

WestConnex is part of the Australian and NSW governments' vision for supporting Sydney's growing population and keeping our economy strong. The M4-M5 Link is the third stage of WestConnex. It will link the New M4 Motorway at Haberfield to the New M5 Motorway at St Peters, with additional connections to the Iron Cove Bridge and Rozelle Interchange.



Example of air quality monitoring equipment

The air quality in Sydney is comparable to levels in other Australian cities and low by world standards according to a global comparison of air pollution levels conducted by the World Health Organisation. The NSW Government is committed to improving it by reducing emissions from industry, vehicles, businesses and residences.

The NSW Advisory Committee on Tunnel Air Quality, chaired by the NSW Chief Scientist and Engineer and including representatives from the NSW Environment Protection Authority, NSW Health, Roads and Maritime and the Department of Planning and Environment, as well as world-leading air quality experts, provided advice on the methodology used for the M4-M5 Link air quality assessment.



Australian Government

BUILDING OUR FUTURE



Keeping you informed

We are committed to keeping you informed and will provide regular information on the M4-M5 Link through direct mail and email notifications, community updates, local papers and face-to-face activities.

You can also contact the WestConnex info line on **1800 660 248**, email **info@westconnex.com.au** or visit **westconnex.com.au/m4-m5link** for more information.

We speak your language



Need an interpreter? Call the Translating and Interpreting Service on **131 450**.

ARABIC

بحاجة إلى مترجم؟ اتصل بخدمة الترجمة الكتابية والترجمة الشفوية على الرقم **131450**.

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Pollutants

Air quality standards are established to protect our health. They typically define maximum concentration limits of pollutants in the air over a given timeframe, for example 24 hours.

Of all the pollutants assessed, $PM_{2.5}$ (tiny particles of matter, less than one-twentieth the width of a hair) is considered to present the greatest potential impact to human health, and accordingly NSW standards for $PM_{2.5}$ are the most stringent in the world.

By far, the biggest source of human-made $PM_{2.5}$ is home heating, such as open-fire-places. This constitutes 50.6 per cent of all human-made $PM_{2.5}$ in Sydney. By contrast, petrol-powered vehicles are a relatively minor source at only 0.75% (see figure 1).

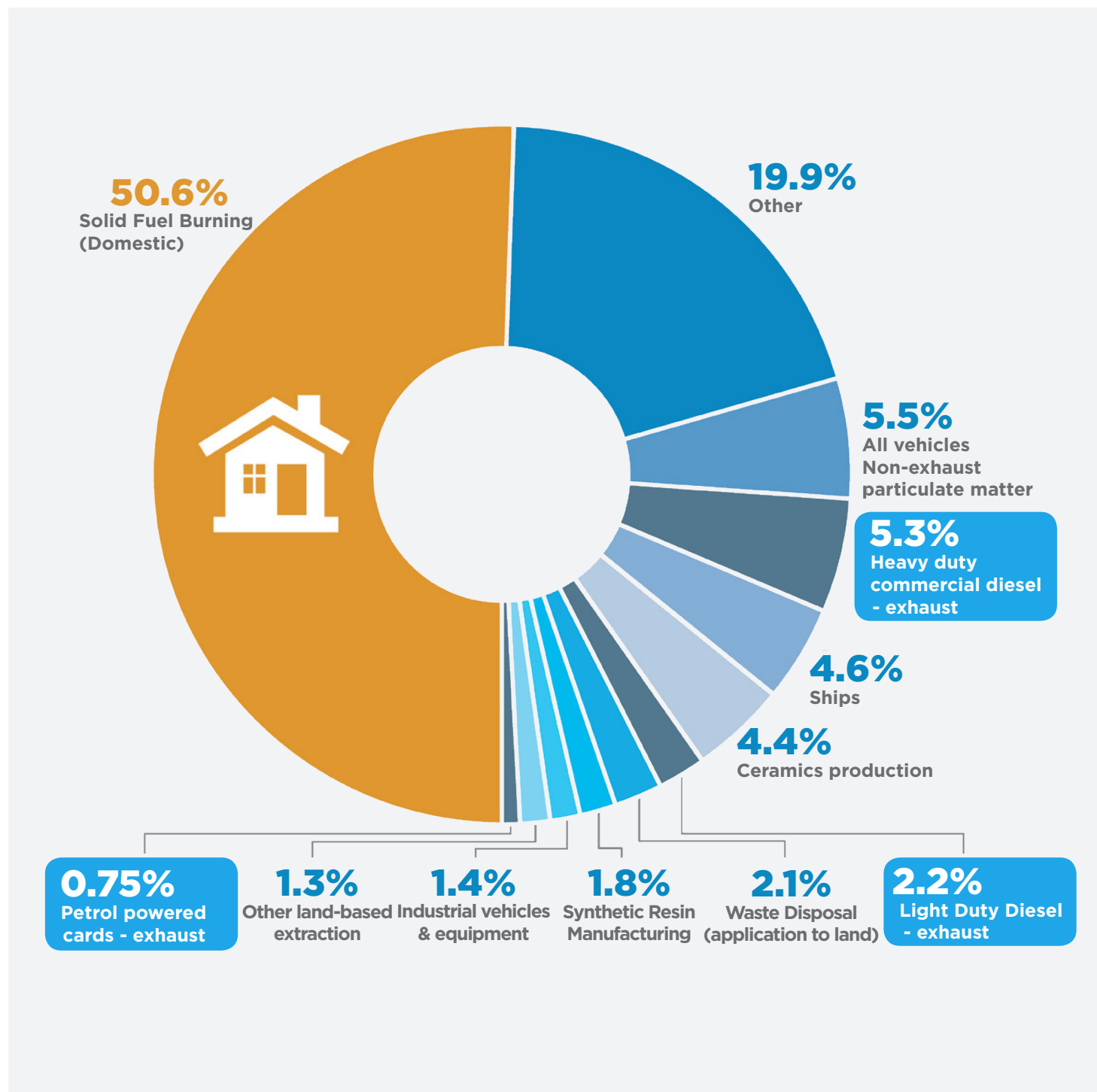


Figure 1. Emission sources in Sydney

Newer vehicles, better air quality

Sydney's air quality has improved and is continuing to improve because newer vehicles produce significantly less emissions than older vehicles. This is in part as a result of improvements in the quality and composition of fuels and engine designs. Cars built from 2013 emit just three per cent of the nitrogen oxides emitted by vehicles built in 1976, and diesel trucks built from

2013 emit just eight per cent of the particles emitted by vehicles built in 1996. Even as Sydney's population (illustrated in green in Figure 4 on the following page) and total vehicle kilometres travelled each year (illustrated in yellow in Figure 4) have increased, key measures of air pollution have dropped significantly and this trend is expected to continue. While road vehicle emissions have significantly decreased, they still contribute to Sydney's air pollution.

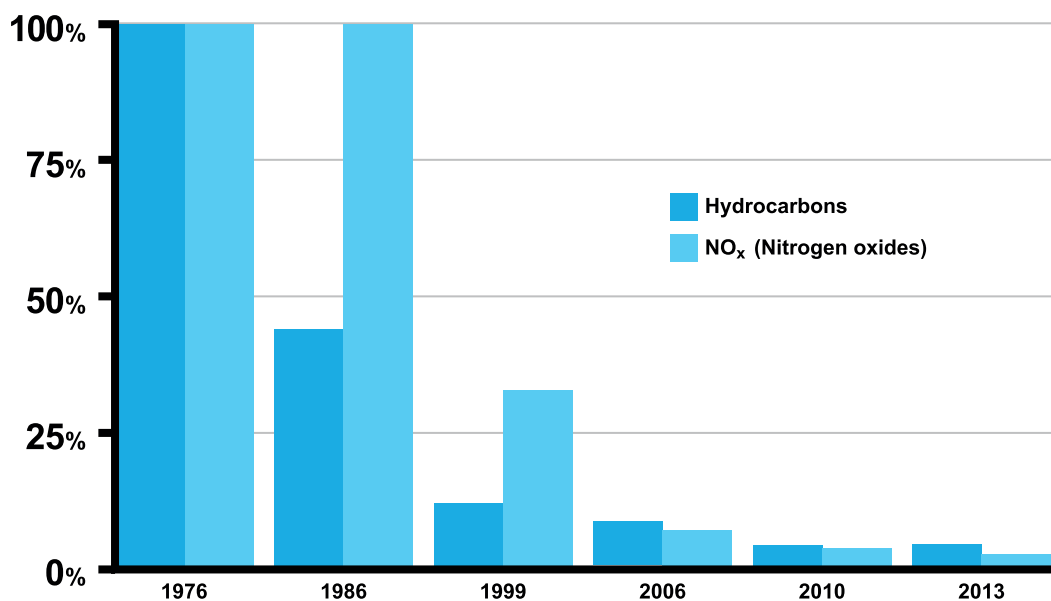


Figure 2: Percentage reduction in emission standards for new passenger vehicles since 1976

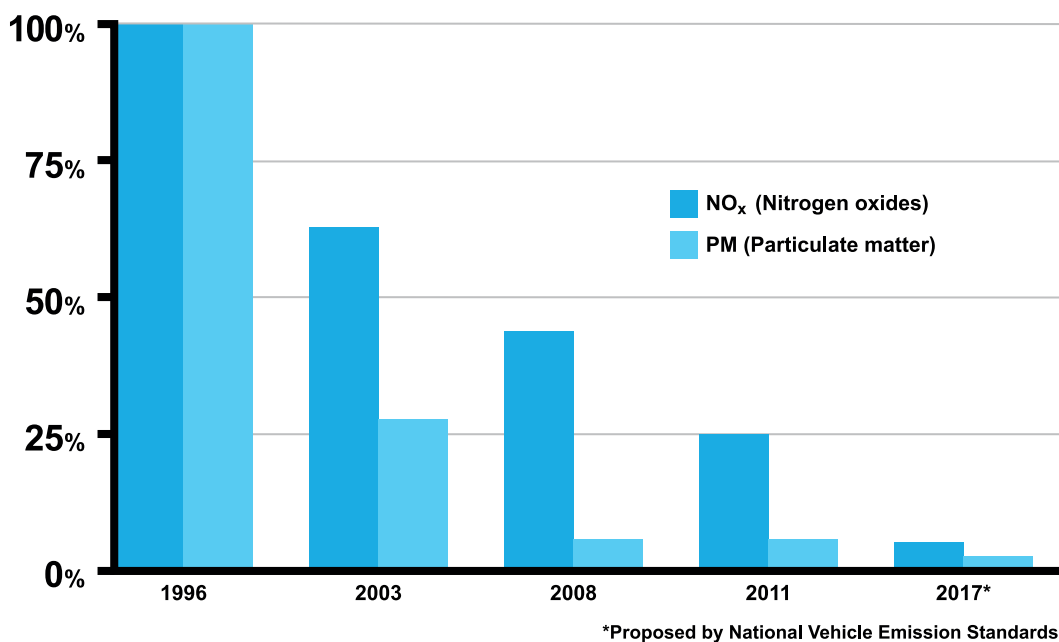


Figure 3: Percentage reduction in emission standards for new heavy vehicles since 1996

Despite a 26 per cent increase in the number of kilometres travelled, emissions of key pollutants have declined significantly.

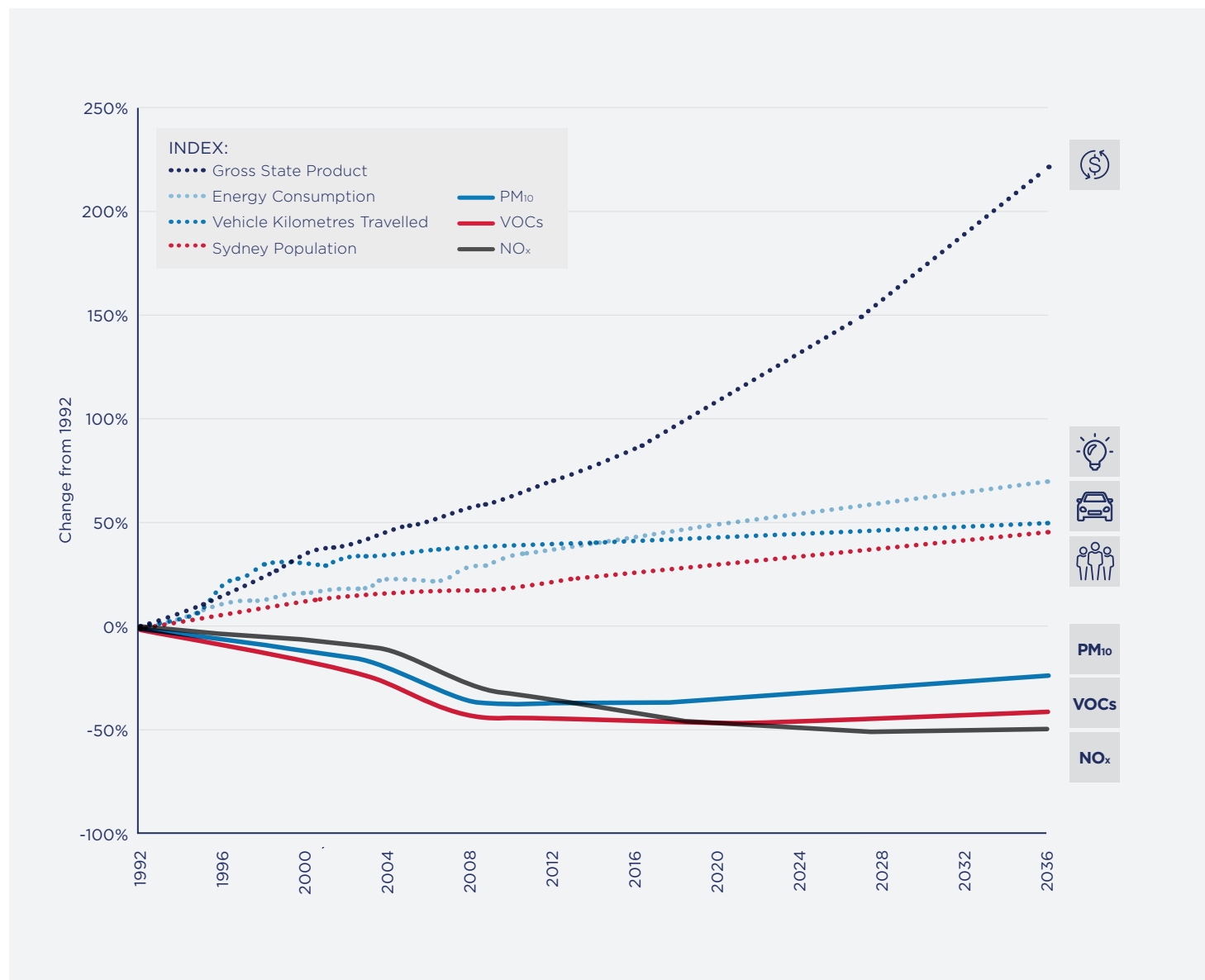


Figure 4: Actual and projected trends in total emissions in Sydney compared with key NSW statistics. Source: Adapted from EPA (2012)

Air quality assessment and evaluation

Air pollutants originate from several sources, with variable impacts on air quality.

In the air quality assessment, background concentration refers to all sources other than nearby road traffic. Surface-road concentration describes the pollutants that emanate from the nearby surface-road network. Ventilation-outlet concentration describes the contribution of pollutants from tunnel ventilation outlets. Moving vehicles underground also reduces the amount of surface-road concentration and helps to improve ambient-air quality.

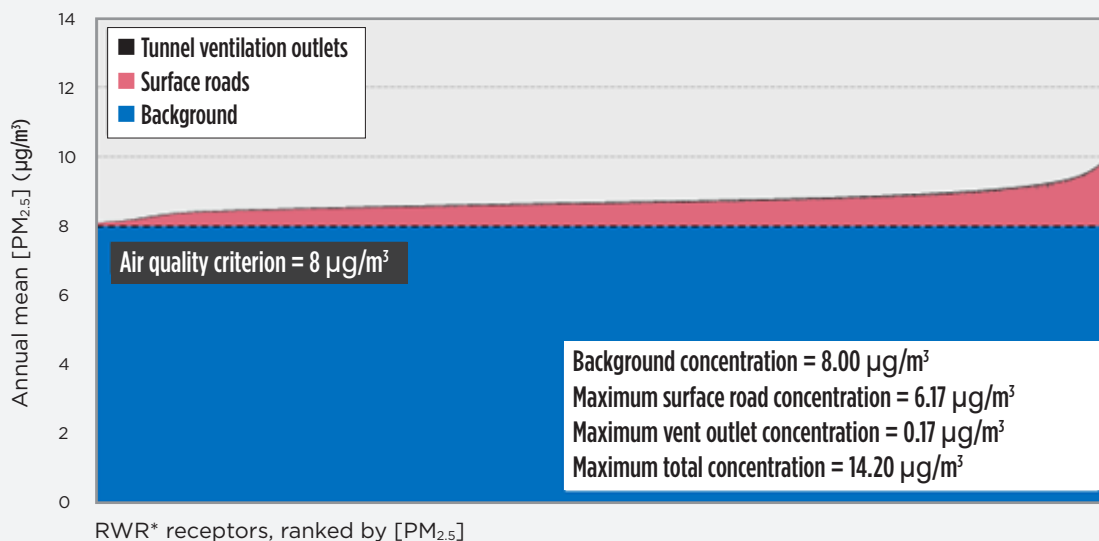
Computer modelling was used to measure the potential impacts on air quality during construction and operation of the project. We also measured the cumulative impacts from other major infrastructure projects, including the rest of the WestConnex program of works, as well as the

proposed Sydney Gateway, the proposed Western Harbour Tunnel and Beaches Link, and the proposed F6 Extension, that are likely to be operational within 10 years of the M4-M5 Link opening.

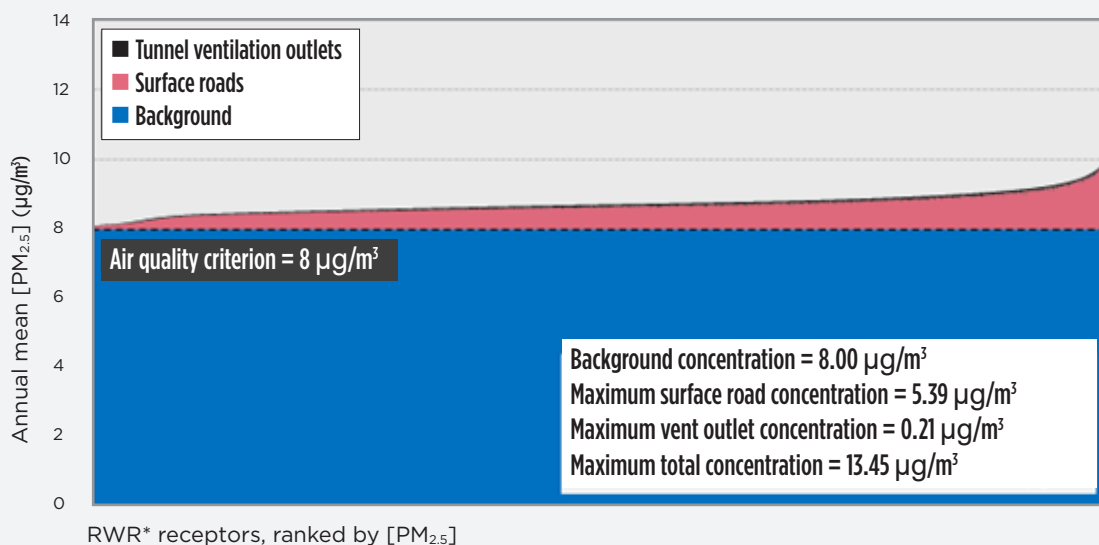
Extensive ambient monitoring around existing motorway tunnels demonstrates that emissions from the ventilation outlets do not have a measurable impact on local air quality.

Figure 5 indicates the contribution of PM_{2.5} from different sources based upon two scenarios in 2033, 10 years after the M4-M5 Link is expected to open. The first scenario (with project) assumes the New M4, New M5, King Georges Road interchange and M4-M5 Link have been completed. The second scenario (cumulative) assumes the proposed Sydney Gateway, Western Harbour Tunnel, Beaches Link and F6 Extension projects have also been completed.

2033 - with project



2033 - cumulative



RWR*- Residential, workplace and recreational receptors

Blue - pollutants contributed from natural sources, industry and domestic activity.

Red - pollutants contributed from nearby surface roads

Black - pollutants contributed from ventilation outlets

Figure 5. Source contributions to annual mean $PM_{2.5}$ concentration (with project and cumulative scenarios)

Air quality would be impacted in some areas where there would be more traffic on the surface roads. However, air quality is set to improve in many locations as traffic moves from surface roads (where emissions are currently at surface level), into the underground motorway tunnels which produce less emissions due to the free-flowing traffic (avoiding up to 28 sets of traffic lights).

On balance, regional air quality would improve overall, particularly in the Inner West Local Government Area (see Figure 6).

Tunnel infrastructure is designed to minimise traffic emissions by avoiding large gradients and reducing traffic congestion within the tunnels. This is further improved using ventilation outlets.



Figure 6. Contour plot of change in annual mean $PM_{2.5}$ concentration after the 2023 cumulative projects

In-tunnel ventilation

WestConnex is constructing state-of-the-art ventilation facilities that meet the EPA air-quality criteria, meaning they are safe for motorists and the community.

Ventilation facilities are needed to maintain air quality within the tunnels. They do this by diluting the emissions with fresh air and then dispersing them through an elevated ventilation system. Monitoring around existing ventilation facilities in Sydney indicates these diluted emissions have no significant impact on outdoor air quality and the use of tunnels results in a significant reduction in surface-level emissions as vehicles and their emissions are removed from surface roads.

Along the M4-M5 Link, ventilation facilities are proposed at the following locations:

- On Parramatta Road at Haberfield (the ventilation building is being constructed as part of the New M4 project and will be fitted out as part of the M4-M5 Link project)
- Within the Rozelle Rail Yards
- On Victoria Road, Rozelle (near the Iron Cove Bridge)
- On Campbell Road, St Peters.

Our analysis of existing tunnels and ventilation systems across Australia and internationally indicates that air filtration would not provide any measurable improvement to the air quality in the surrounding area.

Our tunnels would use longitudinal-ventilation systems, which draw in fresh air as vehicles enter and exit the tunnel. The air from the tunnel is released through ventilation facilities, supported by fans, which control air movement within the tunnel.

The ventilation facility will be located close to the end of the tunnel, before the exit portal, to allow for air to be drawn into the portals against the flow of the traffic. This forced reverse-flow is achieved by jet fans within the exit ramp and tunnel.

The ventilation system is automatically controlled using real-time traffic data – considering traffic mix and speed, as well as feedback from air quality sensors in the tunnel which allow the fans to be adjusted accordingly.

Longitudinal ventilation system

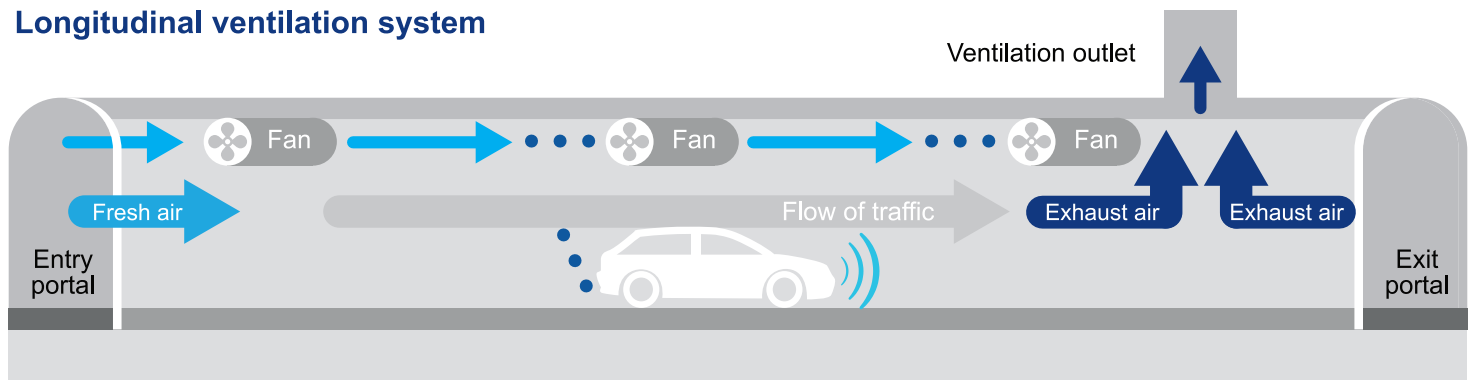


Figure 7. Longitudinal ventilation system

Monitoring air quality

Air quality monitoring stations have been installed along the M4-M5 Link corridor to collect data in places where people work, live and play.

They are located at:

- Ramsay Street in Haberfield
- City West Link in Rozelle; and
- St Peters Public School.

Air quality monitoring results can be found at westconnex.com.au/M4-M5LinkEISAirQuality

In addition, we are collecting data from multiple long-term monitoring stations operated by the NSW Office of Environment and Heritage and Roads and Maritime Services.

A health impact assessment has been carried out as part of the Environmental Impact Statement and we will consult with NSW Health and other agencies as part of this process.

Air quality monitoring will be conducted for at least 12 months prior, and 2 years post opening of the project to monitor any changes in air quality during operation.

Air quality data

After construction, an air quality monitoring and reporting strategy would also be developed. This would be reviewed annually to ensure it meets with stringent planning requirements.