrations will show up in the segment that points towards the location of the primary contributor.

The rose indicates that primarily high TSP concentrations (greater than 100 $\mu\text{g}/\text{m}^3$) are being detected from sources North of the monitoring location, however this may be a result of recirculation of dust due to nearby structures/vegetation (noise barriers, school buildings, trees etc. Elevated TSP concentrations (greater than 50 $\mu\text{g}/\text{m}^3$) are being detected in winds from the south (where construction activities are taking place) but not for long periods of time.

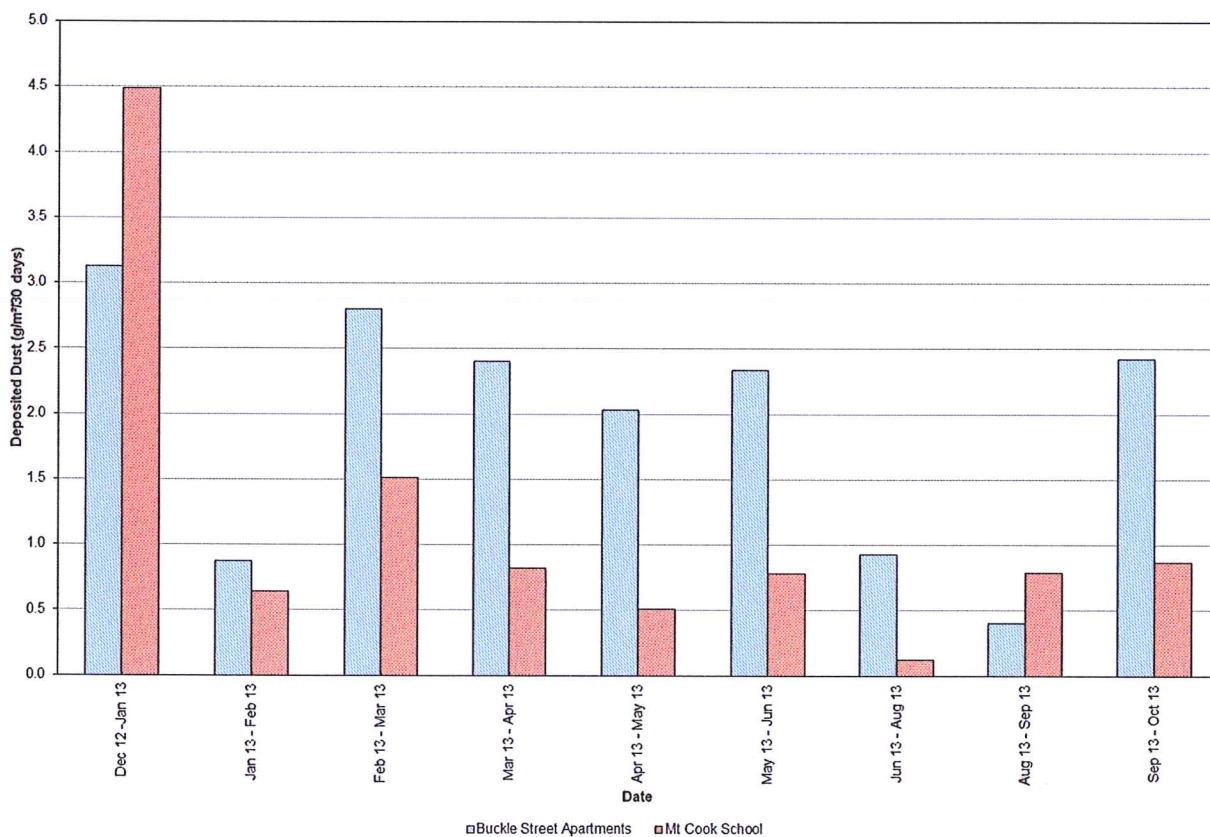
Figure 6 – Pollution Rose (17 October 2012 – 16 October 2013)



2.3 Dust Deposition Results

Dust deposition results for the period December 2012 to October 2013 are presented in Figure 7. The CAMPU does not contain any trigger levels for deposited dust, however the Ministry for the Environment (MfE) Good Practice Guide¹ recommends a trigger level of 4 g/m²/30 days above the background concentration. Given the range of values measured and the predominance of northerly winds it is likely that the Mt Cook School monitor represented background values. The results of monitoring show that dust deposition rates are below the MfE trigger level. It can therefore be inferred that appropriate dust control is being undertaken.

Figure 7 – Dust Deposition Results (21 December 2012 to 26 June 2013)



Note: The data presented above has been prorated for 30 day exposure despite some exposure periods being outside the 30 ± 2 day guideline.

¹ Ministry for the Environment (MfE), Good Practice Guide for Assessing and Managing the Environmental Effects of Dust Emissions, September 2001

3. CONCLUSION

To conclude the level of nuisance dust being detected in the monitoring program has been reduced as further mitigation measures are have been implemented. The levels detected over the last few months are typical of normal background levels in an urban environment.