NSW GOVERNMENT | Health

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Our ref H22/115304

Dear Ms Stewart

Great Western Highway Blackheath to Little Hartley (SSI-22004371): Statement on potential health impacts of air pollution from proposed ventilation outlets or portal emissions

NSW Health has reviewed the air quality assessment and the human health risk assessment of the Great Western Highway Blackheath to Little Hartley draft Environmental Impact Statement (EIS).

NSW Health has received a report from independent expert members of the NSW Advisory Committee on Tunnel Air Quality in which the methodology of the air quality assessment is appraised, and it is concluded that the air quality assessment in the draft EIS is thorough and to a high quality.

The draft EIS includes two ventilation options. In one, air from the tunnel is emitted through ventilation outlets. In the other, air is emitted from the tunnel exit portals. NSW Health has reviewed the assessment of the predicted impacts from these two ventilation options.

Health effects of traffic-related air pollution

Vehicles emit a number of air pollutants including carbon monoxide, nitrogen oxide, particulate matter and volatile organic compounds. The pollutants most likely to have an important health effect are particulate matter less than 2.5 micrometres in diameter ($PM_{2.5}$) and nitrogen dioxide (NO_2), which forms from nitrogen oxide in the atmosphere.

Authoritative groups such as the World Health Organization and the United States Environmental Protection Agency have reviewed the evidence of the health effects of $PM_{2.5}$ and NO_2. There is good evidence that exposure to $PM_{2.5}$ contributes to heart and lung disease risk, reducing people's life expectancy and leading to hospital admissions. The International Agency for Research on Cancer has determined that $PM_{2.5}$ causes cancer. Exposure to $PM_{2.5}$ is also associated with a number of other effects. There is evidence that $PM_{2.5}$ can have health effects, even at relatively low concentrations.

The evidence of health effects of ambient $PM_{2.5}$ is largely derived from large scale epidemiological studies where $PM_{2.5}$ comes from a wide variety of sources. The findings of these studies have been used in health impact assessments to estimate population-level effects in groups with similar demographic and health profiles to the populations observed in the epidemiological studies. However, there is substantial uncertainty in translating the quantitative findings of population-level epidemiological studies to individuals, specific locations, or to specific sources of $PM_{2.5}$.

Vehicles are the primary source of NO_2 in outdoor air. Exposure to NO_2 is associated with respiratory and cardiovascular health effects. However, as NO_2 levels tend to be closely correlated with $PM_{2.5}$ and other pollutants emitted from traffic, some scientific studies have produced uncertain results as to the contribution of NO_2 to observed health outcomes, independent of exposure to $PM_{2.5}$ and other traffic-related pollutants.

Potential impacts associated with the ventilation of air pollution in the proposed tunnels between Blackheath and Little Hartley

Existing air quality is good in the areas around the location of the proposed tunnel, with levels well below National Environment Protection (Ambient Air Quality) Measure (NEPM) standards. For example, the all-hours average $PM_{2.5}$ concentration is in the range 3.5μg/m^3 to 3.9μg/m^3 at the project air quality monitoring locations, compared to the NEPM annual average standard of 8μg/m^3.

The proposed development is predicted to result in an overall improvement in air quality due to improved traffic flow and reduced traffic along the existing Great Western Highway, which has a higher road gradient than the proposed tunnel. Predicted reductions in both $PM_{2.5}$ and NO_2 indicate that the development may provide a reduction in average exposure to these pollutants.

Although there is an overall reduction in air pollution concentrations, areas close to the ventilation outlets or exit portals are expected to experience increases. Under the "typical daily traffic scenario", the highest predicted increase in *annual* average $PM_{2.5}$ concentration for the ventilation outlet option at both Blackheath and Little Hartley is less than 1% of the NEPM standard. For the portal emissions option the highest predicted increase was around 6% of the NEPM standard, or around 0.5 μg/m^3.

The predicted maximum increase in *daily* average $PM_{2.5}$ concentration at the most affected receptor location is 0.9 μg/m^3 or 3.6% of the daily NEPM standard for the ventilation outlet option and 1.5 μg/m^3 or 6% of the daily NEPM standard for the portal emissions option.

The locations of the tunnel exit portals are away from residential areas, which means the difference in impact between the two options is relatively small. Nonetheless, if the portal emission option is selected, it would be prudent to maximise the distance between tunnel portals and residential areas as much as reasonably practicable.

In conclusion, the proposed Great Western Highway Blackheath to Little Hartley project is predicted to reduce the average level of exposure to traffic-related air pollution. There are predicted increases in air pollution in the areas around the ventilation outlets or exit portals, but these increases are relatively small. The higher levels of ground-level air pollution associated with emissions from exit portals are predicted to have limited additional impact because the portals are in sparsely populated areas. Traffic-related air pollution is known to have health effects and it is important that the tunnel ventilation system is operated to keep ground-level concentrations of those pollutants as low as reasonably practicable.

Yours sincerely

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A/Chief Health Officer and Deputy Secretary
Population and Public Health