

REVIEW OF AIR QUALITY MONITORING DATA – CITYLINK PROJECT

TLO REPORT NO 4

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SUMMARY

EPA has received and reviewed air quality data from Translink Operations (TLO) relating to the Burnley and Domain Tunnel stacks and ambient air monitoring at Grant Street and Madden Grove. These data have been compared with data from the EPA network. Results of that comparison are:

- Emissions from the stacks continue to be well below the licence limits for carbon monoxide (CO), nitrogen dioxide (NO₂), and particles.
- PM₁₀ levels monitored at Madden Grove and Grant Street during summer 2000/01 were similar to the EPA network medians.
- There were no breaches of the PM₁₀ objective (50µg/m³) at either Madden Grove or Grant Street during summer 2000/01. The peak particle readings for the 2000/01 summer season coincide with the King Island bushfires.

INTRODUCTION

Data was received from TLO under its licence to operate the Burnley and Domain Tunnels exhaust

stacks at Madden Grove and Grant Street respectively. The data was emission data from the stacks and data from TLO monitoring stations in the vicinity of each stack. In order to interpret the TLO data in view of seasonal variations and meteorological conditions, EPA extracted data from its own air monitoring network for comparison to the TLO data. The results of the review conducted by EPA are detailed below. Note that a more comprehensive review of the data will be possible when more data is collected.

STACK EMISSIONS

TLO has reported the stack emissions to EPA as required. These are also displayed on the EPA web page (www.epa.vic.gov.au). No breaches of the licence limits have occurred, and the emissions are typically about 30 per cent of the limits.

PARTICLES (PM₁₀ AND PM_{2.5})

Both the Burnley and Domain Tunnels are near the central business district, where thousands of vehicles travel daily, so the particle concentrations

would be expected to be elevated compared with stations in the suburbs. In addition, air quality is strongly influenced by meteorology. In order to see whether the air quality has changed due to CityLink, EPA reviewed the data to compare Madden Grove and Grant Street air quality with the nearby EPA monitoring network stations (Alphington, Lord Street, Paisley and RMIT). Comparisons were made to see whether that relationship has changed with the opening of the Burnley and Domain Tunnels.

For PM₁₀ (particles with an equivalent aerodynamic diameter of 10 micrometers or less), during the summer season 2000/01, the air quality at both CityLink sites is similar to the EPA network median (see Tables 1 and 2). PM₁₀ levels at the two CityLink sites during this time were only slightly elevated

above EPA network median levels, with the difference in levels declining in comparison to other summers investigated.

For PM_{2.5} (particles with an equivalent aerodynamic diameter of 2.5 micrometers or less), the fine particles most frequently associated with motor vehicle exhaust, median levels do not appear to have changed significantly before and after opening of the tunnels (see Tables 3 and 4).

Previous reporting has suggested that the ratio of PM_{2.5} to PM₁₀ may have decreased at Grant Street following the opening of the tunnel, however the reduction appears to be consistent with the general seasonal variation tending to occur in that ratio at other sites.

Table 1. Grant St - HiVol Particle Concentrations (PM₁₀ and PM_{2.5}) over various summers

| Period | PM ₁₀ (mg/m ³) | | | PM _{2.5} (mg/m ³) |
|------------------|---------------------------------------|-----------------|-----------------------------------|--|
| | EPA Network median** | Grant St median | Difference – Grant St and Network | Grant St median |
| Summer 1998/1999 | 20 | 26 | 6 | n/a |
| Summer 1999/2000 | 21 | 27 | 6 | 15 |
| Summer 2000/2001 | 22 | 24 | 2 | 7.5 |

** The network median is based on data from EPA sites at Alphington, Lord St, Paisley and RMIT. The median is calculated using data from the EPA network at the same times as when valid readings are available from the TLO monitoring site being investigated. As a consequence, the network medians used in the Grant Street and Madden Grove comparisons may differ slightly, however this will allow more rigorous comparisons to be made.

Table 2. Madden Grove - HiVol Particle Concentrations (PM₁₀ and PM_{2.5}) over various summers

| Period | PM ₁₀ (mg/m ³) | | | PM _{2.5} (mg/m ³) |
|------------------|---------------------------------------|------------------|------------------------------------|--|
| | EPA Network median | Madden Gv median | Difference - Madden Gv and Network | Madden Gv median |
| Summer 1997/1998 | 23 | 32 | 9 | 6 |
| Summer 1998/1999 | 17 | 35 | 18 | 9 |
| Summer 1999/2000 | 21 | 26 | 5 | 7 |
| Summer 2000/2001 | 22 | 26 | 4 | 9 |

Table 3. Grant St – HiVol Comparisons before and after opening the Domain Tunnel

| Period** | Value | PM ₁₀ (mg/m ³) | | | PM _{2.5} (mg/m ³) |
|--|--------|---------------------------------------|----------|-----------------------------------|--|
| | | EPA Network | Grant St | Difference - Grant St and Network | Grant St |
| Before opening: 16 Apr 99 - 28 Feb 00 | median | 17 | 25 | 8 | 21 |
| | max | 43 | 48 | - | 46 |
| After opening: 16 Apr 00 - 28 Feb 01 | median | 16 | 18 | 2 | 7 |
| | max | 37 | 42 | - | 35 |

** To enable a more rigorous comparison, before and after periods are based on the same date ranges over the different years.

Table 4. Madden Grove - HiVol Comparisons before and after opening the Burnley Tunnel

| Period | Value | PM ₁₀ (mg/m ³) | | | PM _{2.5} (mg/m ³) |
|--|--------|---------------------------------------|-----------|------------------------------------|--|
| | | EPA Network | Madden Gv | Difference - Madden Gv and Network | Madden Gv |
| Before opening: 22 Dec - 28 Feb for 97/98, 98/99, 99/00 | median | 19 | 31 | 12 | 8 |
| | max | 44 | 66 | - | 16 |
| After opening: 22 Dec 00 - 28 Feb 01 | median | 23 | 26 | 3 | 9 |
| | max | 37 | 49 | - | 27 |

OTHER POLLUTANTS

CO and NO₂ data from the 2000/01 summer season are summarised in Table 5. It is clear that concentrations of these pollutants are not sufficiently high to be of concern, with maximum levels quite low compared with SEPP objectives.

Maximum CO concentrations observed at the two CityLink sites were well below the CO 8hr objective of 9.0ppm. Maximum NO₂ concentrations observed at the two CityLink sites were well below the NO₂ 1hr objective of 120 ppb.

Table 5. Summary statistics for CO and NO₂ at both CityLink sites.

| Pollutant | Grant Street | | Madden Grove | |
|-----------------------|--------------|-----------|--------------|---------|
| | Median** | Maximum** | median | maximum |
| CO (ppm) | 0.06 | 3.20 | 0.06 | 3.71 |
| NO ₂ (ppb) | 11 | 85 | 11 | 69 |

** All medians and maxima presented are based on the one-hour concentrations rather than rolling averages.