



Figure 5-14 Indicative tunnel ventilation system (northbound tunnel arrangement)

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Figure 5-15 Indicative Wilson Road tunnel support facility operational layout

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Figure 5-16 Indicative Trelawney Street tunnel support facility operational layout

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Normal traffic conditions

During normal operation the tunnel would be longitudinally ventilated. That is, fresh air would be drawn in from the tunnel entry portals and through the tunnels by a vehicle generated piston effect (the suction created behind a moving vehicle which pulls air into and through the tunnel) and pushed towards the tunnel exit portals. Near the portals, tunnel air would be drawn upwards into ventilation facilities with ventilation fans prior to discharge to the environment via a 15 metre high discharge point.

For the tunnel off-ramps, air would be drawn back down the ramp for extraction via the ventilation facility. This would require jet fans (used to accelerate the movement of air through the tunnel) to maintain the air flow against the direction of traffic flow. A similar approach would be applied to parts of the main alignment tunnels close to the exit portals.

In-tunnel air, containing vehicle emissions, would be extracted from the tunnels prior to reaching the exit portals. Air would be exhausted via a ventilation take off (intake) and transferred to the ventilation facility via a vertical shaft (ventilation outlet). The air would then be discharged at high velocity from the ventilation facility to the atmosphere to achieve effective dispersion of the tunnel air.

Low speed traffic conditions

During low speed traffic conditions the vehicle generated piston effect would be lessened. In these situations the airflow may need to be assisted by the tunnel jet fans located throughout the tunnels. Under these conditions, additional fresh air may need to be supplied to the main alignment tunnels via the reverse flow operation of the axial fans in the two tunnel support facilities.

The operation of axial fans in the ventilation facilities would be increased to ensure that acceptable air quality is maintained in the tunnels and to achieve effective dispersion of tunnel air following discharge to the atmosphere.

Based on forecast traffic volumes (refer to **Section 7.1** – traffic and transport), low speed conditions are only likely to occur in the event of an incident within the tunnels.

Emergency conditions

The two emergency smoke extraction outlets at the tunnel support facilities would principally function to maintain air quality in the tunnels in the unlikely event of an emergency. As a secondary feature, these facilities would also supply fresh air to the tunnels during low speed traffic conditions (discussed above).

During smoke control, air would be extracted from the tunnel and transferred to the emergency smoke extraction outlet via a vertical shaft. The smoke would then be discharged from the outlet to the atmosphere.

The emergency smoke extraction outlets are expected to operate infrequently for the extraction of smoke during an emergency, and for a short duration while emergency services and tunnel fire and life safety systems bring the situation under control.

5.2.6 Motorway control centre

The project would involve construction and operation of a 24 hour staffed motorway control centre, located near the southern interchange on the corner of Pennant Hills Road and Eaton Road (refer to **Figure 5-17**). Around 30 full-time equivalent staff would work at the site, of which around 26 would be located at the motorway control centre on a full-time basis. The motorway control centre would include facilities necessary for the monitoring, maintenance and control of tunnel services including tunnel safety, ventilation, power, lighting and other road systems required for the safe and efficient operation of the main alignment tunnels. Facilities would include a tunnel control room, training and incident response room, workshop space, emergency vehicle depot, garage and parking facilities (around 30 spaces for staff and visitors).

Urban design principles and landscaping would be employed to integrate the motorway control centre into the surrounding streetscape and minimise its visual impact. Further details regarding urban design, landscaping and visual impacts are provided in **Section 7.5** (Urban design, landscape character and visual amenity).