NorthConnex is a nine kilometre tunnel that will link the M1 Pacific Motorway at Wahroonga to the Hills M2 Motorway at West Pennant Hills, removing around 5,000 trucks off Pennant Hills Road daily.

The tunnel motorway includes interchanges to the north and south to accommodate connections at either end of the project. When complete in 2019, it will link Sydney’s north to the orbital network and enable travel from Newcastle (M1) to Melbourne without a single set of traffic lights.

NorthConnex will also boost the state and national economies by providing more reliable journeys and shorter travel times for the movement of freight.

Tunnel ventilation systems are designed to manage air quality both inside and outside the tunnel. The NorthConnex tunnel ventilation system has been designed to meet stringent in-tunnel, local and regional air quality criteria set by the NSW Environment Protection Agency and Department of Health.

The NSW Government has 20 years of experience designing road tunnels, with five major tunnels operational in Sydney.

Experience from other motorway tunnels and studies of ambient air quality data from existing Sydney tunnels has confirmed emissions from ventilation outlets have a negligible impact on local and regional air quality.

The lessons learnt from the M5 East tunnel and other Sydney tunnels, together with technical data collected, means NorthConnex has been designed to the highest standards.
Lessons learnt include:

• Providing an alignment that allows vehicles to maintain consistent speed
• Locating ventilation outlets close to exit portals to provide more efficient ventilation compared to locating them remotely
• Creating smooth traffic flows at the entry and exit ramps to prevent congestion and shorten the time or distance of journey
• Regulation and elimination of smoky vehicles
• Increasing the clearance height and width of the tunnel
• Filtration is not effective; it is not used in Australian tunnels and is rarely used overseas.
• Safeguarding for future lane expansion.

**How tunnel ventilation works**

Well-designed ventilation outlets are very effective at dispersing tunnel emissions.

The basic principle of tunnel ventilation is the maintenance of air quality by providing fresh air and removing the air from the tunnel at the main portals via a ventilation outlet (Figure 1).

The NorthConnex ventilation system will be designed with a longitudinal ventilation system with air drawn into the portals by moving traffic.

At the main portals, air will be extracted from the tunnel through a ventilation outlet to effectively and safely disperse the air. Jet fans are used to keep fresh air flowing through the tunnel when traffic is slow or stopped to ensure the air quality within the tunnel meets the appropriate standard.

NorthConnex will also be significantly larger in height and width than previous Sydney tunnels, enabling greater volumes of fresh air to move through the tunnel thereby reducing the build-up of emissions over the nine kilometre tunnel.

The NorthConnex ventilation system is the most commonly used ventilation design around the world.

**NorthConnex ventilation outlet design**

NorthConnex will have a ventilation outlet at the Southern and Northern interchanges. The interchanges have been designed to integrate with the existing urban environment.

The two tunnel support facilities located at Wilson Road, Pennant Hills and Trelawney Street, Thornleigh will be used to inject fresh air in the event of congestion in the tunnel.

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**Figure 1: Ventilation outlet**
Monitoring air quality

The air quality modelling in the Environmental Impact Statement predicts emissions from the NorthConnex ventilation outlets will have little impact on local air quality.

To ensure air quality is maintained, NorthConnex will have a management plan which involves continuous monitoring of tunnel air quality and compliance with independent guidelines for in-tunnel air quality.

Air quality results will be made publicly available.

Air quality near the project will be monitored 12 months before the tunnel is operational and a minimum of 24 months after the tunnel is operational.

Designing for 2015 conditions and beyond

Newer vehicles produce significantly less emissions than older vehicles, and this decrease is predicted to continue.

For example:
- Cars built from 2013 emit three per cent of the nitrogen oxides emitted by vehicles built in 1976
- Diesel trucks built from 2013 emit eight per cent of the particles emitted by vehicles built in 1996.

Total motor vehicle emissions have fallen over the past few decades and are expected to continue to fall, despite increases in population and the number of kilometres driven.

Due in large part to declining emissions from motor vehicles, total emissions in Sydney have declined significantly, and this improvement is expected to continue.

For more information about air quality including filtration, please refer to the NorthConnex Submissions and Preferred Infrastructure Report (volume 1) available on the project website www.northconnex.com.au
More questions?
The NorthConnex project team is committed to working closely with you to inform you of upcoming work over the course of the project and to minimise impact from our construction activities.

For further information on NorthConnex please don’t hesitate to contact members of the project team.

Phone: 1800 997 057 (24 hours a day)
Email: enquiries@northconnex.com.au
Mail: Locked Bag 1001, West Pennant Hills NSW 2125
Visit: NorthConnex Community Information Centre, 118 Yarrara Road, Pennant Hills, open weekdays from 9am to 5pm.

If you require the services of an interpreter, please contact the Translating and Interpreting Service (TIS International) on 131 450 and ask them to call the NorthConnex Project Team on 1800 997 057 - the interpreter will then assist you with the translation.

TIS International business hours are 9am to 5pm Monday to Friday.

For more information:

1800 997 057 (free call)    enquiries@northconnex.com.au    www.northconnex.com.au

NorthConnex Website

Visit the interactive map on the website to view the depth and route of the main alignment tunnels: http://giswebapps.aecomonline.net/northconnex/map_view.html