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## Bays West Stage 1 Rezoning Proposal - Biodiversity

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**NSW Department of Planning and Environment**

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Template 2.8.1

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## Abbreviations

Abbreviation	Description
BC Act	NSW <i>Biodiversity Conservation Act 2016</i>
DCCEEW	Department of Climate Change, Energy, the Environment and Water
DPE	Department of Planning and Environment
EHG	Environment and Heritage Group (part of DPE)
ELA	Eco Logical Australia
EP&A Act	NSW <i>Environmental Planning and Assessment Act 1979</i>
EPBC Act	Commonwealth <i>Environment Protection and Biodiversity Conservation Act 1999</i>
FM Act	NSW <i>Fisheries Management Act 1994</i>
MNES	Matters of National Environmental Significance
OEH	former Office of Environment and Heritage (now EHG)
PCT	Plant Community Type
WM Act	NSW <i>Water Management Act 1994</i>

# 1. Introduction

## 1.1. The proposal

The NSW Department of Planning and Environment (DPE) proposes to rezone land at the White Bay Power Station (and Metro) sub-precinct (Figure 1) consistent with the exhibited Bays West Stage 1 Masterplan. The Proposal would rezone land to provide for residential, commercial, retail and community space as well as public recreation (Figure 2). The intended future zones comprise:

- SP1 – Special Activities to consist of commercial premises, community facilities and creative industry, entertainment facilities, hotel and educational establishment
- MU1 – Mixed Use
- E2 – Commercial Core
- RE1 – Public Recreation to consist of the public open space.

The Bays West Strategic Place Framework (DPIE 2021a) outlines a vision for the place, which reflects and respects Country:

*‘Bays West will represent a new kind of Sydney urbanism that respects and celebrates Country.*

*It will build on its natural, cultural, maritime and industrial stories to shape an innovative and sustainable new place for living, recreation and working.*

*New activities, places, connections and destinations will enrich Bays West’s character and meaning over time through built form and public spaces that embrace its natural and cultural heritage.’ (DPIE 2021a)*

Part of the vision is to embrace the natural heritage of the precinct.

The Connecting with Country Draft Framework is a framework intended to inform the planning, design, and delivery of projects in NSW. The framework is not prescriptive nor formulaic, rather it provides paths, principles and commitments to working collaboratively, putting Country and Aboriginal perspective first.

There are three long-term strategic goals:

- Reduce the impacts of natural events such as fire, drought and flooding through sustainable land and water use practices
- Value and respect Aboriginal cultural knowledge with Aboriginal people co-leading design and development of all NSW infrastructure projects
- Ensure Country is cared for appropriately and sensitive sites are protected by **Aboriginal people having access to their homelands to continue their cultural practices.**

The Proposal therefore considers the higher-level strategies and frameworks to achieve the rezoning.

## 1.2. The site

There are two sub-precincts that formed the Stage 1 Bays West Precinct Master Plan, however only one will be the subject of this Proposal. This is the White Bay Power Station (and Metro) sub-precinct (Figure

1) located on the south-eastern edge of the Balmain peninsula, and to the west of Glebe Island, with a foreshore along White Bay. White Bay is about 2.8 km west from the Sydney GPO, in the Inner West Local Government Area, and forms part of the interconnected bay systems which include Rozelle Bay, Blackwattle Bay and Johnstons Bay.

This area is central to the renewal of the precinct holding both the White Bay Power Station and the Metro Station. Currently the area is closed to the public. The land is bound by Robert Street to the north, Victoria Road to the west, Anzac Bridge Access Road to the south and Glebe Island or the waters of White Bay to the east.

The area subject to the State-led rezoning is currently not in use, and contains the former White Bay Power Station, decommissioned railway tracks, industrial refuse, hardstand areas, exotic plants and access to White Bay. A ports access road follows the highly modified and concrete-edged White Bay. The land seaward of this road forms part of the working port of White Bay.





Figure 1: Location of the Proposal area





Figure 2: Proposed zoning at Bays West Stage 1



## 2. Legislative context

The information contained in Table 1 provides an overview of the key biodiversity and environmental legislation considered by this technical report.

**Table 1: Legislation relevant to the planning proposal at Bays West**

Name	Relevance to the Proposal	Report section
<b>Commonwealth legislation</b>		
<i>Environment Protection and Biodiversity Conservation Act 1999</i> (EPBC Act)	The EPBC Act aims to protect Matters of National Environmental Significance (MNES). Proposed actions that have the potential to significantly impact on matters of MNES must be referred to the Commonwealth Department of Climate Change, Energy, Environment and Water to determine if they are a Controlled Action. MNES have been identified on or near the site. Whilst Planning Proposals are not considered an 'action' under the EPBC Act, consideration of MNES at all stages of planning is prudent.	MNES considered in section 4
<b>State legislation</b>		
<i>Environmental Planning and Assessment Act 1979</i> (EP&A Act)	Planning Proposals are prepared under Part 3 of the EP&A Act.	The report addresses the requirements for a biodiversity assessment for a planning proposal
<i>Biodiversity Conservation Act 2016</i> (BC Act)	<p>The BC Act aims to conserve biodiversity and introduce a framework to avoid, minimise and offset impacts of proposed development.</p> <p>The Act does not have specific provisions that relate to Planning Proposals under Part 3 of the EP&amp;A Act, however it is expected that biodiversity would be considered in an Planning Proposal. The study area is not mapped by the Biodiversity Values Map, nor is there likely to be the area based threshold for complying with the NSW Biodiversity Offset Scheme at the DA stage. Unless at the DA stage there is likely to be a significant impact on threatened species under the BC Act, development applications are unlikely to require a Biodiversity Development Assessment Report.</p>	Considered in sections 5 and 6
<i>Fisheries Management Act 1994</i> (FM Act)	<p>The FM Act aims to protect fish habitat and threatened species.</p> <p>The FM Act does not have specific provisions that relate to Planning Proposals under Part 3 of the EP&amp;A Act, however consideration of fish habitat should be undertaken at all planning stages.</p> <p>Subsequent development of the site will not involve harm to mangroves or other protected marine vegetation, dredging, reclamation or obstruction of fish passage. The proposed rezoning may affect threatened fish habitat and this has been considered in this report.</p>	Considered in sections 5 and 6

Name	Relevance to the Proposal	Report section
<i>Water Management Act 2000</i> (WM Act)	<p>The WM Act aims to protect the water resources of NSW. The Act does not have specific provisions that relate to Planning Proposals under Part 3 of the EP&amp;A Act., however consideration of water resources should be undertaken at all stages of planning.</p> <p>The <i>Water Management (General) Regulation 2018</i> hydroline spatial data 1.0 shows White Bay as the only waterbody or watercourse in the study area, with 'waterfront land' extending 40 m landwards from the Mean High Water Mark of the estuary. However, the study area lies within an exemption area mapped on the department's website (Port Jackson). Therefore, under s36 of schedule 4 of the <i>Water Management (General) Regulation 2018</i>, development approved under the EP&amp;A Act would be exempt from requiring a controlled activity approval for works on waterfront land.</p>	Not considered further in this report

## 3. Methods

### 3.1. Literature and data review

The following information and data sources were reviewed:

- BioNet / Atlas of NSW Wildlife (EHG 2022)
- EPBC Act Protected Matters Search Tool (DCCEEW 2022)
- NSW Threatened Species Profiles (EHG 2022)
- The Native Vegetation of the Sydney Metropolitan Area. Volume 2: Vegetation Community Profiles. Version 2.0. NSW Office of Environment and Heritage, Sydney (OEH 2013)
- Biodiversity Values Map (2022)
- Previous reports (ELA 2014, ELA 2016, ELA 2020, ELA 2021,)
- The natural vegetation of the Sydney 1:100,000 map sheet (Benson and Howell 1994)
- Department of Planning, Industry and Environment (DPIE) 2021a. Bays West Strategic Place Framework – Draft for Consultation.
- DPIE 2021b. Bays West Urban Design Framework – Draft for Consultation
- Soil Landscapes of the Sydney 1:100,000 Sheet map, Ed. 4, Department of Environment, Climate Change and Water, Sydney (Chapman et al 2009)
- Native vegetation of southeast NSW: a revised classification and map for the coast and eastern tablelands. Version 1.0. Department of Environment and Conservation and Department of Natural Resources, Sydney (Tozer et al 2005).

The above information was reviewed to determine what if any biodiversity values might be present within the Proposal area. Threatened species were mapped on aerial photographs to determine if any threatened species habitat might be present. Reports carried out for the Proposal area and surrounds were also examined to understand the results from previous surveys.

The assessment and conclusions on the biodiversity present in the Proposal area is based on this desktop review and the surveys for microchiropteran bats carried out in 2016 (ELA 2016) to determine if any species were using the White Bay Power Station buildings or surrounds. These surveys remain current and were used to inform the assessment. In addition to the bat surveys, a habitat assessment was carried out for the Inner West endangered population of *Perameles nasuta* (Long-nosed Bandicoot).

Vegetation mapping had been carried out as part of the scoping works for the entire Bays Precinct in 2014 (ELA 2014). Since then, several studies have mapped vegetation in or adjacent to the White Bay Power Station sub-precinct. These studies have been used to inform this report, along with examination of high-resolution aerial photography. Review of recent aerial photo (Nearmap) show minimal change to the environment since 2016.

## 4. Existing environment

### 4.1. Geology and soils

Based on geology maps and the place strategy, the land on which the sub-precinct sits is fill, or reworked soil, with a small area of intertidal flat at the foreshore (Chapman et al. 2009). Abutting the site is extensive Hawkesbury sandstone. The Hawkesbury sandstone would have been from the Wianamatta Group and of medium to coarse-grained quartz sandstone with very minor shale and laminite lenses (Herbert 1983).

### 4.2. Vegetation

The vegetation present in the sub-precinct is highly modified and not likely to reflect the vegetation that would have occurred prior to clearing (Figure 3). The vegetation would not correspond with any recognised Plant Community Type listed in the NSW Bionet Vegetation Classification Dataset. Therefore, to visualise what may have once occurred, examining several research reports and papers is required. Hints to what may have been present is based on looking at geology, position in the landscape, proximity to the coast, elevation and surrogate sites in areas that may be relatively 'intact', such as in Sydney Harbour National Park, or local reserves. Several vegetation mapping studies have occurred in the Sydney region. These regional mapping studies have informed the likely vegetation types that would have occurred in the sub-precincts.

The presumed vegetation pattern on the site would have consisted of Sandstone Heaths, Woodlands and Forests (Benson and Howell 1994). That study describes Sydney Sandstone Gully Forest as having a widespread distribution and found on Hawkesbury sandstone of the coast. While there are three sub-units mapped by Benson and Howell (1994), the most likely vegetation that could have occurred in the sub-precinct is the Open forest/woodland *Eucalyptus piperita*-*Angophora costata* – *Eucalyptus pilularis* sub-unit.

The equivalent map unit described by Tozer et al. (2005) is Coastal Sandstone Gully Forest. That report (Tozer et al. 2005) describe this type as an open eucalypt forest with a diverse shrub layer, with a ground cover dominated by sedges, and found in lower slopes of sandstone gullies. This further relates to the contemporary plant community type (PCT) Coastal Sandstone Foreshores Forest. This PCT is described in the Bionet Vegetation Classification data, and in the mapping project carried out by the then Office of Environment and Heritage (OEH 2013). In the 2013 report, it is described as found on sheltered sandstone slopes along the foreshores of Sydney's major waterways and coastal escarpments. It is an open forest with a moist shrub layer and a ground cover of ferns, rushes and grasses. The flora of this community has a maritime influence given its exposure to prevailing sea breezes.

While there may have been small scale variation and some small areas of saltmarsh or even riparian vegetation, the Coastal Sandstone Foreshores Forest is likely to have been the dominant vegetation type across the sub-precinct.



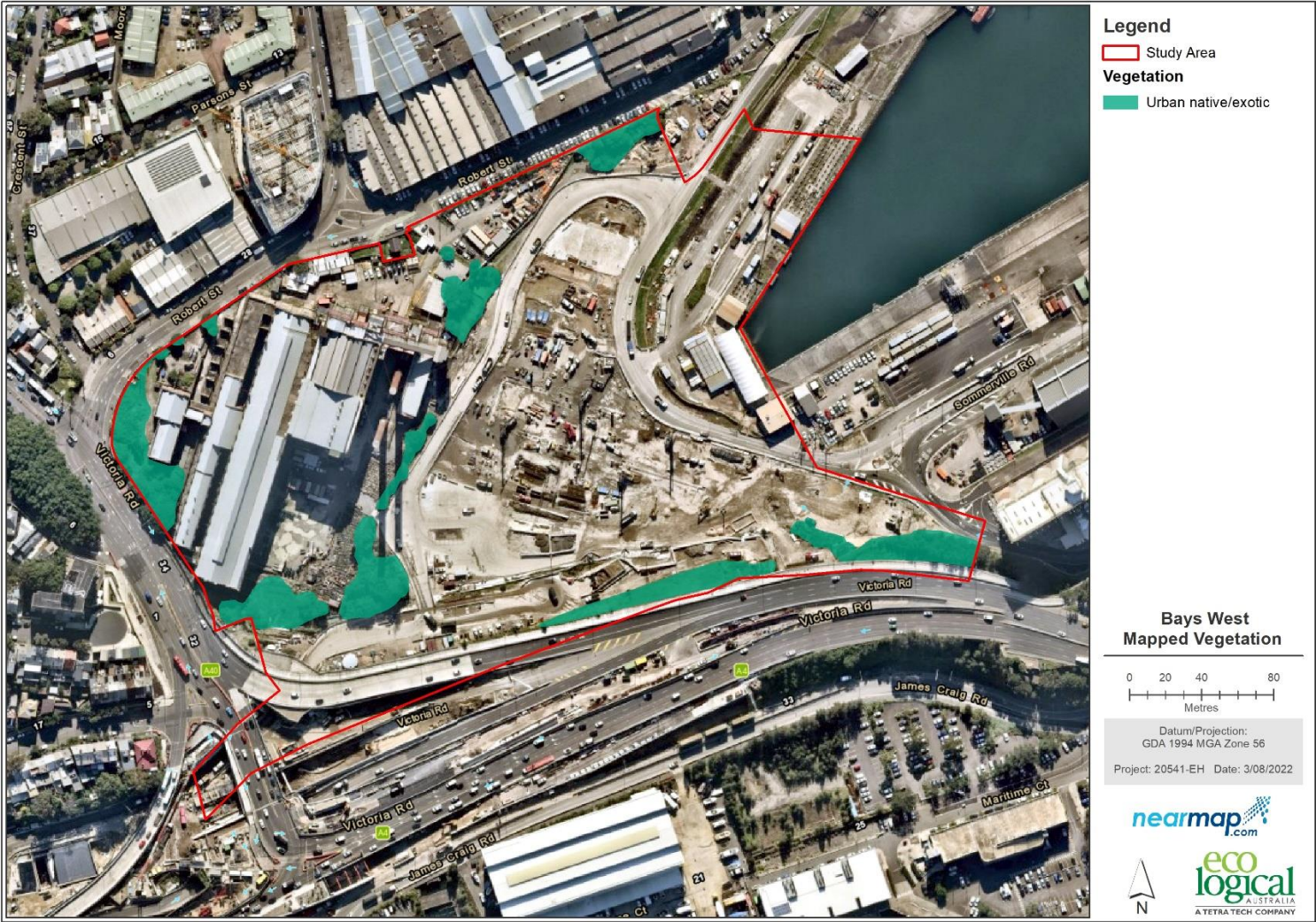


Figure 3: Mapped vegetation within the Proposal area





Figure 4: Threatened species records in and around the Proposal area (source Bionet DPE 2022)

### 4.3. Threatened terrestrial species

A search of the Bionet threatened species records show that there are very few threatened species within 1 km of the sub-precinct (Figure 4). There were 10 threatened fauna and one threatened flora record within 1 km of the sub-precinct.

Between 2014 and 2016, ELA carried out several surveys and studies either in the sub-precinct or close to it. As part of these surveys, ELA detected microchiropteran bat species, including two threatened species at the White Bay Power Station. Microchiropteran bats (or microbats) are small bats ranging in weight from 3 g to about 40 g. They are diverse in both Australia and NSW, comprising about 39% of all mammal species in NSW. Microbats require roosts, with some species using tree hollows while others use caves, culverts, buildings, tunnels and bridges.

ELA detected two threatened and two non-threatened bats on the White Bay Power Station in 2016. The species are outlined in Table 2. None of the species detected are listed under the EPBC Act.

**Table 2: Microbat species found at the White Bay Power Station (ELA 2016)**

Species	Common name	BC listing	Act	General species comments (not site specific to White Bay)
<i>Chalinolobus gouldii</i>	Gould's Wattled Bat	Not listed		Gould's Wattled Bats roost in hollows in old trees, occasionally in ceilings or basements of buildings. They roost together in colonies of around 30 bats, sometimes smaller and other times larger. Gould's Wattled Bat feed on a variety of insects, including scarab beetles, caterpillars, crickets and moths, depending on the time of year (Churchill 2008).
<i>Miniopterus schreibersii</i> <i>oceanensis</i>	Eastern Bentwing Bat	Vulnerable		This species forages from just above the tree canopy, to many times the canopy height in forested areas, and will utilise open areas where it is known to forage at lower levels. Moths appear to be the main dietary component. Though individuals often use numerous roosts, it congregates in large numbers at a small number of nursery caves to breed and hibernate. Although roosting primarily occurs in caves, it has also been recorded in mines, culverts, stormwater channels, buildings, and occasionally tree-hollows
<i>Mormopterus ridei</i>	Eastern Freetail Bat	Not listed		Colonies of several hundred individuals have been recorded in NSW and they prefer to roost in tree hollows. Living along the eastern seaboard means their habitat preferences lean towards rainforest, tall open forests, woodlands, riparian open forest and dry sclerophyll forests. They tend to fly in open spaces between trees as they hunt for bugs, flies, beetles, moths and spiders (Churchill 2008).
<i>Saccolaimus flaviventris</i>	Yellow-bellied Sheath-tail Bat	Vulnerable		Roosting individually or in groups of up to six, they generally roost in tree hollows, but in treeless areas they are known to utilise buildings and even mammal burrows. This species has been observed 'resting' on the walls of buildings in the broad

Species	Common name	BC listing	Act	General species comments (not site specific to White Bay)
				daylight (Richards 2008). They will forage in most habitats throughout their very wide range, including areas with and without trees and appear to defend an aerial territory (DPIE 2021c).

All the species detected were found outside the buildings. Detectors placed inside parts of the White Bay Power Station did not record presence of microbats. However, it should be noted that the surveys were not exhaustive and not carried out over multiple seasons. Bats can use sites infrequently. Hollow roosting microbats tend to exhibit dynamic roost usage where multiple [up to ten or more (Brad Law pers. comm., 2011)] hollow-bearing trees are used at any one time for maternity and winter roosts, with bats moving between them each night or every few nights.

Survey for the Long-nosed Bandicoot did not reveal any individuals present. There is limited habitat present, although this species can use sub-floor spaces, rubble piles and exotic vegetation cover for foraging, nesting and dispersal. The Proposal area is surrounded by busy roads and the Port, therefore the species is unlikely to be present.

#### 4.4. Threatened marine species

A search of the *Fisheries Management Act 1994* (FM Act) revealed that four threatened marine fish and one endangered marine flora population were recorded within 1 km of the sub-precinct (Table 3).

**Table 3: List of marine threatened species and population within 1 km of the sub-precincts**

Type	Species name	Common name	FM Status	Act	EPBC Status	Use of site
Bony Fish	<i>Epinephelus daemeli</i>	Black Rockcod		V	V	No suitable habitat present, eg rock overhangs, crevices or caves. Much of the current shoreline is artificial and constructed cement walls.
	<i>Hippocampus whitei</i>	White's Seahorse		E	E	Recorded under jetty / near pylon on opposite side of White Bay, few macroalgae plants on piles.
Shark	<i>Carcharias taurus</i>	Grey Shark	Nurse	E4A	CE	Limited suitable habitat
	<i>Carcharodon carcharias</i>	Great Shark	White	V	V	
Seagrass	<i>Posidonia australis</i> - Port Hacking, Botany Bay, Sydney Harbour, Pittwater, Brisbane Waters and Lake Macquarie populations	Posidonia australis		E2	E	No plants observed – waters in White Bay too deep for these meadows to persist



Of the five matters listed under the FM Act, only one is known to have been present near the sub-precinct: *Hippocampus whitei* (White's Seahorse) was recorded in White Bay during a 2001 survey by the Australian Museum. This species is listed as endangered under the FM Act and EPBC Act. It is understood to have been found under a wooden jetty at Port No. 3 on the northern side of White Bay. This fish lives in protected areas usually within a dense marine flora habitat. Such habitats occur on seagrass beds and submerged objects including swimming nets and jetty pylons. Threats to the species includes removal of this habitat in events such as net cleaning or sedimentation, which kills marine plants.

## 5. Potential impacts and opportunities

### 5.1. Terrestrial ecological constraints and impacts

The Proposal area contains very little remnant native biodiversity. There is no remnant native vegetation remaining and this reflects the history of use and disturbance. Previous survey identified the Proposal area to contain exotic vegetation and weeds. These pose little to no ecological constraint.

The Proposal area does provide some habitat for threatened microbats, which have been detected flying in and around the area. There was no evidence that the species detected were using the buildings for roosting or breeding habitat. The Proposal area also did not contain any individuals of the Long-nosed Bandicoot endangered population. However, during any development application, further assessment would be required for all these species (see section 6.1 for further detail).

Overall, the terrestrial ecological constraints of the Proposal area are low, limited to potential bat habitat. If the proposed rezoning progresses, there would unlikely be any significant impacts on native terrestrial biodiversity.

### 5.2. Marine ecological constraints and impacts

The marine environment adjacent to the Proposal area is highly modified. The shoreline is constructed from concrete, with sheer walls providing the intertidal interface, and the seabed likely to have been dredged to allow for a working port. No seagrass meadows or significant marine flora are likely to persist in this environment. The exception may be scattered macroalgae attached to rocky rubble at the toe of sloping seawalls, which may provide limited connectivity between wharf piles.

One threatened species was previously detected in marine flora attached to jetty pylons opposite from the Proposal area, but still within White Bay. White's Seahorse is listed under the FM Act and EPBC Act as endangered. The proposed open space (RE1 – Public Recreation) includes a vision for reinventing the shoreline. This may include new treatments of the shoreline. If this is proposed at the DA stage, appropriate assessment of the likely impact on White's Seahorse would be completed. However, since there is limited habitat on the western side (Proposal side) of White's Bay, the Proposal is unlikely to significantly affect this fish species.

### 5.3. Terrestrial ecological and biodiversity opportunities

Typical restoration would rely on making improvements to the existing elements of the natural heritage on a site. There is little to restore, so a new way of thinking could be used to approach the biodiversity opportunities on this site.

As discussed in section 4.2, there are hints as to the vegetation that may have once inhabited the sub-precinct. There is an opportunity to draw on the presumed vegetation types and to add others that may reflect the current landforms. These have been summarised in Table 4.

Table 4: Potential plant community types, their main elements and where they can be used (species source data OEH 2013)

Plant type	community	Canopy species	Mid stratum species	Ground cover species	Where might this be used in the sub-precinct
PCT 1778 Sandstone Foreshores Forest	Coastal	<i>Angophora costata</i> , <i>Eucalyptus botryoides</i> , <i>integrifolia</i> , <i>Eucalyptus piperita</i> , <i>Eucalyptus pilularis</i>	<i>Glochidion ferdinandi</i> , <i>Pittosporum undulatum</i> , <i>Allocasuarina littoralis</i> , <i>Breynia oblongifolia</i> , <i>Notelaea longifolia</i> , <i>Dodonaea triquetra</i> , <i>Elaeocarpus reticulatus</i> , <i>Polyscias sambucifolia</i> , <i>Acacia longifolia</i> , <i>Myrsine variabilis</i>	<i>Dianella caerulea</i> , <i>Pteridium esculentum</i> , <i>Lomandra longifolia</i> , <i>Entolasia stricta</i> , <i>Imperata cylindrica</i> var. <i>major</i> , <i>Microlaena stipoides</i> var. <i>stipoides</i> , <i>Poa affinis</i> , <i>Themeda triandra</i> , <i>Xanthorrhoea arborea</i> , <i>Lepidosperma laterale</i> , <i>Pratia purpurascens</i>	Elements could be used in the open space between Robert Street and the foreshore



PCT 1778 (source Bionet Vegetation Classification data set)

PCT 1127 Sandstone Cliff-face Soak	Not usually present	<i>Baeckea linifolia</i> , <i>Callicoma serratifolia</i> , <i>Ceratopetalum apetalum</i> , <i>Tristaniopsis laurina</i>	<i>Bauera rubioides</i> , <i>Drosera peltata</i> , <i>Drosera spatulata</i> , <i>Adiantum aethiopicum</i> , <i>Adiantum hispidulum</i> , <i>Blechnum ambiguum</i> , <i>Blechnum wattsi</i> , <i>Christella dentata</i> , <i>Gleichenia dicarpa</i> , <i>Gleichenia rupestris</i> , <i>Selaginella uliginosa</i>	Along the sandstone 'cliff' faces where sandstone ledges have been modified and there are seep zones
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Plant type	community	Canopy species	Mid stratum species	Ground cover species	Where might this be used in the sub-precinct
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PCT 1127 (source Bionet Vegetation Classification data set)

PCT 1126 Saltmarsh	Estuarine	Not usually present	Not usually present, but can include: <i>Aegiceras corniculatum</i> , <i>Avicennia marina</i> , <i>Casuarina glauca</i> , <i>Rhagodia candolleana</i>	<i>Samolus repens</i> , <i>Sarcocornia quinqueflora</i> , <i>Sporobolus virginicus</i> , <i>Juncus kraussii</i> , <i>Suaeda australis</i> and <i>Tetragonia tetragonioides</i>	In the proposed tidal area adjacent to the foreshore
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PCT 1126 (source Bionet Vegetation Classification data set)

PCT 1913 Meadows	Seagrass	Not usually present	Not usually present	<i>Zostera capricorni</i> , <i>Zostera muelleri</i> , <i>Heterozostera tasmanica</i> , <i>Halophila ovalis</i> , <i>Halophila decipiens</i> , <i>Halophila australis</i> , <i>Posidonia australis</i>	In the future, if the seabed changes and depth within White Bay is reduced, then a seagrass meadow is a potential community that could be created. Currently these meadows are not present in White Bay.
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There is an opportunity to create linking habitats via stepping stones from within to outside the sub-precincts. Currently habitat connectivity is absent terrestrially and mediated by the working port, bathyscape and water quality in the marine environment. Lack of habitat connectivity was identified as one of the key biodiversity threats in the City of Sydney Urban Ecology Strategic Action Plan (City of Sydney 2014). While the Bays West sub-precincts were not identified as key priority sites, inclusion of connecting habitat would contribute to the overall urban ecology targets in the City.

The landscape design could consider the inclusion of smaller areas of Country positive native plants, representative of previous elements (see Table 4) across the open space and other areas in the sub-precincts. While larger corridors and remnant patches of vegetation are considered the ideal for protection and resilience of biodiversity, in a highly spatially constrained area, this is not possible nor practical if other land uses are to be achieved.

The site has a challenge of managing stormwater that forms an overland flow across the site. Creative use of the water flowing off the built form and transforming that in three ways that integrates with the Connecting with Country vision for this element on the site:

- Use of stormwater to provide a freshwater environment which could be used by microbats for foraging
- Creation of interpreted aquatic habitats to include bioretention / water quality improvements for overland flow from the land to marine environments
- Allowing for an interpreted shoreline and using plants consistent with estuarine saltmarsh which could allow for tidal movements onto the land and considers future climate / sea level rise.

Improvements in the quality of water exiting the site into the Harbour should be a key consideration of planning the landscaping and other bio-systems.

The presence of native microbats in buildings is both a challenge and an opportunity. Since the buildings at the White Bay Power Station are not intended to be demolished, there is an opportunity to manage any populations that may be using the buildings and to potentially provide additional, robust habitat. Recent examples of how to manage microbats in built structures have included:

- Provision of compensatory habitat
- Management of bats during construction
- Intention to retain roosting habitat within structures
- Develop new microbat habitat within structures.

Ideally, if microbats are found within the buildings, retention of the roosting habitat and / or provision of additional habitat within the structures would be better outcomes than exclusion or provision of bat boxes. This is because bat boxes can be colonised by undesirable and abundant species such as European Honeybees, Common Myna and Noisy Miner. Bat roosts are usually occupied because they have very specific temperature, light and humidity conditions, which can be difficult to mimic in bat boxes.

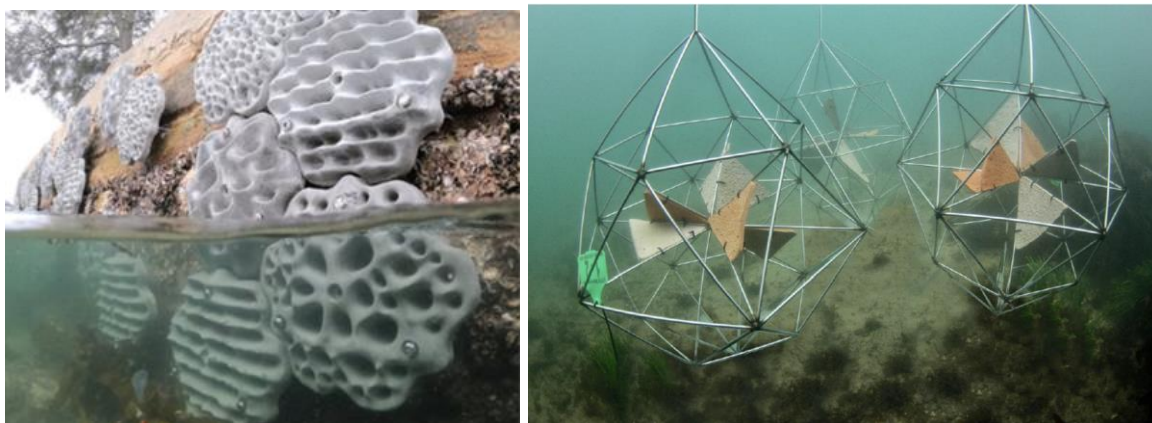
The scale of the planned open space will limit what can be achieved regarding attracting native species. Species that are uncommon in urban areas could be attracted to the sub-precinct with planting appropriate species and providing other habitat elements:

- Microbats with the provision of additional habitat and unobstructed water
- Small birds, such as Superb Fairy-wren, New Holland Honeyeater and Silvereye with the provision of shrubs and nectar producing flowers
- Reptiles such as Blue-tongue Lizard, Eastern Water Dragon through the provision of water, logs and leaf litter
- Native bees, beetles, moths and butterflies through the provision of shrubs and nectar producing flowers, grasses and sedges.

#### 5.4. Marine ecological and biodiversity opportunities

The marine and intertidal environments provide a plethora of opportunities to create new habitats. The aim is to improve habitat connectivity around a highly modified foreshore. The improvements could include:

- Use of intertidal and subtidal seawall tiles to create vertical habitat on the constructed sea wall (Plate 1)
- Design and deployment of subtidal structures (bio-shelters) to encourage the growth of marine algae and fish aggregation (Plate 1)
- Design and deployment of seahorse hotels (see below).



**Plate 1: Examples of seawall tiles (left) and prototype fish aggregation devices (right) (credit: Reef Design Lab and Sydney Institute of Marine Science)**

The above structures, excluding the seahorse hotels, plus a rocky reef have been proposed for the new Sydney Fish Market in Blackwattle Bay. By including these elements in the marine environment, the existing habitat can be augmented and connectivity improved around the bay. If this was included in potential future development applications, there is an opportunity to increase the diversity of marine habitat in an area where this is severely limited.

The University of Sydney carried out research to identify if temporary 'accommodation' for *Hippocampus whitei* (White's Seahorse) would be effective (Simpson et al. 2020). The researchers tested three different models of 'hotel'. They found that White's Seahorse had no preference for hotel type, they will inhabit the hotels and overall, the hotels could be a useful tool in providing supplementary

habitat in places where there is none (Simpson et al. 2020). The approach taken by the researchers could be adopted as part of the improvements to biodiversity goals for the Bays West sub-precincts. The seahorse hotels were primarily designed to encourage occupancy by seahorse populations, however they may benefit other species. The hotels comprise open structures, such as wide gauge netting. This netting allows for the recruitment of macroalgae and marine flora, thus increasing marine biodiversity in a small area. Increasing structural complexity in the benthic environment is thought to provide better protection and more available food resources for a range of marine fauna.

## 6. Recommendations

### 6.1. Terrestrial biodiversity impact assessment requirements for development applications

For a development application under Part 4 of the EP&A Act the assessment provisions of the BC Act and EPBC Act would apply. The BC Act includes a range of triggers for the Biodiversity Offsets Scheme (BOS). The BOS applies to developments assessed under Part 4 of the EP&A Act. The triggers for the BOS and considerations for impact assessment under the BC Act include:

- impacts to land mapped under the Biodiversity Values Map
  - none detected in the Proposal area as at July 2022
- clearing of native vegetation above the permissible threshold per lot size
  - the study area does not appear to contain remnant native vegetation likely to trigger the area based threshold
- determination through the application of an assessment consistent with s7.3 BC Act that the impact is significant to the matter under consideration
  - threatened bat species were detected in the past, and are likely to continue using some or all the Proposal area
  - assessments consistent with the BC Act would be required at the DA stage
- impacts to a listed matter that is subject to Serious and Irreversible Impacts (SII).
  - the study area does not contain any matters subject to SII, however the consent authority can add SII matters for assessment , and it is understood the list is updated periodically.

Targeted survey would need to be updated and repeated to determine the presence of threatened fauna species. This is because survey data has currency for five years and would be outdated prior to any DA.

Assessment of potential prescribed biodiversity impacts may also require consideration. According to s6.3 of the BC Act, assessment and biodiversity offsets may apply to impacts that are prescribed by the regulations. The prescribed impacts are described in cl. 6.1 (1) of the *Biodiversity Conservation Regulation 2017* and are:

- (a) the impacts of development on the following habitat of threatened species or ecological communities—
  - (i) karst, caves, crevices, cliffs and other geological features of significance,
  - (ii) rocks,
  - (iii) human made structures,
  - (iv) non-native vegetation,



- (b) the impacts of development on the connectivity of different areas of habitat of threatened species that facilitates the movement of those species across their range,
- (c) the impacts of development on movement of threatened species that maintains their lifecycle,
- (d) the impacts of development on water quality, water bodies and hydrological processes that sustain threatened species and threatened ecological communities (including from subsidence or upsidence resulting from underground mining or other development),
- (e) the impacts of wind turbine strikes on protected animals,
- (f) the impacts of vehicle strikes on threatened species of animals or on animals that are part of a threatened ecological community.

Of relevance to the Proposal area is the presence of human-made structures and non-native vegetation. The elements are present as the buildings which could be bat habitat and the exotic species which may be sheltering habitat for the Long-nosed Bandicoot (although unlikely). While there could be impacts on water quality and waterbodies, these do not support populations of threatened species listed under the BC Act. Regardless, if a Biodiversity Development Assessment Report is required, these prescribed impacts would need to be considered and appropriately assessed.

## 6.2. Aquatic biodiversity impact assessments for development applications

The presence of White's Seahorse in the waters adjacent to the site mean that under the FM Act and EPBC Act, an assessment of a development or activity needs to be carried out. The assessment under s.221ZV of the FM Act and Part 3 of the EPBC Act seek to determine if a proposed development or activity is likely to significantly affect threatened species, populations or ecological communities. Appropriate survey and assessment consistent with the FM Act, EPBC Act and their guidelines would need to occur prior to the submission of a development application.

The waters adjacent to the Proposal area are mapped as Key Fish Habitat in the NSW DPI Fisheries Spatial Data Portal (DPI 2022). Assessment of direct and indirect impacts would need to be considered at the development application stage and may require consultation or a Part 7 FM Act permit to ensure 'no net loss' of Key Fish Habitat occurs. This would depend on the type of development application and the proponent.

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