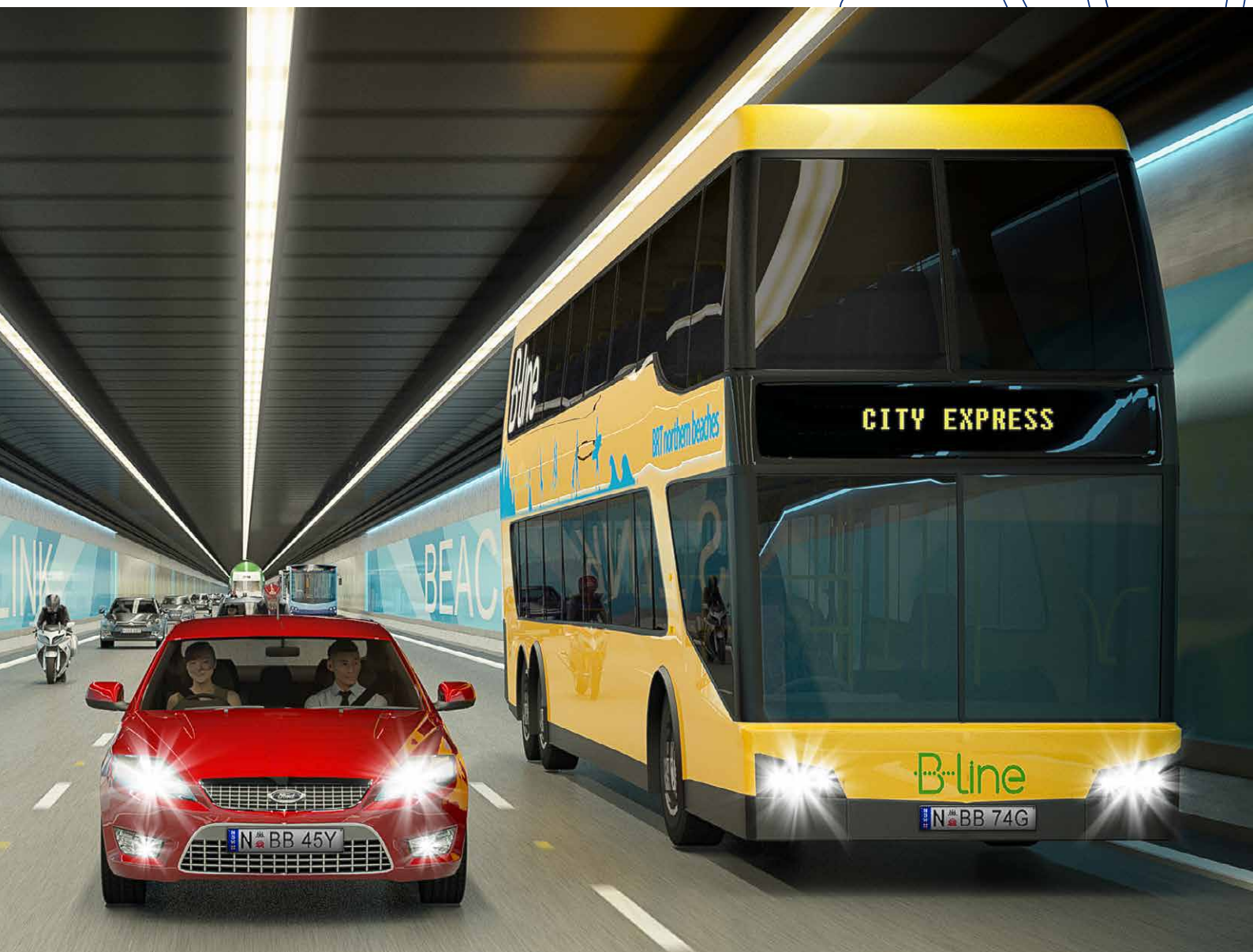
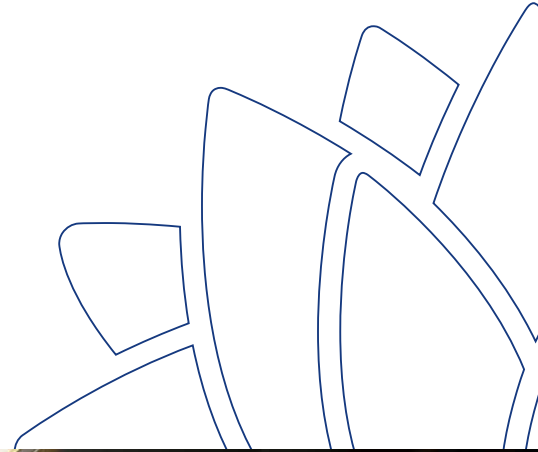


Beaches Link

Project update





Beaches Link



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Project overview

Beaches Link is a major transport infrastructure project that will make it easier, faster and safer to get around Sydney.

As Sydney continues to grow, with more and more trips being made, so will the challenges to our transport network.

Heavily constrained routes to the Northern Beaches impact on all road users, including bus commuters, and Military Road.

Areas such as Mosman, Artarmon and the Northern Beaches run the risk of lagging behind the rest of Sydney because of current transport reliability.

Faster and more reliable trips are essential to reducing congestion and providing new levels of access to jobs and services.

Beaches Link is key to delivering the transport vision for Sydney.

It will unlock new levels of access to jobs, recreation and services, including health and education, across Sydney.

With Beaches Link, people will spend less time in traffic and have more time for themselves and their families.

Beaches Link includes over 11 kilometres of tunnels as well as upgrading over five kilometres of surface roads.

Beaches Link will be largely underground and its design has been improved as a direct result of community feedback.

This design work has minimised surface impacts and reduced property needs.

Beaches Link

A new tunnel from the Northern Beaches, under Middle Harbour, connecting to:

- Gore Hill Freeway for travel between Manly and the Northern Beaches and Chatswood, Macquarie Park and North West Sydney
- The Warringah Freeway for journeys to North Sydney, Sydney central business district (CBD) and Sydney's south and south west.

Beaches Link will:

- Improve journey times and reliability on critical transport routes on both sides of Middle Harbour
- For the first time, provide a motorway link between the Northern Beaches and the rest of Sydney
- Relieve traffic pressure on the North Shore
- Integrate with Sydney's public transport network (bus, metro and rail) to deliver significant improvements for bus services.

Beaches Link

less time in traffic, more time for you

currently

69,000 vehicles

a day cross Spit Bridge

forecast to carry **80,000 vehicles by 2037**

with **43 bus routes**



Project benefits

Beaches Link is an integrated transport solution that will improve car and bus journey times to and from the Northern Beaches. It will also provide new connections to St Leonards and Macquarie Park linking people with jobs, education and services.

Connecting the Northern Beaches, south and west

- Bypassing 19 sets of traffic lights through The Spit, Mosman and Neutral Bay
- Improved connections to North Sydney and Sydney CBD
- New connections to St Leonards and Macquarie Park
- Access to motorway network for faster journeys across Sydney



More reliable North Shore trips

- Reduced pressure on key arterial roads – Military Road and Warringah Road
- Greater resilience to incidents and delays
- Reduced rat-run traffic on local roads – Eastern Valley Way, Frenchs Forest Road and Ourimbah Road



Less traffic on North Shore roads

- Spit Bridge – 40% less
- Roseville Bridge – 25% less
- Eastern Valley Way – 35% less
- Military Road – 15% less



New public transport options

- Operation of express bus services on Beaches Link to Sydney CBD and North Sydney
- Direct access to North Sydney for interchange with the new Sydney Metro and Sydney Trains
- Faster, more reliable bus trips on Military Road and Warringah Road



Returning streets to local communities

- Less rat-running through local streets
- Reduced traffic on arterial corridors



Better access to jobs and business

- Over 15 per cent more Northern Beaches residents will be within 45 minutes commute to work
- Local Northern Beaches businesses will benefit from better access to Greater Sydney
- More direct access will be available for movement of goods and services



Travel time savings

- 🕒 **Brookvale to Sydney CBD**
up to 27 minutes
- 🕒 **Dee Why to Sydney Airport**
up to 41 minutes
- 🕒 **Frenchs Forest to Rozelle**
up to 40 minutes
- 🕒 **Manly to Macquarie Park**
up to 23 minutes



New community open space

- Opportunity for new open space at the Balgowlah Golf Course site
- New shared path along the Wakehurst Parkway, connecting Seaforth with the Northern Beaches Hospital precinct

Design changes led by community feedback

In March 2017, the NSW Government released a project concept and started detailed design work on the Beaches Link project.

Since then, there has been extensive community engagement, geotechnical testing, field studies and market sounding with the finance and construction industries.

This project update provides an overview of how the proposed design has evolved, incorporating feedback from community and stakeholder groups over the past year.

We want to hear what you think about where we are up to. Roads and Maritime Services will shortly commence community engagement on the design presented in this document.

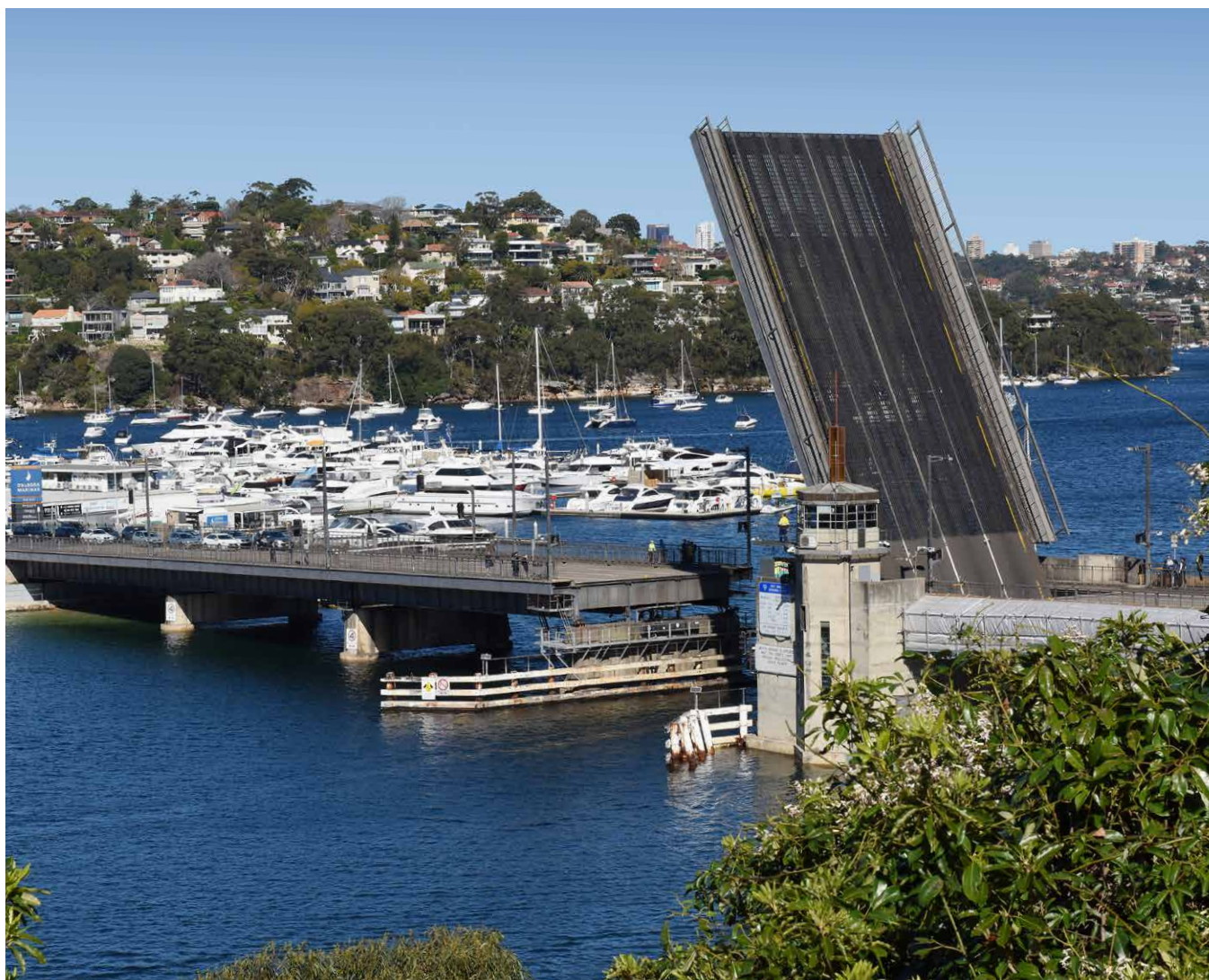
Once we have heard your feedback, Roads and Maritime will continue to refine the design.

The NSW Government will then progress this refined design through the planning assessment process. This will include the exhibition of Environmental Impact Statements (EISs) when the community can provide formal feedback.

What we've heard

Extensive engagement has included over 5000 face-to-face conversations via a series of 16 community feedback sessions, 12 shopping centre displays, workshops and meetings with schools and community groups.

We have made significant changes to the design, based on what we have heard from the community.



Seaforth



What we heard	How the design addresses this
Concern that tunnel ramps are too close to houses and Seaforth Oval – community proposal to move ramps further north on the Wakehurst Parkway to reduce local impacts	Proposed tunnel ramps including ventilation outlets moved 500 metres north from concept design location for superior community and engineering outcomes
Concern about potential changes to local roads, including rat-runs through local streets to access the tunnels	No access from North Balgowlah into tunnel ramps to avoid local rat-running
Concern that Seaforth Oval sports field will be directly impacted by construction Concern about construction traffic on local streets and around the oval	Temporary construction sites designed to minimise local impacts No impact to Seaforth Oval sports field Construction traffic carrying tunnel spoil will head north (not south) on the Wakehurst Parkway Construction traffic separated from traffic using the oval car park
Desire for safe and accessible active transport and connections to existing cycle and walking trails	New dedicated shared user paths along the Wakehurst Parkway, including a new underpass to connect existing trails of Garigal National Park and Manly Dam Reserve
Need for design to accommodate crossings for wildlife	New crossings for fauna provided along the Wakehurst Parkway
Concern about a ventilation facility being located near Seaforth Oval	Ventilation facility will be located with the tunnel ramps further north on the Wakehurst Parkway Air quality assessment, taking into account local conditions, is being undertaken and will be included in the EIS

Balgowlah

What we heard	How the design addresses this
Preference for tunnel ramps and construction to use Balgowlah Golf Course rather than impacting homes, Burnt Bridge Creek bushland or Seaforth Public School	<p>Proposed tunnel alignment changed so tunnel ramps are located in the centre of Burnt Bridge Creek Deviation</p> <p>Revised tunnel alignment avoids impact on homes and bushland west of Burnt Bridge Creek Deviation – significantly reducing the number of homes needed for the project</p> <p>Use of Balgowlah Golf Course for major construction site and permanent facilities including a ventilation outlet and new link road means:</p> <ul style="list-style-type: none"> - Reduced construction impact on local residences and Seaforth Public School - Less disruption to traffic and buses - Opportunity to reconfigure the golf course as community open space after construction, in consultation with Northern Beaches Council and the community
Concern about a ventilation outlet being located in the Burnt Bridge Creek valley	<p>Ventilation outlet will be located near the tunnel ramps, in the Balgowlah Golf Course precinct, which is the most efficient location</p> <p>Air quality assessment, taking into account local conditions including topography, is being undertaken and will be included in the EIS</p>
Desire to keep the shared user path under Burnt Bridge Creek Deviation	The shared user path crossing Burnt Bridge Creek Deviation will be maintained throughout and after construction
Concern about queuing of vehicles going in and out of the tunnel ramps and traffic impacts on local roads	Improved design of connections to Condamine Street and a new link road to Sydney Road provide good outcomes for the local road network



Artarmon and Willoughby



What we heard	How the design addresses this
Concern about impacts to sporting facilities in the Willoughby area	Alternative proposal for Flat Rock Drive construction site which eliminates impacts on the Flat Rock Baseball Diamond
Concern about Artarmon Reserve sports field	No impact to Artarmon Reserve sports field No construction site at Artarmon Reserve
Avoid the homes to the north of Gore Hill Freeway	No homes acquired in this area
Locate the ventilation outlet to the south of Gore Hill Freeway in industrial area	Ventilation outlet will be located in Artarmon industrial area, south of Gore Hill Freeway An air quality assessment, taking into account local conditions (including topography) is being undertaken and will be included in the EIS
Concerns about the clearing of bushland next to Gore Hill Freeway	Minimise impact to bushland by widening to the south and avoiding Artarmon Reserve bushland
Desire to be able to access Beaches Link	Access to Beaches Link via Gore Hill Freeway and Reserve Road

Design facts and map

Beaches Link

Beaches Link (Camberay to Balgowlah)	7.2 kilometres	Main tunnels three lanes each way
Beaches Link (the Wakehurst Parkway connection)	2.5 kilometres	Two lanes each way
The Wakehurst Parkway upgrade	3 kilometres	Two lanes each way – Beaches Link ramp to Warringah Road
Beaches Link (connection to Gore Hill Freeway)	2 kilometres	Two lanes each way
Surface Works, Gore Hill Freeway	1.3 kilometres	Integration of Beaches Link with existing road network



Project need

As Sydney's population grows, our economy and jobs will also grow, as will the number of trips made in and around Sydney every day.

Congestion costs our economy around \$6.1 billion a year. By 2030, this cost is expected to hit \$12.6 billion a year.

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

Beaches Link is a key initiative for Sydney's integrated transport network. It will relieve congestion, improve access by public transport to jobs and services and increase the efficiency of the freight network.

The project has been identified as an infrastructure priority by both the NSW and Australian Commonwealth Governments.

It supports the NSW Government's strategic objectives for Greater Sydney and delivers on recommendations made by Infrastructure Australia.

In 2018, the NSW Government delivered a long-term planning and transport blueprint, releasing:

- Greater Sydney Commission's Greater Sydney Region Plan and District Plans, which establish 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
- Future Transport 2056 (see page 12).

Beaches Link:

Supports the Greater Sydney Region Plan

(Greater Sydney Commission, 2018) vision for access by public transport to the Eastern Harbour City, including Sydney Harbour, St Leonards, Chatswood and Macquarie Park.

Supports the Eastern City and North District Plans

(Greater Sydney Commission, 2018), special objectives to maintain the Harbour City's economic success and support sustainable growth of strategic centres across the North District.

By reducing pressure on arterial roads, the project also facilitates improvements to places in the Eastern City and North Districts.

Supports customer outcomes Future Transport 2056

including enabling 30 minute access to jobs and services by public transport, improving the legibility of the transport network and improving freight journey times by better separating local and through traffic.

Aligns with Infrastructure Australia's Priority List

which is developed by this independent infrastructure advisor to define the nation's infrastructure priorities. The project is listed as a priority initiative.

Funding

The NSW Government is investing a record \$51.2 billion over the four years to 2021/22 for public transport and roads.

This represents a \$9.8 billion, or 23.6 per cent increase on the four years to 2020/21 included in the 2017/18 NSW State Budget.

The total amount is comprised of \$26.6 billion for public transport and \$24.6 billion for roads.

Over the next four years, a total \$556.2 million has been allocated for the Western Harbour Tunnel and Beaches Link Program.

A total of \$130 million has been allocated for the 2018/19 financial year for planning and early works for the Western Harbour Tunnel and Beaches Link.

Future Transport 2056

By 2056, NSW will have more than 12 million residents and Sydney will become a global city of eight million people, similar in size to London or New York.

Planning and investment for Greater Sydney will focus around the three cities concept – the Western Parkland City, the Central River City and the Eastern Harbour City.

The NSW Government's Future Transport Strategy is an overarching strategy supported by a suite of plans to achieve a 40-year vision for our transport system.

Future Transport has been developed in close collaboration with the Greater Sydney Commission, Infrastructure NSW, the NSW Department of Premier and Cabinet and the NSW Department of Planning and Environment.

Future Transport 2056 identifies Beaches Link as a committed infrastructure initiative along with the F6 Extension, Sydney Metro West and Parramatta Light Rail.

As part of the Movement and Place Framework outlined in Future Transport 2056, motorways are identified as

strategically significant roads that move people and goods rapidly over long distances.

Movement corridors and motorways are highly important for the movement of people and goods, with a key role to provide efficient movement across the road network where there is little interaction with adjacent land use. Motorways provide a critical function in taking long distance through-traffic off surface roads when access to places is not required.

The Future Transport vision for the transport network is one where different road and rail links form part of an integrated and connected network across the Greater Sydney region with each of the three cities in a hierarchy of corridors performing different functions.

Motorways can support a city-shaping function as they facilitate higher speed and volume linkages between cities and centres. While motorways provide access across the metropolitan area and to and from regional NSW, as part of this vision, they are complemented by city-serving corridors better suited to accessing centres.

Within the 10-kilometre area around metropolitan centres, city-serving corridors will be able to support higher frequency, reliable on-street public transport while city-shaping motorways divert major traffic away from centres.

This is our vision for the integrated network around the Harbour CBD where the network of new motorways, including WestConnex and Western Harbour Tunnel will support high volume and capacity of private vehicles, road-based public transport and freight movement. At the same time they will enable busy surface roads, such as Parramatta Road, Victoria Road and Military Road, to support more on-street public transport to provide reliable access to land uses along these roads.

Motorways such as Beaches Link support successful places, a key outcome sought from Future Transport 2056. They provide for a through-traffic bypass of places such as the Sydney CBD, facilitate a 30-minute city by allowing greater surface priority for public transport, and create the opportunity for better places, for example at Neutral Bay or Rozelle.



Public transport and active transport

Beaches Link benefits public transport across the Northern Beaches, the North Shore, North Sydney and around the CBD by opening up new express bus connections and adding capacity to existing corridors.

Beaches Link will:

- Enable direct, reliable public transport between the Northern Beaches and North Sydney as well as south of Sydney Harbour and new direct connections to centres such as St Leonards
- Free up Military Road for more reliable bus services through Mosman, Cremorne and Neutral Bay and ease pressure on Warringah Road for bus services through Frenchs Forest, Forestville and Roseville Bridge
- Improve bus travel on the Warringah Freeway, including a new continuous, free-flowing bus lane between Miller Street and Sydney Harbour Bridge and improved access to North Sydney
- Enable opportunities for express buses to use Beaches Link.

Beaches Link public transport integration

By connecting with the Warringah Freeway, Beaches Link allows direct access to the Sydney CBD and North Sydney – and delivers new opportunities for new express bus services.

We are working closely with Transport for NSW to explore opportunities for new public transport, including express buses to use Beaches Link and then interchange with Sydney Trains and Sydney Metro at North Sydney.



B-Line Bus

Before the new B-Line Bus service was introduced, the Northern Beaches experienced some of Sydney's longest peak-hour bus travel times.

The new Northern Beaches bus network, along with traffic flow improvements delivered by B-Line, has already increased bus patronage and reduced travel times.

Over 2000 weekly B-Line services are now providing an enhanced connection between Mona Vale and Wynyard, with further improvements expected from current road upgrades.

By reducing traffic on existing bus corridors, Beaches Link will further enhance the travel time and reliability benefits created by B-Line.

Beaches Link has the potential to further expand express bus transport for the Northern Beaches as part of our integrated transport network.

Active transport

Beaches Link delivers over five kilometres of new cycleways and pedestrian paths.

New active transport connections will provide new travel options and create new paths for recreation.

New Wakehurst Parkway shared path

- Links the new Northern Beaches Hospital precinct with Seaforth, Balgowlah and Manly
- Integrates with the Garigal National Park and Manly Dam Reserve trails with safe underpasses and overpasses

Balgowlah Recreation precinct

- Provides additional shared pathways integrated with existing paths to nearby schools and shops



Integrated planning

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 modes, including mass transit solutions such as heavy rail or metro rail, and other solutions, including bus, light rail, motorways and active transport.

Beaches Link complements other major NSW Government initiatives:

B-Line

Beaches Link will provide the opportunity to the new Northern Beaches B-Line by enabling express services through Beaches Link and reduced pressure on existing arterial routes.

Sydney Metro

Beaches Link will enable direct connections to Sydney Metro. For example, the interchange for Beaches Link express buses at Victoria Cross Station in North Sydney will increase the Metro catchment area and will provide a fast, one-transfer journey between the Northern Beaches and Greater Sydney.

Northern Beaches Hospital

Beaches Link will connect to the new Northern Beaches Hospital precinct, providing a direct connection to the Warringah and Gore Hill Freeways and enabling new routes to St Leonards and Macquarie Park.



Proposed Victoria Cross interchange. Image courtesy Sydney Metro.





Legend

Existing motorways/highways

Projects completed

- WestConnex New M4 widening
- M5 widening

Public transport in delivery

- B-Line
- Sydney Metro Northwest
- Sydney Metro City and Southwest
- City & South East Light Rail

Public transport in planning

- Parramatta Light Rail
- Sydney Metro West
- North South Rail Line

Motorway projects in delivery

- NorthConnex
- WestConnex New M4 tunnel
- WestConnex New M5
- WestConnex M4-M5 Link
- The Northern Road
- M4 Smart Motorway

Major transport projects in planning

- Warringah Freeway Upgrade
- Western Harbour Tunnel
- Beaches Link
- F6 Extension - Stage 1
- F6 Extension - Kogarah to Loftus
- M12
- Sydney Gateway
- The Northern Road
- T4 and T8 Rail Upgrades
More Trains More Services

Growth areas

- North West Land Release Area
- Western Sydney Priority Growth Area
- South West Priority Growth Area
- Western Sydney Airport
- Western Sydney Employment Area

Middle Harbour – the challenge



Military Road – Sydney's worst traffic?

A recent study by the Grattan Institute found Sydney's worst traffic congestion is from Manly, across The Spit, through Mosman and Cremorne to the city.

Motorists from the Northern Beaches experience long and unreliable journey times.

Just three arterial roads serve the Northern Beaches:

Spit Bridge

- The only 'opening' bridge on the Sydney road network
- Carries 69,500 vehicles a day
- Forecast to increase to over 74,500 vehicles a day by 2027.

Warringah Road

- Carries 78,500 vehicles a day
- Forecast to carry 83,000 vehicles a day by 2027.

Mona Vale Road

- Carries 57,400 vehicles a day
- Forecast to carry 61,200 vehicles a day by 2027.

Due to the limited access and extensive congestion, routes to and from the Northern Beaches are vulnerable to incidents and delays.

Congestion on the Spit Bridge – Military Road and Warringah Road – Roseville Bridge corridors has significant impacts on the North Shore.

Congestion also causes some traffic to use local roads, such as Ourimbah Road in Mosman, Frenchs Forest Road in Seaforth and Eastern Valley Way in Willoughby.

This impacts the amenity of suburbs including Cremorne, Mosman, Neutral Bay, Seaforth, Willoughby and Roseville.

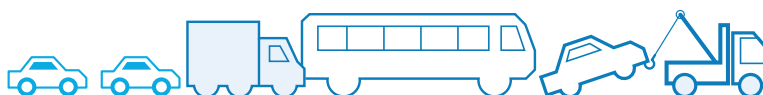
It also impacts bus and car journey times for people in these areas.



The Northern Beaches B-Line is delivering important benefits to bus customers. These benefits will be enhanced as a result of Beaches Link.

On average
between
2014 and 2017

550 Spit Bridge & Military Road
incidents on every year



Limited alternate routes lead to a network vulnerable to incidents

Middle Harbour – the solution

Beaches Link

- For the first time, a direct, free-flowing connection between the Northern Beaches and the rest of Sydney
- A seven-kilometre integrated transport tunnel crossing under Middle Harbour connecting the Northern Beaches to the Warringah Freeway and Gore Hill Freeway
- Less pressure on Spit Bridge and Military Road – improving amenity in Mosman, Cremorne and Neutral Bay – and relieving traffic flows through Roseville and Willoughby
- Direct Warringah Freeway access for fast and reliable access to North Sydney, the Sydney CBD and beyond
- A fast, reliable link between the Northern Beaches and key centres including St Leonards and Macquarie Park via direct Gore Hill Freeway connection
- Opportunity for additional express bus services and improved connections to Sydney Trains and the new Sydney Metro
- Widening the Wakehurst Parkway to two lanes each way between the Wakehurst Parkway tunnel ramps and Frenchs Forest
- Pedestrian and cyclist pathways including safe crossings of the Wakehurst Parkway and connections to the Northern Beaches Hospital precinct
- Opportunity for new open space in Balgowlah to be developed in consultation with council and community
- Less traffic on major arterial roads across the North Shore, improving urban amenity and travel times.



Morning peak travel times in 2027, with and without Western Harbour Tunnel and Beaches Link (WHTBL)

Origin	Destination	Without WHTBL	With WHTBL	Percentage faster
Balgowlah	North Sydney	32 mins	14 mins	57%
Brookvale	Sydney CBD	57 mins	30 mins	48%
Chatswood	Sydney Airport	50 mins	30 mins	41%
Dee Why	Sydney Airport	75 mins	34 mins	55%
Manly	Macquarie Park	47 mins	24 mins	49%
Manly	Parramatta	78 mins	53 mins	32%
Mosman	Sydney Airport	48 mins	30 mins	38%

* Based on 2027 traffic forecasts.

Western Harbour Tunnel – companion project

Western Harbour Tunnel is a major transport infrastructure project that will make it easier, faster and safer to get around Sydney.

Sydney Harbour Bridge and Sydney Harbour Tunnel are at the heart of Sydney's road transport network.

Both are now at over-capacity and a single incident can have a major flow-on effect on travel times across the transport network and impact our economy.

As Sydney continues to grow, with more and more trips being made, so will the challenges to our transport network.

This is why the NSW Government is investing \$51.2 billion across NSW on roads and public transport to deliver an integrated transport solution for Greater Sydney.

Western Harbour Tunnel is key to delivering this transport vision.

It will change the way people move around Sydney and how people travel between the North Shore, the CBD and Western and Southern Sydney.

With Western Harbour Tunnel, people will spend less time in traffic and have more time for themselves and their families.

Western Harbour Tunnel includes over six kilometres of tunnels as well as upgrading over nine kilometres of surface roads.

Largely underground, the proposed reference design for Western Harbour Tunnel will have minimal impacts to communities and significantly reduce property needs.

The project includes:

Western Harbour Tunnel – a new tunnel from the WestConnex Rozelle Interchange, under Sydney Harbour to the Warringah Freeway.

Warringah Freeway Upgrade – streamlining Australia's busiest road.

For further detail on Western Harbour Tunnel go to www.rms.nsw.gov.au/whtbl

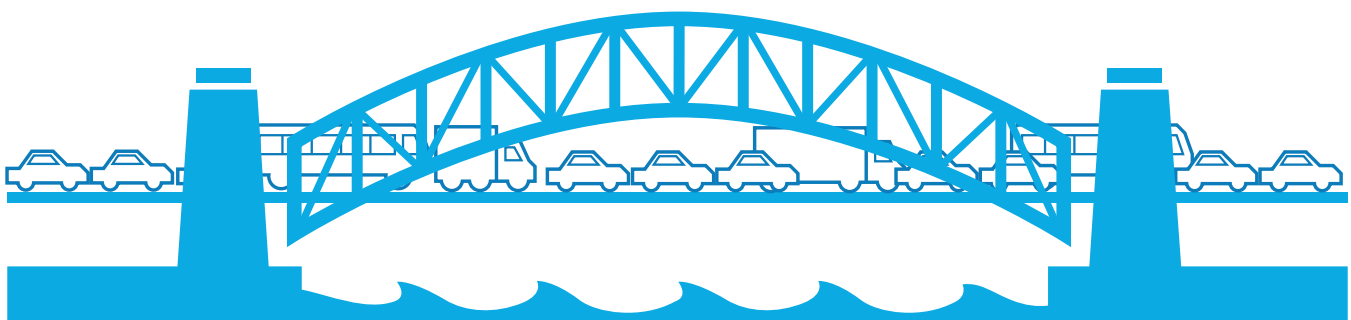
Western Harbour Tunnel will:

- Create a western bypass of the CBD and take pressure off Sydney Harbour Bridge, Anzac Bridge and Western Distributor
- Integrate with public transport, improve travel times and boost reliability for cross-harbour trips and the broader network
- Provide core capacity that enables improved links across Sydney.

Western Harbour Tunnel

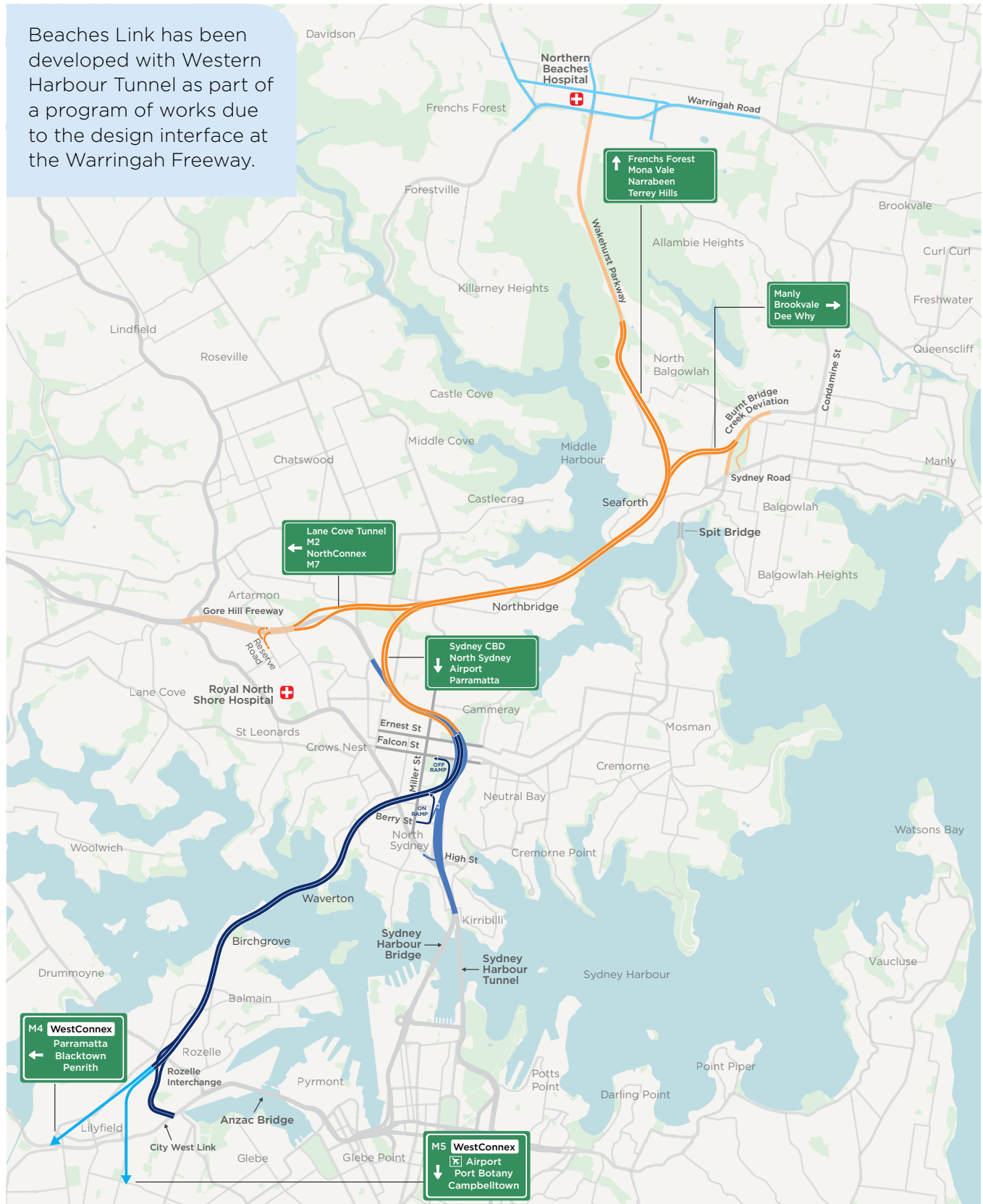
less time in traffic, more time for you

more than
4.3million people
cross **Sydney Harbour Bridge and Tunnel**
by car, bus and train every week



Western Harbour Tunnel and Beaches Link map: combined projects

Beaches Link has been developed with Western Harbour Tunnel as part of a program of works due to the design interface at the Warringah Freeway.



Legend

- Beaches Link
- Western Harbour Tunnel
- Warringah Freeway Upgrade
- Wakehurst Parkway Upgrade
- WestConnex
- Northern Beaches Hospital roadworks

- Motorways
- Major roads

0 1km 2km



Stronger measures on tunnel emissions

Sydney's air quality

Sydney's air quality 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 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.

Although the number of cars is expected to further increase as

our population grows, total emissions from motor vehicles are expected to continue to fall over the next decade due to new, cleaner vehicles replacing older technology vehicles.

Modern tunnel ventilation

Beaches Link will be designed to achieve:

- Strict in-tunnel air quality limits
- 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 air flow is achieved through a combination of traffic flow, tunnel size and ventilation design (jet fans).

Recent NSW tunnels longer than one kilometre are required to have zero ramp emissions, whereas outside Australia almost all road tunnels have ramp emissions.

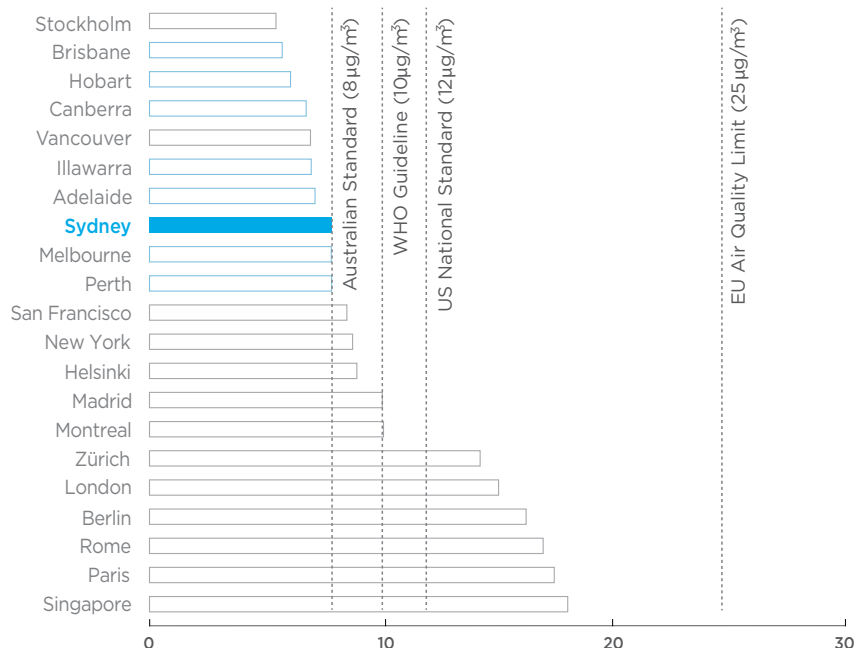
To achieve zero ramp emissions, jet fans draw in air from the exit ramp to ensure a net inflow of air at the ramp so that all tunnel emissions are removed through an elevated ventilation outlet.

This is most efficiently done when the ventilation outlet is positioned near the exit ramp, reducing ongoing energy use and improving effectiveness.

This is why all ventilation outlets for Western Harbour Tunnel and Beaches Link will be located near tunnel exit ramps.

Locations of ventilation outlets for Beaches Link are shown on the maps for tunnel ramps on the following pages.

Australia's air quality standards are stringent by global standards



Air quality in Sydney and internationally

Annual Average PM_{2.5} Concentrations µg/m³

Source: World Health Organization



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



Beaches Link 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.

Once complete, Beaches Link will be continuously monitored at the ventilation outlets to control the ventilation system.

This will ensure that strict limits outlined in the 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 on emissions from motorway tunnels.

The NSW Environment Protection Authority will regulate the ventilation outlets of all current and future operating motorway tunnels in NSW, including the new Beaches Link tunnel.

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

Additional checks will be required before determination of the Environmental Impact Statements for the project.

The Advisory Committee on Tunnel Air Quality (ACTAQ) will coordinate a scientific review of the project's air emissions from ventilation outlets. ACTAQ, which advises the NSW 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.

The Minister for Planning will not approve a motorway tunnel project until the ACTAQ scientific review is considered.

The Beaches Link tunnel will be subject to stringent assessment of the tunnel ventilation systems and ambient air quality in surrounding areas.

Further reading

Roads and Maritime interactive portal on air quality:

[www.rms.nsw.gov.au/air quality](http://www.rms.nsw.gov.au/air%20quality)

NSW Chief Scientist and Engineer:

www.chiefscientist.nsw.gov.au/reports/advisory-committee-on-tunnel-air-quality



Artist's impression of longitudinal tunnel ventilation system.

Design and construction





This section of the project update provides information about the proposed reference design for an integrated transport solution that includes Beaches Link and the Gore Hill Freeway connection.

Most of this project will be deep underground in tunnels.

Community and stakeholder input over the last year has resulted in significant design changes to the project.

Roads and Maritime wants to hear what you think about this proposed reference design.

Roads and Maritime will shortly commence community engagement on the design presented in this project update.

Balgowlah connection – indicative layout

Community input has led to major design changes for the Balgowlah connection.

The Balgowlah connection provides access between Beaches Link and the southern area of the Northern Beaches peninsula, including Seaforth, Manly and Brookvale.

Key features

- The Beaches Link tunnel ramps will emerge in the centre of a widened Burnt Bridge Creek Deviation to the south of Kitchener Street
- The existing Kitchener Street over-bridge will be lengthened and re-aligned with clearances increased to 5.2 metres to allow safer passage of large vehicles in and out of the tunnels
- There will be a new link road between Burnt Bridge Creek Deviation and Sydney Road
- Motorway facilities and a ventilation outlet will be located within the current golf course area. These will be housed in a structure designed to blend with the urban environment.

Benefits

- This provides the opportunity to reconfigure the golf course after construction to provide much needed new open space for the community (see below)
- The new design greatly reduces local impacts. It requires significantly less private property and preserves the Burnt Bridge Creek green space west of Burnt Bridge Creek Deviation
- The new link road reduces pressure on other key roads such as Pittwater Road and Condamine Street and takes pressure off the intersection of Burnt Bridge Creek Deviation, Sydney Road and Manly Road
- This link road provides the opportunity for express bus services to connect to the Sydney transport network
- There is the potential for additional bus stops to be integrated into the design
- The new design maintains active transport along the underpass of Burnt Bridge Creek Deviation and provides new shared user paths.

Future use

- The opportunity exists to reconfigure the golf-course site following construction of Beaches Link
- Roads and Maritime will continue to work with Northern Beaches Council on plans for the precinct, in consultation with the local community
- After construction, it is envisaged Roads and Maritime will leave a terraced, grassed area in a form that is compatible with the future final layout of the site, as developed by Northern Beaches Council
- The final layout of the site will be developed by Council in consultation with the community and key stakeholder groups
- The existing sports field at Balgowlah Oval will be accessible and remain intact throughout construction
- The existing scout hall is unaffected and will remain accessible at all times
- The existing shared path access under Burnt Bridge Creek Deviation will remain open.





The Wakehurst Parkway Upgrade



The Wakehurst Parkway will be a key link between Warringah Road (and suburbs to the north) and Beaches Link at Seaforth, improve connectivity to the Northern Beaches and peninsula and reduce pressure on Warringah Road.

Key features

- Widening to two lanes in each direction between the Wakehurst Parkway connection and Warringah Road
- Free-flowing traffic environment with a posted speed of 80 km/h
- Three-kilometre-long shared user path connecting Seaforth / North Balgowlah with the new Northern Beaches Hospital precinct
- Bus stop bays on both sides of the Wakehurst Parkway
- Multiple shared connections across the Wakehurst Parkway
- Wildlife crossings over and under the widened Wakehurst Parkway.

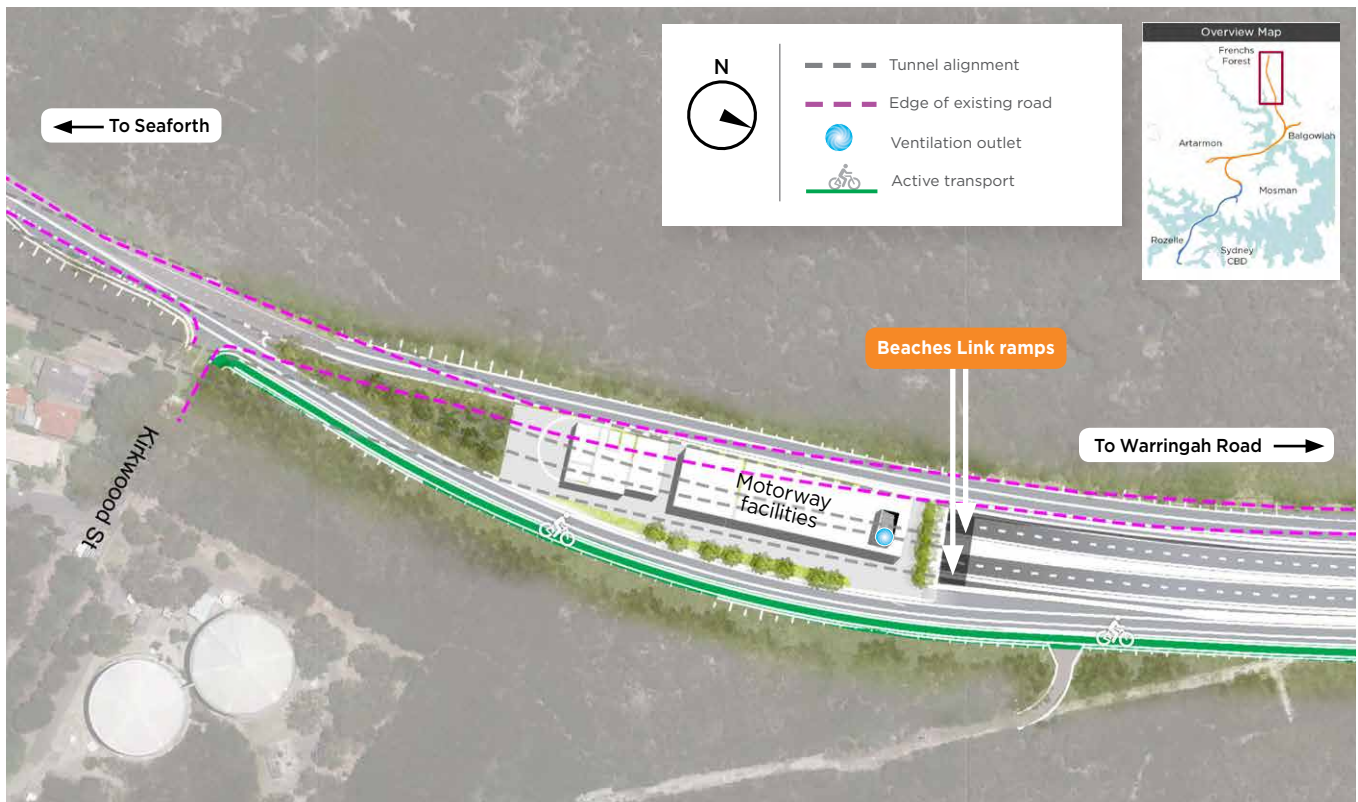


Benefits

- All works will be within the existing road reserve and clear of Garigal National Park and Manly Dam Reserve
- The upgrade improves recreational connectivity between Frenchs Forest and Seaforth
- Wildlife crossings facilitate safe crossing of the Wakehurst Parkway for fauna and provide a safer journey for motorists
- The upgrade improves access to the north of the Northern Beaches Peninsula
- The trails in Garigal National Park and Manly Dam Reserve are safely connected.



The Wakehurst Parkway connection



The Wakehurst Parkway connection will join Beaches Link to the Wakehurst Parkway – a key arterial route that provides direct access to Warringah Road, Frenchs Forest and the north of the Northern Beaches peninsula, as well as acting as a Seaforth bypass.

The proposed location of the tunnel ramps is 300 metres north of Kirkwood Street.

Key features

- Tunnel ramps will emerge in the centre of a re-designed and widened the Wakehurst Parkway to provide for free-flowing traffic bypassing Seaforth
- Motorists who do not wish to enter the Beaches Link tunnels will use a southbound slip lane to stay on the Wakehurst Parkway
- Motorists travelling north on the Wakehurst Parkway will merge with the widened Wakehurst Parkway, just north of the ramps
- A motorway facility and ventilation outlet will be located above the tunnel ramps in the centre of the Wakehurst Parkway
- A shared path connection along the Wakehurst Parkway will link Seaforth / North Balgowlah to the Northern Beaches Hospital precinct

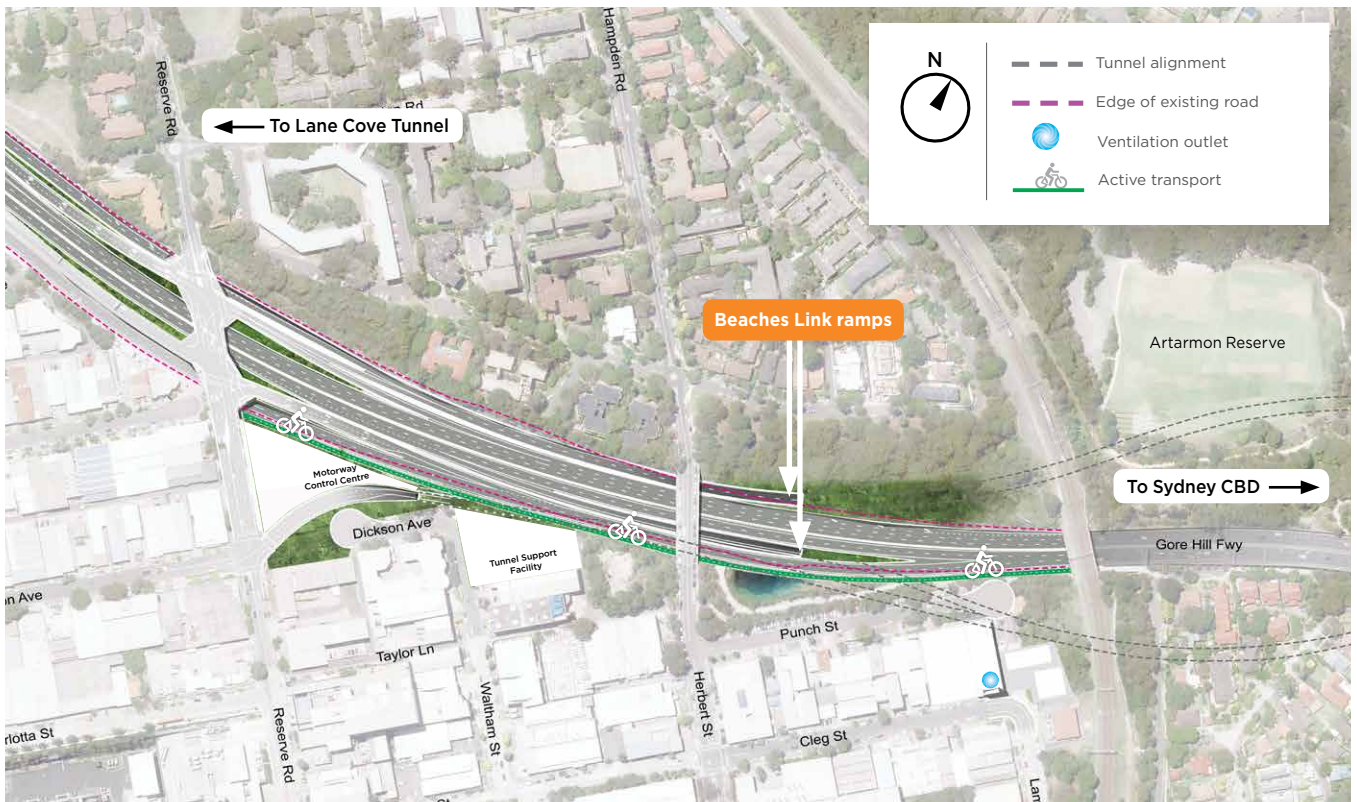
- The design incorporates key features from submissions developed by local residents and workshopped with the project team
- South of the Beaches Link tunnel ramps, the Wakehurst Parkway will remain one lane in each direction.

Benefits

- The design will ensure there are no operational impacts from Beaches Link upon key local streets such as Kirkwood and Judith Streets, as well as Seaforth Oval
- All works will be within the existing road reserve and clear of Garigal National Park and the Manly Dam Reserve
- The connection will improve access to the north of the Northern Beaches Peninsula including the Northern Beaches Hospital precinct
- Provides opportunity for additional express bus services to access the Sydney transport network.



Gore Hill Freeway connection



The Gore Hill Freeway connection provides a direct connection between Beaches Link and Sydney's west and north-west via the Lane Cove Tunnel.

The ramps emerge within and next to the existing Gore Hill Freeway corridor between Reserve Road and the North Shore Rail Line.

Key features

- Beaches Link entry ramp travelling eastbound
- Two Beaches Link exit ramps travelling westbound
- Beaches Link motorway control centre located in the Artarmon industrial area
- A motorway facility and ventilation outlet located in the Artarmon industrial area on the corner of Punch Street and Lambs Road.

Benefits

- Provides relief to Warringah Road and Roseville Bridge corridor
- Takes traffic off local roads such as Eastern Valley Way and Boundary Street
- Improves the connectivity and accessibility from Northern Beaches to major employment areas such as Macquarie Park, St Leonards, Artarmon and Royal North Shore Hospital
- No residential properties in the Artarmon area are required for the project
- No impact on Artarmon Reserve.



Beaches Link vertical alignment

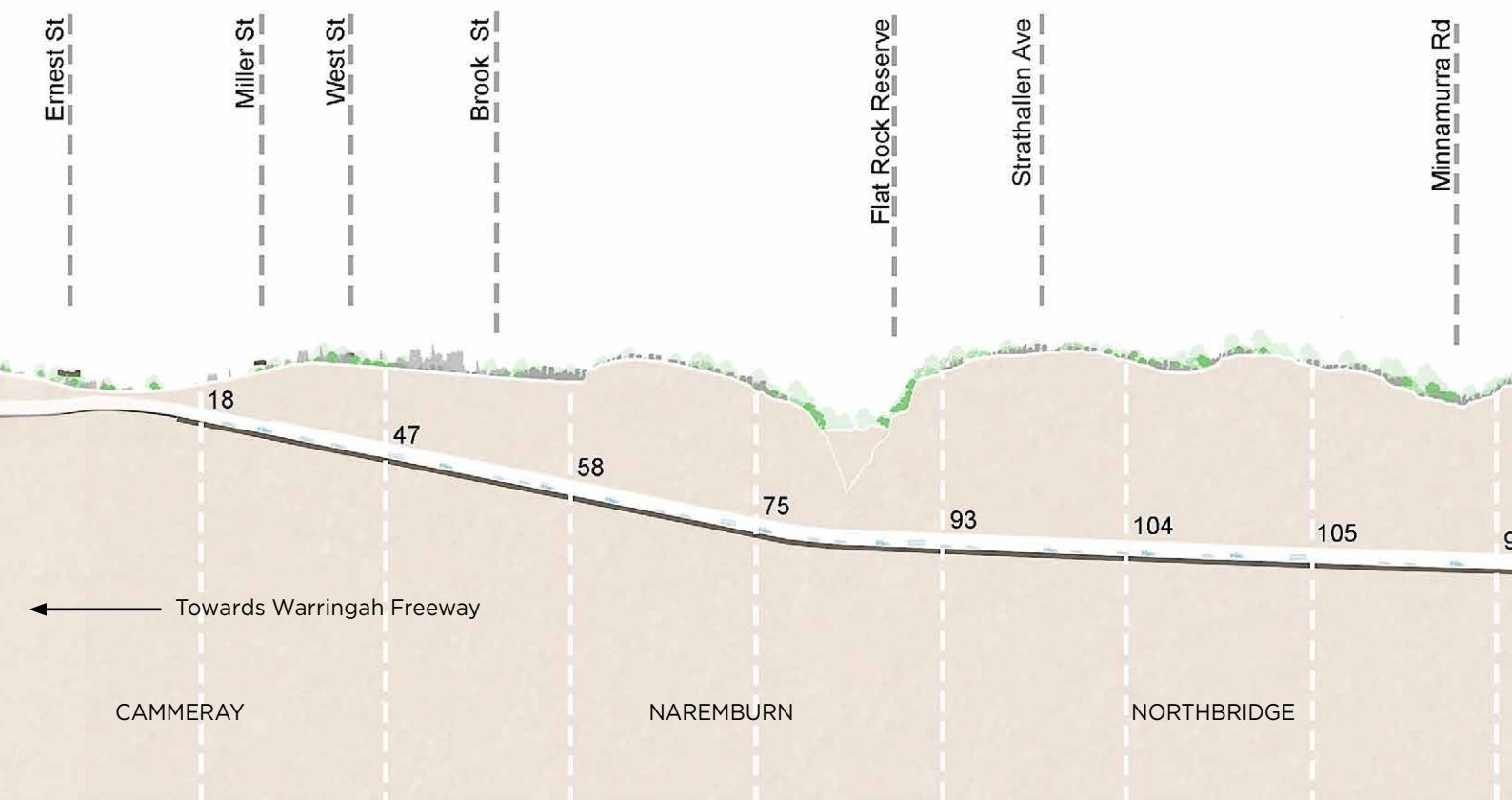
Cammeray to Balgowlah

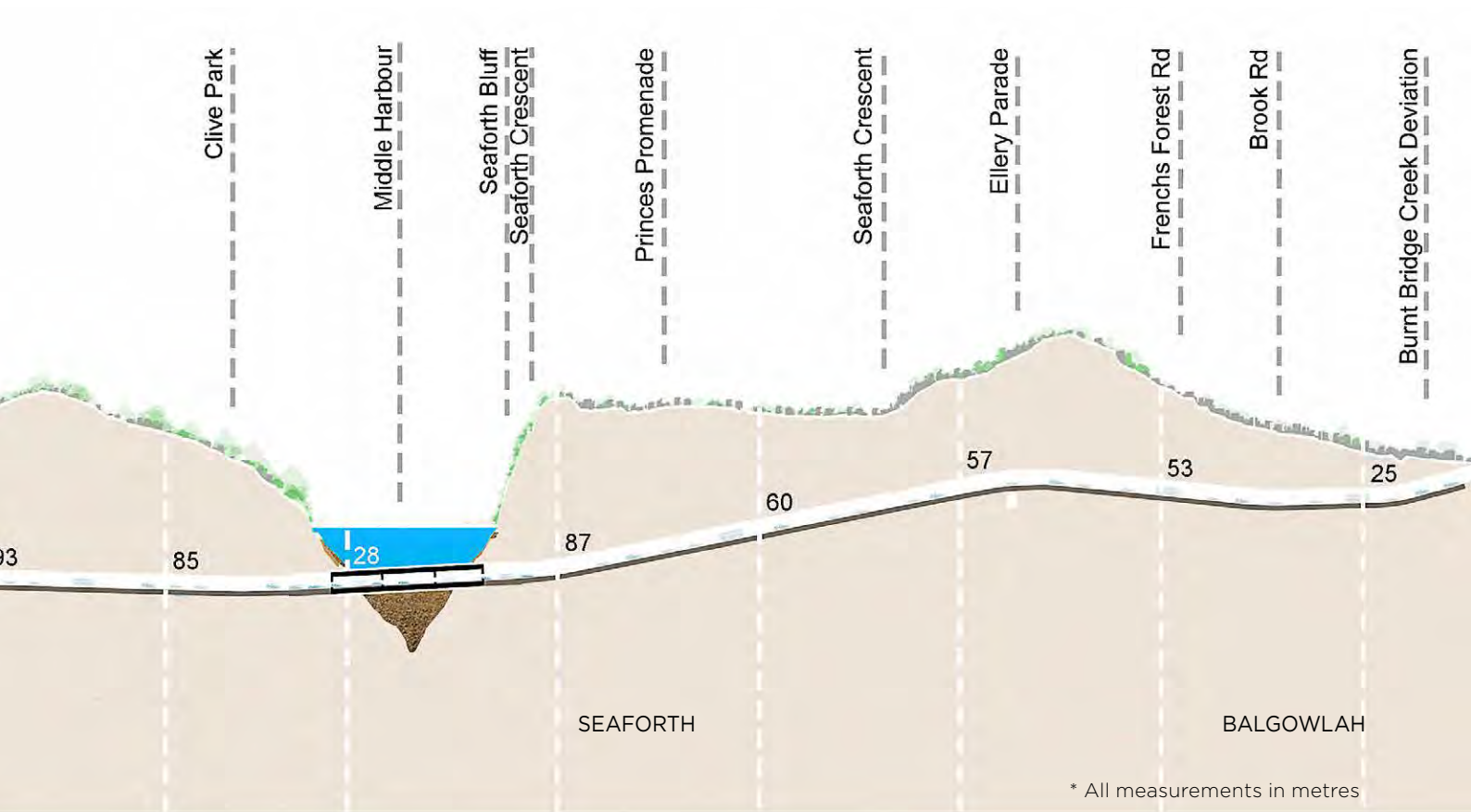
Most of the project will be deep underground in tunnels. This greatly reduces surface impacts, including to private property, communities and the environment.

The tunnels, built mostly through high-quality Sydney sandstone, will be engineered and constructed by industry leaders using world-class technology, and will be world's best practice in terms of safety, efficiency and road user experience.

The vertical alignment diagrams show the approximate depth of the tunnels below the surface along the alignment of the Beaches Link tunnel.

The depths, shown in metres, are measured from ground level to the road surface in the tunnel.





Legend

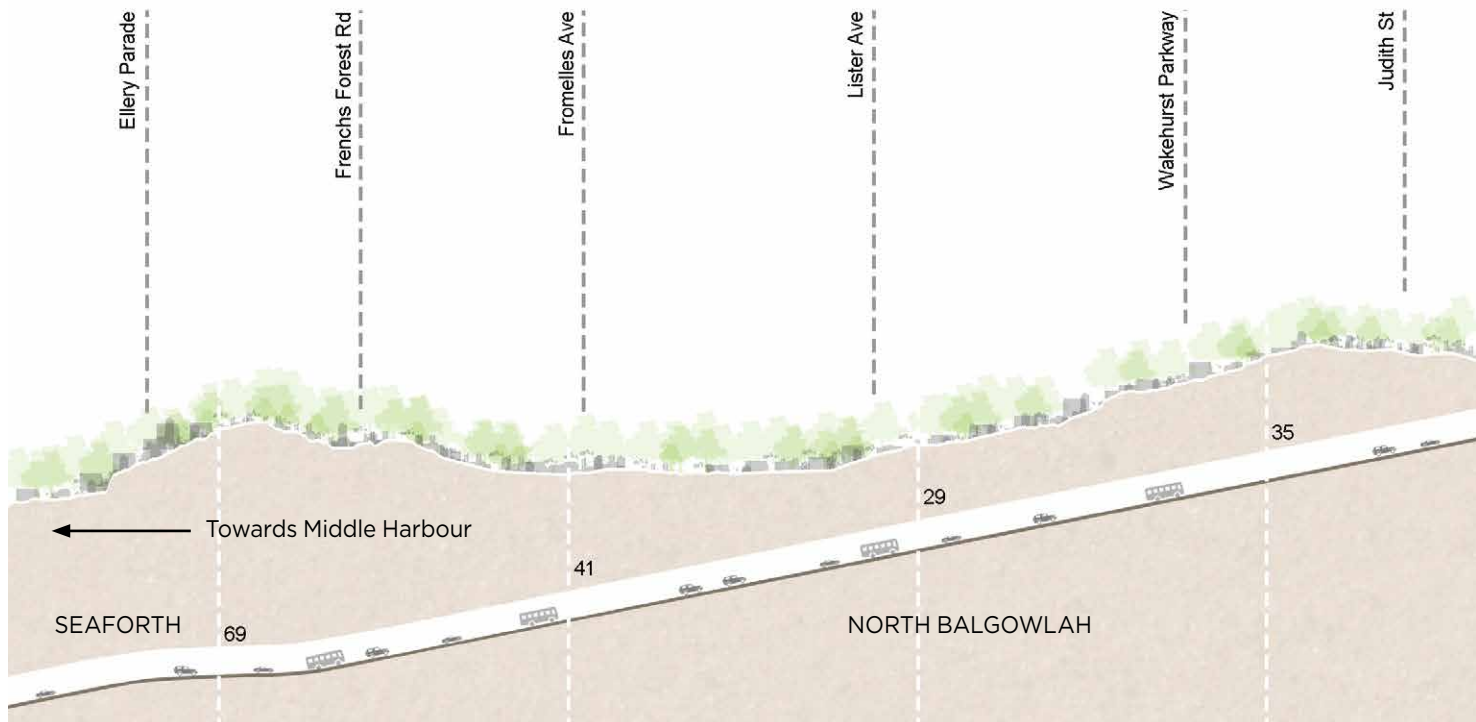


Immersed tube tunnel (IMT)

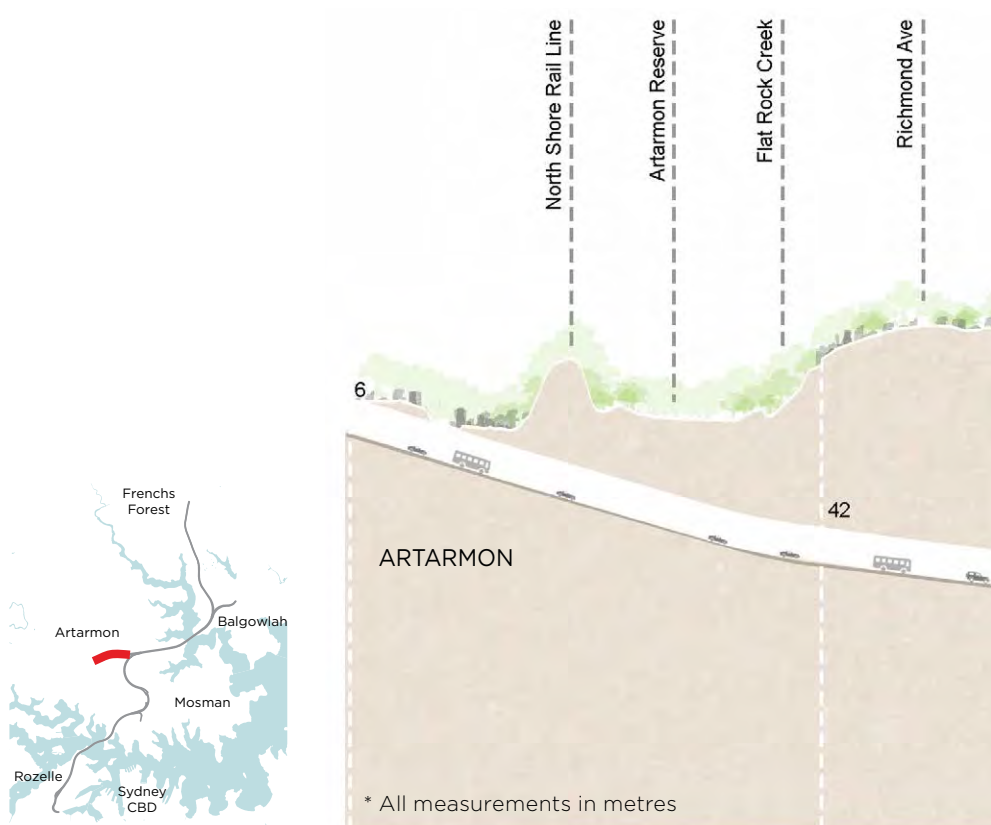
Roadheader tunnel

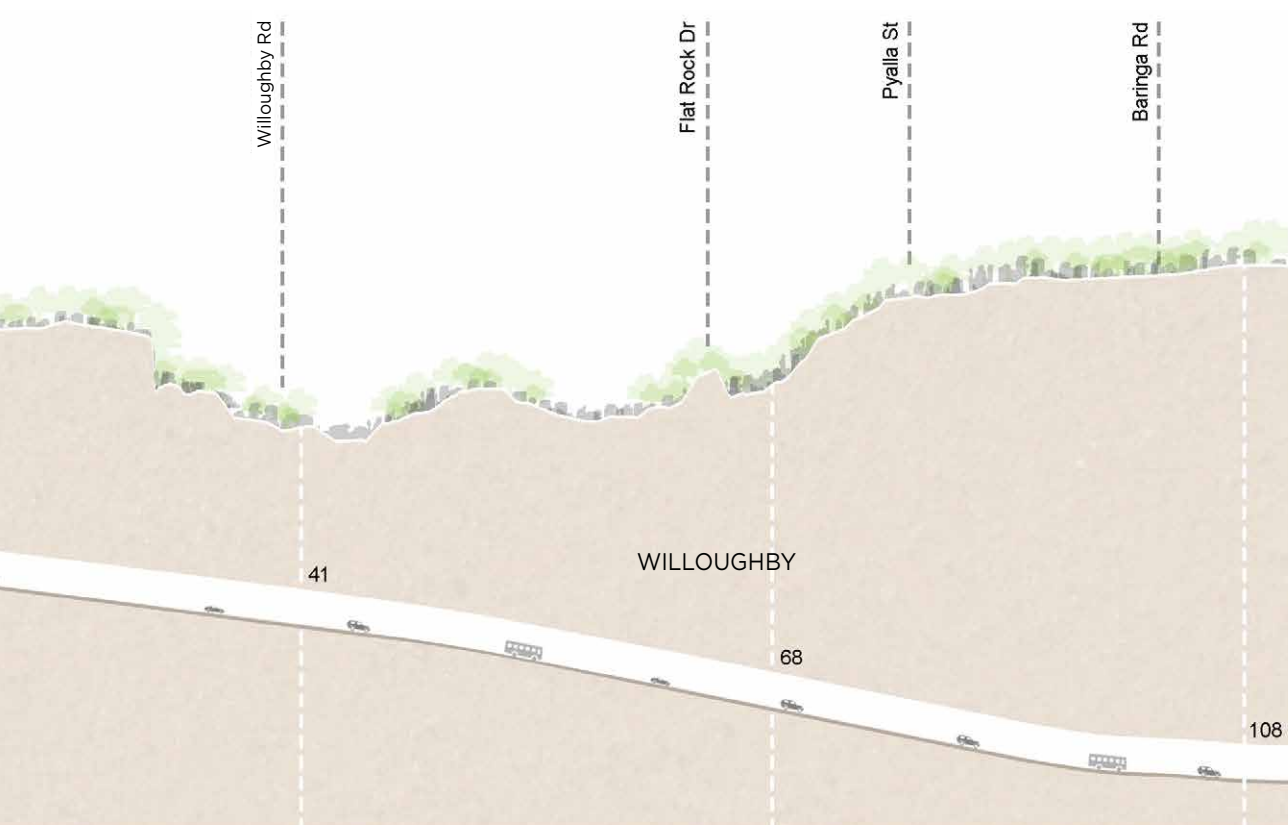
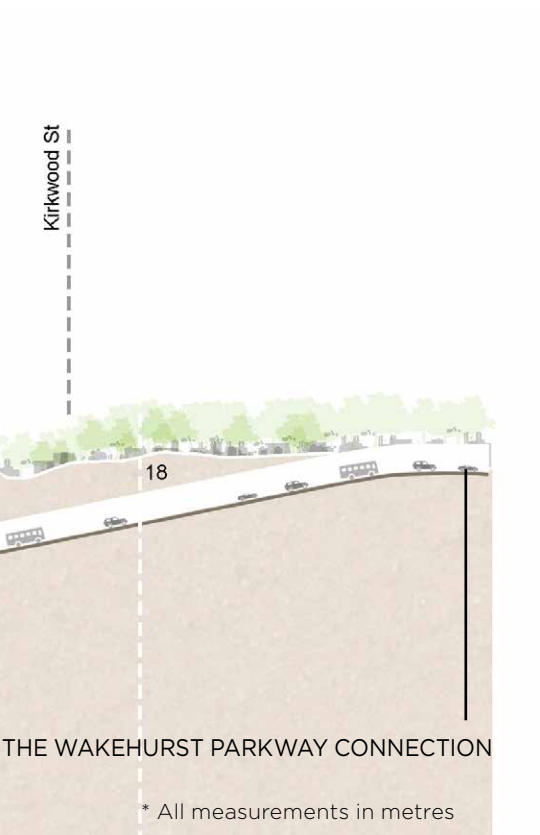
Beaches Link vertical alignment

The Wakehurst Parkway ramp



Gore Hill Freeway connection





Construction

On a global scale, building a major tunnel beneath Middle Harbour as part of a network of new road tunnels will be a significant engineering achievement.

The majority of the project will be in deep tunnels, greatly reducing surface construction impacts and the need for private properties.

To build the tunnels and surface works, construction sites are needed to ensure that:

- Tunnels and surface works seamlessly integrate with the existing road network and connect users to destinations
- Construction machinery, equipment and materials can be stored safely
- Construction personnel have appropriate amenities
- There is adequate access to construction areas for removal of excavated material and delivery of raw materials such as concrete and steel
- There is enough space to build the project safely and efficiently.

All these measures ensure the project can be delivered safely while minimising overall construction times and levels of impact to communities, the road network and the environment.

Tunnel construction

After extensive assessments by a multi-disciplinary team with local and international experience (including design, construction and environment specialists) the preferred method for building the tunnels is:

1. Land tunnels

Using multiple roadheader machines to cut through sandstone at depths of up to 100 metres below Sydney – methodology proven on all road tunnels constructed in Sydney to date.

Spoil from tunnels is a clean and stable fill material, being essentially crushed rock, which is generally beneficially reused at development sites across Greater Sydney. Unless a specific opportunity exists to use spoil as part of the site restoration, all of the spoil will be transferred away from the construction site to suitable end locations.

Tunnelling will be undertaken 24 hours a day, seven days a week to deliver benefits as soon as possible; however hours for spoil haulage will be limited to reduce community impacts.

2. Waterway crossings

Building the crossing of Middle Harbour using immersed tube tunnelling – a proven methodology adopted on many global road and rail tunnel projects (including the existing Sydney Harbour Tunnel).

The construction strategy has been chosen because it:

- Is most suited to the cross section of a modern motorway – reducing excavation and spoil haulage
- Reduces geotechnical risk associated with tunnelling under Sydney Harbour and Middle Harbour – making it safer to build
- Provides the lowest vertical grades – making it easier for cars and heavy vehicles and reducing vehicle emissions
- Provides the shortest and most efficient route.

Immersed tube tunnels have been successfully delivered in sensitive and highly utilised marine environments across the world, with this experience being captured by the project team.

The location and technique has been developed after careful consideration of sensitive marine habitats, natural water flows, contamination, existing uses and heritage items, and will be constructed under strict environmental regulation.

As with many harbours around the world that have an industrial heritage, Sydney Harbour has levels of contamination in some of the bed sediments.

Suitable processes for the removal and disposal of such sediment, and construction in such marine environments, are well understood both domestically and internationally. We have taken expert advice from local and international experts in preparing our design and proposed methodology for handling and managing sediment.

Marine sediment removal is done routinely to keep shipping channels operational, to enable infrastructure works, and to remediate marine environments.

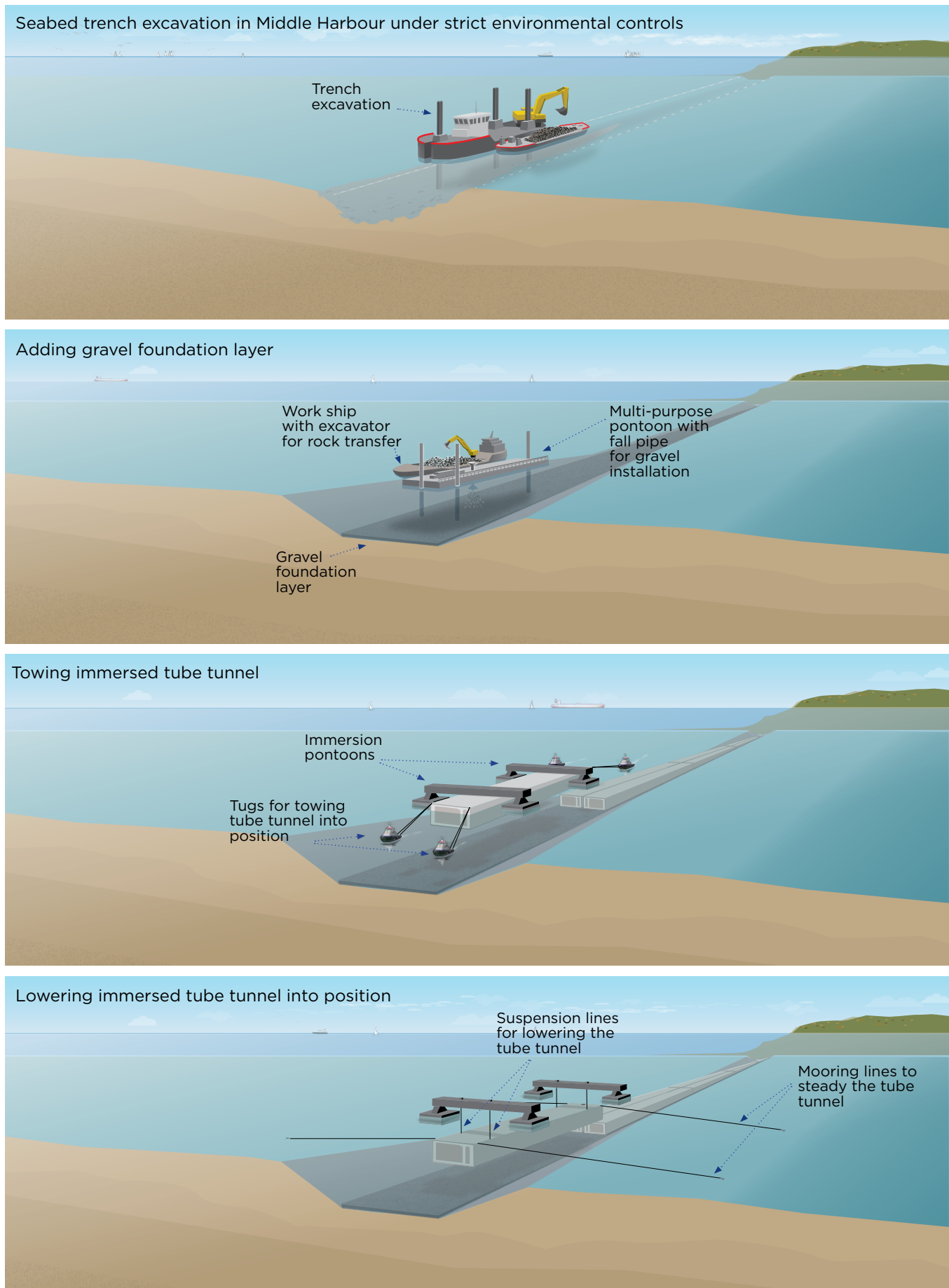
Ultimately, these materials are removed from the marine environment, cleaning up the area in which the works were actually undertaken.

The project team is working with key maritime stakeholders, including Port Authority of NSW, the Harbour Master and Transport for NSW to ensure the appropriate management of impacts to commercial shipping, ferries, recreational activities and other harbour uses.

Construction of an immersed tube tunnel

- Excavation for the immersed tube tunnels and their construction will be subject to stringent environmental safeguards
- Seabed excavated to prepare trench that tunnel units will be laid into
- Immersed tube tunnel units are fabricated elsewhere and then towed into place above the excavated trench
- Immersed tube tunnel units are then lowered one at a time, creating the tunnel.

Immersed tube tunnel construction sequence



Safety is the number one priority

Beaches Link will feature world-class safety systems including:

- Constant video monitoring, including automated analysis systems to identify incidents and immediately alert the tunnel control centre
- Cross passages at regular intervals to allow safe passage from one tunnel to another
- Breakdown bays along the tunnel
- Fire suppression systems
- As a safety precaution, ventilation systems designed to manage smoke in the unlikely event of a vehicle fire in the tunnel
- Comprehensive, tested incident response plans – with response teams on standby at key locations, including tow-trucks.



Temporary construction sites

The proposed construction sites for Beaches Link have been carefully selected, taking into account community and industry feedback.

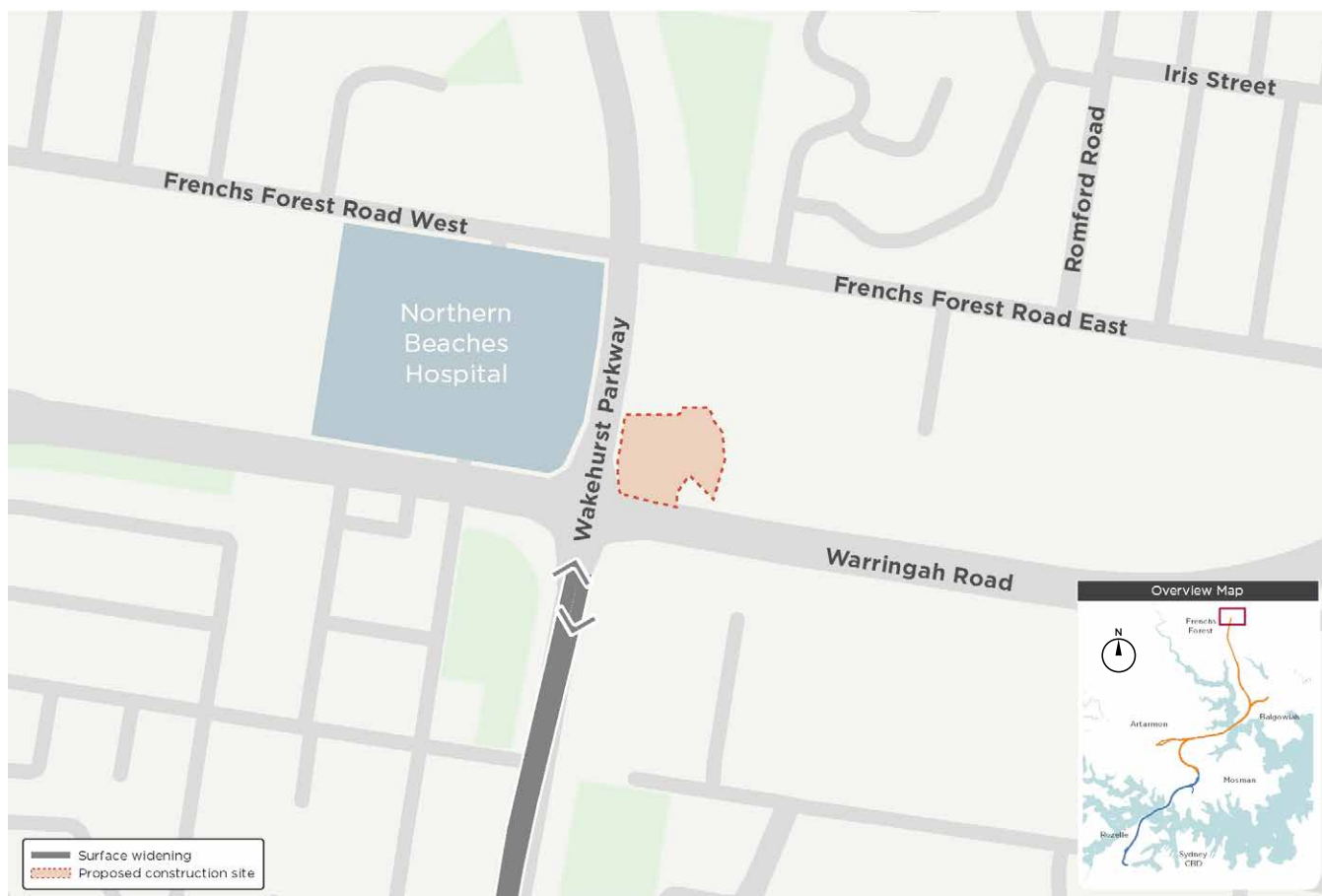
Construction sites are temporary. After works have been completed, they will be remediated for future use.

The sites aim to:

- Minimise the number of private properties acquired
- Minimise impacts to the community
- Minimise impacts to the environment
- Have good main road or water access to minimise the number of trucks on local streets
- Maintain the functionality of open spaces as much as possible
- Provide opportunities for re-use of the sites post construction
- Ensure the works can be delivered safely.

Construction site type	Function	Key activities
Land based tunnelling	<p>These sites enable roadheader tunnelling to occur below Sydney, as well as fit-out of the tunnels</p> <p>The ability to tunnel from multiple sites provides significant construction time savings, delivering project benefits sooner and reducing the duration of construction disruption</p>	<ul style="list-style-type: none"> • Tunnel excavation • Tunnel spoil removal • Tunnel fit-out (concrete, steel, mechanical equipment) • Amenities for workers
Waterway crossings	<p>These sites have two main functions – enabling the immersed tube tunnels to connect with the roadheader tunnels, and fit-out of the immersed tube tunnel sections</p>	<ul style="list-style-type: none"> • Tunnel excavation • Connecting the water and land tunnels • Immersed tube tunnel section fit-out • Tunnel spoil removal • Amenities for workers
Surface works	<p>These sites enable all surface works like road upgrades and widenings required to deliver the connections road users need. The ability to locate these sites next to surface works activities allows for more efficient construction, reducing transportation of machinery and materials through local areas</p>	<ul style="list-style-type: none"> • Road pavement widening and adjustments including temporary traffic staging • Cut and cover tunnel construction • Bridge construction • Drainage construction • Utilities relocations • Amenities for workers

Warringah Road, Frenchs Forest



A temporary construction site is proposed at the corner of Warringah Road and the Wakehurst Parkway to support the Wakehurst Parkway Upgrade works.

When construction is completed there will be a small incident response and maintenance facility located at the site.

This site utilises NSW Government land currently being used for construction of the Northern Beaches Hospital road upgrade.

Key activities

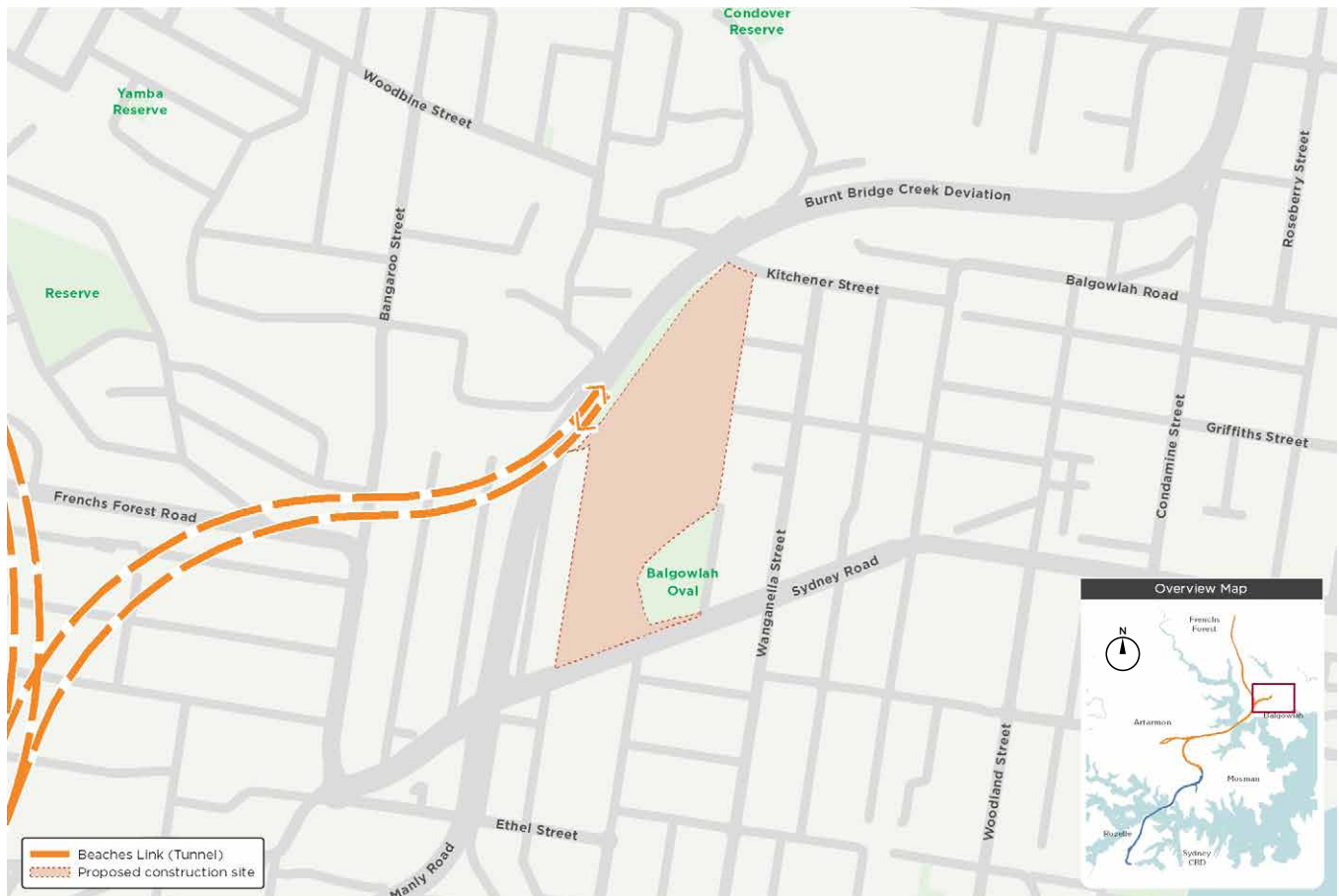
- Support of the Wakehurst Parkway Upgrade works
- Construction of Beaches Link permanent maintenance and support facilities
- Construction of personnel amenities
- Construction materials laydown and storage.

Reducing our impact

- Utilises existing Government land – no need for private property acquisition. This site is being used for the Northern Beaches Hospital road upgrade
- Good arterial road access – keeps construction traffic off local streets
- Minimises vegetation clearing along the Wakehurst Parkway corridor
- Rehabilitation of surplus land will be undertaken in consultation with Northern Beaches Council and local community.



Balgowlah Golf Course



The temporary construction site for the northern portion of Beaches Link will be located within Balgowlah Golf Course.

The site will be used for both tunnelling and surface works activities and construction of permanent facilities.

The majority of the site will be re-purposed post construction for community use.

Key activities

- Entry point for roadheader machines tunnelling south for the Beaches Link tunnels
- Beaches Link tunnel fit-out
- Construction of Beaches Link tunnel ramps
- Construction of motorway facilities

- Staging for all surface works on Sydney Road and Burnt Bridge Creek Deviation
- Supporting Spit West Reserve site.

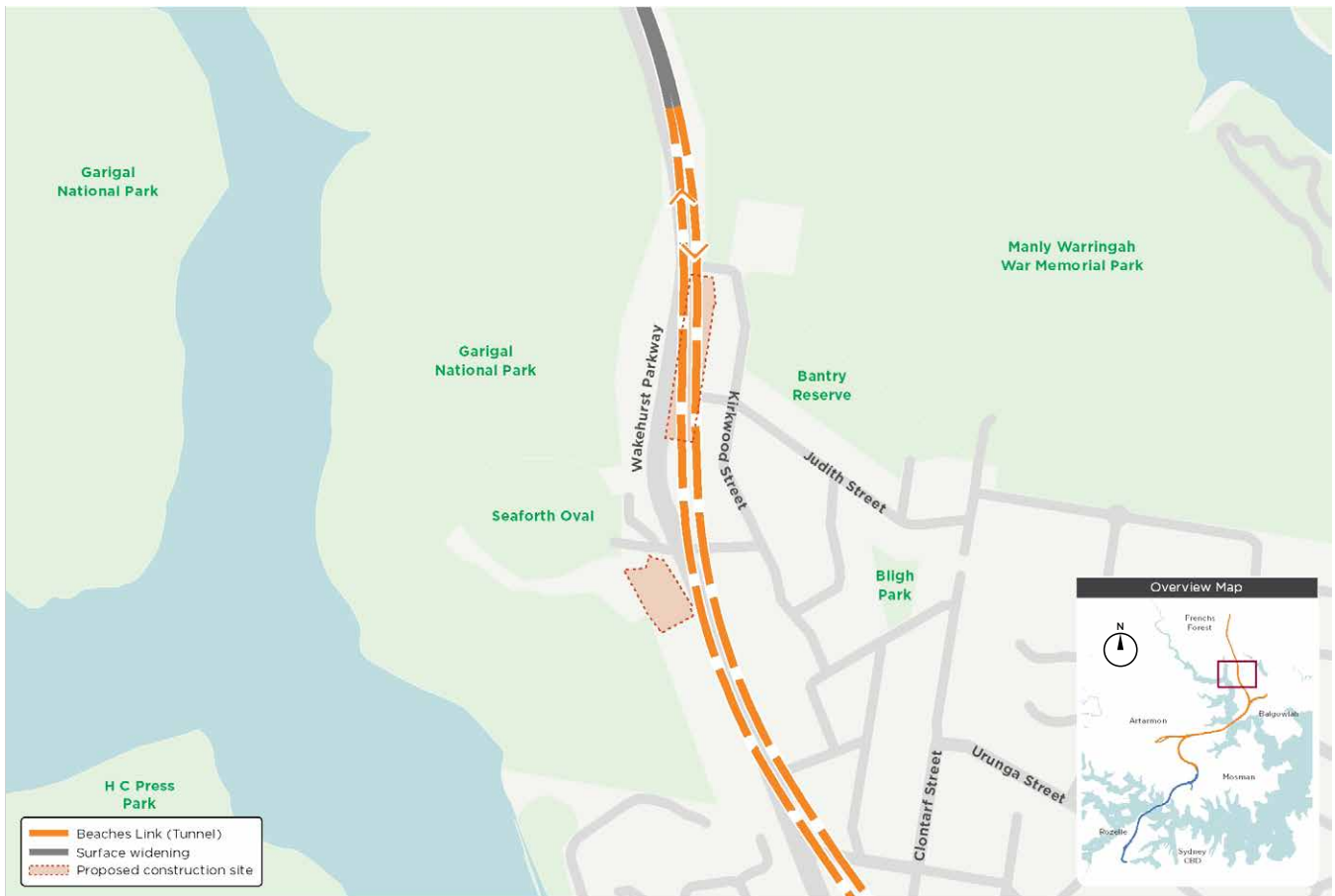
Reducing our impact

- Minimises temporary and permanent impacts to private property in the area
- Minimises impacts to key areas of vegetation and Burnt Bridge Creek
- Minimises disruption to the functionality of key arterial roads that local commuters currently rely on, including Burnt Bridge Creek Deviation and Sydney Road
- Reduces the impact at Spit West Reserve by having key activities located at this site
- No impact to the scout hall

- Potential to reconfigure the golf course site as recreational space post-construction. We will work with Northern Beaches Council on the final form of the site in consultation with the community
- Balgowlah Oval will remain open during construction and access to Balgowlah Oval via Sydney Road footbridge will be maintained
- Acoustic shed for tunnelling works to contain noise and dust
- Good motorway and arterial road access – minimising trucks on local streets.



Option A: the Wakehurst Parkway – west side



A temporary site is required for tunnelling to the ramps (north) and towards the harbour (south) concurrently.

Option A is proposed at the current 'overflow' car park area beside Seaforth Oval, with direct access to the Wakehurst Parkway.

A surface work site is also proposed on the eastern side of the Wakehurst Parkway within Government-owned land to support construction of the ramps further to the north.

Key activities

- Entry point for roadheader machines tunnelling north and south to connect with the Beaches Link main tunnels
- Beaches Link tunnel fit-out
- Tunnel spoil removal
- Support surface works and ramp construction further to the north.

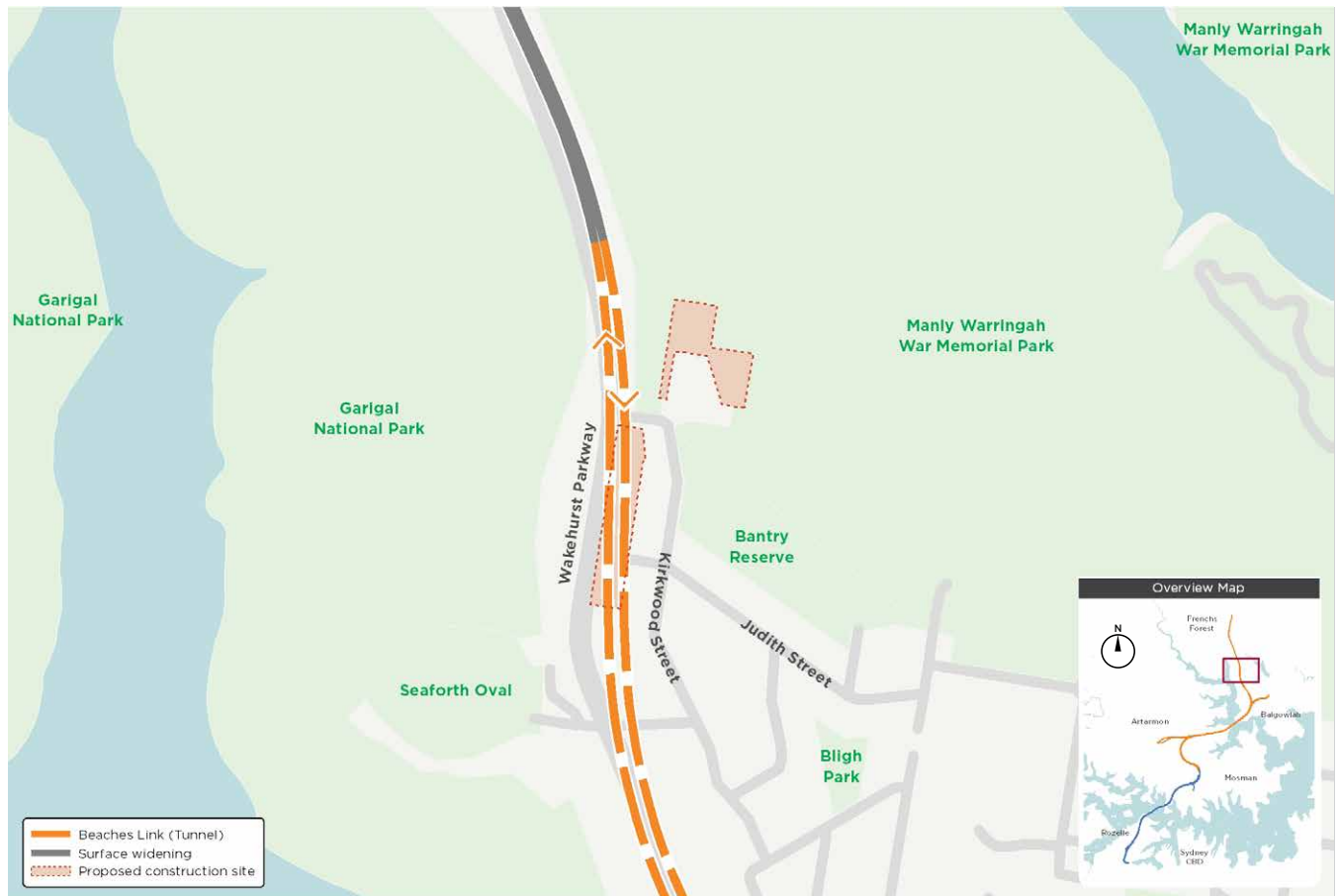
Reducing our impact

- Avoids direct impact to Seaforth Oval
- Avoids need for private property acquisitions
- Less vegetation removal along the Wakehurst Parkway than alternative sites
- Existing number of car parking spaces at Seaforth Oval to be maintained

- Site designed to avoid construction traffic on weekends, when oval will be in peak use
- Acoustic shed for tunnelling works to contain noise and dust
- Signalised intersection provides safe access to and from the Wakehurst Parkway
- Construction traffic to be separated from Seaforth Oval traffic
- Allows tunnelling north and south from the site – reducing construction duration
- Opportunity to re-purpose tunnelling site for community use post-construction (in consultation with local users and Northern Beaches Council).



Option B: the Wakehurst Parkway – east side



A temporary site is required for tunnelling to the ramps (north) and towards the harbour (south) concurrently.

Option B is proposed on Sydney Water land north of Kirkwood Street.

A surface work site is also proposed on the eastern side of the Wakehurst Parkway within NSW Government-owned land to support construction of the ramps further to the north.

Key activities

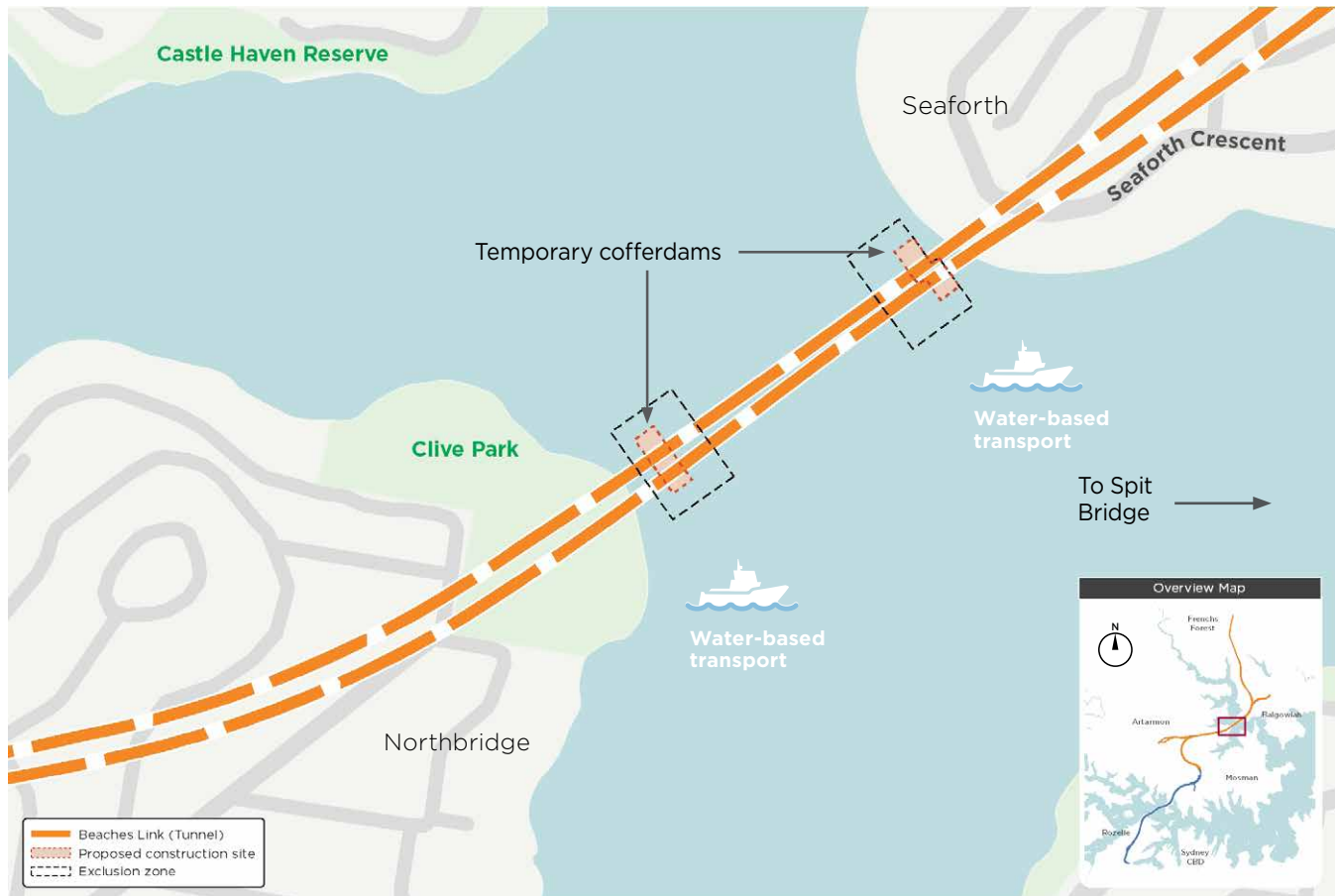
- Entry point for roadheader machines tunnelling north and south to meet the Beaches Link main tunnels
- Beaches Link tunnel fit-out
- Tunnel spoil removal
- Support surface works and ramp construction further to the north.

Reducing our impact

- Avoids interface with Seaforth Oval precinct
- Uses NSW Government-owned land
- Avoids need for private property acquisitions
- Acoustic shed for tunnelling works to contain noise and dust
- Allows tunnelling north and south from the site – reducing construction duration.



Middle Harbour temporary cofferdams



Temporary cofferdams are proposed about 20 metres offshore from Seaforth Bluff and Clive Park.

Key activities

- Temporary cofferdams are needed for the construction of concrete transition structures connecting the tunnels under dry land with the tunnels under the harbour
- Cofferdams are temporary steel structures approximately 50 metres long and 25 metres wide (a bit larger than an Olympic swimming pool) that are drained of water
- These facilities are proposed for the construction of a concrete 'adaptor' (transition structure) connecting the roadheader (land) tunnels and immersed tube (under-sea) tunnels.

Reducing our impact

- Locating cofferdams offshore eliminates direct impacts to private property and foreshore areas
- No permanent facilities at these locations apart from the tunnels below
- No direct impacts to Clive Park or Seaforth Bluff area
- Cofferdams will be supported by water-based transport – keeping trucks off local streets
- The cofferdams will require temporary relocation of some vessels from swing moorings and private jetties
- We will work with boat and property owners and maritime staff to minimise the impact
- There is not expected to be any impact to Northbridge Sailing Club or the safe passage of recreational vessels.



Spit West Reserve, Mosman



A temporary floating work site is proposed in waters off Spit West Reserve for construction of the Beaches Link tunnel beneath Middle Harbour.

It is proposed to fabricate the steel 'shells' of the Beaches Link immersed tube tunnels elsewhere, and then tow these units up through Middle Harbour and the Spit Bridge area to the temporary floating work site.

Here, the steel shells will be reinforced with concrete and fitted out for their future use. Once this work is complete, they will be floated into position and lowered to the sea bed.

The site was chosen as it provides a rare combination of access to both Middle Harbour and direct access to arterial roads.

The majority of the site will be a floating pontoon to minimise impacts to the park.

The area will be fully restored post-construction.

Key activities

- Immersed tube tunnel section fit-out (casting of internal concrete) prior to immersion
- Water-based transport site.

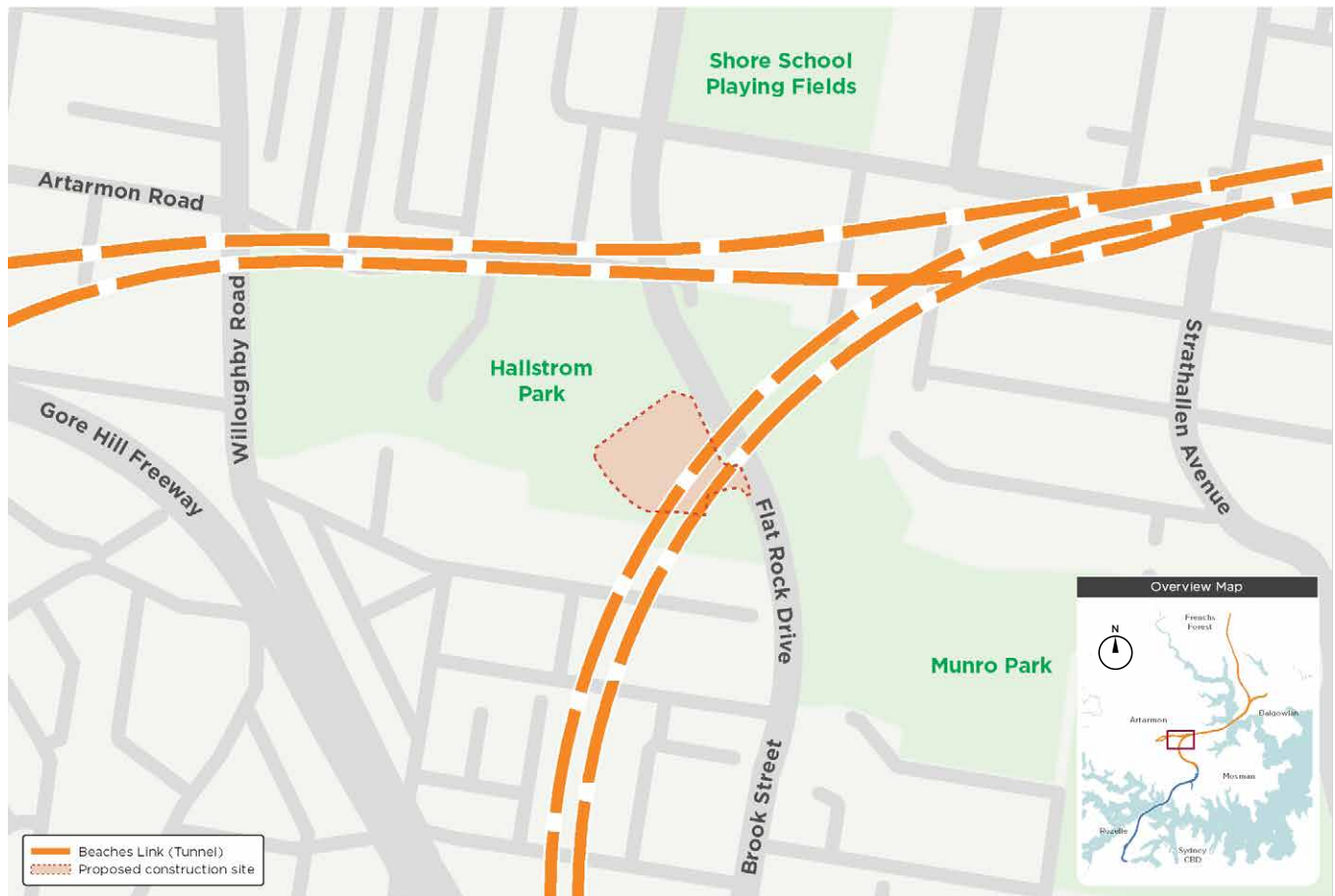
Reducing our impact

- Site has good arterial road access, minimising impacts to local streets
- A floating work site will minimise impact to Spit West Reserve – the majority of the park will remain open
- Pedestrian access along the foreshore will be maintained by providing a safe crossing of the construction access road
- We will work with Mosman Rowers Club to limit impact to the club and maintain safe access to the water

- The temporary pontoon will require relocation of some swing moorings. We will provide temporary moorings in the same area near Spit West Reserve. We will be contacting boat owners and will work with them to minimise the impact of relocation
- There will be no impact to Middle Harbour marina moorings
- Recreational water craft will always have right of way
- Private property acquisition is not required
- Reserve will be fully restored in consultation with Mosman Council and the community.



Option A: Flat Rock Baseball Diamond



This is the primary, temporary tunnelling site south of Middle Harbour. Tunnelling would proceed in both directions from this site.

Option A is located at the current Flat Rock Baseball Diamond, adjacent to Flat Rock Drive.

Key activities

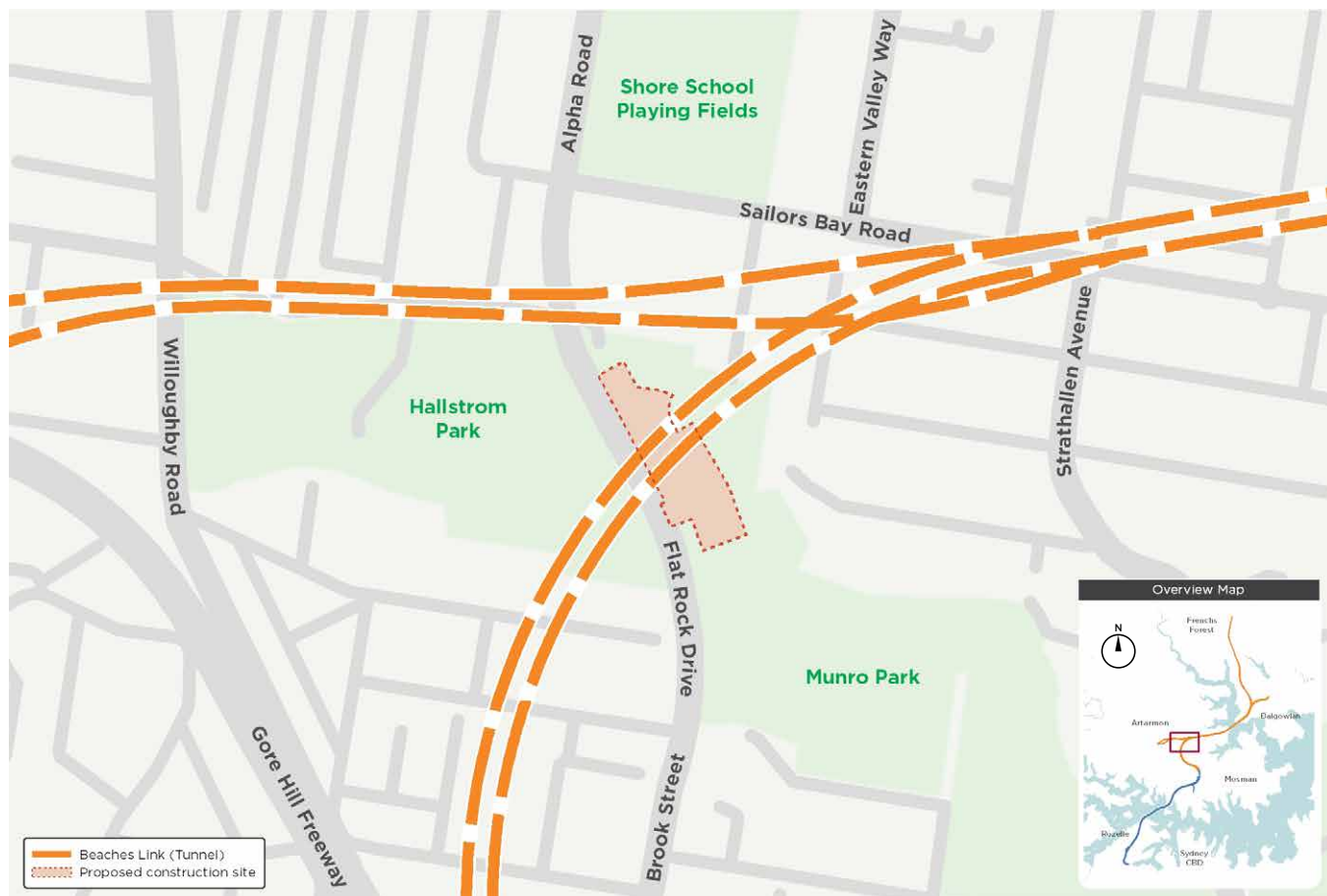
- Entry site for roadheader machines tunnelling north, south and west
- Beaches Link tunnel fit-out
- Tunnel spoil removal by truck directly onto Flat Rock Drive to the Warringah Freeway.

Reducing our impact

- We will work with Willoughby Council and local sports clubs to minimise the impact on sporting activities in the area while it is unavailable during construction
- No impact to Willoughby Leisure Centre indoor facilities, netball courts or car park
- Shared user path remains open for the duration of construction
- Opportunity for major refurbishment of the area following construction

- Single large site in a strategic location reduces the need for additional intermediate sites
- Allows road access directly off Flat Rock Drive to keep trucks off local streets
- No direct impact to private properties
- Acoustic shed for tunnelling works to contain noise and dust.

Option B: Flat Rock Drive



This is the primary, temporary tunnelling site south of Middle Harbour. Tunnelling would proceed in both directions from this site.

Option B is located near Flat Rock Drive in an area re-vegetated by Willoughby Council over the last 20 years.

Key activities

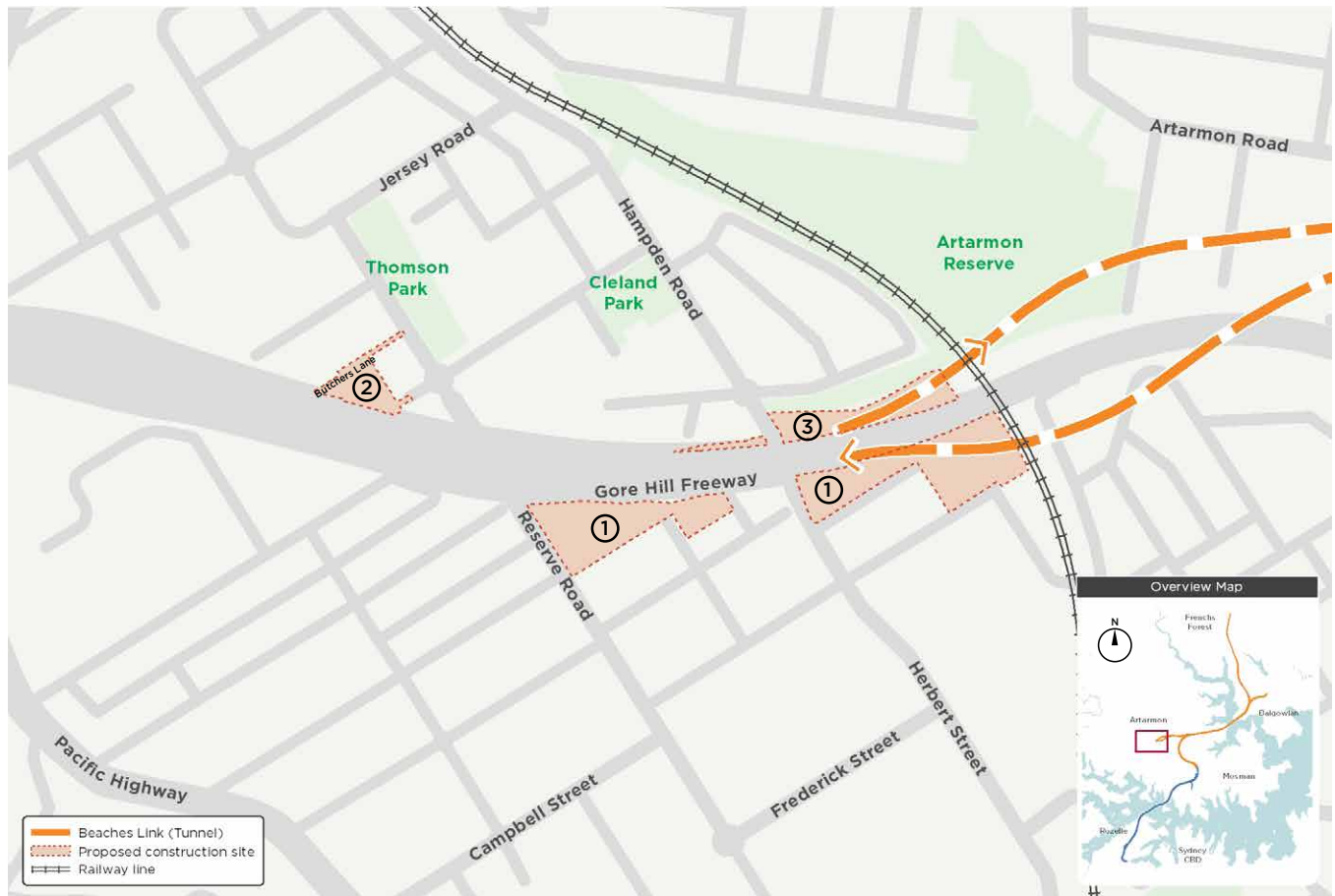
- Entry site for roadheader machines tunnelling north, south and west
- Beaches Link tunnel fit-out
- Tunnel spoil removal by truck directly onto Flat Rock Drive to the Warringah Freeway.

Reducing our impact

- Impact on bushland is limited to an area that has been re-vegetated by Willoughby Council over the last 20 years
- Shared user path to be re-routed and remain open during construction
- Opportunity to provide new recreation facilities, or re-vegetate the site post-construction. We will work with Willoughby Council on the final form of the site in consultation with the community

- No impact to baseball diamond, Willoughby Leisure Centre indoor facilities, netball courts or car park
- Single large site in strategic location reduces the need for additional intermediate sites
- Allows road access directly off Flat Rock Drive to keep trucks off local streets
- No direct impact to private properties
- Acoustic shed for tunnelling works to contain noise and dust.

Artarmon industrial area



Temporary construction sites are required in Artarmon for construction of the Beaches Link connection to the Gore Hill Freeway.

There will also be construction of some permanent facilities in this area.

The selection of sites maximises use of NSW Government-owned and commercial or light industrial areas, to avoid the need for residential property acquisition.

There is no surface impact to Artarmon Reserve and no impact on the operation of the North Shore Rail Line.

Key activities

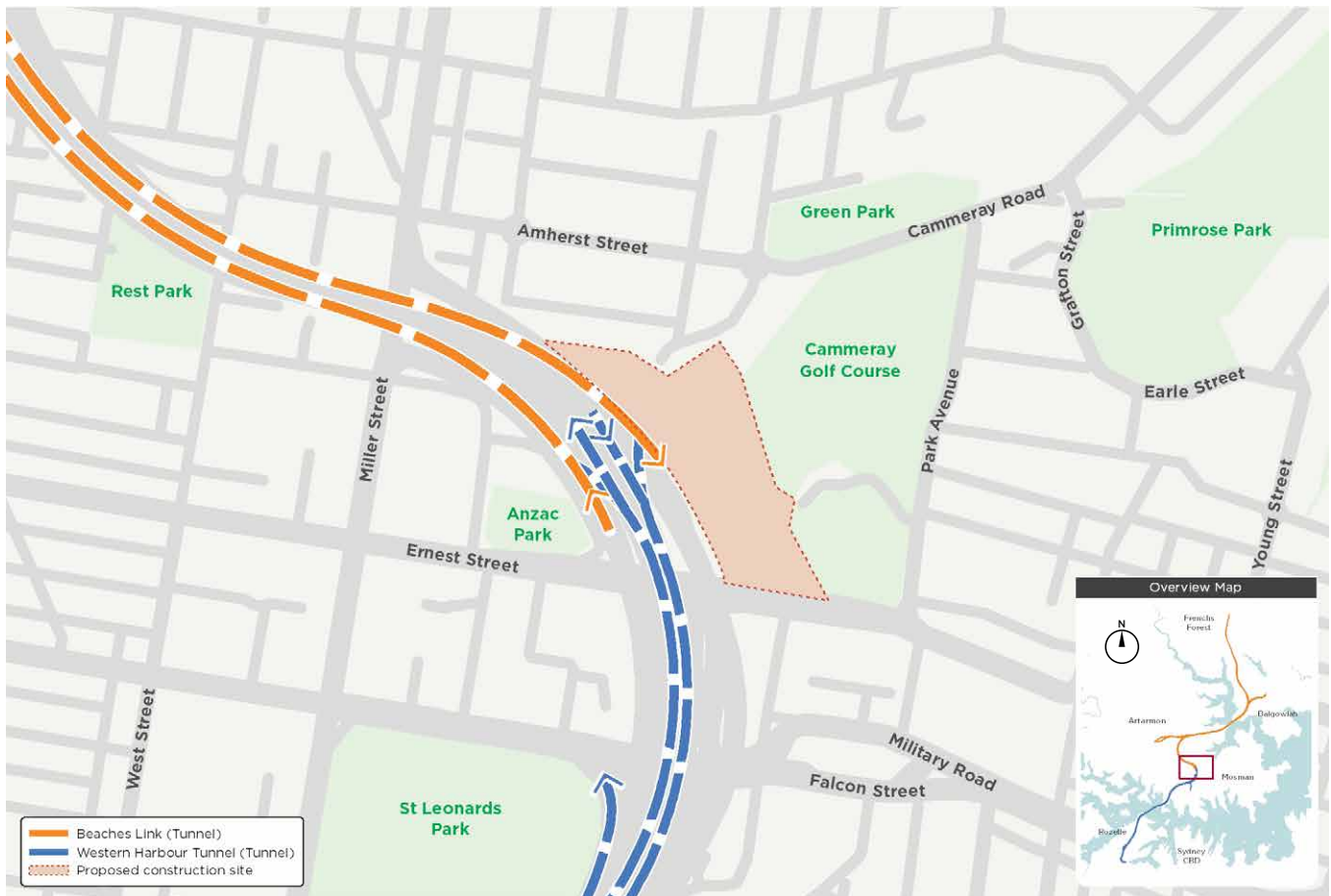
There are three main sites:

1. Artarmon industrial area – integration of Beaches Link into the Gore Hill Freeway and Reserve Road, tunnelling site, and permanent facilities including the ventilation outlet
2. Butchers Lane – surface work support site. This site will only be used if the Artarmon Public School no longer requires the area
3. Northern side of Gore Hill Freeway – tunnel ramp work and widening of the Gore Hill Freeway Corridor between Hampden Road and the North Shore Rail Line to integrate the Beaches Link northbound ramp.

Reducing our impact

- No residential property required
- No surface impact on Artarmon Reserve
- No impact on the operation of the North Shore Rail Line
- Good motorway and arterial road network access – minimising trucks on local streets
- Acoustic shed for tunnelling works to contain noise and dust.

Cammeray Golf Course



Temporary construction site proposed for both tunnelling and surface works for Western Harbour Tunnel, the Warringah Freeway Upgrade and Beaches Link Tunnel.

A number of construction activities have been consolidated into this site to ensure it is used as efficiently as possible. This minimises impacts in other locations around North Sydney and Cammeray, including to private property and parks.

Key activities

- Entry site for roadheader machines tunnelling north and south from the golf course
- Western Harbour Tunnel and Beaches Link tunnel fit-out
- Tunnel spoil removal by truck with direct access to arterial roads and the motorway network
- Storage for construction materials
- Amenities for construction workers
- Construction of the Western Harbour Tunnel and Beaches Link motorway facilities and ventilation outlets
- Construction of Western Harbour Tunnel motorway control centre
- Construction of the new Ernest Street bridge
- Construction staging for the Warringah Freeway Upgrade.

Reducing our impact

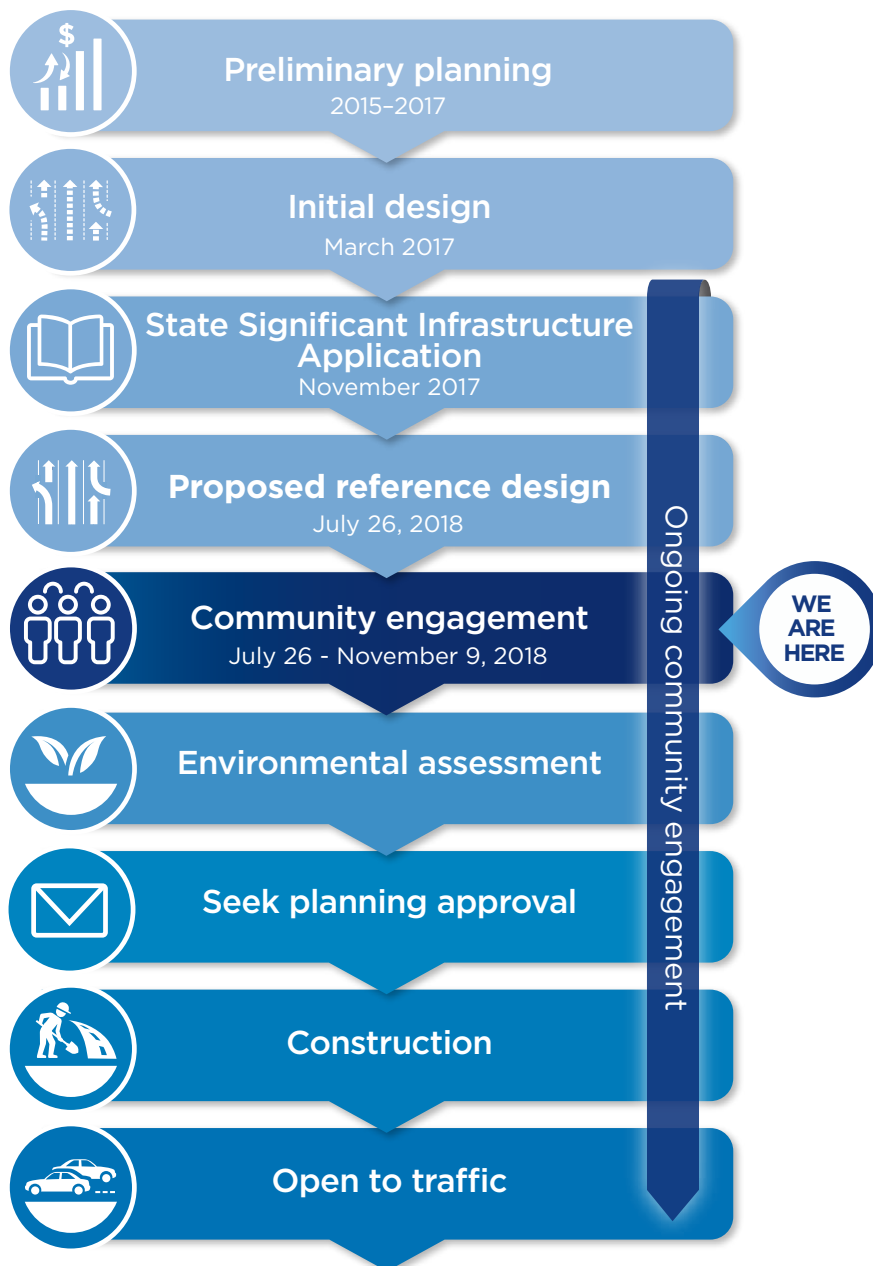
- Minimises the requirements for private property acquisition
- Minimises temporary impacts on St Leonards Park and Anzac Park
- Direct access to the Warringah Freeway and Ernest Street for spoil haulage and construction delivery – keeping trucks off local streets
- Acoustic shed for tunnelling works to contain noise and dust
- No impacts to all-weather football pitch, skate park or tennis courts at Cammeray Park
- We will work with the golf club with the objective of allowing a significant portion of the golf course remains open throughout construction
- Permanent impacts will be significantly smaller than the temporary construction site shown.



Next steps

- Community and stakeholder engagement continues in the second half of 2018
- This will include a series of community feedback sessions, shopping centre displays, workshops and meetings with community groups, including schools and sporting clubs
- Roads and Maritime will work with councils and the community on urban design and final form of spaces used for the project
- Refinement of the design will take into account your feedback. This will include cost estimates to allow the NSW Government to consider its funding options
- Public exhibition of the Environmental Impact Statement based on the refined design
- During the exhibition period, community sessions will be held and formal submissions will be accepted by the NSW Department of Planning and Environment.

**Have
your
say**



We want to hear what you think about where we are up to. Roads and Maritime will shortly commence community engagement on the proposed reference design presented in this document.

This engagement program will conclude on Friday 9 November 2018.

We encourage you to provide us with your feedback to help us develop the best project we can. You can do so by attending one of our community engagement sessions, or by phone or email at any time. See contact details on the next page.

Environmental impact assessments

Once Roads and Maritime has received community and stakeholder feedback on the proposed reference design, Roads and Maritime will refine the design and prepare the Environmental Impact Statements (EISs).

There will be two EISs – one for Western Harbour Tunnel and the Warringah Freeway Upgrade and one for Beaches Link (including the Gore Hill Freeway connection). These will include more detailed information on the project such as:

- A detailed description of the project, construction activities and potential construction staging
- A comprehensive assessment of key environmental issues, including a description of the existing environment, assessment of potential direct and indirect impacts associated with the project from construction through to operation, including noise, vibration, traffic and air quality
- A detailed assessment of proposed tunnel ventilation systems
- Description of measures and strategies to be implemented to avoid, minimise, manage, mitigate, offset and or monitor the potential impacts of the project

- Identification and response to issues raised by stakeholders and the community.

The NSW Department of Planning and Environment will conduct the environmental assessments for Western Harbour Tunnel and Beaches Link.

The EISs will be prepared in accordance with the *Environmental Protection and Assessment Act 1979* and will address the Secretary's Environmental Assessment Requirements (SEARs) issued in December 2017.

You can view the SEARs

by following the link on our project web page www.rms.nsw.gov.au/whtbl or at the Department of Planning and Environment major projects website: www.majorprojects.planning.nsw.gov.au

During the EIS exhibition period, Roads and Maritime will hold a series of display sessions for the community along the project alignment.

Display sessions will be advertised in the local press, on the Roads and Maritime website and via social media.

The EIS documents will be available on the NSW Department of Planning and Environment website.

You can sign up to our project mailing list to receive project updates by contacting the project team. See contact details below.

You will be able to make formal submissions on any aspect of the project once the EISs are on exhibition. These submissions will be considered in the EIS assessment process.

All submissions will be reviewed by the NSW Department of Planning and Environment and forwarded to Roads and Maritime for response.

A report summarising the submissions and the Roads and Maritime responses will be published after the exhibition period.

Roads and Maritime will continue to engage with the community and stakeholders in the lead up to the EIS exhibition, throughout the exhibition period and after it is completed.

You can provide feedback to the project team at any time.

For more information



www.rms.nsw.gov.au/whtbl



1800 931 189



whtbl@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 931 189**. The interpreter will then help you with translation.


Privacy Roads and Maritime Services ('RMS') is subject to the *Privacy and Personal Information Protection Act 1998* (PPIPA) which requires that we comply with the Information Privacy Principles set out in the PPIPA Act. All information in correspondence is collected for the sole purpose of assisting the assessment of this proposal. The information received, including names and addresses of respondents, may be published in subsequent documents unless a clear indication is given in the correspondence that all or part of that information is not to be published. Otherwise RMS will only disclose your personal information, without your consent, if authorised by the law. Your personal information will be held by RMS. You have the right to access and correct the information if you believe that it is incorrect.


Notes


Notes

Contact us

 www.rms.nsw.gov.au/whtbl

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