DRAFT Sensitive: NSW Government

For out-of-session consideration by the Advisory Committee on Tunnel Air Quality

Tunnel Air Quality Review
Endorsement of Findings and Publication of the Review

Purpose: Endorsement of Findings and Publication of the Review.

Analysis: The Minister for Roads wrote to the Minister for Innovation, Science and Technology on October 23, 2023, requesting that the NSW Chief Scientist and Engineer lead a review of the Advisory Committee on Tunnel Air Quality (ACTAQ) findings regarding the health effects of emissions from road tunnel ventilation outlets.

The review concluded that consistent with previous advice from ACTAQ in 2014 and 2018, a review of available evidence shows little to no health benefit for surrounding communities in installing air cleaning technologies in any of Sydney's motorway tunnels.

Recommendations

That the Advisory Committee **endorse**:

1. The findings of the review.
2. Publication of the review on the website of the NSW Chief Scientist & Engineer, comprising:
   a. Tunnel Air Quality Review - Summary Report (Attachment 1)
   b. Review of the health effects of traffic-related air pollution (Attachment 2)
   c. Air Quality Analysis of NSW Tunnel Data (Attachment 3)
   d. Peer Review (Attachment 4)
      - Initial peer review of Air Quality Analysis of NSW Tunnel Data — DRAFT, 7 Nov 2024
      - Initial peer review of Air Quality Analysis of NSW Tunnel Data — DRAFT, 7 Nov 2024 – responses
      - Peer review of Air Quality Analysis of NSW Tunnel Data — Published: February 18, 2025
      - Peer review of Air Quality Analysis of NSW Tunnel Data — Published: February 18, 2025 – responses
3. State of World Practice Urban Motorway Tunnel Air Treatment Systems 2024 Report (Attachment 5)

Summary of Main Findings

The main findings of this review align with previous conclusions and can be summarised as:

- There is increased confidence in the associations between traffic-related air pollution and adverse health effects.
- Air pollution primarily affects health through cardiovascular and respiratory diseases. However, it also impacts metabolic health, neurodevelopment, and childhood development, increasing chronic disease risks later in life.
- There is no safe level of exposure to traffic-related air pollution.

- Governments and regulators must continue to implement and evaluate the effectiveness of measures to reduce exposure to traffic-related air pollution, thereby improving the health and well-being of the population.
- Various air cleaning technologies can effectively remove a significant proportion of particulates, nitrogen dioxide (NO_2), and, in some cases, nitrogen oxides (NO_x) from tunnel air.
- In countries with existing air cleaning technologies (for particles, and in some cases NO_2) designed and used for external air quality management in an urban context, such as Spain, Italy, Norway, Hong Kong and China, the technology is either not used, is used occasionally or is used for very short periods (minutes or perhaps one or two hours per day during the busiest periods of traffic).
- While NO_2 removal systems exist in countries like Spain, Hong Kong, and Mainland China, they are not regularly operated or maintained. NO_x removal technologies are complex and primarily used in Japan.
- In all cases examined by Professor Dix, air-cleaning technology was not installed to meet environmental performance criteria. Professor Dix found that tunnel proponents often use air cleaning technologies to gain public acceptance and project approval.
- Excluding the Sydney Harbour Tunnel and Eastern Distributor, there are 19 operating and under construction motorway tunnel stacks in Sydney. Based on the costs identified in the Dix review, installing air cleaning technologies in these 19 stacks could cost between $855 million and $1.425 billion (using a nominal 1000 m^3/s per stack). This is only the capital cost of the air cleaning equipment and does not include any associated civil works or ongoing operating costs.
- There is no evidence of emissions from tunnel stacks in Sydney significantly impacting ambient air quality.
- The most effective approach for reducing traffic-related air pollutants is at the source through vehicle emission controls.

Consistent with previous advice from the Advisory Committee on Tunnel Air Quality in 2014 and 2018, a review of available evidence shows little to no health benefit for surrounding communities in installing air cleaning technologies in any of Sydney's motorway tunnels.

Background

Terms of reference

The Minister for Roads wrote to the Minister for Innovation, Science and Technology on the 23rd of October 2023 requesting the NSW Chief Scientist and Engineer lead a review of the Advisory Committee on Tunnel Air Quality findings on the health effects of emissions from road tunnel ventilation outlets and providing the Terms of Reference for the review.

The Terms of Reference (Attachment 6) state that:

- The review will be overseen by the ACTAQ and chaired by the NSW Chief Scientist & Engineer.
- In consultation with ACTAQ and the Office of the Chief Scientist & Engineer, Transport for NSW will engage qualified independent experts and provide Secretariat support.

The review comprised three components:

1. A review of the findings and recommendations of studies and reports on the human health effects of traffic-related air pollution.
2. A review of the air quality monitoring data from operating motorway tunnels across the Greater Sydney network and impact on ambient air quality – including a peer review.
3. A peer review of the air quality data analysis is proposed to maximise robustness and credibility. The air quality data analysis will provide evidence of whether filtration would provide any health

benefit to the surrounding community by identifying whether or not emissions from operational tunnel stacks result in increases in levels of traffic-related air pollution.

4. Consideration of the effectiveness and relative costs of tunnel filtration and air treatment systems for removing particles, nitrogen dioxides and other pollutants from air emitted from tunnel ventilation outlets.

ACTAQ endorsed independent experts

ACTAQ endorsed the following four independent experts to conduct the review:

- Professor Bin Jalaludin - Review of Health Effects of Traffic-Related Air Pollution
- Professor David Carslaw - Review of Air Quality Monitoring Data
- Dr Mark Hibberd - Review of Air Quality Monitoring Data – Peer Review
- Professor Arnold Dix - Cost and Effectiveness of Filtration

Short CV's for the experts are provided at Attachment 7.

ACTAQ endorsed scope of works

The ACTAQ endorsed scope of works for each independent expert engagement are at Attachment 8.

Summary Report

The Tunnel Air Quality Review - Summary Report was drafted by the ACTAQ Secretariat in consultation with the Office of the NSW Chief Scientist and Engineer. Professors Bin Jalaludin, David Carslaw and Arnold Dix are all comfortable with how their findings have been presented in the summary report.

Attachments

Attachment	Title
1	Tunnel Air Quality Review - Summary Report
2	Review of the health effects of traffic-related air pollution
3	Air Quality Analysis of NSW Tunnel Data Download here
4	Peer Review
5	State of World Practice Urban Motorway Tunnel Air Treatment Systems 2024 Report
6	Tunnel Air Quality Review - Terms of Reference
7	Short CVs for ACTAQ Endorsed Independent Experts
8	ACTAQ endorsed scope of works for each independent expert engagement