M5 East Motorway

Report 6: In-Tunnel Air Quality Monitoring

January 2017
### Document Control

#### Revision History

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<td>001</td>
<td>03/02/2017</td>
<td>Joanna Trube</td>
<td>Final</td>
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#### References

| Document name | Version | Abbreviation |
|---------------|---------|--------------|------------|
Summary

- This report is provided consistent with Exhibit 1 of the O&M Contract (SSR, Appendix 24, Item 21).

- CCTV cameras are used to monitor conditions within the tunnels and jet fans are used to increase tunnel ventilation, in response to in-tunnel conditions, to ensure that tunnel air quality remains within specified limits.

- Erroneous visibility data in the main tunnel, westbound, occurred following calibration and cleaning of instrumentation during the planned closure in December. Units affected include AQS402, AQS404 and AQS604. Their data has been removed from the westbound main tunnel chart to enable AQS403 results to be read. Ecotech have been engaged to inspect the visibility faults during the February closure.
Preamble

Air Quality Report: In-Tunnel Air Quality Monitoring

This report shows the carbon monoxide (CO) and visibility levels in the M5 East Tunnel (Main Tunnel) and the Cooks River Tunnel (CRX).

Carbon Monoxide

Carbon monoxide (CO) is monitored in the tunnel because exposure to high levels can be harmful to people's health. The limits in the tunnel are based on World Health Organisation guidelines for short term exposure to CO. The limit for CO in the tunnel is 87 parts per million (ppm) for 15 minutes and maintaining levels below this limit is a requirement under the Ministerial Conditions of Approval for the M5 East Motorway. The level of CO in the tunnel is continually measured and the ventilation system is adjusted to ensure that the concentration of CO within the tunnel remains below the required levels.

Visibility

Visibility is measured in the tunnel because poor visibility can make driving conditions dangerous. The major cause of reduced visibility or haze in the tunnel is from smoky vehicles, mainly for diesel trucks. Visibility limits used in the tunnel are taken from the World Road Association guidelines which recommend the tunnel is closed if the visibility reaches 0.012/m.

15-minute time-weighted average

This refers to the CO or visibility readings averaged over a 15 minute period with this reading being updated every 15 minutes.
M5 East Main Tunnel Ventilation System

The arrows show the direction of air flow.

- Red: Air flow in the western end of tunnels
- Black: Air flow in the eastern end of tunnels
- Red: Fresh air in through western tunnel portals
- Black: Fresh air in through eastern tunnel portals

AQS303
AQS304
AQS604
AQS402
Graphical Representation of Data

Main Tunnel Westbound
CO Levels (15min time-weighted average)
Graphical Representation of Data

Main Tunnel Eastbound
CO Levels (15min time-weighted average)

Date

ppm

1 Jan 17
2 Jan 17
3 Jan 17
4 Jan 17
5 Jan 17
6 Jan 17
7 Jan 17
8 Jan 17
9 Jan 17
10 Jan 17
11 Jan 17
12 Jan 17
13 Jan 17
14 Jan 17
15 Jan 17
16 Jan 17
17 Jan 17
18 Jan 17
19 Jan 17
20 Jan 17
21 Jan 17
22 Jan 17
23 Jan 17
24 Jan 17
25 Jan 17
26 Jan 17
27 Jan 17
28 Jan 17
29 Jan 17
30 Jan 17
31 Jan 17

AQ5301 CO (ppm)
AQ5302 CO (ppm)
AQ5303 CO (ppm)
AQ5304 CO (ppm)
CO Limit
Graphical Representation of Data

CRX Tunnel
CO Levels (15min time-weighted average)
Graphical Representation of Data

Main Tunnel Westbound
Visibility (15min time-weighted average)

- AQS403 Vs (%)
- Normal
- Congested
- Heavy Congestion

Date:
1 Jan 17, 2 Jan 17, 3 Jan 17, 4 Jan 17, 5 Jan 17, 6 Jan 17, 7 Jan 17, 8 Jan 17, 9 Jan 17, 10 Jan 17, 11 Jan 17, 12 Jan 17, 13 Jan 17, 14 Jan 17, 15 Jan 17, 16 Jan 17, 17 Jan 17, 18 Jan 17, 19 Jan 17, 20 Jan 17, 21 Jan 17, 22 Jan 17, 23 Jan 17, 24 Jan 17, 25 Jan 17, 26 Jan 17, 27 Jan 17, 28 Jan 17, 29 Jan 17, 30 Jan 17, 31 Jan 17

Visibility Levels:
- 0.002 to 0.004: Normal
- 0.004 to 0.008: Congested
- 0.008 to 0.012: Heavy Congestion
Graphical Representation of Data

Main Tunnel Eastbound
Visibility (15min Time Weighted Average)

Date

Data

AQS301 Vis (%)
AQS303 Vis (%)
AQS302 Vis (%)
AQS304 Vis (%)
Normal
Congested
Heavy Congestion
Graphical Representation of Data

CRX Tunnel Visibility (15min time-weighted average)

Date

0 0.002 0.004 0.006 0.008 0.01 0.012
units/m

1 Jan 17 2 Jan 17 3 Jan 17 4 Jan 17 5 Jan 17 6 Jan 17 7 Jan 17 8 Jan 17 9 Jan 17 10 Jan 17 11 Jan 17 12 Jan 17 13 Jan 17 14 Jan 17 15 Jan 17 16 Jan 17 17 Jan 17 18 Jan 17 19 Jan 17 20 Jan 17 21 Jan 17 22 Jan 17 23 Jan 17 24 Jan 17 25 Jan 17 26 Jan 17 27 Jan 17 28 Jan 17 29 Jan 17 30 Jan 17 31 Jan 17

AGS305 Vis (%) AGS406 Vis (%) Normal Congested Heavy Congestion