1 INTRODUCTION

The following submission is based on the submission made by Willoughby Environmental Protection Association. It outlines our family **objections** to findings of the Transport for NSW Beaches Link and Gore Hill Freeway Connection Environmental Impact Statement (December 2020) (EIS). The submission Part 1 deals with Alternatives and Need, and the impacts of the proposed project on Biodiversity and Part 2 with Community impacts.

1. Our submission focuses on the biodiversity and environmental impacts on **Flat Rock Gully (FRG), Clive Park and Middle Harbour**, while acknowledging that similar impacts are anticipated relating to Seaforth, Manly Dam and the bushland along Warringah Expressway. The submission which follows is in response to the breadth of the EIS, the mitigation strategies it includes and its overall conclusions.

2 SUMMARY

We strongly object to the placement of the dive site for the proposed Beaches Link Tunnel at the top of FRG and the use of Clive Park and Middle Harbour as a construction site for an immersion tunnel. The tunnel works will result in the clearing of over 16 acres of bushland habitat at the top of the catchment with flow on effects to the rest of the gully, Tunks Park, Middle Harbour, the Sailors Bay foreshores, and local and regional north-south and east-west wildlife corridors. We are particularly concerned that the future of FRG is unclear and that part of this bushland habitat may be lost to our area forever.

Indeed over 20 years, when Sydney Water proposed I, (L. Saville) was the WEPA community representative on the North Side Storage Tunnel (NSST) Community Liaison committee at Tunks Park. The original Sydney Water proposal was to locate the enormous tunnel dive site in Tunks Park, covering the playing fields and to the west, east of the bridge. There was enormous community opposition to the proposal partly because the park was used extensively by the community, schools etc, the presence of the culverts & because of potential contamination risk from the Flat Rock tip upstream. Eventually, due to community concerns, identified risks etc, the dive site was sited below ground in the carpark. It was a great example of engineering ingenuity, community consultation, and certainly achieved a better outcome than that originally proposed.

The proposed works also raise serious health and safety risks for people using these areas, particularly the younger members of our community. I would like to see a moratorium on this project and a re-examination of the need for the project in light of changed work habits due to COVID-19 and the relative merits of public transport solutions in dealing with traffic congestion/transport issues on the North Shore and Northern Beaches. Greater transparency and additional research needs to be undertaken for the EIS and the

development of more robust mitigation measures to ensure that it does not negatively impact the environment that our communities and local wildlife share.

In summary, **major objections** include:

- the Beaches Link construction sites will negatively disrupt significant wildlife corridors, including Flat Rock Gully, Clive Park and marine ecosystems at Middle Harbour;
- the biodiversity scoped in the Beaches Link EIS is, in line with existing legislation, deliberately narrowed. The bulk of the biodiversity assessment concentrates and comments on 23 threatened species only. It fails to assess impacts on the many hundreds of species which will lose their habitat, be driven away or bulldozed under by construction including a wide range of invertebrates, birds, frogs, reptiles, fish and mammals;
- the EIS has assessed a number of threatened species listed under the *Environment Protection and Biodiversity Conservation Act* 1999 (Cwlth) (EPBCA) and concluded that they do not require referral to the Australian Government Minister for the Environment. It is believed that insufficient assessment and mitigation is provided to support this non-referral;
- the construction risks contamination of local land, creeks and the harbour which threatens land and marine ecosystems and public health;
- the results of contamination testing relating to FRG have not been released;
- further mooted contamination testing in relation to FRG should be done now;
- many of the EIS mitigation measures proposed to protect biodiversity and public health are inadequate or require further evidence and details of proposed management methods;
- there has been no serious consideration given to the need for the project in light of of changed work habits due to COVID-19 and the relative merits of public transport solutions in dealing with traffic congestion/transport issues on the North Shore and Northern Beaches. Demands for rail links to the northern beaches for decades have been made for over 50 years, yet there has been no effective government action.
- there has been insufficient time for community members to inform themselves and comment on the EIS, in particular for P&Cs; and
- **the current EIS is inadequate in light of the above, and other shortcomings raised in this submission, and a revised EIS containing the additional information should**

be exhibited and a three-month period (not including the Christmas/ January period) allowed for public comment.

3 ALTERNATIVES AND NEED

These matters are required to be assessed as part of the Secretary's Environmental Assessment Requirements (SEARs).

Firstly, no **business case** has been released.

There has never been a full business case assessed by Infrastructure Australia or even a business case submitted to Infrastructure Australia for Beaches Link separately to the Western Harbour Tunnel. Therefore, Beaches Link (in conjunction with the Western Harbour Tunnel) is classified by IA as an initiative rather than a project.[1]

As regards Infrastructure NSW, although a Final Business Case Summary (**FBCS**) – Western Harbour Tunnel was released in May 2020 that summary states:

> *The Western Harbour Tunnel and Beaches Link Program (the Program) Business Case prepared by Roads and Maritime Services (now Transport for NSW) includes the Beaches Link project. The Beaches Link project is subject to a final investment decision by the NSW Government and will be evaluated in a separate summary at the appropriate time.*[2]

As far as we can ascertain 'the appropriate time' has not yet arrived. There is certainly nothing in the EIS to suggest otherwise.

Nevertheless, the FBCS states: '*Total economic benefits of the Program are estimated at $12,469 million in discounted terms.*[3] which is considerably less than the current estimated cost of the Program.

Even if this calculation is an incorrect way in which to calculate benefit compared to cost (**BCR**), the figure for the BCR for the Program – 1.2 to 1.3[4] – raises real questions as to whether the BCR for the Beaches Link considered alone would be over 1.0. This is because, as mentioned below, the project will not have any significant freight component compared to the Western Harbour Tunnel and is a road, in effect, to a peninsula as opposed to being part of any real network.

[1] Infrastructure Priority List, August 2020
[2] Infrastructure NSW, Final Business Case Summary Western Harbour Tunnel (FBCS)
[3] FCBS, p.10
[4] FCBS, p.15

Secondly, no serious consideration has been given to the current need for the project in light of the impact of **COVID-19**, with any impact being dismissed with the following:

> *In Greater Sydney, traffic levels on most roads have returned to those experienced before NSW government restrictions were put in place. This indicates a relatively rapid response to the event by the city, and suggest that the movement of people, goods and services and demand for road capacity is returning to conditions similar to those prior to the COVID-19 pandemic.*

This is misleading as the proponent is well aware of the modal shift from public to private transport which has taken place due to COVID-19 and the fact that this shift is likely to be temporary. Comments such as those in Infrastructure Australia's December 2020 report "*Infrastructure beyond Covid-19*" are more relevant eg.:

- *A 2020 Gartner CFO survey reports that 74% (CFOs) expect a shift whereby some employees remote work permanently, indicating significant uncertainty for CBDs following COVID-19*[5]

It should be a relatively simple matter for the proponent to adjust current traffic figures to allow for the temporary modal shift as it relates to traffic to and from the Northern Beaches Local Government Area (LGA) and assess the long-term impact of COVID-19 on relevant traffic volumes, as opposed to Greater Sydney traffic volumes.

Thirdly, the impact on congestion and journey times of the **current B-line service** has not been examined.

Fourthly, the impact on congestion and journey times of a **tilt lock system** to reduce the number of Spit Bridge openings has not been examined.[6]

Fifthly, while the EIS makes reference to the capacity of the planned rapid bus service from Dee Why to Chatswood in combination with the Metro from Chatswood to the Sydney CBD (due for completion in 2024) to **reduce relevant congestion**, there is no detailed analysis of the likely impact on traffic to and from the Northern Beaches LGA. Instead, there is reference to journey patterns in Greater Sydney:

[5] Infrastructure beyond COVID-19, A national study on the impacts of the pandemic on Australia, 14 Dec 2020, p.49

[6] https://www.yachtingmonthly.com/news/tilting-lock-submerges-yachts-under-low-bridges-31419

> *While these projects would contribute to reducing congestion on the existing road network, they would not be sufficient to resolve the existing road network capacity constraints between the lower North Shore and the Northern Beaches. This is due to the complexity of journey patterns and trip purposes within Greater Sydney and the dispersed nature of origin and destination points for an individual journey.*

For the following reasons it appears likely that fast and frequent public transport between Chatswood and Dee Why along the Warringah Road corridor, could make a significant contribution to reducing traffic. And this reduction would be both along the Spit Road/Military Road corridor and along the Warringah Road corridor:

1. The EIS states that the metro from Chatswood to the Sydney CBD will provide a capacity increase of 100,000 passengers an hour (page 4-14). The Metro website gives an estimated journey time of nine minutes from Chatswood to Barangaroo and 11 minutes to Martin Place, and a frequency of a train every four minutes at peak.[7]
2. Census journey to work data shows that 52.1% of Northern Beaches residents work in their own LGA and 65% of the remainder work in either the City of Sydney LGA, North Sydney LGA, Willoughby LGA or Ryde LGA – all areas which will be serviced by the planned rapid bus service from Dee Why to Chatswood, the Metro from Chatswood to the city and beyond to be completed in 2024, or the existing metro from Chatswood. Given that the reference in the EIS is to Military Road/Spit Road and Warringah Road/Eastern Valley Way road corridors generally operating over capacity during peak periods) but not at other times, journey to work data becomes particularly relevant.[8]
3. The EIS shows that the Warringah Road corridor is both busier and more congested than the Spit Road/Military Road corridor.
4. The EIS shows that public transport utilisation of the Warringah Road corridor is much lower than public transport utilisation of the Spit Road/Military Road corridor.
5. There is currently no priority given to public transport along the Warringah Road corridor by way of measures such as bus lanes or transit lanes.
6. The projected growth in traffic is primarily generated by growth around the Frenchs Forest area which is directly serviced by the Warringah Road corridor.[9]

[7] Crows Nest Train Station | North Sydney Information | Sydney Metro; Sydney Metro Southwest Project Overview | Sydney Metro

[8] Residents journey to work | Northern Beaches Council area | profile.id page 3-4)

[9] NSW Transport for NSW Traffic Volume Viewer; Frenchs Forest Priority Growth Area - Summary

7. Freight traffic is not a significant contributor to traffic volumes. Using Spit Bridge morning peak data for the most recent available years (2012, 2013, 2014), heavy vehicles comprised 8.80%, 8.86% and 9.26% of traffic volumes respectively.[10]

Finally, it is noted that the proponent states the project will only provide meagre benefits for the Spit Road/Military Road corridor in any event with a 10% reduction from current travel volumes by 2037.

The following figure is from the EIS -

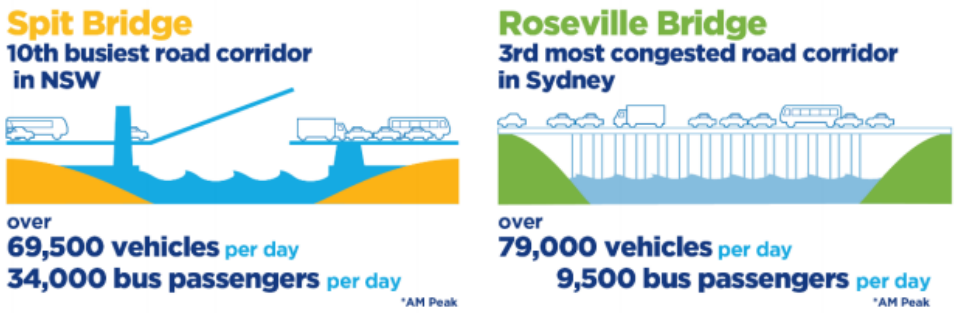

Figure E-2 Key metrics for the Eastern Harbour City's transport network

Recommendation:
That a revised EIS be prepared dealing with: the need for project in the light of COVID-19 impacts on relevant traffic volumes and population growth rates; the BCR of a frequent and fast public transport service from Dee Why to the metro at Chatswood compared to the BCR of the Beaches Link project, considered alone, setting out in detail how each has been calculated and including the business case for the Beaches Link; and the BCR of a tilt lock under Spit Bridge setting out in detail how it has been calculated.

PART 1

4 BIODIVERSITY IMPACTS

4.1 SEARs, Legislative Framework and Biodiversity

[10] Traffic Volume Viewer

Under the revised Secretary's Environmental Assessment Requirements (SEARs) for the Environmental Impact Statement (EIS) on the Beaches Link project, the EIS is,

> *to avoid, minimise or offset impacts so that the project, on balance, has the least adverse environmental, social and economic impact, including its cumulative impacts.*

The SEARs also requires that the,

> *project design considers all feasible measures to avoid and minimise impacts on terrestrial and aquatic biodiversity*[11].

These considerations seem to be in line with one of the key principles of Ecologically Sustainable Development in the *Protection of the Environment Administration Act 1991* (NSW) which declares that conservation of biological diversity and ecological integrity should be of fundamental consideration[12].

Biodiversity is commonly understood and generally defined in scientific terms to mean the variety of **all life forms** on earth - the different plants, animals and micro-organisms, their genes, and the terrestrial, marine and freshwater ecosystems of which they are a part. Critical to the preservation of biodiversity is the maintenance of viable habitat.

There is a marked disjunction, however, between the holistic references above to the protection of biodiversity and its application in the form of the EIS. The SEARs goes on to indicate the need for biodiversity assessment to utilise the *Environment Protection and Biodiversity Conservation Act* 1999 (Cwlth) (EPBCA) and the NSW *Biodiversity Conservation Act 2016* (BCA). They are complemented by protection provided under Part 7 of the *Fisheries Management Act 1994*.

Despite the repeated use of the term biodiversity, what this legislation, and the associated Biodiversity Assessment Methodology (BAM), have in common is that they are limited in their focus to deal, not with the full gamut of biodiversity, but only with **threatened ecological communities** and certain **threatened species** which have been listed by the Federal and NSW acts. While this is an important measure for those threatened plants and wildlife and is to be commended if it assists in their conservation, it only provides protection for the rich native biodiversity and habitat found in the areas to be impacted by the proposed Beaches Link tunnel if those areas contain ecological communities and/or species listed in the two acts.

[11] SEARS 2020 6 Biodiversity
[12] PEAA Act Part 3(2)(c)

While the SEARs called for all feasible measures to avoid and minimise impacts on terrestrial and aquatic biodiversity[13] I do not believe that this requirement has been fully answered either in relation to the listed species or to the broader biodiversity at the sites proposed to be impacted by the project.

4.2 Saving Suburban Bushland

Urban bushland is fast disappearing under Sydney's bulldozers, hence we can no longer afford to put construction sites, with all their impacts, in the remaining biodiversity rich areas.[14]

Research by Brendan Wintle, Professor, Conservation Ecology, University Melbourne, and others found small urban bushland patches to be of far greater importance to continued biodiversity than hitherto thought:

> *The combined impact of the loss of many small patches is massive. It's a significant contributor to our current extinction crisis*.[15]

Dr Wintle's global study, which included Australian cities, found these small patches of habitat are critical to the long-term survival of many **common but declining** as well as rare and endangered species. Despite repeated Government commitments to enhance the vegetation cover of urban areas and halt species extinctions, the loss of vegetation in Australian cities continues.

The following comments and recommendations in relation to the EIS deal not only with threatened species but with the **full biodiversity** of **Flat Rock Gully Reserve, Clive Park and Middle Harbour** and the significance of these small patches of bush in a highly urban area.

5 FLAT ROCK GULLY RESERVE

The proposed tunnel construction site on the eastern side of Flat Rock Drive will result in the clearance of a large area of much valued and biodiverse bushland and habitat which provides an important wildlife corridor, the regeneration of which has been a 25-year project for Willoughby City Council and the local community.

The Flat Rock Gully Reserve is bounded by Flat Rock Drive to the west, falls away steeply into the gully and then extends beyond the Cammeray Bridge to the east, adjacent to Tunks

[13] SEARS 2020 6 Biodiversity
[14] Ives, Christopher D et al, Cities are Hotspots for Threatened Species, Global Ecology and Biogeography, 25 (1) Jan 2016
[15] Wintle Brendan and Bekessy Sarah, 'The small patch of bush over your back fence might be key to a species' survival' The Conversation, December 13, 2018

Park.[16] The gully is deeply sided which naturally amplifies noise in its vicinity. It contains low open eucalypt woodland with a dense shrub layer typical in other Sydney sandstone woodlands. Several creeks, including Willoughby Creek and Flat Rock Gully Creek, and stormwater flow into the gully providing water for plants and animals. In one section at the base of the plateau, earthworks, which provide habitat for a wide range of lizards and other creatures, have been introduced to cap the former deep tip site. An ephemeral creek channel has been created in the upper section of Flat Rock Creek with three detention ponds which provides important habitat for frog and lizard populations and access to still water to a range of birds and other animals.

5.1 Reserve Designation

To preserve and protect our native wildlife, Council has designated selected bushland reserves in the City as 'Wildlife Protection Areas' (WPAs) and designated them as Zone E2 Environmental Conservation. The WPAs were selected because a Fauna Study undertaken by Council found that these areas provide essential habitat for many of the native animals found in Willoughby. Flat Rock Gully Reserve is one such area as it provides significant habitats that support a wide range of birds - particularly small birds - mammals, reptiles and frogs that are disappearing from our urban areas.

Many in our community believe that bushland which the community has formally set aside for environmental protection should not be destroyed or disturbed. To do so undermines the value of these designations of high biodiversity and leaves all protected areas open to destruction.

Recommendation 1
That the revised EIS assesses the impacts of destroying bushland which has been designated by the community and local government as a Wildlife Protection Area and set aside for Environmental Conservation.

Recommendation 2
That the revised EIS consider utilization of already cleared areas, such as the Baseball Diamond adjacent to Flat Rock Drive in Bicentennial Reserve, rather than destroy a Wildlife Protection Area.

5.2 Wildlife Corridors

Flat Rock Gully Reserve is also a key part of the network of wildlife corridors across Sydney required to maintain biodiversity. It is a major and central component of the east-west

[16] Willoughby City Council, 'Flat Rock Gully Reserve Action Plan' (July 2018), p2

wildlife corridor between Middle Harbour and Lane Cove River Catchments. Bushland in Flat Rock Gully contributes to habitat linkages that include Tunks Park, Middle Harbour, Northbridge Park, Cliff Ave Reserve, Bicentennial Reserve and Artarmon Reserve. This wildlife corridor has been in place for many decades and is important to the wellbeing of wildlife across several catchments.

On a regional scale, Flat Rock Reserve, is part of a significant east-west wildlife corridor which winds from the Berowra Valley National Park through to the shores of Middle Harbour, Northbridge as well as linking up to the north with Garigal and Ku-ring-gai National Parks and the Hawkesbury River[17]. This degree of habitat connectivity at a landscape scale, exerts substantial influence on the biodiversity of bird life and other fauna still present in the Willoughby Local Government Area (LGA).

In urban areas of Sydney, such as the Willoughby City Council (LGA), where native vegetation has been intensively removed, wildlife corridors have become critical for the maintenance of the ecological processes underpinning natural biodiversity. These corridors provide shelter, food and protection from predators and allow the movement of birds, animals and insects and the continuation of viable wildlife populations. They support biodiversity by allowing wildlife to respond to environmental variables such as access to water, food abundance or scarcity, population changes and the access to breeding partners which maintains genetic diversity in a healthy, local population. Many threatened and endangered native species owe their survival to these wildlife corridors.

The importance of wildlife corridors was most recently emphasised in the draft Design Guidelines released by the NSW Architect in association with the Department of Planning. The Guidelines advocate for the incorporation of a goal to protect, conserve and connect urban wildlife habitat in all relevant NSW legislation, policies, strategies, plans, and programs.[18]

Recommendation 3
That the revised EIS be expanded to take into consideration the impact the construction site will have on a significant local and regional wildlife corridor.

5.3 Regenerated Bushland

The proposal outlined in the EIS is that all bushland and trees on the plateau above FRG, equal to around 6.77 ha (over 16 acres), be cleared (EIS p.19.6). The EIS plays down the

[17] See WCC Urban Bushland Management Plan; Vegetation Management Strategy (2019); and WCC Reserve Action Plans.
[18] Government Architect NSW, Draft Greener Places Design Guide, Issue no.04 2020, p.50ff

ecological importance of this area and attempts to justify the removal of the bush and trees on the basis that it is only 'regenerated bushland' having been introduced to cover a tip formerly on this site.[19]

The bush regeneration at this site is the result of the application of over 25 years of work and resources by Willoughby City Council (WCC) and the contributions of large numbers of bush care volunteers. Most of the plantings were propagated from cuttings taken from local indigenous plants. No evidence is offered in the EIS that wildlife discriminates between regenerated and remnant indigenous trees and bushland and the wildlife lists for the area would seem to bear out its success as habitat for native wildlife (see Attachment A). To destroy such a high value community asset diminishes valuable community effort, and could discourage further community efforts to regenerate bushland.

Recommendation 4
That the revised EIS include a full study of the regenerated bushland marked for clearance at FRG to provide evidence of its value or otherwise as faunal habitat.

5.4 Remnant Bushland

There is approximately 14 hectares (ha) of remnant bushland within the Flat Rock Creek Gully Reserve. It is bounded by Flat Rock Drive to the west and extends beyond the Cammeray Bridge to the east, adjacent to Tunks Park.[20] The EIS fails to confirm that this remnant bushland will be retained. It is unclear whether the large Sydney Red Gums at the bottom of the slopes on the north-eastern edge of the construction site are to be retained.

Recommendation 5
That the revised EIS confirm in its conditions of consent that construction works be sited so that it does not impinge on the remnant trees and bushland on the north-eastern edge or other boundaries of the site.

5.5 Tree removal

Over 240 trees will be potentially or directly impacted (removed or roots built over) in the construction site at FRG.[21] Of this number, the EIS maintains that only two-thirds will be replaced. The WCC tree policy requires that 3 trees be replaced for each tree removed.[22] Local tree policies are urged by the NSW Government to reflect the needs of different areas for tree canopy, wildlife habitat and to combat the problems of rising urban heat. Given the

[19] EIS Chapt 19 Table 19-4
[20] Willoughby City Council, 'Flat Rock Gully Reserve Action Plan' (July 2018), p2
[21] EIS Annexure C in Appendix W Pt 1, p.32
[22] Willoughby City Council, Vegetation Management Strategy, 2020

increasing need for trees for these purposes, local tree policies should not be overridden by the NSW State Government.

Recommendation 6
The conditions of consent in the revised EIS should provide for full bush regeneration following any construction and provide three for one tree plantings as required by the local vegetation strategy.

Recommendation 7
The conditions of consent in the revised EIS should include provisions for all suitable felled trees with hollows, particularly those larger than 20cm, to be relocated to nearby areas so they can continue to provide habitat for birds and arboreal mammals.

If that is not feasible, then funds should be set aside for new artificial hollows to be made in suitable dead trees nearby or habitat boxes installed. Provision should be made for long term maintenance of this infrastructure.

Recommendation 8
The conditions of consent for the revised EIS should require that Willoughby City Council be allocated sufficient funds to ensure maintenance and management of replacement vegetation on land under their responsibility for a minimum of 10 years.

5.6 Assessments and Field Studies

The content of the EIS seems to indicate that only a limited assessment process was carried out in relation to FRG. A large part of the assessment appeared to be 'desktop' in nature involving a search through databases to determine the species 'likely' to be present locally and to rate this likelihood. This was followed up it seems by approximately 5 visits to 'Willoughby' and 3 to Flat Rock Reserve over 4 years (May 2016 – April 2020). The length of the visit, its focus, the number of people involved, and their qualifications is difficult to determine from the EIS chapters and appendices.[23]

What is clear from the content of the EIS is that a full assessment of wildlife actually on and near the construction site was not carried out. Council's well-kept register of wildlife sightings did not appear to have been utilised. The community living around and visiting the site were not asked about the wildlife they see daily in their visits.

[23] EIS Appendix S Table 2.2 Field Studies, pp19-20

Recommendation 9
That the revised EIS include a full study of biodiversity at FRG and other impacted sites.

Despite the importance to a wide range of native birds and animals of hollows in trees, the assessment of trees was carried out at ground level only.[24]

Recommendation 10
Given that a high proportion of native wildlife uses hollows, both small and large, to shelter and breed, a full check of hollows in or around the construction site should be undertaken as part of the revised EIS.

The inspections of waterways, including Willoughby Creek and Flat Rock Creek, also seem to have been limited to an assessment of likely impacts. No assessment was done in this area for aquatic wildlife and microorganisms[25]. Despite human impacts, the creek system, particularly at the FRG site, still provides habitat for a number of aquatic species including a multitude of microorganisms as well as vertebrates such as mullet, common jolly tails, striped gudgeons, long-finned eels, long-necked turtles, frogs and water birds.

Recommendation 11
That the revised EIS carry out fish and macroinvertebrate sampling in creeks and waterways in the FRG area.

5.7 Native Flora

The EIS acknowledges that there are large tracts of native vegetation occurring at Flat Rock Gully Reserve, within and near the proposed construction site[26]. The native flora in the construction footprint, however, has been assessed for threatened plant species only. At Flat Rock Gully Reserve this is represented by a total of two plants of one species (EIS Table 10-5).

The rich biodiversity[27], with over 240 native plant species appearing on the FRG Native Plant Species List, demonstrated in the proposed construction footprint and adjacent areas does not appear to have received anything more than a passing acknowledgement.

[24] EIS Appendix W, p.v
[25] Annexure D Freshwater ecology impact assessment in Appendix 6
[26] EIS Chapt 19 Table 19.6
[27] WCC Urban Plan of Management Vol 2, Resource Inventory, Flat Rock Gully – Native Plant Species list, pp.157 - 164

Recommendation 12
That a full assessment of native plant species and consideration of impact of their removal on local fauna and the wildlife corridor be undertaken as part of a revised EIS.

5.8 Native Fauna

The flora noted above, coupled with the local geography, ensures that Flat Rock Gully Reserve has both natural and habitat significance. FRG is significant due to its diverse range of plant species and the fact that rock outcrops are home to locally rare fauna such as the Gully Shadeskink, Bibron's Toadlet, Short-beaked Echidna and Brown Antechinus.[28] Destruction of this habitat has the potential to cause local extinctions of these creatures. The site has become a highly important area for foraging and nesting for a suite of small birds; many now missing entirely from local urban areas. It provides trees of different height and density, an intact shrub layer, a creek and other waterways, ponds, open grasslands and rock habitat.

Smith and Smith in their 2010 study for North Sydney Council[29], found that the lower end of the Flat Rock Gully catchment (around Tunks Park) in Cammeray was a biodiversity hotspot in terms of small birds and was the **last refuge** for these birds in the North Sydney region. White-browed Scrub Wren, Eastern Spinebill, Superb Fairy Wren, Variegated Fairy Wren, Golden Whistler, Red-browed Finch, Eastern Yellow Robin, Grey Fantail and Silvereye are amongst the small, insectivorous birds regularly found in and around the proposed construction site at FRG.[30]

The EIS acknowledges at various points that native vegetation at FRG is providing fauna habitat resources for a range of mammals, birds, frogs, reptiles and bats but makes only passing mention of these other species. A full list of fauna in this Reserve – which could have been obtained from Willoughby City Council (see Attachment A) was not included in the EIS. The WCC list includes frogs (6 species), 1 turtle species, lizard (11 species), snakes (6 species), a total of at least 98 bird species and over 10 mammal species. Some species, such as the Superb Lyrebird and the Swamp Wallabies, have only returned to FRG and neighbouring gardens in recent years after being locally extinct since the 1950s. In total more than 130 separate species of vertebrate wildlife are known to use the FRG area.

[28] Willoughby City Council, 'Flat Rock Gully Reserve Action Plan' (July 2018), p2
[29] Peter Smith and Judy Smith, 'North Sydney Council Natural Area Survey Report', prepared for North Sydney Council, November 2010
[30] https://www.domain.com.au/news/australian-cities-urban-sprawl-is-killing-native-bird-species-homes-912289/; https://www.environment.nsw.gov.au/get-involved/sydney-nature/wildlife/birds-in-sydney; InSight Ecology, 'The Avifauna of Willoughby LGA: August 2016 Survey Report', February 2017

Recommendation 13
That the revised EIS process undertake an assessment of the full biodiversity of Flat Rock Gully. That such an assessment include species on the WCC list, others identified in discussion with Council's bushland staff and Bushcare teams and ascertained further by community consultation.

The EIS argues that the removal at FRG of habitat,

> *would be negligible since the habitat to be removed does not comprise a significant proportion of habitat available to species in the surrounding terrestrial biodiversity locality or wider bioregion.*"[31]

This very broad statement implies that, with little effort, the threatened species and other fauna will move away. The EIS also states the intention that the site be visited 24 hours before construction commences to capture and relocate any fauna sighted.

This approach ignores that:

- the habitat removal will have an impact on hundreds more species than those listed as threatened under the relevant Acts;
- this area provides water for local fauna;
- many species may not have the ability or instinct to move from the area;
- attempts at capture are likely to be futile and possibly injurious to the species involved;
- many are territorial and risk injury or death by moving to other territories;
- this is just one in a number of removals of small patches of local bushland, on public and private land, which is gradually rendering many species locally extinct.

It is a peculiar circumstance that under the BCA it is an offence to harm a protected animal 2.1 (1) (c) (all NSW wildlife is protected with a few exceptions) but it is acceptable to destroy their habitat, injure them during capture, disperse them to face injury or fatalities and in many cases to bury them under the advancing bulldozers. This situation would seem to be directly inimical to the need expressed to take all '*measures to avoid and minimise impacts on terrestrial and aquatic biodiversity'.*
The WCC's list does not include the vast array of **invertebrates** which are present in these habitats and are an important part of the biodiversity network. Science is adamant that these organisms, many of which are the building blocks for life, are declining rapidly to the detriment of the entire environment.[32]

[31] EIS Chapter 19, 19.5.2, p.19-60

[32] https://www.sydney.edu.au/news-opinion/news/2019/02/12/insect-population-faces--catastrophic--collapse--sydney-research.html

Recommendation 14
That a revised EIS include the assessment of invertebrates in the areas impacted by the tunnel in recognition of their importance to the environment.

6 CLIVE PARK AND SAILORS BAY CATCHMENT

Another noticeable omission in the EIS is the failure to provide any assessment of biodiversity impacts in Clive Park and in other bushland surrounding the Sailors Bay catchment. Clive Park is a 5.77ha Bushland Reserve, managed by WCC, at the bottom of Sailors Bay Road Northbridge. It is part of a group of four bushland reserves located in the north-east area of Northbridge. Clive Park is the largest of the four and is located at the junction of the Sailors Bay and Flat Rock Creek catchments. The bushland has high ecological integrity and has a small creek through the centre, which runs almost continually. The Sailors Bay catchment is marked by wooded bushland foreshores around the Middle Harbour area.

The construction related to the tunnel crossing will be directly off Clive Park in Middle Harbour. Clive Park will be fully exposed to the noise of construction, including pile driving several hours a day during coffer dam construction. The other foreshore areas will also be exposed to the noise, light, odour and movement associated with marine traffic and construction work.

Clive Park provides important habitat for some remnant populations of small-range species, such as Brown Antechinus, skink species as well as woodland birds. Its harbour foreshore also provides habitat for the threatened fishing bat species, the Southern Myotis, and its shallows are visited by the endangered Little Penguins from the Manly rookery, which is the last mainland NSW rookery for these birds.[33] Endangered White-bellied Sea-Eagles fish in the area. Over 100 vertebrate species are included on the WCC Sailors Bay catchment list of native fauna. A full list of the vertebrate wildlife found in the bush around the foreshore can be seen in Appendix B[34].

[33] https://www.willoughby.nsw.gov.au/files/sharedassets/public/ecm/willoughby-council-website/publications-reports-master-plans-strategies-action-plans/publications-reports-master-plans-strategies-action-plans/1-clive_park_rap_2016_final.pdf. See also WCC Urban Bushland Plan of Management Part 2, p.108

https://www.willoughby.nsw.gov.au/files/sharedassets/public/ecm/willoughby-council-website/publications-reports-master-plans-strategies-action-plans/publications-reports-master-plans-strategies-action-plans/1-native_fauna_ofsailors_bay.pdf

[34] Willoughby City Council, Native Fauna of Sailors Bay Catchment

The impact of light and noise (particularly pile-driving) on the wildlife in Clive Park could be even more significant than at FRG as they are not part of a larger contiguous area of bushland and are separated from similar habitat by dense housing, roads and the waters of Middle Harbour. Northbridge residences are predicted to experience noise levels that exceed noise management levels and could result in sleep disturbance.

In order to protect local terrestrial and fauna from noise and associated harm, the EIS should first ascertain what is living locally.

Recommendation 15
That a revised EIS be required to carry out a full biodiversity assessment of terrestrial fauna at Clive Park and in the bushland of the Sailors Bay catchment.

7 MIDDLE HARBOUR AND FORESHORES

The environmental health of these areas has improved dramatically over the last few decades in terms of the clarity of the water, return of sea organisms and of marine fish and animals. The health of these waters and the fact that they are part of a Harbour which is one of the most biodiverse in the world should be acknowledged in the EIS. Coastal and aquatic species have all returned to these waters with the closure of nearby industries and regulation of industrial and sewage inputs, the increased use of gross pollutant traps and other water screening and protection regulations. [35] We have not forgotten the sight several years ago of a whale appearing at the exact site off Clive Park which is now proposed for dredging, silt disturbance and the placement of a coffer dam.[36] Several weeks ago a large seal was seen swimming in and around piers in local waters.
The SEARs for the EIS indicated concern over the impacts to aquatic habitats due to changes to tidal flushing across Middle Harbour and concerns about the disruption of existing (contaminated) sediment. The work to be undertaken will take up to four years as the coffer dams are set up, tunnelling undertaken and the tubes set in place and then the site demobilised. The construction peak at this site will be when they are dredging and constructing the cofferdams and will be up to two and a half years.

As for other areas, the assessments of wildlife in this area have focussed on threatened plant communities and vertebrate species only. It has been known for some time that more than 70 threatened species were at risk from the project including fragile seagrasses which support more than 20 species of endangered seahorses and sea dragons.

[35] Marine Estate Management Authority, Sydney Harbour Background Report (2014);
[36] https://www.dailytelegraph.com.au/newslocal/north-shore/hundreds-gather-to-see-the-amazing-sight-of-whale-frolicking-in-middle-harbour/news-story/4b09a6ce90638e928431b7aa0da09424

Dolphins, turtles and whales are seen in the area. Rare fauna such as the endangered Black Rockcod, White's Seahorses, White-bellied Sea-eagle, Grey Nurse Shark (critically endangered) and Southern Myotis could also be affected. Middle Harbour is visited by the Little Penguin travelling from its rookery at Manly. This population of Little Penguins is the last colony on the NSW coast. Threatened saltmarsh and seagrass (Posidonia australis) - two marine threatened ecological communities – also occur near the construction area. The shallower habitats closer to shore provide protection for juvenile fish of all many local species.

Recommendation 16
That the revised EIS undertake a full study of marine biodiversity, in addition to those designated as threatened, in the Middle Harbour area.

8 IMPACTS ON TERRESTRIAL FAUNA

Apart from the removal of habitat, there will be a number of major impacts on all species, including threatened wildlife in the areas, over a period of five years or more:

8.1 Noise

The proposed works on the FRG site and at the base of Clive Park would be expected to significantly impact wildlife and interfere with the existing wildlife corridors and ecological linkages across several local catchments. Apart from the obvious impacts arising from the destruction of trees and bushland, the around-the-clock nature of tunnelling and the passage of trucks and people to and from the site will undoubtedly introduce additional noise and night-time light pollution to the previously dark areas in and near these reserves. Exceedances, including night-time noise, are predicted during vegetation clearing, utility modification, access decline excavation and road modification works[37]

The EIS states that,

> *Construction activities would result in localised and temporary noise and vibration impacts; however, as most construction areas occur in highly urbanised areas that are subject to ambient noise, any increase in noise and vibration is not expected to have a significant impact on terrestrial fauna*.[38]

[37] EIS Chapt 10.6.6
[38] EIS Chapter 19 EIS Table 19-6 p.19-25

Research has shown that as noise levels increase in an area, abundance and species richness significantly decreases. This problem will be exacerbated at FRG because the natural amphitheatre created by the gully will cause sound to reverberate into and around the area and well beyond the construction footprint. The Australian Academy of Science has reviewed research about noise impacts on wildlife and concluded that anthropogenic noise pollution is affecting animals across multiple habitats, causing animals to alter their natural behaviours or relocate to avoid noisy areas.[39] The EIS adds that "*For less mobile species or breeding individuals, the effects of the high noise levels may be more acute*".

Most animals have specially adapted to the natural noises in their environment —they are aware of them, understand them and know how to use and interpret them. When we start to add **artificial, unfamiliar noises** to soundscapes it can cause a range of problems. It can affect an animal's ability to hear or make it difficult for it to find food, locate mates and avoid predators. It can also impair its ability to navigate, communicate, reproduce and participate in normal behaviours. The noise to be added to FRG will be in addition to the usual noise of nearby traffic and from homes around the gully. Cumulative noise can often trigger a tipping point where species leave the site.

Bats

Numerous studies[40] have indicated that noise pollution decreases the foraging efficiency of bats, which are acoustic predators. FRG is known to be inhabited by Gould's Wattled Bat, the Grey-headed Flying Fox and the Lesser Long-eared Bat. Studies carried out during the EIS also found the Grey-Headed Flying Fox, the Large Bent-winged Bat, the Little Bent-winged Bat and the Large-eared Pied Bat – all of which are listed as Vulnerable – to be present in bushland near the proposed FRG construction site.[41] The Southern Myotis, which is also listed as Vulnerable, is believed to be present in the open water habitat within Middle Harbour.[42]

Recommendation 17

That the revised EIS include a further expert study of the bats found in FRG – particularly those known to be Vulnerable - and their response to disruption caused by noise, light and vibration.

[39] https://www.science.org.au/curious/earth-environment/noise-pollution-and-environment

[40] Haddock JK, Threlfall CG, Law B & Hochuli DF (2019) Light pollution at the urban forest edge negatively impacts insectivorous bats. Biological Conservation, 236, 17–28; Jones Dr Theresa, What happens to wildlife in a city that never sleeps, Pursuit, University of Melbourne

[41] EIS Chapt 19 p.19-29

[42] EIS Chapt 19 p.19-26

The population and diversity of certain bird populations has been shown to decline or change when exposed to continuous noise generated by urban environments, such as roads, cities and industrial sites. By discouraging species sensitive to loud sound, and replacing them with more tolerant ones, noise may be reshaping ecosystems. This can potentially alter whole food webs and species combinations, resulting in groupings that may never have occurred naturally in the wild. Noise can change an animal's most basic stay-or-go assessments of habitat, and 'prompt more than the usual number of birds on thousand-mile marathons to skip a chance to rest and refuel'.

Powerful Owl

Noise pollution could potentially interfere with other acoustic predators, such as owls, in a similar fashion. It is well known to the locals around FRG that a **Powerful Owl** pair roosts and hunts in FRG – the Powerful Owl is listed as Vulnerable. This was confirmed by the EIS which reported that the Powerful Owl was recorded in bushland near the FRG construction site. Guidance[43] provided by the Powerful Owl Coalition to managers of sites where these magnificent birds are located, emphasises the need to maintain suitable dense vegetation along drainage lines and gullies for roosting; protect canopy connectivity; provide natural buffers between development sites and local reserves; and, in particular, prevent proposals to remove more than 1 ha of foraging habitat within 2 km of a nest site. It is important that its core habitat areas are sufficiently away from noise and disturbance.

Recommendation 18
That a revised EIS include a study, in association with BirdLife Australia's Powerful Owl Project[44], to determine where the Powerful Owl pair in FRG is roosting, hunting and breeding and the mitigation required to ensure they are not disturbed,

Powerful Owls need large, deep hollows, which are increasingly difficult to find in suburban areas. It should be noted there have been few, if any, successes in encouraging Powerful Owls to adopt artificial nest boxes.

While the comments above deal with a handful of species found in FRG it is our contention that noise impacts should be known for all fauna before construction begins. We note the comment in the EIS that fauna is sensitive to elevated noise and may desert the area at start and that some species may return but "displacement from the immediate area could become permanent"[45]. In order to ensure that displacement of fauna does not become permanent we would suggest:

[43] STEP, 'Protecting Powerful Owls in Urban Areas' (2018) p.10
[44] https://birdlife.org.au/projects/urban-birds/powerful-owl-project-pow
[45] EIS Chapter 19, p.19-64

Recommendation 19
That a revised EIS include a study, utilising peer-reviewed science, in relation to the impact of noise on the fauna of FRG and Clive Park.

8.2 Light

Research into light impacts[46] has increasingly noted the adverse impact of 'turning night into day' on indigenous fauna. The glare of artificial lights has a well-documented and drastic impact on native fauna interfering with reproduction and foraging patterns, revealing hiding places to predators, reducing dark cover for prey and blinding animals resulting in vehicle strike, all of which have serious implications for maintaining local biodiversity. There are measures which can be introduced to mitigate some of the damage caused by light spill:

Recommendation 20
That a revised EIS include measures to prevent noise and light spill which impacts fauna in the bushland next to the construction sites. These can include:

- ensuring that lighting does not impact the full height of trees;
- that bright, artificial lighting is kept away from riparian areas, ponds and other core habitats and nesting sites; and
- that motion-activated lights are placed in parts of the site which do not require constant illumination.

Apart from the noise and light mitigation generally applied to development sites, there appear to be no mitigation developed specifically to protect fauna near construction sites. The EIS seems to take it as a given (but without evidence) that, as the construction areas are in highly, urbanised areas that are subject to ambient noise, any increase in noise and vibration are not expected to have a significant impact on terrestrial fauna[47] and that, if it does, those which are mobile will move away.

8.3 Collisions and Accidents

There are a large number of species in FRG which could be injured or killed by human and heavy vehicle traffic and machinery in or near the construction site.

[46] Jones Dr Theresa, What happens to wildlife in a city that never sleeps, Pursuit, University of Melbourne; Kusmanoff, Alex et al, Getting smarter about city lights is good for us and nature too, The Conversation, 16 Dec 2016; https://www.latrobe.edu.au/news/articles/2015/release/how-artificial-light-effects-mammals; Newport J et al, "The Effects of Light and Noise from Urban Development on Biodiversity: Implications for Protected Areas in Australia," Ecological Management & Restoration, vol. 15, no. 3, 2014. (see https://onlinelibrary.wiley.com/doi/abs/10.1111/emr.12120); Joanna K. Haddock, Caragh G. Threlfall, Bradley Law, Dieter F. Hochuli Responses of insectivorous bats and nocturnal insects to local changes in street light technology. May 2019 https://onlinelibrary.wiley.com/doi/abs/10.1111/aec.12772

[47] EIS, Chapt 19, p. 19-63

Recommendation 21
That a revised EIS prescribe the use of fauna exclusion fencing at FRG to keep terrestrial animals out of the construction site.

8.4 Contamination

There is concern that contaminated materials from the exposed tip site and/or accidental oil or chemical spills could be washed by stormwater or wastewater discharges into nearby waterways with serious consequences to plant life, wildlife and the Long Bay catchment.

Recommendation 22
That the revised EIS include a full testing of the chemicals in FRG and complete a new risk assessment based on this information.

Recommendation 23
That the revised EIS include detailed plans to prevent contamination from the tip material or from accidental oil or chemical spills. The emergency remedial action to be taken if such contamination occurs should also be delineated.

8.5 Water Quality and Flows

Residents have expressed concerns regarding potential effects from changes to water quality and waterway flows on native fauna through diversions, wastewater release and flooding.

Culvert

Recommendation 24
That the revised EIS consider the impacts on local wildlife of the diversion of Flat Rock Creek, which is currently above ground, of a culvert which will cover it.[48]

Wastewater

The EIS notes that 711 kL will be flushed down Flat Rock Creek each day during construction. Further wastewater is likely to move into FRG during rain due to the impervious and/or compacted surfaces in the construction footprint.

Recommendation 25
That the EIS be expanded to explain the impacts of these changes to Flat Rock and Quarry Creeks and thus the quality and flow rates of the water currently supporting bushland, trees and fauna in Flat Rock Gully.

[48] EIS p.19-65

Salinity and Sedimentation

There would also appear to be a potential for high levels of salinity and sedimentation to be introduced into the local waterways due to the local geography (as confirmed in EIS Appendix N Groundwater – Chapter 4).

Recommendation 26

Engage consultants (independent of contractors) to measure water quality in the creek before, during and after construction to check for scouring, contamination from the site and elevated salinity and sediment levels. Make this information publicly available in a revised EIS.

Water Quality Improvements

Recommendation 27

That the revised EIS consider as part of the conditions of consent that funds be set aside to install permanent water quality improvement devices that capture rubbish and improve water quality with sediment and nutrient management. The suitable infrastructure should be determined in consultation with Sydney Water and WCC as a form of offset.

Flooding

The EIS is unclear on how the tunnel builders will deal with the high level of flood water run-off into Flat Rock Creek and FRG.[49] There appears to be little assessment of the flooding impact on the FRG dive site and downstream habitats, parks and waterways. The flood study limits the Flat Rock Creek assessment to the upper reaches around Gore Freeway. Given the size of the catchment, the location of the dive site in and around the diverted creek and in a flood zone it would be appropriate to continue the flood study around Flat Rock Gully and down into Tunks Park. This information should inform the health risk and waterways assessment.

Recommendation 28

That the revised EIS extend the flood study to the construction site at FRG and Flat Rock Creek as it continues into the gully.

Recommendation 29

That the revised EIS include an explanation of the impacts on the creek and wildlife associated with these drainage works and to detail mitigation methods.

[49] Flat Rock Creek Flood Study 2018; ABC News Flood water spills over barriers in Naremburn, Sydney.

Flow Reductions

The EIS notes that there is a potential for a reduction in some flows during and after construction eg a 20% reduction at the end of construction into Flat Rock Creek and a 23% reduction in baseflow into Quarry Creek at the end of construction and continuing to decline[50] These reductions would surely have an impact on water flows and quality.

It has been reported that residents were told at a Transport information session that Willoughby City Council also plans to draw water from Flat Rock Creek to water their playing fields following construction and that this would be factored into the design.

Recommendation 30
That the revised EIS include advice on the impacts of these longer term reductions in flow in Flat Rock Creek on wildlife in FRG.

8.6 **Groundwater drawdown**

Community members are also concerned that groundwater drawdown (of up to four metres by 2028 and 11 metres by 2128)[51] caused by the construction which is predicted to occur further downstream in FRG will, over time, and particularly in times of drought, lead to trees and bushland becoming highly stressed and/or dying.[52]

Recommendation 31
That the revised EIS map the potential areas impacted by drawdown and provide appropriate offsets including those based on a worst-case scenario as a precautionary principle in the conditions of consent. These should cover riparian areas and Threatened Ecological Communities.

Recommendation 32
That the revised EIS include conditions of consent to provide appropriate funds for Willoughby City Council to continue to monitor groundwater drawdown in the long term – for a minimum of 50 years. The conditions should include a clear allocation of responsibilities.

[50] EIS p.19-66.
[51] EIS p.19-67
[52] EIS p.19-49

Recommendation 33
Additional modelling based on the lining of the tunnel beneath Flat Rock Creek was mentioned in the EIS.[53] The revised EIS should confirm whether or not this lining will be implemented in order to prevent high levels of long-term groundwater drawdown.

9 IMPACTS ON MARINE FAUNA

Residents are concerned that the construction site planned for the end of Clive Park will have an unacceptable impact on marine fauna in this area through the destruction of foreshore areas, the dredging of the harbour floor, the potential for existing contamination to be redispersed, the storing of contaminated materials and the increase in marine traffic on Middle Harbour and across to Spit Point. This would make a large portion of Middle Harbour waterways, including Northbridge Baths, unusable for the period of the project and, it is likely, for some time after. There is also a potential for Clive Park to be contaminated. Sydney Coastal Council Group, representing 11 member councils, have expressed similar concerns regarding potential effects on water quality.

Recommendation 34
That the revised EIS consider alternatives to immersed tube tunnels involving less disturbance to sediment, such as a tunnel through bedrock or a submerged floating tunnel.

9.1 Habitat destruction

This is a relatively pristine part of Middle Harbour and has not been built on in contrast to other foreshore areas in the vicinity. It is alarming to note that the EIS provides for removal of the rock sill at the intertidal level off Clive Park.

Recommendation 35
That the EIS provide detail of the process intended for reinstatement of natural habitats like the rocky sill at the edge of Clive Park provided at the level of detail needed to assess the potential for habitat recovery after the works.

The current construction methodologies (EIS, chapters 13, 16, and 17) indicate that during and post construction, that new potentially contaminated sedimentation will overlay the Clive Park Beach, foreshore and bay, wider sea floor areas. The current EIS high level modelling indicates some 2-10mm of toxic sedimentation (containing re-animated toxins,

[53] refer to Chapter 16 (Geology, soils and groundwater) and Appendix N (Technical working paper: Groundwater))

heavy metals and odour release) will be deposited on areas used by wildlife, the public and in particular young children.

9.2 Contamination, turbidity and sedimentation

The project plans for Middle Harbour has the potential to dredge and remove tonnes of sediment contaminated by heavy metals, pesticides, potentially Per- and polyfluoroalkyl substances' (PFAS) and tributyltin (used in shipworks), which has been banned world-wide since 2008 as it causes sex changes in marine organisms. These contaminants have been detected in Middle Harbour and found to be above 'safe levels' (Table 1, Annexure C, Appendix F). However, only limited sampling seems to have been conducted at the Middle Harbour construction site.

Recommendation 36
That the revised EIS include a detailed contamination analysis of the sea floor in the area of the proposed construction to provide a baseline for measuring contamination and to determine the full impacts on the sea floor, the foreshore, beaches and water quality during and after construction and at different times and flows.

Silt Curtains

The re-animation of toxic sediment has the potential to create toxic and turbid plumes of water that could impact aquatic life for several kilometres around the disturbed site.
This issue has been addressed in the EIS by the proposed use of a series of silt curtains to alleviate the risk of contaminated material impacted surrounding waters. Questions have been raised previously about the ability of these silt curtains (which will not be fully anchored) to operate effectively in such a deep area. For example, the US EPA has recommended that:

> *As a generalisation, silt curtains and screens are most effective in relatively shallow quiescent water. As the water depth increases and turbulence caused by currents and waves increase it becomes increasingly difficult to effectively isolate the dredge operation from the ambient water. The St. Lawrence Centre (1993) advises against the use of silt curtains in water deeper than 6.5m or in currents greater than 0.5m/s*. [54]

The EIS states that the maximum depth in Middle Harbour where the immersed tubes are being laid is 34 metres but the silt curtains will only have a draught of 12 metres. The Australian Marine Science Association has noted previously that shallow silt curtains will not be effective at full containment of contaminated resuspended sediments. Full length silt curtains anchored to the sea floor are the only viable method of restricting the movement of fines. It should also be recognised that silt curtains cannot prevent the complete dispersal

[54] U.S. Environmental Protection Agency, 1994 & DOER, 2005

of toxic sediment created by dredging which will be compounded by wind, tide and vessel movements.

The Sydney Metro - Chatswood to Sydenham EIS[55] states that an immersed tube design was assessed and not selected due to the high contamination risks to Sydney Harbour. Given this was the case why is this EIS proposing an immersed tube for such a sensitive area of Middle Harbour where there are known contaminants?

There needs to be clear strategies to counteract the release of contaminants into Middle Harbour following storms and due to potential damage to the silt curtains during construction.

The EIS also seems to be silent on the possible contamination of waters by oil leakages from equipment and barges. Contamination by oil spills can be fatal, for example, for Little Penguins if it adheres to their feathers as it interferes with their thermoregulation by allowing water and cold air to contact their skin. It is also toxic if ingested. [56]

Recommendation 37
That the revised EIS identify events which could cause damage to the silt curtains and that the conditions of consent require:

1. the silt curtains extend to the sea floor
2. the silt curtains be regularly checked for effectiveness
3. that dredging work cease after an event which could cause damage to the silt curtains until such time as the curtain has been inspected and cleared
4. that a remediation plan or budget for compensating for spills or accidents be developed.

Recommendation 38
That the revised EIS develop a detailed plan for dealing with contamination due to oil and spills of other contamination and make provision for compensation due to these event.

Waste

Much of the material to be dredged is expected to be classified as "controlled waste," which requires the NSW EPA to authorise any disposal plan. The potential of significant foreshore water pollution is also mentioned in the scoping documents. The EIS notes that 10,000m^3 of contaminated sediment will be barged out of Middle Harbour past Clontarf and Balmoral

[56] https://penguinfoundation.org.au/get-involved/penguin-jumpers; https://www.environment.nsw.gov.au/topics/animals-and-plants/native-animals/native-animal-facts/little-penguin; https://www.environment.nsw.gov.au/resources/nature/littlepenguineia0203.pdf

Beaches to be dried out before being trucked to a licenced facility. The drying point is not yet known or the disposal site.

Recommendation 39
That the revised EIS detail the drying point for the contaminated waste and the transport route for its disposal.

9.3 Altered hydrodynamics

The EIS states that a permanent alteration of hydrodynamics would occur due to the installation of the immersed tube tunnel [57] Chief among the impacts would be a reduction in the natural flushing of upstream environments which could lead to the death of marine life.

Modelling of sea currents has been done on the assumption that the silt curtains have a draught of 12 metres. If the silt curtains go deeper than this this has implications for the sea current modelling as it applies during construction.

Recommendation 40
The revised EIS should include updated modelling on the impact on currents of full length sea curtains to ascertain what impact this may have on marine life and whether any additional protective measures need to be implemented.

9.4 Underwater noise

The EIS acknowledges that underwater noise will have an impact on marine life. In most cases it believes that the noise will deter aquatic animals from approaching the site however this does not account for aquatic animals already close to the construction when the noise commences. The vulnerable **Little Penguin**, for example, is known to fish in the Middle Harbour waters. It can experience hearing loss or damage to auditory tissues due to an encounter with sudden or high levels of sound. The mitigation provided is to adopt '*an observer qualified to spot Little Penguins*' and call a stop to marine construction activities. [58] This would seem to be an almost impossible task given that Little Penguins are always difficult to see in the water, the water is likely to have chop and possibly be turbid.

Recommendation 41

[57] EIS p.19-69 -70

[58] EIS Chapter 19, p.19-64

That the revised EIS include a proposal for barriers which will safely exclude marine animals from the Middle Harbour construction area in order to safeguard vulnerable species such as the Little Penguin.

Noise could also have negative impacts on the **Southern Myotis bat** which is recognised by the EIS as likely to be roosting near and fishing in these waters. The Southern Myotis, which is listed as Vulnerable under the BCA, is easily displaced by human disturbance, particularly during the breeding season in November to December.[59]

Recommendation 42
That field study be undertaken in and near Clive Park to check for the roosts of Southern Myotis and the revised EIS should include any practices advised by experts which might limit their disturbance.

There is the potential for noise to be a major **threat** to the **White-bellied Sea-Eagles**[60] nesting in a nearby bay. This pair are regularly spotted flying over the Middle Harbour region. Disturbance of nesting pairs can cause them to abandon their nests, especially during the early stages of the breeding season, and they may desert nests and young entirely if exposed to the noise and movement of construction and human activity.

Recommendation 43
That the location of the White-bellied Sea-Eagle nest be ascertained in consultation with the relevant Councils and that the revised EIS include plans to mitigate disturbances particularly during the breeding season.

9.5 Boat strike

Watercraft pose a unique threat to penguins because the birds sit low (within the top metre) of the water where they cannot easily be seen. They also blend in on the surface when the water is choppy. Research in Perth on **Little Penguins** found that over a quarter of recorded deaths was due to being hit by boats or propeller strikes.[61] Boats generally travel at speeds far faster than penguins so they find it hard to get out of the way. So, "*if there are increasingly more boats in the same areas that are used by the penguins, then the likelihood of impacts will be higher*." As noted above, the presence of a Little Penguin spotter is unlikely to be effective and better outcomes may be achieved by instituting slower speeds

[59] https://www.environment.nsw.gov.au/threatenedspeciesapp/profile.aspx?id=10549
[60] https://www.environment.nsw.gov.au/threatenedSpeciesApp/profile.aspx?id=20322
[61] Nicholas S. Phillips, Humans kill a quarter of Perth's Little Penguins Western Independent September 20, 2016

for the barges and a form of exclusion fencing placed around the construction site and barge routes.

Recommendation 44
That expert advice be sought and included in the revised EIS on ways to further minimise boat strike in relation to Little Penguins and other marine animals with particular reference to the speed limits for the barges which will be plying across Middle Harbour to the Spit.

9.6 Mitigations

The proposed mitigation measures contained in the EIS to protect wildlife during construction are weak. Checking that no animals are in the way with a ground survey 24 hours before construction or having people 'spot' them from barges and remove them during construction seems doomed to failure as it will not be the main focus or within the expertise of most involved in the construction.

Acting only on the assumption that the noise, lights, construction, contamination etc will merely drive wildlife on land and in the water away is, on any measure, basically a withdrawal of responsibility for mitigating impacts on biodiversity in this area. No evidence has been provided for the assertion that this will be temporary and at times the EIS admits that it may be permanent.

Residents are questioning the assessments made and mitigations suggested for threatened species and ecological communities listed under the EPBCA that are in the path of the project. The EIS maintains that the project does not require referral to the Australian Government Minister for the Environment. As noted above, some of these assessments appear to be incomplete and the mitigations prepared without expert advice. This would seem to undermine the assertion by the EIS that the project would not have a significant impact on these species and call for further work to be done in protecting these threatened species.

Recommendation 45
That the revised EIS provide more detailed assessments, compiled with the aid of experts in each species, on the likely impacts of construction on threatened species and mitigations which might feasibly reduce this impact.

10 BIODIVERSITY OFFSETTING

The only compensation offered for the potential impacts on threatened species likely or found to be in the areas (not the full biodiversity of fauna and plants destroyed or displaced) looked at in the EIS will be via the controversial system of biodiversity offsetting. Just over

440 biodiversity credits will need to be purchased for destroyed ecosystems and 1,099 credits for the potential impacts on threatened faunal species across the complete construction footprint for this project.[62]

The key principle of the Biodiversity Assessment Method (BAM) is 'no net loss', where impacts of development in one place are offset by improving the condition of vegetation or habitat at another Biodiversity Stewardship Site. Importantly, developments cannot proceed simply by securing the required offsets, they are required to firstly demonstrate avoidance, minimisation, and mitigation of impacts through reasonable measures prior to offsets being used. However, BAM only considers threatened species, populations and communities listed under NSW legislation as well as Matters of National Environmental Significance (MNES) under the (EPBC Act).

The problems with its application have been fully discussed elsewhere.[63] Biodiversity credits are likely to be applied to areas far from the construction footprint. It has often been hard to find offsets which meet the criteria, or which are 'like for like' in urban environments and thus the offset guidelines have been amended to allow for monetary credit (for education and research) if on-the-ground offsets cannot be found.

This policy, which allows for the destruction of biodiversity in one area, as long as it is protected somewhere else in NSW, remains a recipe for local extinction.

Recommendation 46
That the revised EIS include in its conditions of consent a range of offsets which can be applied to Flat Rock Gully and other local bushland. This additional work could include the provision of nest boxes and rock habitats for displaced wildlife and long-term bush regeneration in Flat Rock Gully Reserve, Tunks Park and Clive Park.

11 FUTURE OF FRG CONSTRUCTION SITE

The EIS remarks at several points that the future of the construction site at Flat Rock Gully is not confirmed. Transport officials at information sessions have suggested that some might like to see it utilized for competitive sports fields.

[62] EIS 19-81

[63] https://www.edo.org.au/publication/endorsing-extinction-is-not-a-minor-admin-task/; https://www.step.org.au/index.php/item/225-assessment-of-biodiversity-offsetting-a-fail-and-worse-to-come; https://theconversation.com/a-tree-for-a-tree-can-biodiversity-offsets-balance-destruction-and-restoration-3682; https://theconversation.com/a-tree-for-a-tree-can-biodiversity-offsets-balance-destruction-and-restoration-3682; https://theconversation.com/biodiversity-offsets-could-be-locking-in-species-decline-14177; https://www.theguardian.com/environment/2021/feb/17/development-should-stop-serious-flaws-in-offsets-plan-for-new-western-sydney-airport; https://www.theguardian.com/environment/2021/feb/10/its-an-ecological-wasteland-offsets-for-sydney-tollway-were-promised-but-never-delivered

The Flat Rock Gully Reserve was set aside for environmental protection and it is clear that since it was declared, the need for this type of reserve and its importance in relation to biodiversity extinctions, has become even more critical to the community. The construction site to be excised from the Reserve represents over 10% of the FRG Reserve. The return of this land to bushland will both buffer the existing Reserve from traffic and nearby carparks and sports fields and provide a large enough habitat for a healthy biodiversity to regenerate over time.

While there is constant pressure on local sporting bodies to find available land for their sports, it should also be noted that there is an even larger community of people who want access to a beautiful area of bushland where they can enjoy nature in a range of quiet ways and also participate in non-competitive activities such as strolling or bush walking, pushing prams, picnicking, nature observation, resting, playing with children, jogging, bird watching and cycling amongst a range of other activities. Some people will not even visit these areas but will draw comfort from their existence for wildlife and the continuation of natural areas in suburban Sydney.

Recommendation 47
Decision-making about the future of the Flat Rock Gully construction site should not be left to the end of the construction process. The revised EIS should confirm that it be restored to bushland consistent with the Environmental Conservation zoning of the site and in accordance with the local *Urban Bushland Plan of Management* and the *Flat Rock Gully Reserve Action Plan*.

It should also be noted that WCC has spent over $1m on earthworks and other infrastructure works and a further $1.5m on administering this bush reserve since site restoration was completed 20 years ago.

We note that, in relation to the Western Harbour Tunnel a short-list of preferred private partners has been recently released. The relevant press release states that the chosen partner will be responsible for ‘procurement and delivery’. There is always a danger that a private entity will become insolvent which is why it is commonplace in the mining industry to require rehabilitation bonds. We believe the same principle should apply here.

Recommendation 48
It should be a condition of consent in the revised EIS that the site is required to be rehabilitated to its original condition and the responsible entity. Should the work be carried out by a private entity rather than the NSW government, the private entity should be

required to deposit a bond sufficient to cover Willoughby City Council's estimate of the cost to adequately restore the site by matching the original level of investment and regenerating the site and its infrastructure.

ATTACHMENT A

Willoughby City Council, 'Native Fauna of Long Bay Catchment'

NATIVE FAUNA OF LONG BAY CATCHMENT

INCLUDES LOWER FLAT ROCK CREEK, FLAT ROCK GULLY RESERVE, TUNKS PARK, NORTHBRIDGE GOLD COURSE, WRECK BAY AND NEIGHBOURHOOD

FROGS

Common Eastern Froglet
Brown-striped Frog
Bibron's Toadlet
Eastern Dwarf Tree Frog
Peron's Tree Frog
Leaf-green Tree Frog

REPTILES

Turtles

Long-Necked Turtle

Lizards

Broad-tailed Gecko
Burton's Snake-lizard
Cream-striped Shinning-skink
Eastern Water-skink
Dark-flecked Garden Sunskink
Pale-flecked Garden Sunskink
Weasel Skink
Gully Shadeskink
Eastern Blue-tongue
Eastern Water Dragon
Lace Monitor

Snakes

Diamond Python
Common Tree Snake
Golden-crowned Snake
Eastern Small-eyed Snake
Yellow-faced Whip Snake
Red-bellied Black Snake

BIRDS

Non-passerine

Australian Brush-turkey
Brown Quail
Chestnut Teal
Pacific Black Duck
Australian Wood Duck
White-headed Pigeon
Crested Pigeon
Tawny Frogmouth
Australian Swiftlet
Uniform Swiftlet
White-throated Needletail
Little Penguin
Little Pied Cormorant
Great Cormorant
Little Black Cormorant
Pied Cormorant
Australian Pelican
White-necked Heron
Striated Heron
White-faced Heron
Nankeen Night Heron
Spoonbill sp
Australian White Ibis
Straw-necked Ibis
Collared Sparrowhawk
Brown Goshawk
Grey Goshawk
Pacific Baza
Black-shouldered Kite
White-bellied Sea-Eagle
Nankeen Kestrel
Peregrine Falcon
Dusky Moorhen
Buff-banded Rail
Masked Lapwing
Silver Gull
Sulphur-crested Cockatoo
Little Corella
Yellow-tailed Black-Cockatoo
Galah
Australian King-Parrot
Musk Lorikeet
Scaly-breasted Lorikeet
Rainbow Lorikeet
Crimson Rosella
Eastern Rosella
Pheasant Coucal
Fan-tailed Cuckoo
Eastern Koel
Channel-billed Cuckoo
Powerful Owl
Southern Boobook
Laughing Kookaburra
Sacred Kingfisher
Dollarbird
Superb Lyrebird

Passerine

Superb Fairy-wren
Variegated Fairy-wren
Brown Thornbill
Grey Gerygone
Brown Gerygone
White-throated Gerygone
White-browed Scrubwren
Spotted Pardalote
Eastern Spinebill
Red Wattlebird
Little Wattlebird
Noisy Miner
Noisy Friarbird
New Holland Honeyeater
Yellow-faced Honeyeater
Eastern Whipbird
Black-faced Cuckoo-shrike
Grey Shrike-thrush
Golden Whistler
Rufous Whistler
Olive-backed Oriole
Australasian Figbird
Australian Magpie
Grey Butcherbird
Pied Currawong
Grey Fantail
Willie Wagtail
Australian Raven
Magpie-lark
Black-faced Monarch
Leaden Flycatcher
Eastern Yellow Robin
Jacky Winter
Rose Robin
Golden-headed Cisticola
Silvereye
Welcome Swallow
Tree Martin
Mistletoebird
Red-browed Finch
Double-barred Finch
House Sparrow

MAMMALS

Short-beaked Echidna
Brown Antechinus
Long-nosed Bandicoot
Sugar Glider
Common Ringtail Possum
Common Brushtail Possum
Grey-headed Flying-fox
Gould's Wattled Bat
Lesser Long-eared Bat

These records are from Willoughby City Councils' Wildlife Register. To contribute sightings to the wildlife register email wildlifewatch@willoughby.nsw.gov.au. All sightings are also recorded in BioNet and Atlas of Living Australia.

ATTACHMENT B

Willoughby City Council, 'Native Fauna of Sailors Bay Catchment'

NATIVE FAUNA OF SAILORS BAY CATCHMENT

WILLOUGHBY CITY COUNCIL
City of Diversity

INCLUDES UPPER SAILORS BAY CREEK, INCLUDING BUTTRESS, CASEMENT, CASTLEHAVEN, CORTILE, EMBRASURE, HAVEN AMPHITHEATRE, KEEP, LOOKOUT, MERLON, ORIEL, RETREAT, SAILORS BAY PARK, THE BAILEY, TOWER, TURRET, WARNERS PARK, WATERGATE, CLIVE PARK AND NEIGHBOURHOOD

FROGS

Common Eastern Froglet
Brown-striped Frog
Red-crowned Toadlet
Leaf-green Tree Frog
Peron's Tree Frog

REPTILES

Turtles

Long-Necked Turtle

Lizards

Broad-tailed Gecko
Cream-striped Shinning-skink
Eastern Water-skink
Dark-flecked Garden Sunskink
Pale-flecked Garden Sunskink
Gully Shadeskink
Eastern Blue-tongue
Eastern Water Dragon
Lace Monitor

Snakes

Common Tree Snake
Golden-crowned Snake
Eastern Small-eyed Snake
Red-bellied Black Snake

BIRDS

Non-passerine

Australian Brush-turkey
Pacific Black Duck
White-headed Pigeon
Brown Cuckoo-Dove
Crested Pigeon
Tawny Frogmouth
Australian Owlet-nightjar
Little Penguin
Little Pied Cormorant
Little Black Cormorant
Pied Cormorant
Striated Heron
White-faced Heron
Australian White Ibis
Brown Goshawk
Pacific Baza
Black-shouldered Kite
Peregrine Falcon
Black Falcon
Buff-banded Rail
Masked Lapwing
Common Sandpiper
Painted Button-quail
Silver Gull
Sulphur-crested Cockatoo
Yellow-tailed Black-Cockatoo
Galah
Australian King-Parrot
Crimson Rosella
Eastern Rosella
Rainbow Lorikeet
Pheasant Coucal
Shining Bronze-Cuckoo
Eastern Koel
Channel-billed Cuckoo
Barking Owl
Southern Boobook
Powerful Owl
Azure Kingfisher
Laughing Kookaburra
Sacred Kingfisher
Dollarbird
Superb Lyrebird
Superb Fairy-wren

Passerine

Variegated Fairy-wren
Brown Thornbill
White-browed Scrubwren
Spotted Pardalote
Eastern Spinebill
Red Wattlebird
Little Wattlebird
Noisy Miner
New Holland Honeyeater
Eastern Whipbird
Black-faced Cuckoo-shrike
Golden Whistler
Olive-backed Oriole
Australasian Figbird
Australian Magpie
Grey Butcherbird
Pied Currawong
Grey Fantail
Willie Wagtail
Rufous Fantail
Australian Raven
Magpie-lark
Black-faced Monarch
White-winged Chough
Eastern Yellow Robin
Jacky Winter
Rose Robin
Silvereye
Welcome Swallow
Red-browed Finch
House Sparrow

MAMMALS

Short-beaked Echidna
Brown Antechinus
Long-nosed Bandicoot
Sugar Glider
Common Ringtail Possum
Common Brushtail Possum
Swamp Wallaby
Grey-headed Flying-fox
Gould's Wattled Bat
Southern Myotis

These records are from Willoughby City Councils' Wildlife Register. To contribute sightings to the wildlife register email wildlifewatch@willoughby.nsw.gov.au. All sightings are also recorded in BioNet and Atlas of Living Australia.

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