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To: Department of Planning, Industry and Environment (DPIE) / Reference Western Harbour Tunnel & Warringah Freeway Upgrade EIS Application Number SSI-8863

The Australian Institute of Architects (the Institute) is an advocate for the city with respect to the quality, liveability and sustainability of the built environment. The Institute comments only on major city-shaping proposals which have an important impact on the functioning of the city and the quality of places within the city.

The Western Harbour Tunnel (WHT) and Warringah Expressway Upgrade (WEU) is a significant city shaping project which is highly consequential for the built environment. The project and the subsequently planned Beaches Link Tunnel will have far-reaching effects. However, many of the most immediate effects will occur in North Sydney, so this submission will principally focus on North Sydney.

Our submission is framed by the Government Architect NSW Integrated Design Policy: *Better Placed, Greener Places*, together with *The National Urban Design Protocol*. Each of these documents sets out a framework which aims to create productive, sustainable and liveable places for people through leadership and design excellence. The framework recognises there is a need to create places that are liveable, desirable and sustainable, that cultivate healthy, cohesive and inclusive communities and foster environmental responsibility.

To achieve this the we have adopted following themes when we consider and comment on significant city shaping projects.

1. Safe & Effective
The design contributes to a safer, more effective long-term built environment.

The proposal should:

- Improve the economic and social functioning of the city
- Create a built environment that is safe to build, maintain and use and discourages crime and anti-social behaviors.

2. Responds & Enhances
The design fits sensitively into its place.

The proposal should:

- Reflect its unique built, natural and cultural context
- Speak to Aboriginal culture and stories
- Connect to the past, the heritage of a place and the community and its art and culture
- Fit the landform and landscape character – views, skyline
- Respond to the local climate – winds, solar access, heat/cold
- Fit the scale, grain and qualities of the local urban and built fabric.

3. Connected & Healthy
The design increases connectivity and improves active transport connections.

The proposal should:

- Increase connections to places with jobs, schools, shops, facilities and services
- Encourage physical activity and social interaction
- Improve walking and cycling choices
- Connect people to the natural environment and healthy lifestyles.

4. Enduring & Resilient
The proposal contributes to the quality of the built environment.

The proposal should:

- Contribute to a long-term high-quality public domain - craftsmanship, materials, durability
- Improve the amenity of the public domain – lighting, shade and shelter, reduced noise and air pollution, reduced heat island effect
- Achieve resilience in the face of a changing climate and extreme weather events.

5. Environment & Ecology
The proposal contributes to environmental quality of NSW, Australia and globally.

The proposal should:

- Contribute to the green grid - canopy trees, community parks
- Reduce the drain on resources (water, energy waste)
- Improve biodiversity protection & recovery
- Sequester carbon and regenerate the environment.

Quality of the built environment in North Sydney CBD

Objection: The Institute objects to the adverse impacts on the built environment, pedestrian safety and sustainable transport that will result from worsening traffic in the North Sydney CBD which will be a consequence of the proposed design.

Problem: Reliance on Berry Street for access into the Western Harbour Tunnel and Beaches Tunnel. Berry Street is an important CBD street in North Sydney. Prior to the advent of the Tunnels project, plans were being developed to improve the CBD including to make the street two-way. Berry Street is also the location of the new Victoria Cross Metro Station. North Sydney is one of the most important CBDs in Australia. Pedestrian amenity and sustainable transport should be paramount in this setting.

Result: Reliance on Berry Street for access into the Western Harbour Tunnel and Beaches Tunnel has the effect of characterising this street as major traffic artery in the heart of the CBD. This has the result of diminishing the quality of the public domain and the built environment in North Sydney in the following ways:

- Increasing private motor vehicle traffic in North Sydney CBD and Miller Street
- Losing street parking which serves an important function shielding pedestrians
- Lengthening pedestrian crossings at CBD intersection through lost pedestrian blisters
- Increasing pressure to set traffic light phases to favor traffic over pedestrians and cyclists
- Increasing pressure on intermodal public transport function of North Sydney, particularly buses
- Permanently losing opportunities to improve the public domain such as the potential to return Berry Street to two-way.

Recommendation:
Modify the design, possibly including the position of portals, to protect amenity and sustainable transport in North Sydney. The absolute performance measure for the design should be improvement of the built environment: reduced surface traffic in North Sydney; improved amenity; and improved sustainable transport function.
Conditions of approval: 1. Undertake a review of the traffic design of the WHT/WEU project seeking modifications which will protect and improve the built environment in North Sydney. 2. Following the above review, undertake an urban design investigation for North Sydney CBD to improve amenity in the public domain through projects such as footpath widening, upgrades, and other public domain improvements.

Traffic on local streets

Objection: The Institute objects to the adverse impacts on the built environment, pedestrian safety and sustainable transport that will result from worsening traffic on local streets which will be a consequence of the proposed design.

Problem: The proposal will result in the loss of connectivity between local streets and the motorway system. The set of existing motorway connections collectively distributes the traffic across a number of local streets. This connectivity plays an important role in the quality of life and the amenity of the built environment in this part of the city. Under the proposal, cars will be forced into longer routes, travelling further on local streets to reach the remaining access points. Furthermore, this problem is exacerbated by additional traffic on local streets seeking to access the proposed tunnels.

The Miller Street corridor is particularly sensitive from Cammeray to North Sydney, because it includes twelve (12) schools, including elementary, primary and high schools. As such it has more than 10,000 children walking in the area as well as parents picking up and dropping children. Traffic in this corridor is made significantly worse by the proposal.

The main problems are as follows:

- Lost connection for traffic from North Sydney CBD to Neutral Bay, Cammeray and Mosman using Berry Street via the motorway to Falcon Street westbound and Military Road eastbound. Result: Northbound and eastbound traffic from North Sydney CBD will use local roads such as Miller Street and High Street.
- Northbound traffic from Sydney Harbour Bridge and Sydney Harbour Tunnel will no longer be able to access Falcon Street westbound. Result: worse traffic in Cammeray and North Sydney.
- Lost connection for northbound traffic from the Sydney Harbour Tunnel to: Falcon Street eastbound; Miller Street and; Brook Street. Result: longer routes on local streets in North Sydney, Neutral Bay and Cammeray (or longer route using Cahill Expressway and Harbour Bridge).
- Connection lost for southbound traffic from Brook Street to the Sydney Harbour Tunnel (also no connection to WHT). Result: longer routes on local streets through Crows Nest, Willoughby, Cammeray and Narremburn leading to increased congestion, for example on West Street and Alexander Street.
- Connection lost between Ernest Street and Sydney Harbour Bridge for Northbound and Southbound traffic. Lost direct connection to important local routes along Park Avenue and Ourimbah Road. Result: Longer traffic routes on in local streets in Cammeray, Neutral Bay, Mosman and Cremorne for example Merlin Street and Young Street.

The EIS states the performance of the following intersections will fail at peak hours:

- Miller St and Falcon St
- Miller St and Berry St
- Miller St and Ernest St
- Miller St and Amhurst St
- Pacific H/way and Bay Rd
- Pacific H/way and Berry St
- Military Rd and Ben Boyd Rd

Result: Reduced amenity in the public domain is the result of heavier traffic on local streets through the impacts of noise, air pollution and physical presence of the vehicles. Additional traffic

also limits the potential for future works to improve amenity through measures such as: footpath widening, pocket parks and outdoor dining. Specific unwanted outcomes anticipated include:

- Reduced safety of the public domain, which results from heavy traffic on local streets through increased difficulty crossing intersections
- A less pleasant public domain, which reduces people's propensity to walk, thereby diminishing the passive surveillance achieved with pedestrian traffic
- Further diminishment of passive surveillance through architectural design responses to heavily trafficked streets, which tend to be fortified to deal with the environment
- Diminished opportunities for sustainable transport resulting from heavier private motor vehicle traffic and competition at intersections and road space with more sustainable transport options such as walking, cycling and buses.

Recommendation:
Modify the design to prioritise safety, amenity and sustainable transport, for example by retaining all existing connections to the motorway system. The absolute performance measure for the design should be improvement of the built environment: reduced surface traffic in the local street network; improved amenity; improved safety, and; improved sustainable transport function.
Conditions of approval: 1. Undertake a review of the traffic design of the WHT/WEU project seeking modifications which will protect and improve local traffic connectivity and function. 2. Following the above review, undertake an urban design investigation across the areas impacted by the project to improve amenity in the public domain through projects such as: footpath widening; pocket parks, upgrades; and other public domain improvements. 3. Undertake a project to improve sustainable transport in the areas affected by the projects. This should include elements such as: walkability; pedestrian networks; bus routes; and shelters.

Air Pollution

Problem: The tunnel extends from Rozelle to Cammeray and is 7.2km in length. Note also that the plan is that the emissions from the Beaches Link Tunnel (not part of this EIS) will also be discharged unfiltered from this same stack. Furthermore, the additional surface traffic adds to the pollution load. Concerningly, theexhaust stacks at Cammeray are less than 200m from the new ANZAC Park Public School.

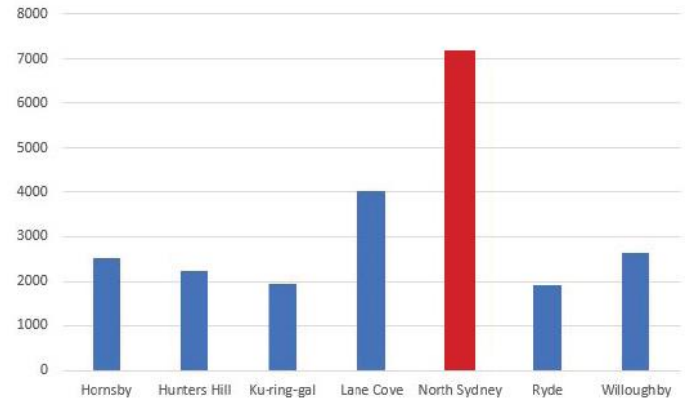
Result: The quality of the air in Rozelle and North Sydney will be degraded by the emission of pollutants such as carbon monoxide, nitrogen dioxide, hydrocarbon residues and fine particulates. The preservation of good air quality is fundamental and vital to the health of the community. The health of and Rozelle and North Sydney will be adversely impacted by this proposal because of the design of the in tunnel ventilation system and the location of the emission stacks.

Recommendation:
The proposal should examine what opportunities exist to improve the situation if the were to adopt this position. The objective should be to ensure that pollution should be no worse than would be the case without this project.
As *Conditions of Approval*, we recommend: 1. The installation of transverse ventilation during construction – tunnels in Madrid, Tokyo and Stockholm offer strong precedents. 2. Alternately install filtration technology in the stacks, compliant with International Best Practice. The recently completed Central-Wanchai bypass tunnel in Hong Kong is a precedent. 3. That diesel heavy vehicles be banned from using this tunnel, as is the case for other tunnels over 4.5 kms in length (examples are the Paris Duplex Tunnel and Istanbul's Eurasia Tunnel).

Public Green Space

Objection: The Institute objects to the adverse impacts on the built environment, recreation and livability that will result from the loss of green space which will be a consequence of the proposed design.

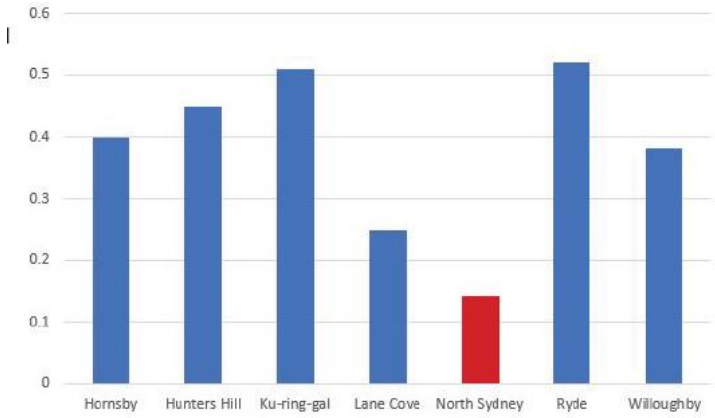
Problem: The proposal is for the loss of more than 26,000m^2 of public recreation space in Cammeray Park. Under the current design this would be permanently replaced with the large sheds for the control centre and the motorway itself.



Persons Per Hectare

Source: Recreational Needs Study 2017

North Sydney has the highest population density among the local government areas in the Northern District, with over 7000 persons per hectare. Population density is effectively further increased with the workforces of North Sydney, St Leonards and Crows Nest.

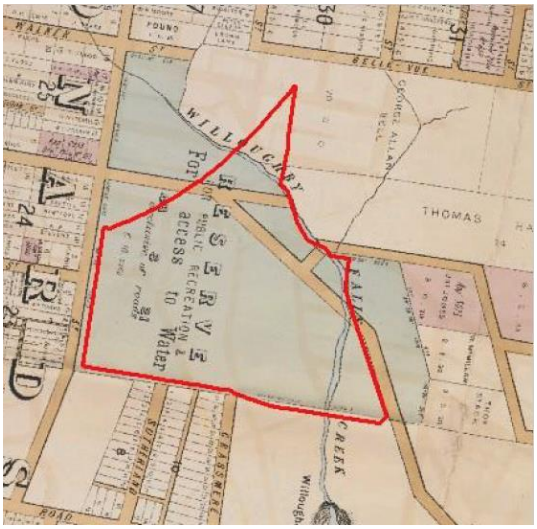


Recreation Space Per Person (Ha)

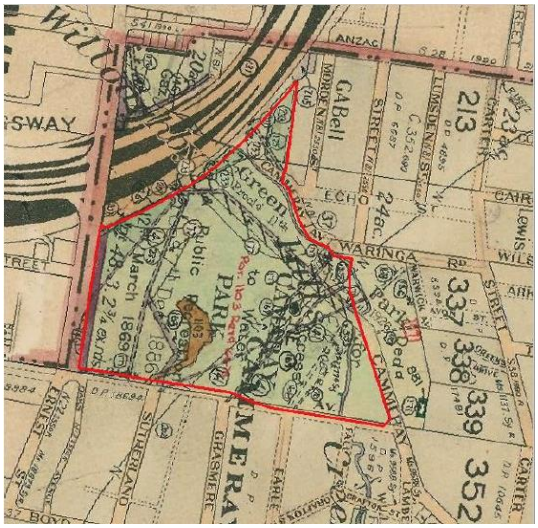
Source: Recreational Needs Study 2017

North Sydney has the smallest area of recreation space per person among the local government areas in the Northern District, with less than 0.15 hectares per person. This does not include the need associated with the large workforce in North Sydney who live elsewhere.

Cammeray Park forms part of a network of open spaces in North Sydney that establishes an almost-continuous green belt between Middle Harbour and the ridgetop parkland. Primrose Park/ Cammeray Park/ ANZAC Park/ Jeafferson Jackson Park/ St Leonards Park.



1887 the area is reserved for public recreation and access to water, this being the catchment of Willoughby Falls Creek. The spectacular waterfall remains at the head of Primrose Park.



1965 the Warringah Expressway devides the parkland separateing the western part of Cammeray Park to become ANZAC Park.

The Proposal is to:

- Permanently reduce public recreation space by more than 26,000 m2
- Erect two large industrial sheds in the area which had been parkland
- Enlarge the separation between the parks from 200mto 330 metres
- Sever the pedestrian path that crosses Cammeray Park and golf links between Ernest Street and Warringah Road
- Remove the lake in Cammeray Park.

Result: In a high-density part of Sydney with a growing population the result of the existing design is the loss of open space and loss of potential green links. The proposal fails to satisfy the key matters for consideration in a city shaping project with respect to public green space on the following grounds:

- Safe and effective - The design does not contribute to a safer, more effective long-term built environment because it adversely impacts the potential for recreational and social activity which would otherwise occur in the 2.6ha of green space being lost
- Responds and enhances – The design does not fit sensitively into its place, rather it exacerbates a problem that was created in the 1960s
- Connected and healthy - The design fails to increase connectivity and improve active transport, because it severs pedestrian links, enlarges gaps in the green network and reduces public recreation space
- Enduring and resilient – The proposal fails to contribute to the quality of the built environment because the loss of green space will exacerbate the urban heat island effect and reduce the likelihood of future improvements such as the missing pedestrian links such as from Cammeray Park to Miller Street at Cammeray
- Environment and Ecology – The proposal fails to contribute to the green grid or to the biodiversity protection and recovery.

Recommendation:
The proposal should examine what opportunities exist to improve the situation if the project adopts the objective of improving and increasing green space both in terms of the total useable area and its ability to serve the variety of objectives set out in *Greener Places*.

There are many examples of projects around the world and here in Australia where the innovative integration of infrastructure creates green space over roadways and over infrastructure. The opportunity exists to improve the connectivity of green space in North Sydney. This would align with the NSW state government initiative for the Green Blue Grid.

Conditions of approval:

1. There should an increase in the total area of useable green space in North Sydney as a result of the project
2. Changes to the green space in North Sydney that result from the project should be better connected and of a higher quality than would be the case without the project
3. A design investigation should be undertaken to discover the best option to meet the conditions above.

Following are two possible options that demonstrate how the above objectives may be met.

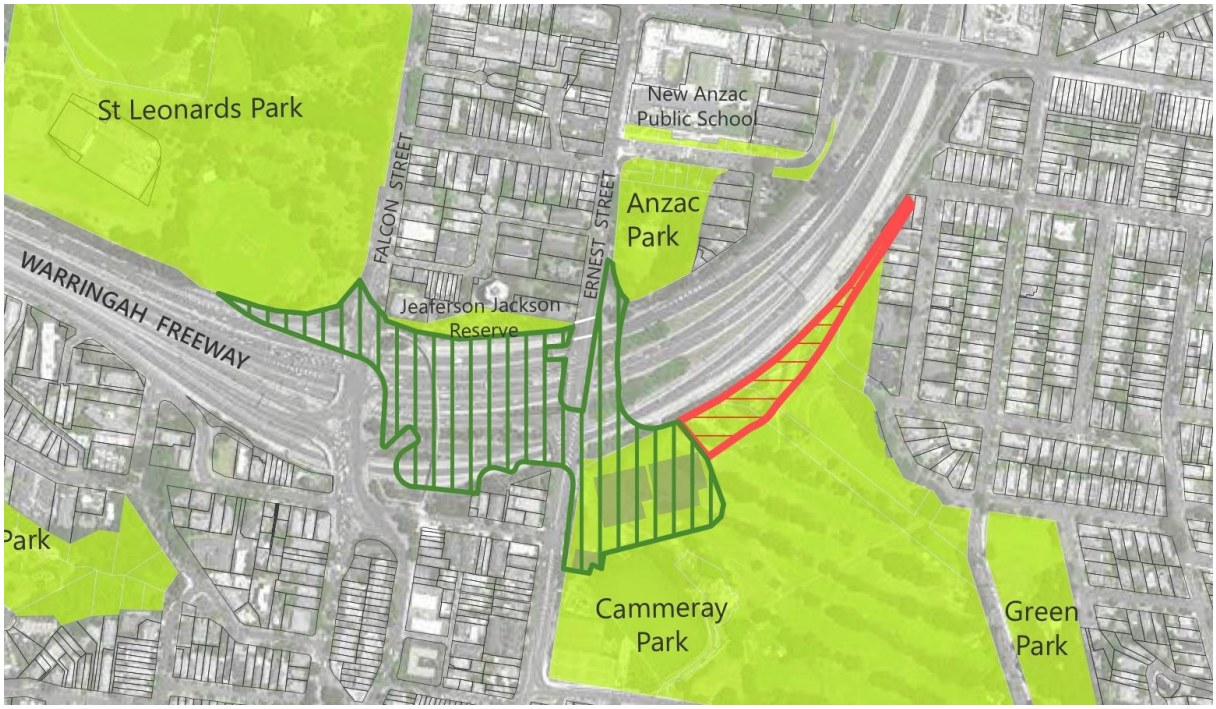
OPTION 1

This option adopts the objective of creating no net loss of public green space and improving connectivity between green spaces. The option takes advantage or the topography, with a land bridge to the north or Ernest Street. The Motorway Facilities may be only partly cut-in because an elevated landscape cap would provide a new ground level of sufficient elevation to clear the motorway.
A pedestrian crossing of Ernest Street between ANZAC Park and Jeaffreson Jackson Reserve would extend the green link to St Leonards Park.

Key elements:

- Landscape cover over Motorway Facilities
- Green cap over motorway at the level of Ernest Street
- Re-connect parks
- Widen Jeaffreron Jackson Reserve to improve its function as part of the Green Grid.

OPTION 2



This option includes similar elements to Option 1, however, it also includes a green cap over the motorway from Ernest Street to Falcon Street and green bridges over the two streets. The option takes advantage or the topography with a land bridge situated at the point where the motorway cuts through the ridge. The Motorway Facilities may be only partly cut-in because an elevated landscape cap would provide a new ground level of sufficient elevation to clear the motorway.

Key Elements:

- Re-connect the landform over the Warringah Expressway at the point where the main ridgeline runs from Crows Nest to Mosman
- Join Cammeray Park to St Leonards Park through connected parkland
- Enlarge the total green space in the area
- Landmark the project to demonstrate Green Grid

PRECEDENT

Central-Wanchai bypass - Corridor link with urban greening - Green space over a filtration system

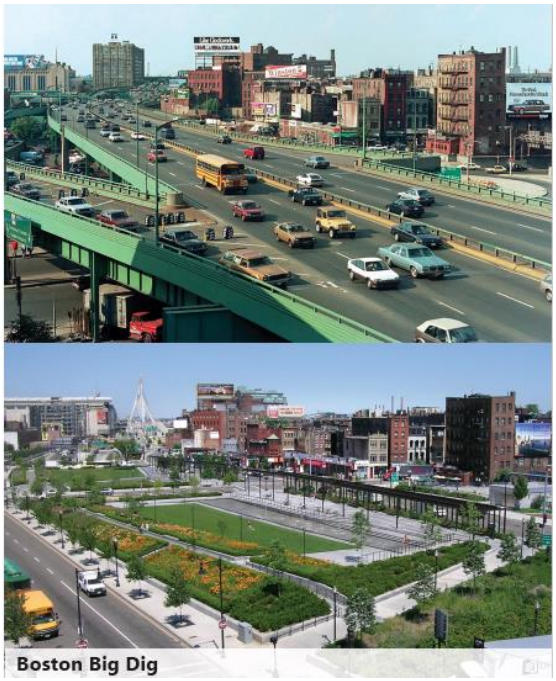
PRECEDENT

Landbridge, Brisbane

PRECEDENT

Parks and open space

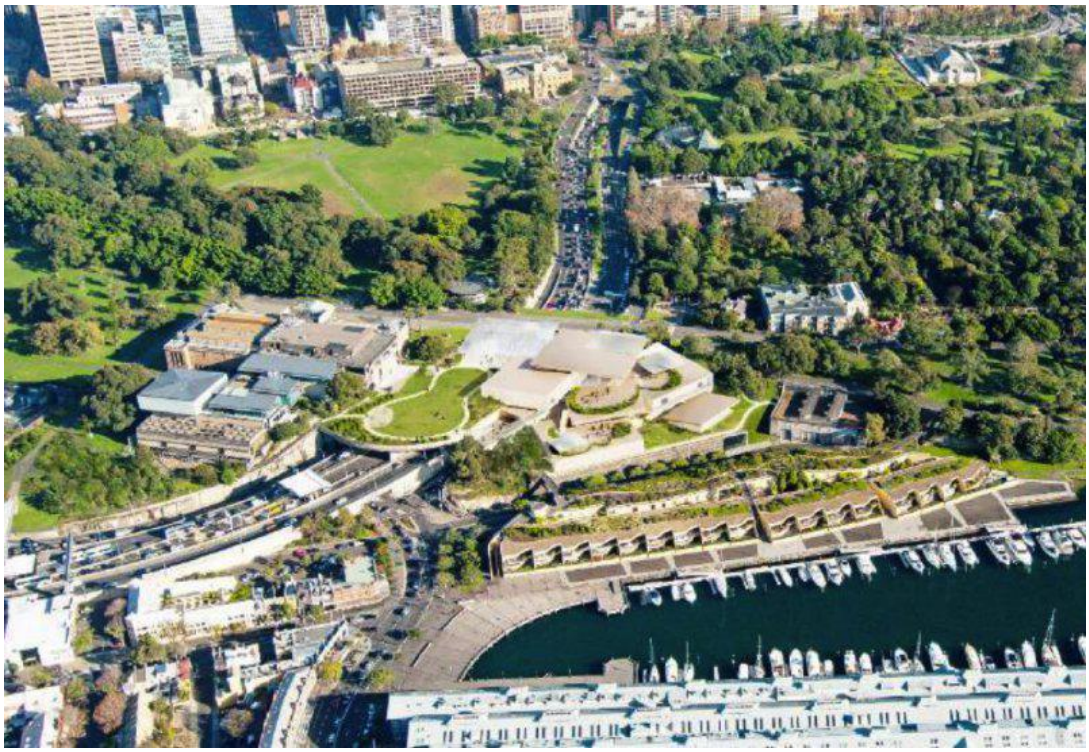
- The project created more than 120 Ha of new parks and open space
- This includes 11 Ha where the existing elevated highway stood, 42 Ha at Spectacle Island, 16 Ha along the Charles River, and 3 Ha as part of an expanded Memorial Stadium Park in East Boston.
- More than 2,400 trees and 26,000 shrubs were planted at Spectacle Island. Another 2,400 trees and more than 7,000 shrubs were planted.



Boston Big Dig

PRECEDENT

Sydney, Eastern Distributor Land bridge



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