Facts and benefits

The F6 Extension Stage 1 will deliver the missing link from Sydney’s south to the wider motorway network, making your journey easier, faster and safer.

The four kilometre underground motorway tunnels will connect President Avenue at Kogarah to the New M5 Motorway at Arncliffe, removing more than 2,000 trucks a day from surface roads.

The F6 Extension Stage 1 will ease congestion, meaning less time in traffic and faster trips to the CBD and across Greater Sydney.

It will contribute to a more accessible, more liveable and productive Greater Sydney.

Cover: F6 Extension tunnel Stage 1 (artist’s impression).
Inside cover: Princes Highway and President Avenue intersection.
**Introduction**

The F6 Extension Stage 1 is a key element of the NSW Government’s transport vision for NSW. As NSW continues to grow, our transport challenge also increases, and congestion impacts our economy. This is why the NSW Government is investing $41.5 billion on roads and public transport projects over the next four years alone, to deliver an integrated transport solution to make it easier, faster and safer to get around. Projects include Australia’s first Metro, Light Rail and improvements to rail services.

In October 2017, the NSW Government announced it will proceed with the F6 Extension Stage 1 to provide a new motorway connection between the New M5 Motorway at Arncliffe and President Avenue at Kogarah. The project will be the first stage in completing the missing link from southern Sydney to the Sydney motorway network. At present there is no efficient connection to Sydney’s motorway network from the south.

Roads and Maritime Services is also continuing with investigation work along the existing F6 reserved corridor between Kogarah and Loftus to help determine the most appropriate alignment and design for further stages of the future motorway.

**About this document**

This project update provides community members and stakeholders with more detailed information about what Roads and Maritime is proposing for the F6 Extension Stage 1 and provides an opportunity to give further feedback on the project.

This document contains:

- The indicative alignment for the motorway tunnels
- Information about the locations of motorway construction sites and permanent facilities
- Information on the new intersection at President Avenue
- Information on the proposed shared cycle and pedestrian pathways.

The project is still subject to change and further refinement as it progresses through the planning approval process and detailed design.

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Want to learn more about the F6 Extension Stage 1?

Visit the website [rms.nsw.gov.au/F6](http://rms.nsw.gov.au/F6) to watch our animation or leave your comments about the project on our online interactive map.

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Left: Brighton-Le-Sands beach.
Project overview

F6 Extension Stage 1
The project includes new underground tunnels around four kilometres in length. The scope of work includes:

- Twin tunnels linking the New M5 Motorway at Arncliffe to President Avenue at Kogarah
- Ramps between the motorway tunnel and the surface intersection at President Avenue
- Tunnel stubs for a future connection south to extend the F6 Extension
- Provision of new shared cycle and pedestrian pathways.

Map: F6 Extension Stage 1.
F6 Extension Stage 1

easier
- **Reduce** traffic on General Holmes Drive by 10,000 vehicles a day
- Built **underground** to minimise disruption to the community and property impacts
- More **direct** access from southern Sydney to the wider Sydney motorway network
- **Access** to jobs, education and lifestyle opportunities
- **Bypass** Sydney airport traffic.

faster
- **Bypass** up to 23 sets of traffic lights on the Princes Highway between St Peters and Kogarah
- **Less stop-start**, more reliable travel times
- **Travel time savings** between southern Sydney and the Sydney CBD.

safer
- **Less traffic** to return local streets to local communities
- **Improving** pedestrian and cyclist safety through the new shared cycle and pedestrian pathways
- Tunnels designed for **free-flow traffic** at 80 kilometres per hour – means less vehicle emissions compared to stop-start traffic
- **Reduce** the number of trucks on surface roads by over 2,000 per day.

Below: Cooks River shared cycle and pedestrian pathway.
Improving travel times

Stage 1 would provide travel time savings of:

- Kogarah to ANZAC Bridge 15 minutes
- Miranda to Macquarie Park 15 minutes
- Kogarah to South Sydney 13 minutes
- Taren Point to Mascot 12 minutes
- Kogarah to the City 8 minutes.

Improving the amenity of the foreshore precinct at Brighton-Le-Sands and The Grand Parade through a reduction in traffic, returning local streets to local communities.

Less time in traffic
more time for you

The project will give communities and businesses new levels of access across the transport network.

It’s an integral part of the Future Transport Strategy 2056 and will keep our city moving as we continue to grow.

Below: Brighton-Le-Sands beach.
Strategic need

The southern Sydney road network experiences daily congestion and unreliable travel times. On the Princes Highway between Kogarah and the Sydney CBD, peak hour travel speeds are amongst the slowest for a major arterial road in Sydney. As Sydney’s population and economy continues to grow so will the challenges to our transport network.

This is why the NSW Government is investing $41.5 billion in roads and public transport projects over four years to deliver an integrated transport solution. Motorways will become more important for moving people and goods around Sydney efficiently. They form the backbone of our road transport system; providing easier access to jobs and services.

Motorways return local streets to local communities by removing freight traffic and making bus trips more efficient. They mean less time in traffic and more time being where you choose to be.

The NSW Government is progressively building Sydney’s first integrated motorway network — to make every journey easier, faster and safer.

The Greater Sydney Commission has released the Greater Sydney Region Plan based on a vision for ‘three cities’, where people in each city have convenient access to jobs and services.

**Eastern Harbour City** - spans the North, Eastern City and South Districts including Sydney Airport, Port Botany and Kogarah.

**Central River City** - anchored by Greater Parramatta and Sydney Olympic Park to the west.

**Western Parkland City** - an emerging City focussed on Western Sydney Airport, Greater Penrith, Liverpool and Campbelltown-Macarthur.

The NSW Government has set strategic priorities for these areas to support its vision for a more productive, liveable and sustainable Greater Sydney, including 30-minute access to jobs and services, and an efficient freight network.

For strategic planning purposes, and separate to the ‘three cities’ vision, Greater Sydney has been divided into six districts.

The F6 Extension Stage 1 is within the Eastern City District, which includes Rockdale, and will improve accessibility to the South District.

**Eastern City District**

Home to around 22 per cent of Greater Sydney’s population, the Eastern City District accommodates 38 per cent of its jobs, and generates over 45 per cent of Sydney’s economic activity.

**South District**

Around 16 per cent of Greater Sydney’s population resides in the South District, which includes the centres of Kogarah, Miranda, Hurstville and Sutherland. It provides 10 per cent of the city’s jobs.

Of the six districts, population growth is expected to be highest in the Eastern City and South Districts growing by 325,000 residents or 32 per cent in Eastern City and by 204,100 residents or 28 per cent in the South District by 2036.

Together, the Eastern City and South District are expected to provide 53 per cent of jobs in Greater Sydney by 2036, with a large number of these jobs located near the F6 Extension Stage 1 project area, including employment centres in Sydney City, Green Square-Mascot, Port Botany and the Health and Education Precinct at Kogarah.

The F6 Extension Stage 1 will support the Greater Sydney Commission’s identified need for improved north-south road access to support this future population and job growth in the area.
Our transport future

In March 2018 the NSW Government delivered the state’s first fully coordinated planning and transport blueprint through the release of:

- **The Greater Sydney Commission’s Greater Sydney Region Plan** – establishing a vision for Sydney as a productive, sustainable metropolis of three cities where people can access jobs and services within 30 minutes by public transport.

- **The State Infrastructure Strategy 2018-2038** – identifying the policies and strategies needed for NSW to continue to deliver infrastructure to grow the economy and meet the needs of a growing population.

- **The Future Transport Strategy 2056** – supporting the new planning vision for Sydney and responding to significant changes in how people and goods will move around.

The *Future Transport Strategy 2056*, sets the 40 year vision, directions and outcomes for customer mobility in NSW. This strategy will be the blueprint for future transport investment in NSW. The strategy, which considers all modes of transport, has identified the F6 Extension Stage 1 as a committed initiative in the next ten years, subject to project approvals.

For more information, please visit: futuretransport.nsw.gov.au

The F6 Extension Stage 1

The NSW Government is committed to improving travel times and easing congestion for motorists travelling between the Illawarra and the Sydney CBD. Progressing the F6 Extension Stage 1 is an important part of the long term travel solution, preparing for ‘Tomorrow’s Sydney’ and building the resilience of the Sydney motorway network.

In early 2018 the NSW Government released *Future Transport Strategy 2056* an update of the *NSW Long Term Master Plan 2012* to consider the future of Sydney’s transport network over the next 40 years to better support a productive economy, liveable communities and a more sustainable society.

The F6 Extension Stage 1 has been identified by *Future Transport Strategy 2056* as a priority project for delivery.

The F6 corridor has been reserved for a surface road since 1951. While use of the surface corridor was considered, practical considerations, including the underground connection point to the New M5 Motorway meant this was not feasible.

Construction as a tunnel will also allow the implementation of new shared cycle and pedestrian pathways from south Sydney towards the Sydney CBD, and provides the potential surface road capacity for future express bus services to the Sydney CBD and other locations.

Delivering the F6 Extension Stage 1 is just one part of the NSW Government’s integrated transport solution to support predicted future growth in southern Sydney. *Future Transport Strategy 2056* also identifies the need for upgraded rail infrastructure to provide increased resilience across the rail network, with more reliable services and better outcomes for customers.

Below: Princes Highway and President Avenue intersection.
Further Stages of the F6 Extension

Map: F6 Extension Stage 1.
What is happening in Section B between Kogarah and Taren Point and Section C between Taren Point and Loftus?

The NSW Government is committed to improving travel times and easing congestion for motorists travelling between the Illawarra and Sydney CBD. Progressing the F6 Extension is an important part of the long term transport solution. Roads and Maritime have undertaken geotechnical investigations along the proposed Section B and C alignment for the F6 Extension, from President Ave through to Loftus. Further work is now underway on design and engineering for the initial concept along this future stage of the road. This work is intended to produce a design that minimises community impacts, while delivering improved connections for the Sutherland Shire and through to Wollongong.

South of Loftus

There are no plans to further investigate the remaining area (Section D) between Loftus and Waterfall for a motorway connection, therefore there will be no impact to the Royal National Park south of Loftus.

Below: St George to Sandingham.
Sydney’s integrated transport future

As a large urban expanse, Greater Sydney is reliant on strategic centres across the metropolitan area to provide employment and services. Ensuring these centres are connected with each other and the rest of Sydney by an effective integrated transport network is fundamental to supporting access to jobs, housing, recreation and services, facilitating business-to-business connections and attracting investment.

This requires a range of transport solutions, including roads, rail, light rail, metro, ferries, buses and shared cycle and pedestrian pathways.

Motorway connections, as part of an integrated transport network, provide critical support to a growing economy in a global city like Sydney.
Community consultation

What you told us
The F6 Extension project team met with the community between October and December 2017 to receive feedback on the project’s preliminary concept design. Consultation activities included:

- A 1800 project number and project email for the community to contact the F6 Extension project team
- A project update distributed to around 60,000 residents within the broad F6 Extension study area
- Nine community ‘Pop-Up’ information sessions in Kogarah and Rockdale
- 16 stakeholder briefings
- Door knocking over 500 residences and businesses
- An online mapping tool that allowed the community to submit feedback directly onto a map of the project area.

As outlined in the figure below, feedback from the community focused mainly on seven key topics:
1. Community amenity, health and safety
2. Property and access
3. Local traffic
4. Air quality
5. Environmental impacts
6. Construction impacts
7. Public and active transport infrastructure.

A Consultation Feedback Summary has been prepared and is now available at rms.nsw.gov.au/F6

The Consultation Feedback Summary outlines the feedback received to date, and Roads and Maritime’s responses.

The F6 Extension project team is using the community feedback received as input to further develop and inform the F6 Extension Stage 1 design, and environmental assessment for the project.

Stakeholder Liaison Group

Roads and Maritime understands community concern about impacts of the project at Rockdale Bicentennial Park and the Bicentennial Park East Soccer Fields. We also understand the high value of Brighton Memorial Playing Fields to residents, local schools and community and sporting groups.

We will work with Bayside Council to form a Stakeholder Liaison Group comprised of representatives from Bayside Council, local sporting clubs and other stakeholders. The group will focus on identifying ways to minimise construction impacts and provide a lasting legacy of improved sporting fields and better cycle and pedestrian facilities.

The Group will consider the various community uses of this area, and potential impacts during construction, such as relocating the skate park and playground equipment, maintaining safe access across the park (particularly to Brighton-Le-Sands Public School), and the new shared cycle and pedestrian bridge across President Avenue.

Above: Overview of the distribution of feedback during the consultation period.
Next steps

Preparing an Environmental Impact Statement

Rocks and Maritime is committed to minimising the impacts of this project on the community. To ensure all potential impacts of the project are fully assessed, we are preparing an Environmental Impact Statement (EIS) in line with the Secretary’s Environmental Assessment Requirements (SEARs). The SEARs were issued by the Department of Planning and Environment in January 2018. You can view the SEARs on the project website at: rms.nsw.gov.au/F6.

The project must undergo an environmental impact assessment in accordance with the Environmental Planning and Assessment Act 1979. Approval from the NSW Minister for Planning is required following public exhibition of the EIS, before Roads and Maritime may proceed to construction.

Some of the key areas the EIS considers are:

• Environmental management and mitigation
• Traffic impacts
• Noise and vibration
• Social impacts
• Sustainability
• Air quality
• Indigenous and non-indigenous heritage
• Community consultation.

The EIS for the F6 Extension Stage 1 will be made public for exhibition and community comment.

Project cost

The estimated project cost for F6 Extension Stage 1 is in the range of $2.2 billion to $2.6 billion.

The estimated benefit cost ratio for the project is between 1.21 and 1.56. This means every dollar of investment is set to deliver between $1.21 and $1.56 in benefit to the NSW economy.

Toll rationale

The F6 Extension Stage 1 will be a toll road.

Tolls provide a fair and equitable means to help fund the project where the people using the new infrastructure help to pay for it.

In this way, tolls will contribute to funding the construction and ongoing operation and maintenance of the F6 Extension Stage 1.

A tolling framework has been developed for the project that is consistent with other recent motorway projects.

The motorway tunnel is proposed to be tolled at a flat rate of $1.77 each way (2017 dollars). The shortest trip possible when using the motorway tunnel would be between President Avenue and St Peters interchange, via the New M5 Motorway. The WestConnex flagfall and distance based toll will also apply to journeys along that part of the road network.

Heavy vehicles

Heavy vehicles will pay three times the toll of light vehicles, reflecting the greater wear and tear that trucks have on our roads.

This is consistent with other recent motorways including WestConnex and NorthConnex.

Have your say

Your feedback is important to us, and Roads and Maritime will continue to work closely with the community and stakeholders as the project progresses. During June and July we will be holding community information sessions to provide you with more detailed information about the project and provide an opportunity to meet the project team.

Details about the community information sessions can be viewed by visiting: rms.nsw.gov.au/F6

You can provide your feedback by Friday 27 July 2018:

• In person at the community information sessions
• Using the online feedback form
• Calling 1800 789 297
• Emailing F6Extension@rms.nsw.gov.au

Roads and Maritime will respond to feedback received in the Environmental Impact Statement (EIS) for the project.
F6 Extension Stage 1 proposed design

Legend
- Driven tunnel construction
- Cut and cover construction
- Open slot construction
- At-grade surface road work
- Shared cycle and pedestrian pathways (indicative alignment only)
- Ventilation facility
- Existing F6 reserved corridor

Rockdale Skate Park and playground to be relocated during construction
New cul-de-sac at Moorefield Avenue
New cul-de-sac at O’Neill Street
President Avenue shared cycle and pedestrian bridge
No right turn

Figure 1
Figure 2

Kings Wetland
Brighton-Le-Sands Public School and Little Sails Long Day Care
Brighton Memorial Playing Fields
Scarborough Park North
Bicentennial Park
Rockdale Bicentennial Park
West Boundary Street
Civic Avenue
Civic Avenue
President Avenue
Lachal Avenue
O’Connell Street
O’Neill Street
Bicentennial Park East Soccer Fields
Illinden Sports Centre
Rockdale Skate Park and playground to be relocated during construction
New cul-de-sac at Moorefield Avenue
New cul-de-sac at O’Neill Street
President Avenue shared cycle and pedestrian bridge
No right turn

Driven tunnel construction
Cut and cover construction
Open slot construction
At-grade surface road work
Shared cycle and pedestrian pathways (indicative alignment only)
Ventilation facility
Existing F6 reserved corridor

0 100 200 Metres
Impacts to Rockdale Bicentennial Park during construction

Community access to Rockdale Bicentennial Park and east/west access across the park will be impacted during construction.

The project team will continue to consult with the community and stakeholders to understand community requirements at this location, and is exploring ways to maintain a safe access across the park during construction.

The project has identified the need to relocate the community facilities located in Rockdale Bicentennial Park, including the skate park, play area and barbeque equipment.

This will be done in consultation with Bayside Council, local sporting clubs and other interested stakeholders through the Stakeholder Liaison Group.

Recreational facilities will be relocated before the start of major construction work in consultation with Bayside Council. There are no plans to impact either the Ilinden Sports Centre playing field or Brighton Memorial Playing Fields.

The ‘cut and cover’ section of the tunnel will need to pass around five metres underneath the waterway in Rockdale Bicentennial Park. To construct this it will be necessary to temporarily divert the course of the waterway. This will also require the removal of the existing pedestrian bridge across the waterway.

The temporary diversion shown below, will be designed to maintain water levels in the existing waterway, as well as minimise the risk of potential flood events. The temporary diversion will be closely monitored to ensure there is no impact on existing aquatic life. Once construction work has been completed the waterway will be restored and the pedestrian bridge reinstated.

Above: Temporary diversion of waterway to facilitate construction of the ‘cut and cover’ tunnel section in Rockdale Bicentennial Park.
The tunnel entry and exit at President Avenue Kogarah

The driven motorway tunnels for the F6 Extension Stage 1 end around 25 metres under West Botany Street. From West Botany Street the tunnels gradually rise until they surface in the existing F6 reserved corridor and form a new surface road connection with President Avenue at Kogarah.

As the tunnels pass under Rockdale Bicentennial Park they will rise from 25 metres deep to 10 metres under the surface. This section will be constructed as a ‘cut and cover’ structure, meaning that a deep trench will be dug for the tunnels, which will be completely covered when construction is finished. The land will be returned to parkland and open space for community use.
The intersection at President Avenue

The President Avenue intersection will connect the motorway tunnels with the existing surface road network. All traffic will either enter or exit the project at the President Avenue intersection. The speed limit entering and exiting the tunnel at President Avenue will be 60 kilometres/hour, consistent with the speed limit on the surrounding road network. The intersection will consist of dual two lane ramps to the north.

The southbound tunnel off-ramp will widen to four lanes at the new intersection. President Avenue, between West Botany Street and O’Connell Street will be widened to provide three lanes in each direction as well as turning lanes. President Avenue will be raised by up to three metres between O’Connell Street and Civic Avenue to provide flood immunity to the tunnel exit and entry. Construction work will be staged to allow for the relocation of utilities and to maintain the existing lanes and traffic movements on President Avenue.

A cul-de-sac at O’Neill Street is required due to the proximity of the new President Avenue intersection. Access to the eastern side of O’Neill Street will be via Crawford Road.

There may be changes to other local intersections to allow for the successful integration of the new intersection on President Avenue. Potential changes to local roads will be discussed with Bayside Council and the local community. Further information on changes to traffic and local roads will be available in the Environmental Impact Statement.

Key considerations in designing the President Avenue intersection include:

- Confining the surface road within the existing F6 reserved corridor
- Minimising impacts to Ilinden Sports Centre and Brighton Memorial Playing Fields
- Minimising impacts to the waterway in Rockdale Bicentennial Park
- Minimising private property impacts
- Design and safety standards.
Shared cycle and pedestrian pathways

The provision of shared cycle and pedestrian pathways (also referred to as Active Transport Corridors) will increase amenity for pedestrians and cyclists, by providing safe and direct routes and connections to local centres, schools, public transport and other local destinations.

The F6 Extension Stage 1 supports this important program by providing cycle and pedestrian pathways and connectivity across the project area.

Shared cycle and pedestrian pathways will benefit the community by:

- Encouraging walking and cycling for people travelling in the project area
- Providing an alternative transport option for the community
- Facilitating connections to existing active transport facilities and connections to major destinations
- Promoting a healthy lifestyle by supporting exercise.

Once the project has been completed, the new shared cycle and pedestrian pathways will start from the existing cycleway at Muddy Creek next to Bestic Street, Brighton-Le-Sands, connecting south to Kogarah through Rockdale Bicentennial Park.

The pathways will be a combination of exclusive use off-road facilities through parklands as well as shared use and on road facilities along local roads. The shared cycle and pedestrian pathways will intersect with several existing and proposed east-west paths. A dedicated shared cycle and pedestrian bridge will also be built over President Avenue.
Map: Indicative shared cycle and pedestrian pathway connections through Bicentennial Park.
Below: Existing traffic congestion on The Grand Parade Brighton-Le-Sands.

Below: Existing traffic congestion on the Princes Highway.
Primary construction sites

Roads and Maritime has selected a number of construction sites within the project area to support the construction of the F6 Extension Stage 1.

Construction sites will generally be used to provide access to the tunnel during construction, support tunnelling activities and as facilities for spoil management. The sites will accommodate site offices, worker facilities and equipment storage areas.

Construction activities, proposed operating hours and mitigation measures at these locations will be detailed as part of the Environmental Impact Statement.

Where will the construction sites be located?

There will be primary construction sites at both ends of the tunnels and one within Rockdale, Bicentennial Park.

Roads and Maritime Services Depot, West Botany Street, Rockdale

This site is located on West Botany Street between Bay Street and Bermil Street.

This site is preferred because it:

- Is owned by Roads and Maritime Services, eliminating the need for residential property acquisition
- Provides good arterial road access for construction vehicles and the removal of spoil
- Provides additional access to the tunnels during construction to minimise construction time.

Rockdale Bicentennial Park

A construction site will be located within Rockdale Bicentennial Park next to West Botany Street. This would be the location for the permanent surface works for the project.

This site is preferred because it:

- Eliminates the need for residential property acquisition
- Provides good access for construction vehicles to the arterial road network minimising impact on local residents and businesses
- Can contain all surface construction activities at one location including:
  - Tunnel construction
  - Removal of spoil
  - Construction of the new intersection and the widening of President Avenue
  - Temporary realignment of the waterway and subsequent reinstatement
  - Construction of the shared cycle and pedestrian pathways and bridge over President Avenue.

Roads and Maritime will consult with Bayside Council and the Stakeholder Liaison Group to develop strategies for the remediation of the park after the completion of the project.

Arncliffe Motorway Operations Complex

The F6 Extension Stage 1 proposes to use the current construction site for the New M5 Motoway which is located on government owned land near the M5 East and Marsh Street intersection.

This site is preferred because it:

- Is currently in use by the New M5 Motorway and will minimise additional land acquisition and construction impacts on the surrounding community
- Has been previously set aside for use by road projects
- Provides a pre-existing shaft for access to tunnelling activities to minimise construction impacts
- Provides good access to main roads for construction vehicles and the removal of spoil.

Project opening

The targeted date for the opening of the F6 Extension Stage 1 to traffic is 2024.
Below: Existing traffic congestion at the intersection of President Avenue and The Grand Parade Brighton-Le-Sands.

Below: Existing traffic congestion on The Grand Parade Brighton-Le-Sands.
Location of ventilation facilities

Two ventilation facilities will be constructed for the F6 Extension Stage 1.

**Arncliffe Motorway Operations Complex**

The northern ventilation outlet for the F6 Extension Stage 1 will be integrated with the ventilation facilities for the New M5 Motorway located near the M5 East and Marsh Street intersection. This location creates efficiencies with the New M5 Motorway project and minimises the project footprint on open space and the surrounding community.

The ventilation building will be constructed as part of the New M5 Motorway project. If approved, the F6 Extension will be connected to this ventilation building during the construction of Stage 1.

The ventilation facility is located close to Sydney Airport and the Civil Aviation Safety Authority have been consulted about the design to satisfy the requirements of the Airports (Protection of Airspace) Regulations 1996 (Commonwealth) and Airports Act 1996 (Commonwealth).

**West Botany Street**

The southern ventilation outlet will be located in the industrial zone on West Botany Street. This location minimises impact to the residential community, schools and education facilities and on the surrounding open space, as well as being close to the tunnel portal.

Tunnel ventilation systems placed at or near tunnel portals operate most efficiently.

Right: West Botany Street ventilation facility (artists impression).

Below: New M5 Motorway ventilation facility on Marsh Street (artists impression courtesy of Sydney Motorway Corporation).
**Stronger measures on tunnel emissions**

**Sydney’s air quality is good by world standards**

Air quality in Sydney is good by national and international standards. In NSW, the Office of Environment and Heritage (OEH) monitors, analyses and publishes information about air quality. The NSW Environment Protection Authority (EPA) regulates air quality and implements measures for managing and reporting air pollution.

Despite there being more cars on the road, a number of initiatives and technological developments in both engine emissions and fuel quality have resulted in substantial reductions to Sydney’s vehicle emissions over the past two decades.

**Modern tunnel ventilation**

The F6 Extension Stage 1 will be designed to achieve:

- Sufficient in-tunnel air quality
- No emissions from ramps
- Emissions from ventilation outlets indistinguishable from background air quality.

In-tunnel air quality is achieved by ensuring sufficient air flow through the tunnel to prevent the build up of vehicle emissions.

The airflow is achieved through a combination of traffic flow, tunnel size and ventilation design (jet fans).

To achieve zero ramp emissions, jet fans draw in air from the exit ramp to ensure a net inflow of air at the ramp so that all tunnel emissions are removed through an elevated ventilation outlet.

This is most efficiently done when the ventilation outlet is positioned near the exit ramp.

The F6 Extension Stage 1 will have elevated ventilation outlets that are very effective at ejecting tunnel air high into the atmosphere through a combination of buoyancy and speed.

Once in the atmosphere, the ejected tunnel air dilutes hundreds of times as it mixes with the surrounding air and becomes indistinguishable from background levels.

The effectiveness of a ventilation outlet design in dispersing tunnel air under all operating and weather conditions is assessed through specialised computer modelling using actual hour-by-hour weather data for a full year.

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**Annual Average PM$_{2.5}$ Concentrations µg/m$^3$**

Air quality in Sydney and internationally. Source: World Health Organisation

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**Cars built after 2013 emit 97% less oxides of nitrogen than vehicles built in 1976**

**Diesel trucks built after 2013 emit 92% less particles of matter than trucks built in 1996**

**By 2036 there will be a 48% decrease in PM$_{2.5}$ vehicle emissions since 2003**
Once complete, the F6 Extension Stage 1 will be continuously monitored at the ventilation outlets to control the ventilation system. This will ensure strict limits outlined in the environmental approval conditions are complied with at all times.

Once operating, air quality monitoring data will be publicly available on the new motorway website.

**Assessment and regulation**

The NSW Government has announced stronger measures to regulate emissions from motorway tunnels.

The EPA will regulate the ventilation outlets of all current and future operating motorway tunnels in NSW, including the F6 Extension Stage 1.

The EPA will require tunnel operators to meet air quality limits and carry out air quality monitoring.

Additional checks will be required before determination of the Environmental Impact Statement for the project:

- The Advisory Committee on Tunnel Air Quality (ACTAQ) will coordinate a scientific review of a project’s air emissions from ventilation outlets. ACTAQ, which advises the Government on tunnel ventilation design and operation, is convened via the Office of the NSW Chief Scientist and Engineer.
- The NSW Chief Health Officer will release a statement on the potential health impacts of emissions from tunnel ventilation outlets; and
- The Minister for Planning will not approve a motorway tunnel project until the ACTAQ scientific review is considered.

The F6 extension Stage 1 will be subject to stringent assessment of the tunnel ventilation systems and ambient air quality in surrounding areas. Although the number of cars is expected to further increase as our population grows, total emissions from motor vehicles is expected to continue to fall over the next decade due to new, cleaner vehicles replacing older technology vehicles.

To find out more you can download the initial report on Tunnel Air Quality from the Advisory Committee on Tunnel Air Quality via: chiefscientist.nsw.gov.au or visit: rms.nsw.gov.au/airquality

Below: How longitudinal tunnel ventilation systems work.

![Emissions readily dispersed](#)

![Air quality monitors](#)
Next steps

Roads and Maritime is committed to minimising the impacts of this project on the community.

The community and stakeholders are invited to provide feedback on the proposal until Friday 27 July 2018.

To ensure all potential impacts of the project are fully assessed, we are preparing an Environmental Impact Statement (EIS) in line with the Secretary’s Environmental Assessment Requirements (SEARs) issued by the Department of Planning and Environment in January 2018.

The EIS for the F6 Extension Stage 1 will be exhibited for community information and comment.

Meet the project team

Throughout June and July 2018, Roads and Maritime will be holding a series of community information sessions and ‘pop-up’ events to provide the community with an opportunity to meet the project team and find out more about the project.

Details of these events will be available on the project website at www.rms.nsw.gov.au/F6

Have your say

To find out more about the project, or to have your say by Friday 27 July:

- rms.nsw.gov.au/F6
- 1800 789 297
- F6Extension@rms.nsw.gov.au
- Customer feedback
  Roads and Maritime Services
  Locked Bag 928, North Sydney NSW 2059

This document contains important information about transport projects in your area. If you need an interpreter, please call the Translating and Interpreting Service on 131 450 and ask them to call the Project Team on 1800 789 297. The interpreter will then help you with translation.