Noise wall, M1 Pacific Motorway, Cooranbong

Minor Works Review of environmental factors

Transport for NSW | September 2022

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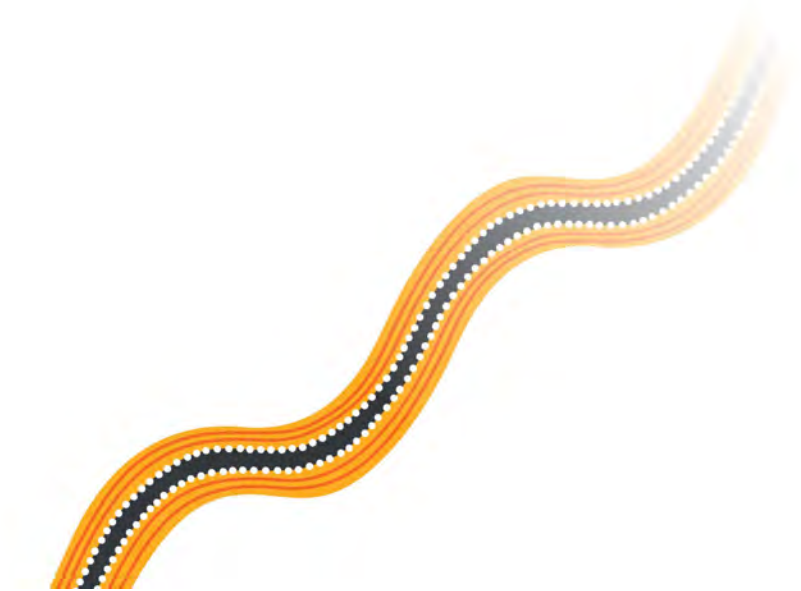
Acknowledgement of Country

Transport for NSW acknowledges the traditional custodians of the land on which noise wall adjacent to the M1 Pacific Motorway at Cooranbong is proposed.

We pay our respects to Elders past and present and celebrate the diversity of Aboriginal people and their ongoing cultures and connections to the lands and waters of NSW.

Many of the transport routes we use today – from rail lines, to roads, to water crossings – follow the traditional Songlines, trade routes and ceremonial paths in Country that our nation's First Peoples followed for tens of thousands of years.

Transport for NSW is committed to honouring Aboriginal peoples' cultural and spiritual connections to the land, waters and seas and their rich contribution to society.



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Document controls

Approval and authorisation

Title	Noise wall, M1 Pacific Motorway, Cooranbong Minor works review of environmental factors
Accepted on behalf of Transport for NSW by:	Willamina Warner Project Engineer Maintenance & Delivery | Network & Assets Regional and Outer Metropolitan
Signed:	
Dated:	26.09.2022

Document status

Document status	Date	Prepared by	Reviewed by
Revision	16.05.2022	S. Hill	Transport for NSW
Revision 2	29.08.2022	S. Hill	Transport for NSW, M. Thomas
Revision 3	23.09.2022	S. Hill	

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1. Introduction

The purpose of the Minor Works review of environmental factors (REF) is to describe the proposal, to document the likely impacts of the proposal on the environment, to detail mitigation measures to be implemented and to determine whether or not the proposal can proceed. For the purposes of this work Transport for NSW (Transport) is the proponent and determining authority under Division 5.1 of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

The description of the proposed works and assessment of associated environmental impacts has been undertaken in the context of section 171 of the Environmental Planning and Assessment Regulation 2021, *Guidelines for Division 5.1 Assessments* (DPE, 2022), the *Biodiversity Conservation Act 2016* (BC Act), the *Fisheries Management Act 1994* (FM Act) and the Commonwealth Government's *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

In doing so the REF helps to fulfil the requirements of section 5.5 of the EP&A Act including that Transport examine and take into account to the fullest extent possible all matters affecting or likely to affect the environment by reason of the activity.

The findings of the REF would be considered when assessing:

- Whether the proposal is likely to have a significant impact on the environment and therefore the necessity for an environmental impact statement to be prepared and approval to be sought from the Minister for Planning and Public Spaces under Division 5.2 of the EP&A Act
- The significance of any impact on threatened species as defined by the BC Act and/or FM Act, in section 1.7 of the EP&A Act and therefore the requirement for a Species Impact Statement or a Biodiversity Development Assessment Report
- The potential for the proposal to significantly impact a matter of national environmental significance, including nationally listed threatened biodiversity matters, or the environment of Commonwealth land. Where a significant impact is considered likely on nationally listed biodiversity matters, either the proposal must be reconsidered or a Project REF must be prepared.

2. The proposal

2.1 Description

2.1.1 Proposal location

Location details	
Title	Noise wall, M1 Pacific Motorway, Cooranbong
File number	A43161161
Road name and number	M1 Pacific Motorway
Closest cross road(s):	Marshall Street (local road)
Chainage of works:	N/A
Local government area:	Lake Macquarie
Transport for NSW region:	Hunter

Figure 2-1: Location of the proposal

2.1.2 Description of proposed work

Transport for NSW proposes to construct a noise wall adjacent to the northbound carriageway of the Pacific Motorway at Cooranbong. Typical cross sections of the proposed noise wall are provided in Figure 2-2 and Figure 2-3. The proposal footprint for the works is shown in Figure 2-4.

Key features of the proposal include:

- Extension of an existing pipe culvert mid-way along the noise wall alignment to facilitate construction and maintenance access. This would include provision of a new headwall, wing wall and apron and adjustment of the adjacent V-drain alignment to suit.
- Construction of a precast concrete panel noise wall about 400 metres long, supported by 73 steel posts at typically six metre intervals and achieving the minimum required height of 5.0 metres above ground level. The posts at the first 12 metres and the last 12 metres of the noise wall are spaced at three metre centres to accommodate the larger wind loads at the wall ends. The new wall would overlap the existing noise wall at the southern end by about 35 metres and at the northern end by about 4.5 metres and would be separated from those walls by 1.5 metres.
- Horizontal steps between panels at the top of the noise wall would be placed to account for the change in ground level. The top two noise wall panels are typically 1.8 metres high, while the bottom noise wall panel has a varied height on each side to accommodate the existing ground level. The height of the noise would be typically 5.03 metres to 5.87 metres from the existing ground level.
- Painting of posts and panels green to match existing noise wall to the north and south
- Realignment of v-drain at the southern end of the proposed noise wall to the west to prevent blocking of flows
- Provision of a new v-drain in front of the noise wall (i.e. the eastern side) over a distance of about 100 metres from the culvert extension to the northern extent of the wall
- Provision of a 1.5 metre wide maintenance access track immediately east of the noise wall for a distance of about 270 metres from the southern end (on land that has been cleared for construction), then provision of a one metre wide access track north for remaining length of the noise wall
- Provision of 1.5 metre wide maintenance access track immediately west of the noise wall for the full length of the wall (on land that has been cleared for construction).

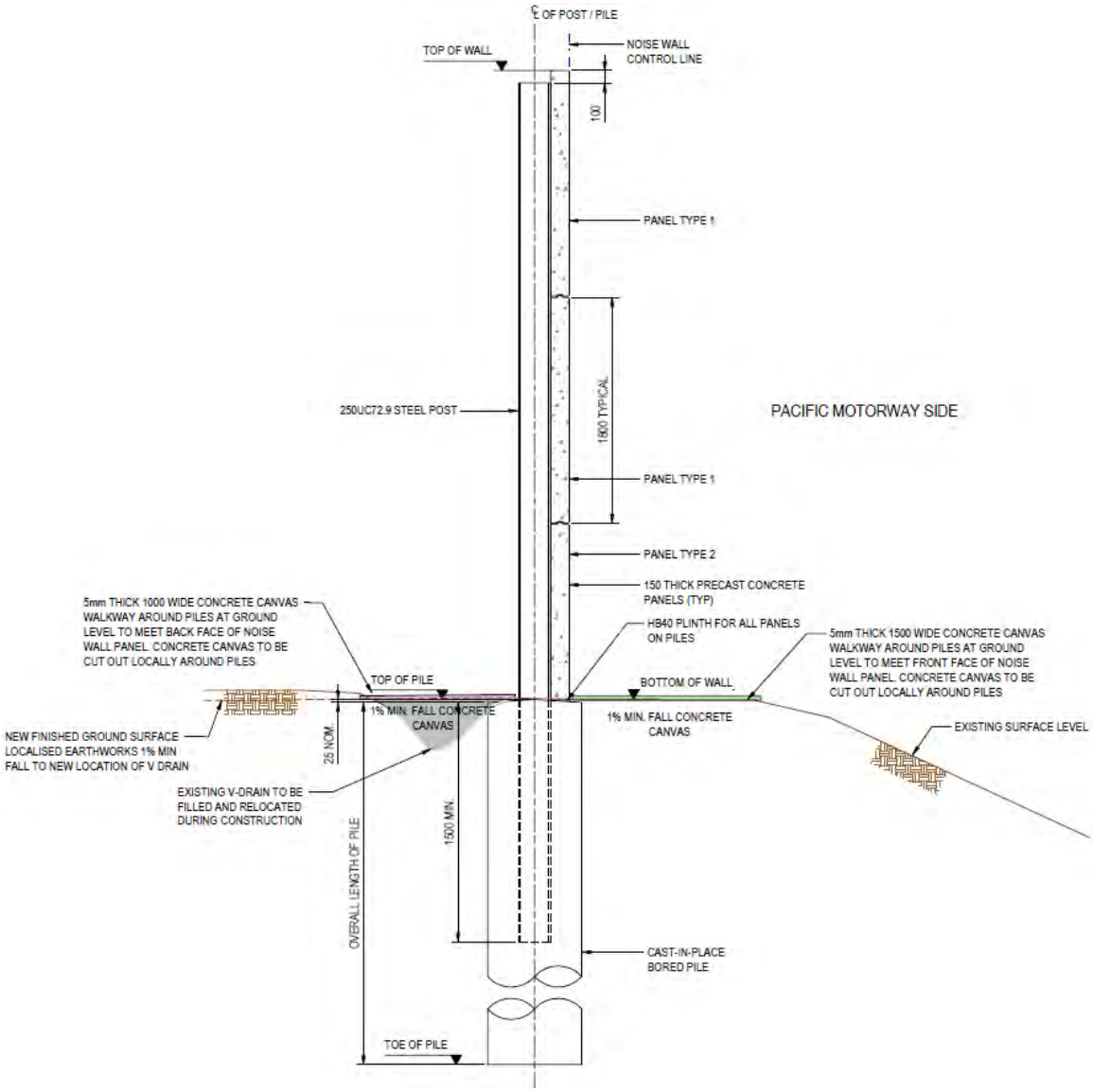


Figure 2-2: Typical cross section – about 175 metres from the southern end of the proposed noise wall

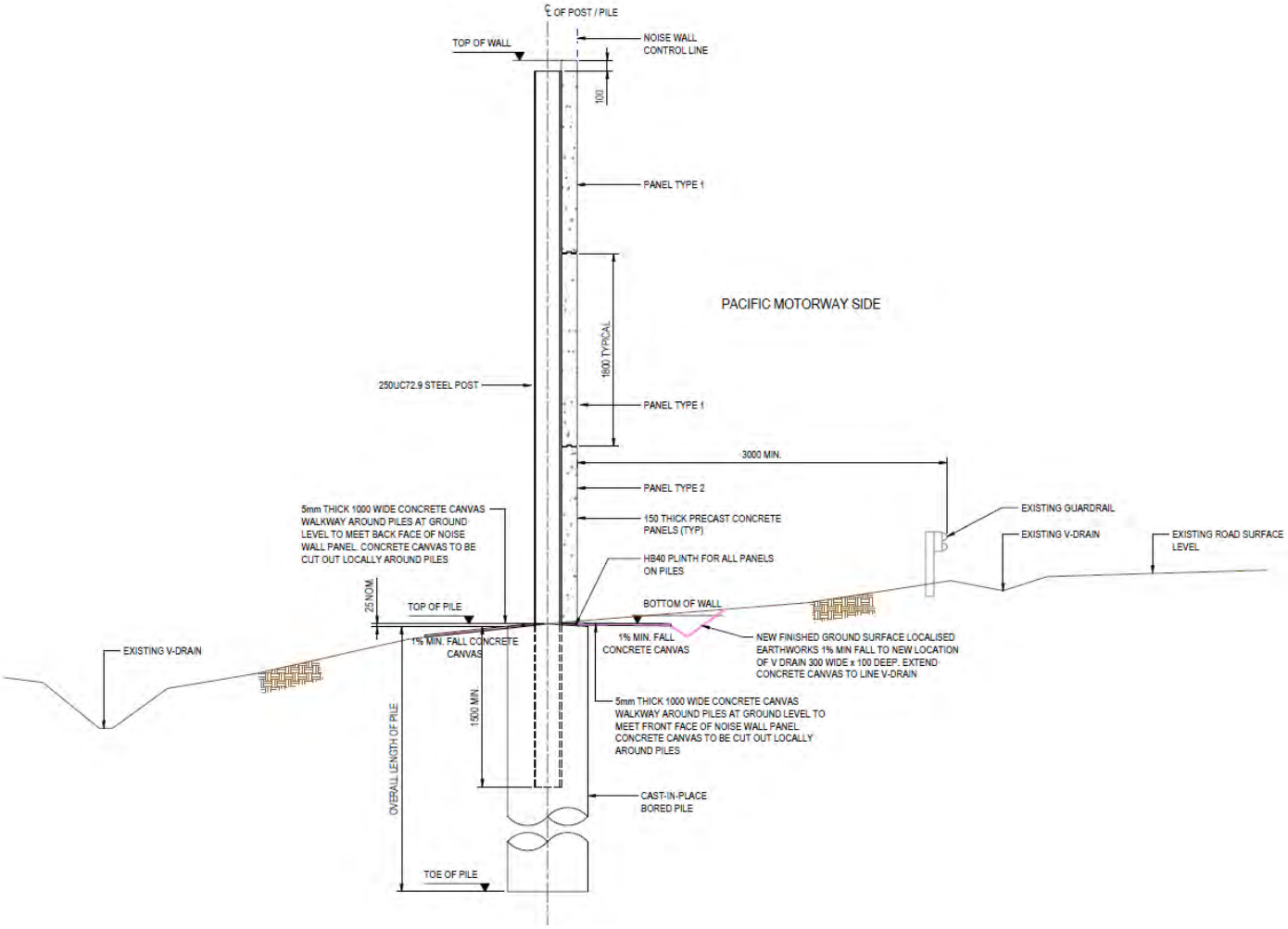


Figure 2-3: Typical cross section – about 40 metres from the northern end of the proposed noise wall

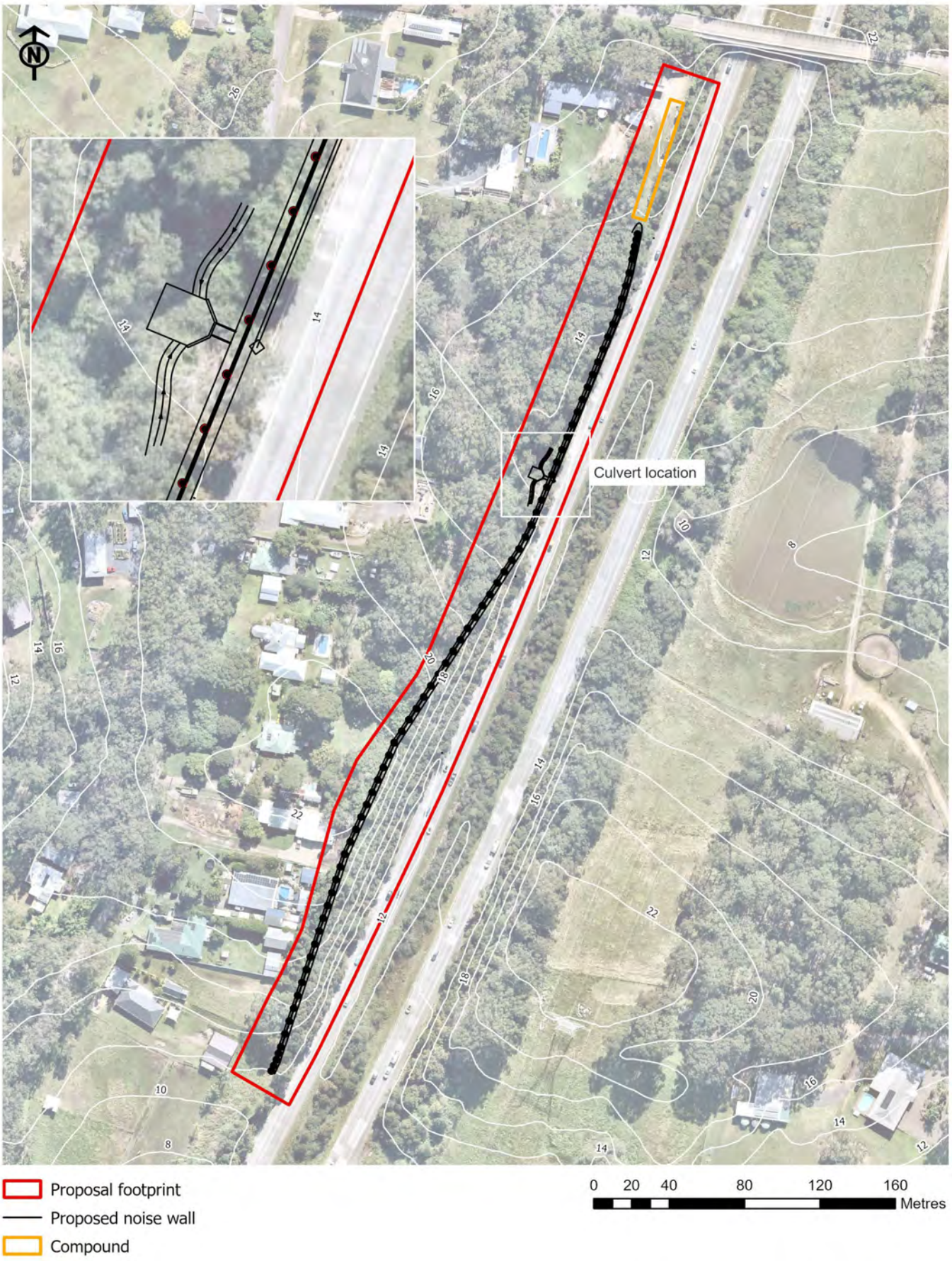


Figure 2-4: The proposal

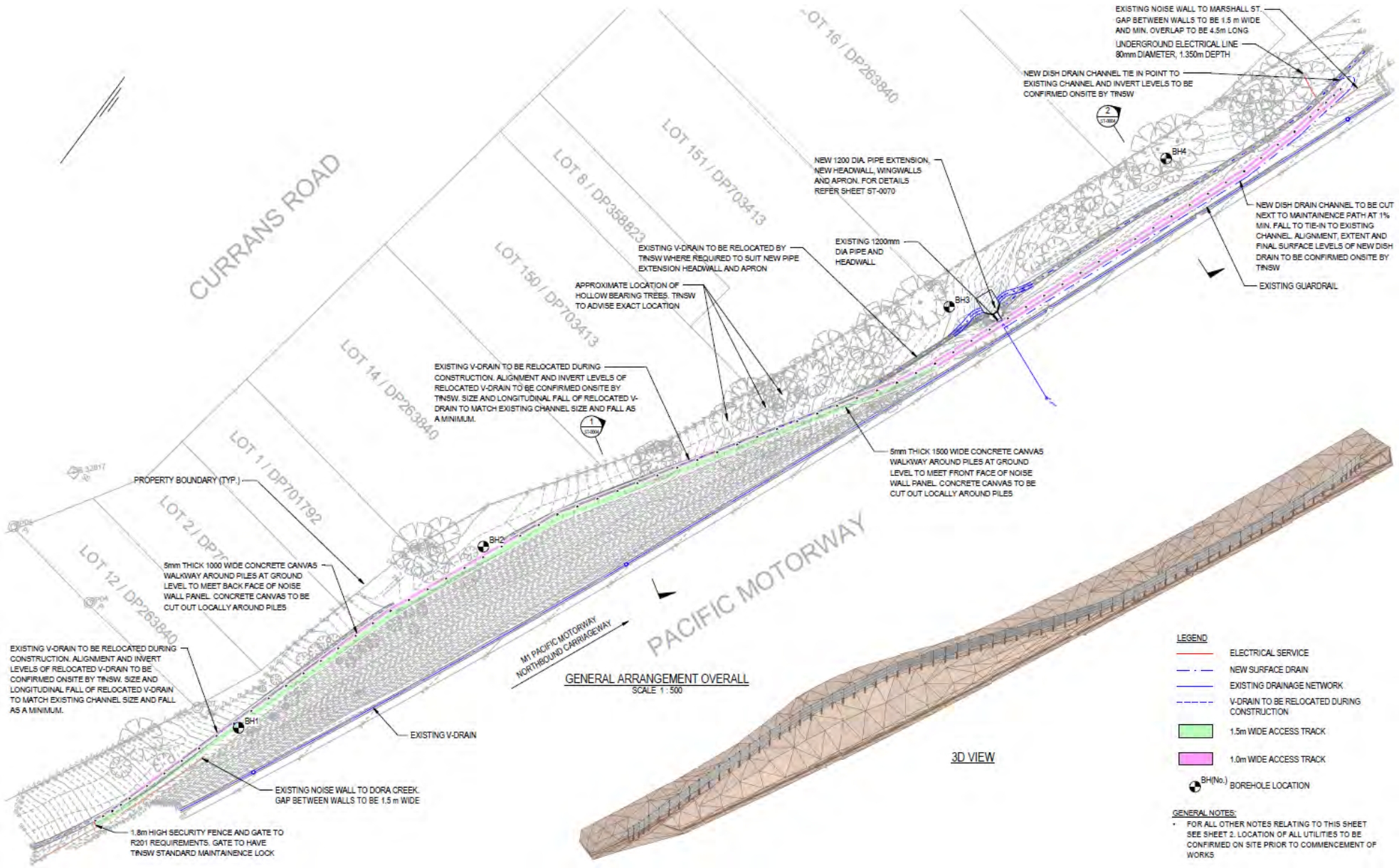


Figure 2-5: Noise wall alignment - detail

Work methodology

The proposal is anticipated to involve the following work methodology:

- Set up traffic control on M1 Motorway, establish access and site parking – this would involve
  - Construction vehicles parking on motorway shoulder protected by hard barriers (in place for duration of construction)
  - Implementation of an 80 kilometre per hour speed limit for motorway traffic and deceleration lane for construction traffic
  - Construction crew to park their private vehicles in a safer location away from the site and taken to site via shuttle bus if required
- Establish security fencing around the site perimeter
- Establish compound within the construction footprint on the motorway side of the noise wall alignment (which would include worker amenities, power generator and a water tank / water cart). No material storage / or plant laydown within the compound is required
- Realign dish drain at the southern end of the noise wall alignment and locally modify ground levels to provide a 1% fall to the drain
- Carry out culvert extension works – this would involve:
  - Demolition of existing headwall and wing wall
  - Placement of new culvert apron, headwall, wing walls
  - Placement of new 1200-millimetre diameter pipe and join to existing
  - Realign section of existing drainage channel on both sides of the extended culvert to suit new culvert headwall location and pipe invert
- Carry out piling and post installation – this would involve
  - Deliver pile cages to post locations
  - Deliver steel posts to post locations
  - Use a medium piling rig to bore 750 millimetre diameter to specified depth
  - Lift pile cage and posts into bored hole using an excavator
  - Pour concrete (using a boom pump which would allow concrete delivery to a single point thereby minimising reversing movements)
  - Stabilise posts in bore holes as the pile concrete cures (about seven days)
- Excavate trenches to accommodate the bottom noise wall panel in each bay (which are to be embedded in the ground by 100 millimetres)
- Lift noise wall panels into place direct from the motorway using an (approximately) 100 tonne mobile crane, positioned behind barriers and install with the aid of a mobile scaffolding system
- Apply fixings
- Site clean-up and demobilisation.

Plant and equipment

The proposal would require the use of a range of plant and equipment including:

- 12 tonne excavator (with attachments)
- Small excavator
- Bored piling rig
- Mobile crane (approximately 100 tonne)
- Concrete truck

- Flatbed trucks
- Trailer mounted vegetation chipper
- Chainsaws
- Utility vehicles
- Various hand tools
- Generator
- Traffic control equipment.

Working hours and construction duration

Construction work would be carried out primarily during the following standard working hours:

- 7am to 6pm Monday to Fridays
- 8am to 1pm Saturdays
- No work Sundays or public holidays

However, to minimise disruption to traffic on the M1 Pacific Motorway, some work would need to be carried out outside these hours (panel installation).

Work outside standard hours would occur during the following periods:

- Evening (OOHW period 1):
  - Monday to Sunday – 6pm to 10pm
- Night (OOHW period 2):
  - Monday to Sunday – 10pm to 7am
  - Saturdays – 10pm to 8am
  - Sundays – 6pm to 7am.

Night works would not involve high noise generating activities and are expected to include:

- Delivery of beams and reinforcement cage for piles – five shifts
- Lifting the panels into place and fixing – 15-20 shifts.

2.1.3 Objectives of works

The objectives of the proposal are to:

- Reduce traffic noise for adjacent residences
- Ensure high quality urban design outcomes
- Minimise environmental impacts.

2.1.4 Ancillary facilities

Ancillary facilities		
Will the proposal require the use or installation of a compound site? Plant and materials would be transported to the site as required from Transport facilities and/or suppliers. As described in Section 2.1.2, a compound would be established within the construction footprint near its	☑ Yes	☐ No

northern extent as shown on Figure 2-4 (and would include worker amenities, power generator and a water tank / water cart).		
Will the proposal require the use or installation of a stockpile site? No new stockpile site is proposed. Existing approved Transport for NSW stockpile sites (such as the existing facility on Mandalong Road at Morisset, about 3.2 kilometres to the south of the proposal footprint) may be used to store excavated materials. Refer to Figure 2-6.	☐ Yes	☑ No
Are any other ancillary facilities required (eg temporary plants, parking areas, access tracks)? An access track approximately five metres wide along the noise wall alignment is proposed. This access track is within the proposal footprint as shown on Figure 2-4.	☑ Yes	☐ No

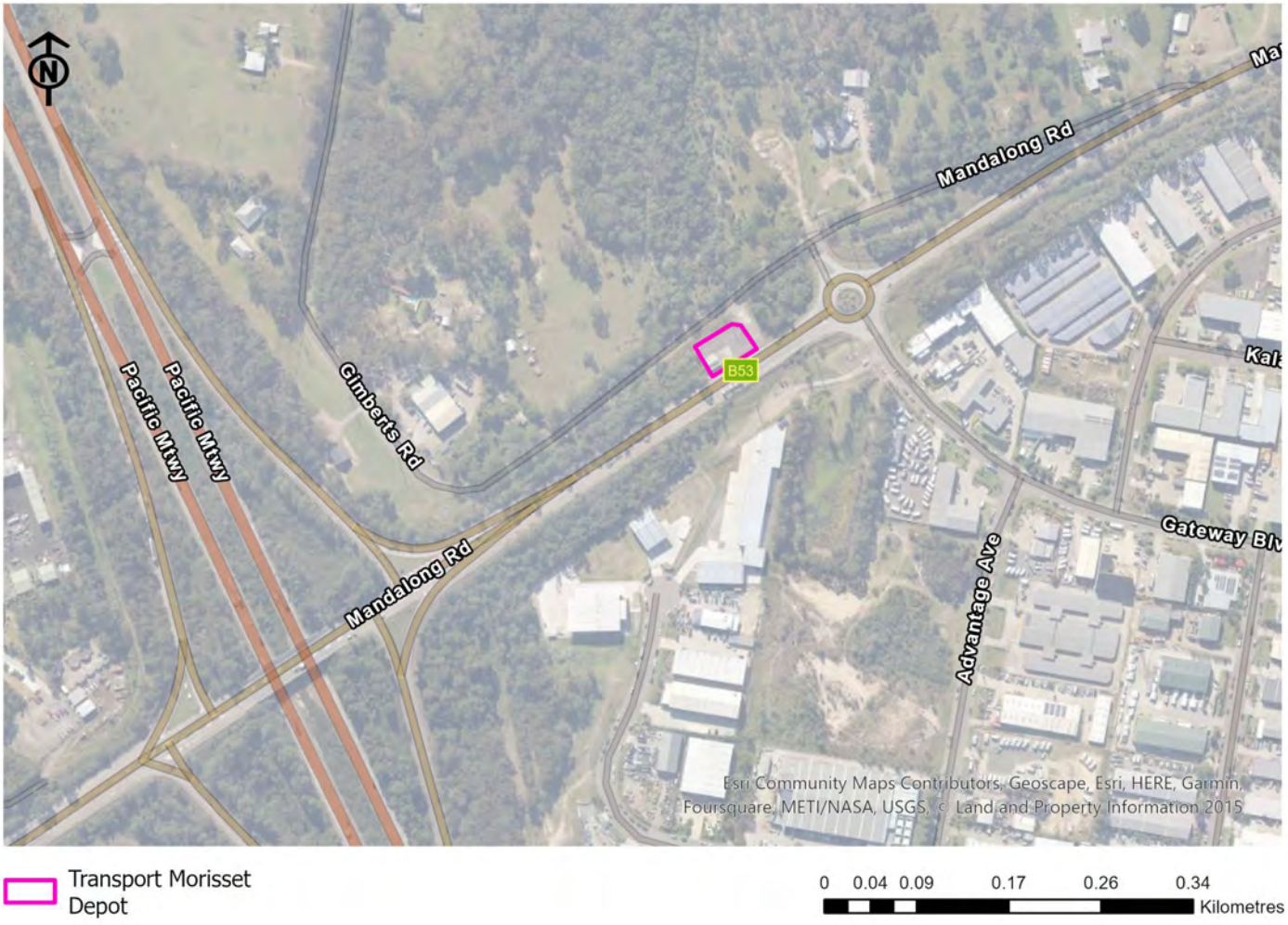


Figure 2-6: Location of Transport Morisset Depot

2.1.5 Proposed date of commencement

Subject to approval the proposal would commence in late 2022.

2.1.6 Estimated length of construction period

It is anticipated that the proposal would take about five months to complete, weather permitting.

2.2 Need and options

2.2.1 Options considered

The methodology for the selection of the preferred option involved an evaluation of options against the proposal objectives. It also involved considering whether the provision of noise attenuation is reasonable and feasible in the circumstances.

The Noise Mitigation Guideline (Roads and Maritime Services, 2015) identifies the following engineering considerations when determining feasible mitigation (what can be practically built):

- The inherent limitations of different techniques to reduce noise emissions from road traffic noise sources
- Safety issues such as restrictions on road vision
- Road corridor site constraints such as space limitations
- Floodway and stormwater flow obstruction
- Access requirements
- Maintenance requirements
- The suitability of building conditions for at-property treatments.

Selecting reasonable measures from those that are feasible involves judging whether the overall noise benefits provide significant social, economic or environmental benefits. The factors to be considered are:

- The noise reduction provided and the overall number of people that benefit from the mitigation
- Existing and future noise levels, and the extent of any exceedance of the noise criteria
- The cost of mitigation, including the cost of noise mitigation measures as a percentage of the total project cost and the ongoing maintenance and operational costs
- Community views and wishes (typically gathered at several stages including route selection, following concept design, community consultation process following the noise assessment and post opening in the operational noise report)
- Visual impacts for the community surrounding the road project and for road users. These are typically identified in the environmental impact assessment
- Relative weighting of treatments with respect to protection of outdoor areas or only internal living spaces.

For Noise Abatement Program proposals, where there is no associated road project, noise mitigation is generally limited to what is feasible within the constraints of the existing road corridor (no additional land acquisition). Quieter pavement surfaces are also generally not considered reasonable and feasible where there is no related road upgrade project. Options considered for Noise Abatement Program proposals therefore generally include:

- Noise barriers
- At-property treatments.

In this context, consideration was given to the following options:

- Option 1 – Do nothing. No provision of noise abatement measures at the site

- Option 2 – Constructing a new noise wall between existing barriers to the north and south
- Option 3 – At-property architectural treatments. These could include:
  - Installation of courtyard screen walls
  - Fresh air ventilation systems
  - Upgraded windows and glazing
  - Upgrading window and door seals
  - Sealing of wall vents
  - Sealing of the underfloor below the bearers
  - Sealing of eaves.

Option 1: Do nothing

The 'do nothing' option does not meet the proposal objectives and would therefore only be preferred in circumstances where the costs and environmental impacts of proceeding were assessed as outweighing identified benefits. That was not the case and therefore the 'do nothing' option was discarded. Importantly, the do nothing option would not deliver noise mitigation for residences on Currans Road.

Option 2: New noise wall

There is sufficient uninterrupted space to provide a continuous barrier structure at the proposal site. Transport for NSW has determined that appropriate noise reduction can be achieved with barrier structures that are five metres high (Renzo Tonin and Associates, 2016). In the context of the site, and having regard to cost, this was considered reasonable. Some vegetation removal would be required, but this would be confined to planted roadside native vegetation and would not have a significant impact on native flora and fauna, or their habitats. Visual impacts would be limited to a small view catchment and can be addressed through the selection of appropriate materials.

Option 3: At-property architectural treatments

While architectural treatments could be considered both reasonable and feasible, they are not the preferred attenuation option in this case. This position was reached having regard to likely costs, expected noise reductions and resident preferences. Unlike the barrier option, this option provides no improvements in acoustic amenity in relation to the use of outdoor areas within adjacent residences.

Preferred option

The preferred option is Option 2 because it is best aligned with the proposal objectives and can be carried out with minor and mostly short-term impacts (refer to assessment in Chapter 3).

2.2.2 Justification for the proposal

The proposal is being delivered under the Noise Abatement Program, which is funded by the NSW Government and is delivered by Transport for NSW. The program is aimed at providing noise mitigation treatment for dwellings and noise sensitive land-uses such as schools, hospitals and churches that are exposed to high levels of road traffic noise. Access to the Noise Abatement Program is subject to certain eligibility criteria as follows:

- The property is classified as a "sensitive receiver" – such as a residence, school, church or hospital
- The property is impacted by noise from an existing State or Federal road and the road is not due to be subject to any upgrading works within a reasonably foreseeable time frame (e.g. 1-2 years)

- External noise levels are at least 65 decibels during the day or 60 decibels during the night at the property. The daytime noise level is the average noise level between 7am and 10pm, and the night-time noise level is the average noise level between 10pm and 7am.
- If residential, the property is no higher than two habitable levels, above at most one non- habitable level (ie garage / laundry)
- Treatment of the property is deemed cost-effective, equitable and practical
- Building development was approved before January 1, 2009
- At least one noise complaint has been received.

Noise modelling has confirmed that all of the adjacent receivers on Currans Road meet the LAeq (9hr) ≥ 60dB(A) night period eligibility criteria, while all but two meet the LAeq (15hr) ≥ 65dB(A) day criteria. The other criteria identified above are also satisfied.

The proposal meets the proposal objectives and can be carried out with minor and mostly short-term impacts (refer to assessment in Chapter 3).

On balance, the benefits derived from proceeding with the proposal are considered to outweigh the impacts, subject to the implementation of safeguards proposed in this report.

2.3 Statutory and planning framework

2.3.1 State Environmental Planning Policy (Transport and Infrastructure) 2021

The State Environmental Planning Policy (Transport and Infrastructure) 2021 (SEPP (Transport and Infrastructure)) aims to facilitate the effective delivery of infrastructure across the state, including for roads and road infrastructure facilities. Section 2.108 of the SEPP (Transport and Infrastructure) permits development on any land for the purpose of a road or road infrastructure facilities to be carried out by or on behalf of a public authority without consent.

As the proposal is appropriately characterised as development for the purposes of a road or road infrastructure facilities, and is to be carried out by or on behalf of Transport, it can be assessed under Division 5.1 of the EP&A Act. Development consent from council is not required.

The proposal is not located on land reserved under the *National Parks and Wildlife Act 1974* and does not require development consent or approval under State Environmental Planning Policy (Resilience and Hazards) 2021, State Environmental Planning Policy (State Significant Precincts) 2005 or State Environmental Planning Policy (Planning Systems) 2021.

2.3.2 Other relevant legislation and environmental planning instruments

State Environmental Planning Policy (Biodiversity and Conservation) 2021

State Environmental Planning Policy (Biodiversity and Conservation) 2021 (Biodiversity and Conservation SEPP) consolidates and repeals the provisions of several SEPPs including State Environmental Planning Policy (Koala Habitat Protection) 2021.

The Biodiversity and Conservation SEPP includes provisions which encourage the conservation and management of areas of natural vegetation that provide habitat for Koalas to ensure a permanent free-living population over their present range and reverse the current trend of koala population decline. The koala habitat protection provisions of the Biodiversity and Conservation SEPP apply to a range of local government areas including Lake Macquarie.

Part 3.2 of the Biodiversity and Conservation SEPP regulates impact on koala habitats. While the SEPP does not affect the permissibility of the proposal as a Division 5.1 or 5.2 assessment, consideration has been given to the proposal's impact on koala habitat. The Biodiversity Assessment (refer to Appendix A) concludes the proposal footprint do not constitute core koala habitat (with reference to the equivalent provisions in the former State Environmental Planning Policy No. 44 – Koala Habitat Protection).

State Environmental Planning Policy (Resilience and Hazards) 2021

State Environmental Planning Policy (Resilience and Hazards) 2021 (Resilience and Hazards SEPP) includes the provisions of the now repealed State Environmental Planning Policy (Coastal Management) 2018 and gives effect to the objectives of the *Coastal Management Act 2016* from a land use planning perspective, by specifying how development proposals are to be assessed if they fall within the coastal zone.

Areas of "coastal wetlands" regulated by the Resilience and Hazards SEPP are located about 180 metres to the south and about 420 metres to the west of the proposal footprint (refer to Figure 2-7). The associated "coastal wetland proximity area" is located about 80 metres to the south and 320 metres to the west of the proposal footprint.

The proposal is partly located within a 'coastal environment area' as defined by the Resilience and Hazards SEPP. Under Clause 2.10 of the Resilience and Hazards SEPP, development consent must not be granted to development on land identified as "coastal environment area" unless the consent authority has considered the impact of the proposal on certain factors where applicable as outlined in Table 2 1. While Clause 2.10 is not directly applicable to Division 5.1 activities, the matters referred to in these provisions have still been generally considered in Chapter 3 of this Minor Works REF.

Table 2-1: Relevant Coastal Management SEPP considerations – Coastal Environment Area

Consideration	Where addressed
(a) the integrity and resilience of the biophysical, hydrological (surface and groundwater) and ecological environment,	Sections 3.1, 3.2 and 3.7
(b) coastal environmental values and natural coastal processes,	Not relevant
(c) the water quality of the marine estate (within the meaning of the *Marine Estate Management Act 2014*), in particular, the cumulative impacts of the proposed development on any of the sensitive coastal lakes identified in Schedule 1	Not relevant
(d) marine vegetation, native vegetation and fauna and their habitats, undeveloped headlands and rock platforms	Section 3.7
(e) existing public open space and safe access to and along the foreshore, beach, headland or rock platform for members of the public, including persons with a disability	Not relevant
(f) Aboriginal cultural heritage, practices and places	Section 3.5
(g) the use of the surf zone	Not relevant

The proposal is located within a 'coastal use area' as defined by the Resilience and Hazards SEPP. Under Clause 2.11 of the Resilience and Hazards SEPP, development consent must not be granted to development on land identified as "coastal use area" unless the consent authority has considered the impact of the proposal on certain factors where applicable as outlined in Table 2-2. While Clause 2.11 is

not directly applicable to Division 5.1 activities, the matters referred to in these provisions have still been generally considered in Chapter 3 of this Minor Works REF.

Table 2-2: Relevant Coastal Management SEPP considerations – coastal use area

Consideration	Where addressed
(a) has considered whether the proposed development is likely to cause an adverse impact on the following (i) existing, safe access to and along the foreshore, beach, headland or rock platform for members of the public, including persons with a disability, (ii) overshadowing, wind funnelling and the loss of views from public places to foreshores, (iii) the visual amenity and scenic qualities of the coast, including coastal headlands, (iv) Aboriginal cultural heritage, practices and places, (v) cultural and built environment heritage	The proposal would not affect safe access to and along any foreshore. The proposal would not overshadow foreshore areas, wind funnelling or result in the loss of views from public places to foreshores. Visual impacts would be highly localised and broader scenic qualities would not be affected. Refer to Section 3.11. Aboriginal heritage is not expected to be affected by the proposal. Refer to Section 3.5. Non-Aboriginal heritage is not expected to be affected by the proposal. Refer to Section 3.6
(b) is satisfied that (i) the development is designed, sited and will be managed to avoid an adverse impact referred to in paragraph (a), or (ii) if that impact cannot be reasonably avoided—the development is designed, sited and will be managed to minimise that impact, or (iii) if that impact cannot be minimised—the development will be managed to mitigate that impact, and	The proposal would have a relatively small footprint within an established motorway corridor and avoids or minimises impacts on the matters identified in (a) above. Mitigation measures proposed are described in Chapter 5.
has taken into account the surrounding coastal and built environment, and the bulk, scale and size of the proposed development.	The assessment of potential impacts provided in Chapter 3 considered the scale and extent of the proposal in the context of the surrounding coastal and built environment.

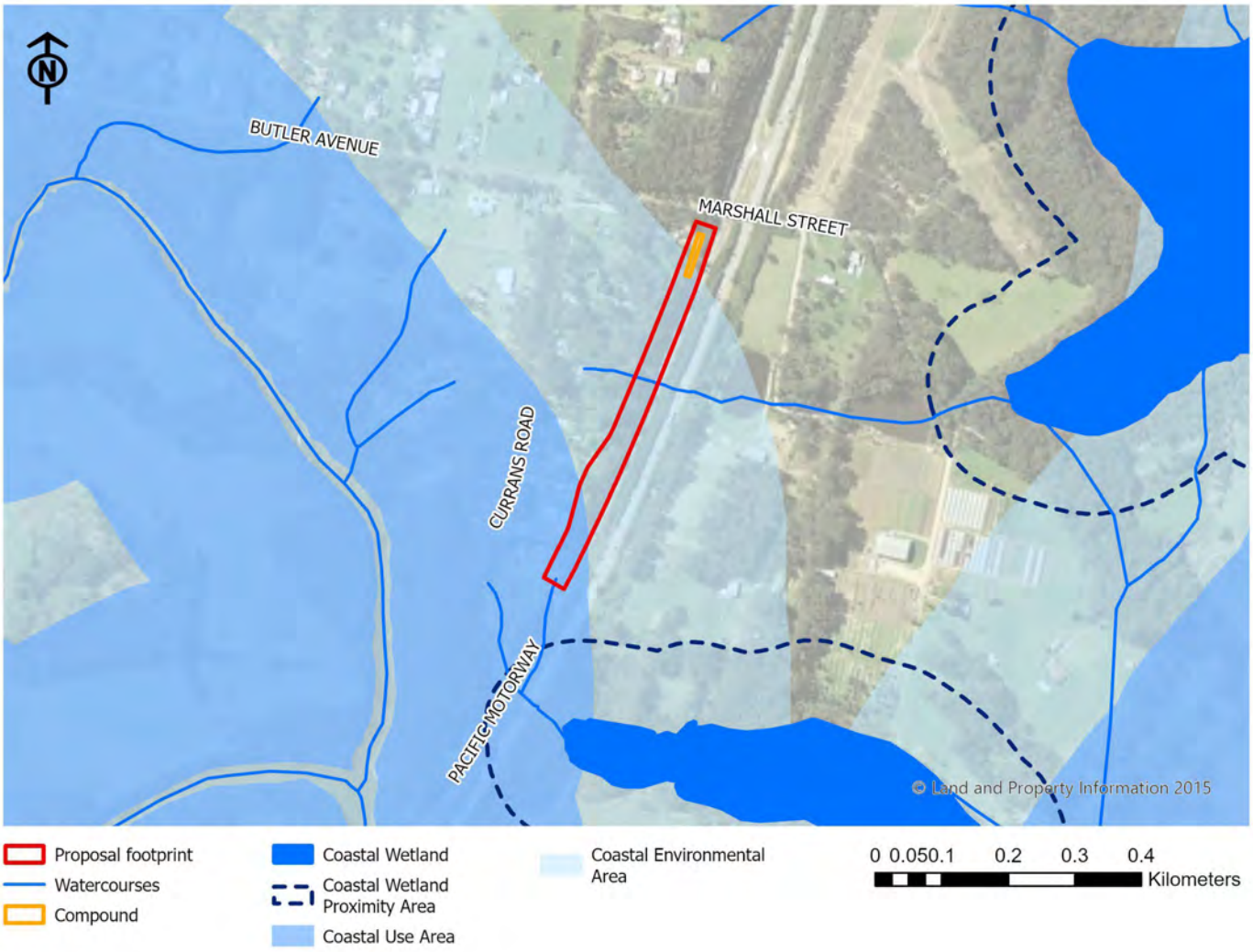


Figure 2-7: Resilience and Hazards SEPP coastal management areas

Protection of the Environment Operations Act 1997

The *Protection of the Environment Operations Act 1997* (POEO Act) is administered by the NSW Environment Protection Authority (EPA). It provides an integrated system of licenses to set out protection of the environment policies and to adopt more innovative approaches to reduce pollution in the environment, having regard to the need to maintain ecologically sustainable development (ESD). Measures to address potential pollution as a result of the proposal have been prescribed in this Minor Works REF and are included in Sections 3.1 and 3.2.

The POEO Act requires an Environmental Protection Licence (EPL) for scheduled development work and the carrying out of scheduled activities. The proposal does not involve undertaking a scheduled activity and therefore an EPL would not be required.

Biodiversity Conservation Act 2016

The *Biodiversity Conservation Act 2016* (BC Act) is directed at maintaining a healthy, productive and resilient environment consistent with the principles of ecologically sustainable development (ESD). The BC Act sets out the assessment framework for threatened species and ecological communities. Certain species of animals or plants are identified as endangered species, populations or communities or vulnerable species under the Act. Areas of land comprising the habitats of listed endangered species may also be declared critical habitat under the Act.

Activities that are likely to have a significant impact on listed threatened species, populations, endangered ecological communities or their habitats must be the subject of a species impact statement and require the concurrence of the Secretary of the Department of Planning and Environment. This is unless the activity is a project to which Division 5.2 of the EP&A Act applies.

Potential impacts on flora and fauna and threatened communities as a result of the proposal are discussed in Section 3.7 of this Minor Works REF.

Biosecurity Act 2015

The *Biosecurity Act 2015* manages biosecurity risks, including weeds of national significance and the risks of contagion of infectious human diseases. Section 22 of the *Biosecurity Act 2015* includes the general biosecurity duty as follows:

Any person who deals with biosecurity matter or a carrier and who knows, or ought reasonably to know, the biosecurity risk posed or likely to be posed by the biosecurity matter, carrier or dealing has a biosecurity duty to ensure that, so far as is reasonably practicable, the biosecurity risk is prevented, eliminated or minimised.

The potential impacts and relevant safeguards are discussed further in Section 3.7. Appropriate biosecurity controls would be put in place for the proposed works to minimise the risk of weed transfer.

Heritage Act 1977

The *Heritage Act 1977* provides for the conservation of buildings, work, relics and places that are of historic, scientific, cultural, social, archaeological, architectural, natural or aesthetic significance to the State.

An excavation permit is required to disturb or excavate any land knowing or having reasonable cause to suspect that the disturbance or excavation will or is likely to result in a relic being discovered, exposed, moved, damaged or destroyed. A permit is also required to disturb or excavate any land on which the person has discovered or exposed a relic. Section 139(4) of the *Heritage Act 1977* makes provision for the issuing of an exception in certain prescribed circumstances. There are no listed heritage items within or near the proposal area (refer to Section 3.5). An excavation permit would not be required for the proposal.

National Parks and Wildlife Act 1979

The proposal is not located on land reserved under the *National Parks and Wildlife Act 1979.*

The harming or desecrating of Aboriginal objects or places is an offence under section 86 of the *National Parks and Wildlife Act 1979*. Under section 90, an Aboriginal heritage impact permit may be issued in relation to a specified Aboriginal object, Aboriginal place, land, activity or person or specified types or classes of Aboriginal objects, Aboriginal places, land, activities or persons.

The potential impacts and relevant safeguards are discussed further in Section 3.5. No permits under the *National Parks and Wildlife Act 1979* are required for the proposal.

2.4 Community and agency consultation

2.4.1 SEPP (Transport and Infrastructure) consultation

Part 2.2 of the SEPP (Transport and Infrastructure) contains provisions for public authorities to consult with local councils and other public authorities prior to the commencement of certain types of development. This is detailed below:

Is consultation with Council required under sections 2.10 - 2.12 and 2.14 of SEPP (Transport and Infrastructure)?		
Are the works likely to have a substantial impact on the stormwater management services which are provided by council?	☐ Yes	☑ No
Are the works likely to generate traffic to an extent that will strain the capacity of the existing road system in a local government area?	☐ Yes	☑ No
Will the works involve connection to a council owned sewerage system? If so, will this connection have a substantial impact on the capacity of the system?	☐ Yes	☑ No
Will the works involve connection to a council owned water supply system? If so, will this require the use of a substantial volume of water?	☐ Yes	☑ No
Will the works involve the installation of a temporary structure on, or the enclosing of, a public place which is under local council management or control? If so, will this cause more than a minor or inconsequential disruption to pedestrian or vehicular flow? Transport for NSW manages the M1 Pacific Motorway.	☐ Yes	☑ No
Will the works involve more than a minor or inconsequential excavation of a road or adjacent footpath for which council is the roads authority and responsible for maintenance?	☐ Yes	☑ No
Is there a local heritage item (that is not also a state heritage item) or a heritage conservation area in the study area for the works? If yes, does a heritage assessment indicate that the potential impacts to the heritage significance of the item/area are more than minor or inconsequential?	☐ Yes	☑ No
Is the proposal within the coastal vulnerability area and is inconsistent with a certified coastal management program applying to that land? Note: a certified coastal zone management plan is taken to be a certified coastal management program.	☐ Yes	☑ No/NA
Are the works located on flood liable land? If so, will the works change flooding patterns to more than a minor extent? Note: Flood liable land means land that is susceptible to flooding by the probable maximum flood event, identified in accordance with the principles set out in the manual entitled *Floodplain Development Manual: the management of flood liable* land published by the New South Wales Government. The Dora Creek Flood Study (WMA Water, 2015) shows the proposal footprint to be outside the extent of the probable maximum flood.	☐ Yes	☑ No

Is consultation with a public authority (other than Council) required under sections 2.13, 2.15 and 2.16 of SEPP (Transport and Infrastructure)?		
Are the works located on flood liable land? (to any extent) (SEPP (Transport and Infrastructure) s2.13)	☐ Yes	☑ No/NA

Is consultation with a public authority (other than Council) required under sections 2.13, 2.15 and 2.16 of SEPP (Transport and Infrastructure)?		
If so, do the works comprise more than minor alterations or additions to, or the demolition of, a building, emergency works or routine maintenance? Note: Flood liable land means land that is susceptible to flooding by the probable maximum flood event, identified in accordance with the principles set out in the manual entitled *Floodplain Development Manual: the management of flood liable* land published by the New South Wales Government. The Dora Creek Flood Study (WMA Water, 2015) shows the proposal footprint to be outside the extent of the probable maximum flood.		
Are the works adjacent to a national park, nature reserve or other area reserved under the *National Parks and Wildlife Act 1974*, or on land acquired under that Act*?*	☐ Yes	☑ No
Are the works on land in Zone E1 National Parks and Nature Reserves or in a land use zone equivalent to that zone?	☐ Yes	☑ No
Are the works for the purpose of residential development, an educational establishment, a health services facility, a correctional facility or group home in bush fire prone land?	☐ Yes	☑ No
Would the works increase the amount of artificial light in the night sky and that is on land within the dark sky region as identified on the dark sky region map? (Note: the dark sky region is within 200 kilometres of the Siding Spring Observatory)	☐ Yes	☑ No
Are the works on buffer land around the defence communications facility near Morundah? (Note: refer to Defence Communications Facility Buffer Map referred to in clause 5.15 of Lockhart LEP 2012, Narrandera LEP 2013 and Urana LEP 2011).	☐ Yes	☑ No
Are the works on land in a mine subsidence district within the meaning of the *Mine Subsidence Compensation Act 1961*? The West Lake Mine Subsides District is on the eastern side of the motorway.	☐ Yes	☑ No

2.4.2 Other agency and community consultation

A letter to residents on the eastern side of Currans Road (south of Marshal Street) was issued in late March 2022. The letter noted the planned start of works for the proposal and requested the removal of any materials stored by residents in the motorway corridor.

A letterbox drop notification for residential receivers within 460 metres will occur at least five business days prior to works starting. The extent of the notification will be confirmed with reference to the noise assessment (refer to Section 3.3) and the specific types of activities proposed. The notification will detail work activities, dates and hours, impacts and mitigation measures. It will also include a contact number for enquiries and complaints.

3. Environmental assessment

This section provides a detailed description of the potential environmental impacts associated with the construction and operation of the proposal. All aspects of the environmental potentially impacted upon by the proposal are considered. This includes consideration of the factors specified in the *Guidelines for Division 5.1 Assessments* (DPE, 2022) and section 171 of the Environmental Planning and Assessment Regulation 2021. The matters of national environmental significance under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* are also considered in section 5. Site-specific safeguards are provided to ameliorate the identified potential impacts.

3.1 Soil

Description of existing environmental and potential impacts		
Are there any known occurrences of salinity or acid sulfate soils in the area? The elevation of the proposal footprint is greater than 10 metres and Department of Planning and Environment acid sulfate soil risk mapping does not identify the proposal footprint as having a risk of acid sulfate soil occurrence. Reference to eSpade indicates the proposal footprint has a very low overall salinity hazard.	☐ Yes	☑ No
Does the proposal involve the disturbance of large areas (eg >2ha) for earthworks? The proposal would require earthworks associated with the boring of post holes, the excavation of shallow trenches to accommodate the bottom noise wall panel and clearing / grubbing. The proposal footprint has an area of about 1.82 hectares and exposed areas would be progressively stabilised during works.	☐ Yes	☑ No
Does the site have constraints for erosion and sedimentation controls such as steep gradients or narrow corridors? There are steep gradients between the noise wall alignment and the motorway. These will be considered in developing the erosion and sediment control plan for the site.	☑ Yes	☐ No
Are there any sensitive receiving environments that are located in or nearby the likely proposal area or that would likely receive stormwater discharge from the proposal? Sensitive receiving environments include (but are not limited to) wetlands, state forests, national parks, nature reserves, rainforests, drinking water catchments). Areas of “coastal wetlands” regulated by the Resilience and Hazards SEPP are located about 180 metres to the south and about 420 metres to the west of the proposal footprint (refer to Figure 2-7). In the absence of appropriate controls, polluted stormwater could be released from the site into downstream waterways. The proposed safeguards	☑ Yes	☐ No

Description of existing environmental and potential impacts		
in this section and Section 3.2 would address water quality risks during construction.		
Is there any evidence within or nearby the likely footprint of potential contamination? A search (2 May 2022) of the NSW Environment Protection Authority (EPA) contaminated land record of notices for the Lake Macquarie local government area returned no records near the proposal footprint. A search of the list of NSW contaminated sites notified to EPA (as of 11 April 2022) also returned no records near the proposal footprint. Current and former land use (road reserve, bushland) at the proposal footprint does not indicate the potential for land contamination.	☐ Yes	☑ No
Is the likely proposal footprint in or nearby a highly sloping landform?	☐ Yes	☑ No
Is the proposal likely to result in more than 2.5ha (area) of exposed soil?	☐ Yes	☑ No

Safeguards

Safeguards to be implemented are:

E1	Erosion and sediment control measures are to be implemented and maintained to: • Prevent sediment moving off-site and sediment laden water entering any water course, drainage lines, or drain inlets • Reduce water velocity and capture sediment on site • Minimise the amount of material transported from site to surrounding pavement surfaces • Divert clean water around the site (in accordance with the Landcom/Department of Housing *Managing Urban Stormwater, Soils and Construction Guidelines* (the Blue Book)).
E2	Erosion and sedimentation controls are to be checked and maintained on a regular basis (including clearing of sediment from behind barriers) and records kept and provided on request.
E3	Erosion and sediment control measures are not to be removed until the work is complete and areas stabilised.
E4	A progressive erosion and sediment control plan is to be prepared for the works.
E5	Parking of construction vehicles and storage of plant/equipment is to occur only within the designated proposal footprints.
E6	Existing ground cover vegetation will be retained to the greatest extent possible to minimise the area of exposed soils.
E7	If suspected contamination is identified all work would cease and the Transport for NSW Project Manager contacted immediately.

3.2 Waterways and water quality

Description of existing environment and potential impacts		
Is the proposal located within, adjacent to or near a waterway? The southern end of the proposal footprint is located about 210 metres from the main channel of Dora Creek. An unnamed watercourse (which flows to Dora Creek) crosses the middle of the proposed noise wall alignment and is carried beneath the motorway via a pipe culvert. The location of the culvert is shown on Figure 2-4. During construction, in the absence of appropriate controls, polluted stormwater (mainly sediment laden site water) could be released from the site into downstream waterways. This would occur via the culvert in the central part of the proposal footprint, the v-drain which runs along the edge of the northbound carriageway, or the v-drain positioned to the immediate west of the proposed noise wall alignment. To reduce the risk of this occurring the proposed safeguards in this section and Section 3.2 would be implemented during construction.	☑ Yes	☐ No
Is the location known to flood or be prone to water logging? The Dora Creek Flood Study (WMA Water, 2015) shows the proposal footprint to be outside the extent of the probable maximum flood.	☐ Yes	☑ No
Is the proposal located within or immediately adjacent to the area managed by WaterNSW covered by chapter 8 of State Environmental Planning Policy (Biodiversity and Conservation) 2021?	☐ Yes	☑ No
Would the proposal be undertaken on a bridge or ferry?	☐ Yes	☑ No
Is the proposal likely to require the extraction of water from a local water course (not mains)?	☐ Yes	☑ No

Safeguards

Safeguards to be implemented are:

W1	There is to be no release of dirty water into drainage lines and waterways.
W2	Water quality controls measures are to be used to prevent any materials (eg grout, sediment etc) entering drainage or waterways.
W3	Plant and equipment will be inspected regularly to ensure there are no leakages of fuel, oil and hydraulic fluid.
W4	All fuels, chemicals and liquids will be stored in an impervious bunded area within the compound site when not in use.
W5	If refuelling of plant and equipment is required on site it will take place on flat ground only using 20 litre drums within a bunded area large enough to contain 120 per cent of the container's contents.
W6	If an incident (eg spill) occurs, the Environmental Incident Procedure (Transport for NSW, 2021) is to be followed and the Transport for NSW Contract Manager and Environment Manager notified immediately.
W7	An emergency spill kit is to be kept on site and maintained throughout the construction work. The spill kit must be appropriately sized for the volume of substances and include an

	absorbent boom suitable for deployment in the waterway. All staff are to be made aware of the location of the spill kit and trained in its use.
W8	Visual monitoring of local water quality (ie turbidity, hydrocarbon spills/slicks) is to be undertaken on a regular basis to identify any potential spills or deficient silt curtains or erosion and sediment controls.

3.3 Noise and vibration

Description of existing environmental and potential impacts		
Are there any residential properties or other noise sensitive areas near the location of the proposal that may be affected by the work (ie church, school, hospital):		
During construction? The nearest receivers to the proposal footprint are about 15 metres (from the edge of the construction footprint to the main dwelling). There is direct line of site between potential construction noise sources and receivers. The potential impact of noise from the proposal on these receivers is discussed below.	☑ Yes	☐ No
During operation? The nearest receivers are as stated above for construction. These receivers would benefit from reduced road traffic noise once the noise wall is complete. Noise modelling indicates that that a five metre high noise barrier would achieve noise mitigation benefit of up to 5dB(A) at the most affected receiver locations (Renzo Tonin and Associates, 2016).	☑ Yes	☐ No
Is the proposal going to be undertaken only during standard working hours? Standard working hours Monday-Friday: 7:00am to 6.00pm Saturday: 8.00am to 1.00pm Sunday and Public Holidays: no work Work outside standard hours would occur during the following periods: • Evening (OOHW period 1): – Monday to Sunday – 6pm to 10pm • Night (OOHW period 2): – Monday to Sunday – 10pm to 7am – Saturdays – 10pm to 8am – Sundays – 6pm to 7am. Night works would not involve high noise generating activities and are expected to include: • Delivery of beams and reinforcement cage for piles – five shifts • Lifting the panels into place and fixing – 15-20 shifts.	☐ Yes	☑ No
Is any explosive blasting required for the proposal?	☐ Yes	☑ No

Description of existing environmental and potential impacts

Would construction noise or vibration from the proposal affect sensitive receivers?

☑ Yes ☐ No

Construction noise impacts have been considered in accordance with the *Construction Noise and Vibration Guideline* (Roads and Maritime Services, 2016) and associated noise estimator tool (refer Appendix E). The 'distance-based scenario' worksheet was used with the 'retaining walls and noise walls' scenario selected.

Noise management levels (NMLs) were established for the proposal using the Rating Background Level (RBL) for the R4 representative environment defined in the noise estimator. This level best reflects nearby M1 Pacific Motorway traffic volumes. The selected ground type used in the assessment was for 'developed settlements (urban and suburban)'. As construction noise sources would be mainly positioned near the top of the existing mound, line of sight between noise sources and receivers has been included in the noise calculations.

The following NMLs apply to the proposal:

Receiver	Period	RBL	NML LAeq(15min) dBA
Residential	Standard hours	55	65
	Day (OOHW)	55	60
	Evening (OOHW period 1)	50	55
	Night (OOHW period 2)	45	50

Key assessment results for the 'retaining walls and noise walls' scenario during the day and night periods are summarised in the tables below, while impact distances are shown in Figure 3-1. The night period results are considered conservative and worst-case given that no piling would be occurring at during this period.

Noise impact (day)	Distance (m)	No. receivers*
Affected distance (>NML)	130	7
Noticeable (5-10 dBA > Background)	-	-
Clearly audible (10-20 dBA > Background)	-	-
Moderately intrusive (20-30 dBA > Background)	40	3
Highly intrusive (>30 dBA > Background)	40	3
Highly noise affected (> 75 dBA)	40	3

* Approximate based on aerial photography

Noise impact (night)	Distance (m)	No. receivers*
Affected distance (>NML)	460	33
Noticeable (5-10 dBA > Background)	460	33
Clearly audible (10-20 dBA > Background)	305	25
Moderately intrusive (20-30 dBA > Background)	130	7
Highly intrusive (>30 dBA > Background)	40	3
Highly noise affected (> 75 dBA)	40	3
Sleep disturbance (LAmax 65 dBA)	330	27

* Approximate based on aerial photography

Description of existing environmental and potential impacts		
The results show that during the day up to seven receivers would potentially experience noise exceeding the NML, while up to three receivers would potentially experience noise above the 75 dBA highly noise affected level for short periods. During the night up to 33 receivers would potentially experience noise exceeding the NML, while up to three receivers would potentially experience highly intrusive noise (>30 dBA above background) levels and noise above the 75 dBA highly noise affected level for short periods. Up to 27 receivers are within the area that could be affected by noise causing sleep disturbance. Safeguards and mitigation measures have been proposed to reduce the identified potential construction noise impacts, including a notification radius of 460 m.		
Would operation of the proposal alter the noise environment for sensitive receivers? This might include, but not be limited to, altering the line or level of an existing carriageway, changing traffic flow, adding extra lanes, increasing traffic volume, increasing the number of heavy vehicles, removing obstacles that provide shielding including changing the angle of view of the traffic, changing the type of pavement, increasing traffic speeds by more than 10km/hr or installing audio-tactile line markings. The operation of the proposal would not result in changes to the traffic mix or traffic speeds and traffic lanes would not move closer to noise sensitive receivers. Nearby receivers would benefit from reduced road traffic noise once the noise wall is complete. Noise modelling indicates that that a five metre high noise barrier would achieve noise mitigation benefit of up to 5dB(A) at the most affected receiver locations.	☑ Yes	☐ No
Would the proposal result in vibration being experienced by any surrounding properties or infrastructure during operation?	☐ Yes	☑ No

Construction vibration has also been considered. Recommended minimum working distances for relevant vibration intensive plant from sensitive receivers are provided in the table below. It is expected these distances can be complied with during construction.

Plant item	Rating / Description	Minimum working distance	
		Cosmetic damage	Human response
Pile boring	≤ 800 mm	2 m (nominal)	4 m

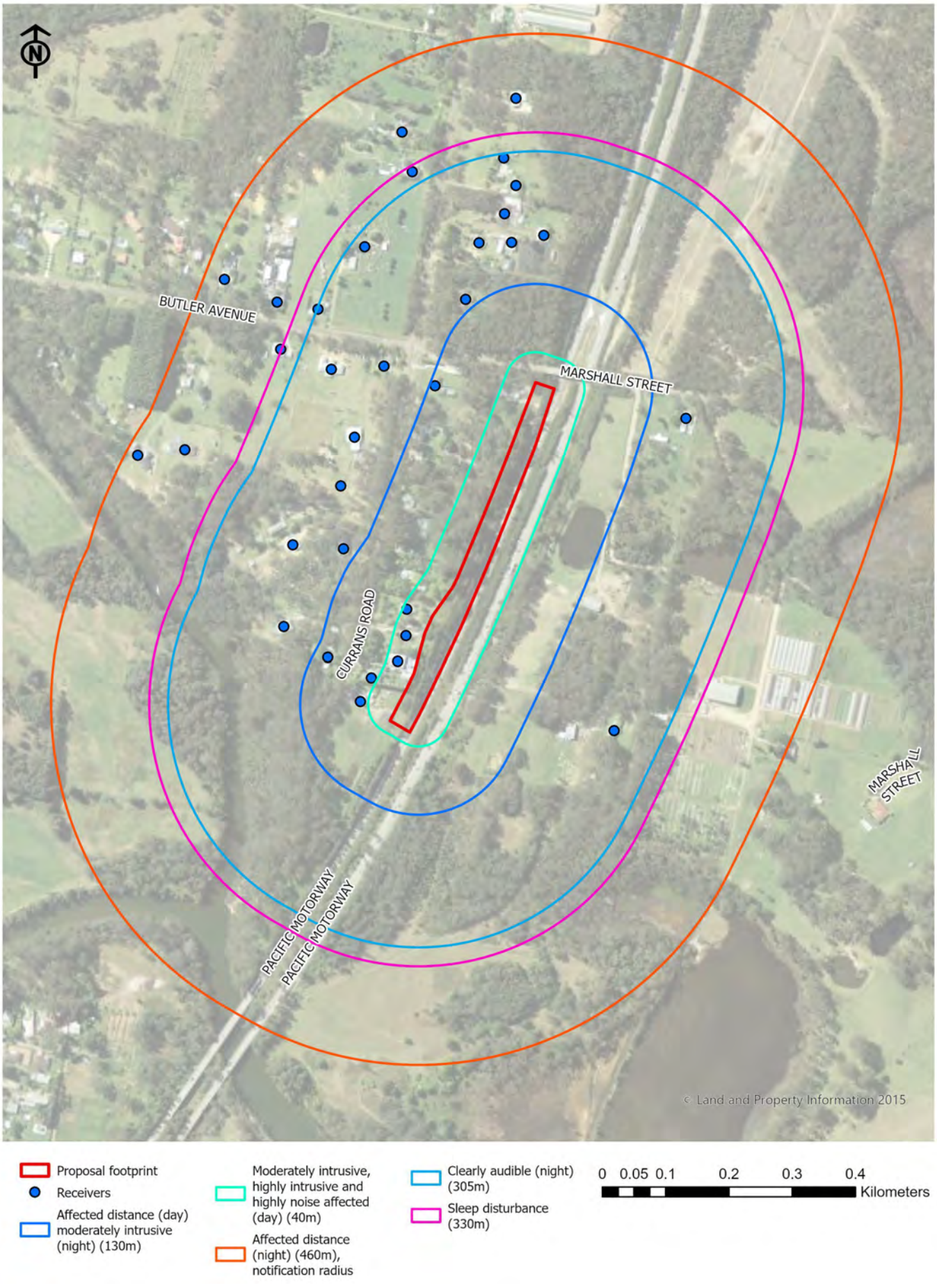


Figure 3-1: Predicted worst-case noise management level exceedance

Safeguards

Safeguards to be implemented are:

N1	The standard mitigation measures prescribed in Appendix B of the Roads and Maritime *Construction Noise and Vibration Guideline* (Roads and Maritime Services, 2016) will be implemented where relevant.
N2	A letterbox drop notification for night works will occur at least five business days prior to works starting for residential receivers within 460 metres of works. The notification will detail work activities, dates and hours, impacts (including any changed traffic arrangements) and mitigation measures. It will also include a contact number for enquiries and complaints.
N3	Where possible, the noisiest works will be carried out before 11pm.

3.4 Air Quality

Description of existing environmental and potential impacts		
Is the proposal likely to result in large areas (>2ha) of exposed soils? The proposal footprint has an area of about 1.82 hectares.	☐ Yes	☑ No
Are there any dust sensitive receivers located within the vicinity of the proposal during the construction period? The nearest receivers to the proposal footprint are about 15 metres (from the edge of the construction footprint to the main dwelling). Given the small area to be disturbed, any mobilisation of dust would be highly localised. The total amount of dust generated would depend on the silt and moisture content in the soil, prevailing weather conditions and the types of activities being carried out. Mitigation measures have been proposed to address the potential for dust impacts.	☑ Yes	☐ No
Is there likely to be an emission to air during construction? The proposal would not result in a material increase in air pollution. The proposal would result in minor exhaust emissions from equipment and vehicles. Given the scale of the proposal and implementation of appropriate controls, the potential for adverse air quality impacts on receivers and the general environment is considered minor.	☑ Yes	☐ No

Safeguards

Safeguards to be implemented are:

A1	Work will not be carried out during strong winds or in weather conditions where high level of dust or air borne particulates are likely.
A2	Vehicles transporting waste or other materials that may produce odours or dust are to be covered during transportation.
A3	Measures (including watering or covering exposed areas) are to be used to minimise or prevent air pollution and dust.

3.5 Aboriginal heritage

Description of existing environmental and potential impacts		
Would the proposal involve disturbance in any area that has not been subject to previous ground disturbances? The proposal footprint has been previously disturbed by road construction activities.	☐ Yes	☑ No
Have online Aboriginal Heritage Information Management System (AHIMS) searches been completed? An AHIMS basic search (22/4/22) was conducted for the locality around the proposal footprint (Lat, Long from: -33.0968, 151.4579 - Lat, Long to: -33.0788, 151.4888). The search returned three records. An AHIMS extensive search (2/5/22) was conducted for the locality around proposal footprint (Lat, Long from: -33.4861, 151.1727 - Lat, Long to: -33.4682, 151.2036). The search confirmed that the three nearby records are along Dora Creek and well outside the proposal footprint.	☑ Yes	☐ No
Is there potential for the proposal to impact on any items of Aboriginal heritage? The proposal would not affect known Aboriginal sites. The risk of encountering unregistered sites is considered low given the extent of previous disturbance at the site.	☐ Yes	☑ No
Would the proposal involve the removal of mature native trees? Some mature trees along the noise wall alignment would be removed as part of the proposal. Potential for culturally modified trees within the proposal area was not identified by the AHIMS search.	☑ Yes	☐ No
Would the proposal impact on any features that may indicate any potential archaeological remains?	☐ Yes	☑ No
Is the proposal consistent with the requirements of the legacy Roads and Maritime Procedure for Aboriginal cultural heritage consultation and investigation (PACHCI)? The Transport for NSW Stage 1 Aboriginal heritage due diligence assessment was completed by the Transport for NSW Aboriginal Community and Heritage Partner for Hunter Region on 26 July 2022. A copy of the assessment is provided in Appendix E. The assessment found that it was not necessary to proceed to Stage 2 of the PACHCI procedure and that the proposal may progress in accordance with this Minor Works REF, the environmental impact assessment process and all relevant approvals.	☑ Yes	☐ No

Safeguards

Safeguards to be implemented are:

AH1	If unexpected Aboriginal heritage items are uncovered during the works, all works in the vicinity of the find must cease and the Transport for NSW Aboriginal Community and Heritage Partner

	and regional environment manager contacted immediately. Steps in the Transport for NSW Unexpected Archaeological Finds Procedure must be followed.
AH2	If the scope of the proposal changes or the extent of the disturbance area changes then the Transport for NSW Aboriginal Community and Heritage Partner and regional environment manager should be contacted immediately.

3.6 Non-Aboriginal heritage

Description of existing environmental and potential impacts		
Have online heritage database searches been completed? • Transport (including legacy Roads and Maritime) section 170 register (searched as part of the State Heritage Inventory 15/5/2022) • State Heritage Inventory (searched 15/5/2022) • Australian Heritage Database (searched 15/5/2022) • Local Environmental Plan(s) heritage items (searched as part of the State Heritage Inventory 15/5/2022). See Appendix E.	☑ Yes	☐ No
Are there any items of non-Aboriginal heritage or heritage conservation areas listed on relevant heritage databases/registers that are located within the vicinity of the proposal?	☐ Yes	☑ No
Are there any items of potential non-Aboriginal heritage significance which are not listed on relevant heritage databases/registers that are in the vicinity of the proposal?	☐ Yes	☑ No
Is the proposal likely to occur in or near features that indicate potential archaeological remains?	☐ Yes	☑ No

Safeguards

Safeguards to be implemented are:

H1	If unexpected archaeological remains are uncovered during the works, all works must cease in the vicinity of the material/find and the steps in the Standard Management Procedure: Unexpected Heritage Items (Roads and Maritime Services, 2015) must be followed. The Transport for NSW Environment Manager must be contacted immediately.

3.7 Biodiversity

Description of existing environmental and potential impacts		
Have relevant database searches been carried out? Database searches (Bionet Atlas and EPBC Act protected matters search) were carried out as part of this Minor Works REF on 15 May 2022. As part of the Biodiversity Assessment (included in Appendix A) a field survey was conducted on 11 March 2019 and involved the following: • Random meander search • 18 rapid assessment plots.	☑ Yes	☐ No

Description of existing environmental and potential impacts		
A full summary of the survey effort is provided in Section 2.3 of the Biodiversity Assessment Report (Appendix A of this Minor Works REF).		
Did the database searches identify any endangered ecological communities, threatened flora and/or threatened or protected fauna, or migratory species in or within the vicinity of the proposed works? Both Commonwealth and State listed matters must be considered. The results of the Bionet Atlas search are provided in Appendix E, with the nearest records noted in the table below.	☑ Yes	☐ No

Scientific and common name	Type of listing (BC Act or EPBC Act)	Distance from works	Potential Impacts
Grey-headed Flying-fox (*Pteropus poliocephalus*)	BC Act – V EPBC Act - V	~700 metres	Not reliant on habitat at site
Eastern Osprey (*Pandion cristatus*)	BC Act – V	~760 metres	Not reliant on habitat at site
Swift Parrot (*Lathamus discolor*)	BC Act – E EPBC Act - CE	~1.1 kilometres	Not reliant on habitat at site
Charmhaven Apple (*Angophora inopina*)	BC Act – V EPBC Act - V	~780 metres	Not affected
Magenta Lilly Pilly (*Syzygium paniculatum*)	BC Act – E EPBC Act - V	~780	Not affected

<u>Vegetation communities and flora</u>

During field surveys for the Biodiversity Assessment a total of 76 flora species were recorded within the study area, including 21 exotic species. No threatened flora species were identified or considered likely to occur.

Most of the proposal footprint was identified as urban/disturbed. The following Plant Community Types (PCTs) were also identified:

- PCT 684 Blackbutt – Narrow leaved Mahogany shrubby open forest of the coastal ranges
- PCT 1579 Smooth Barked Apple – Turpentine – Blackbutt open forest on ranges of the Central Coast

Neither of these PCTs conform to threatened ecological communities listed as threatened by the BC Act or EPBC Act.

The Biodiversity Assessment identified the removal of 0.1 hectares of PCT1579 and about 0.37 hectares of urban/disturbed vegetation.

Following further design development the proposal would now result in the removal of about 0.1 hectares of PCT 1579 and about 0.5 hectares of

Description of existing environmental and potential impacts		
urban/disturbed vegetation. This is based on a clearance footprint of about 0.6 hectares as shown on Figure 3-2. <u>Fauna</u> No threatened fauna species were recorded during the field survey. Mobile species, including threatened microbats, may very rarely visit the study area to investigate potential foraging opportunities. However, this would be on a transient basis only and not permanently for roosting or breeding. Additionally, the majority of the site is located adjacent to the M1 Motorway and is subject to considerable existing traffic and noise impacts. No threatened fauna were assessed as having a moderate or high likelihood of occurring within the proposal footprint.		
Is the proposal likely to impact nationally listed threatened species, ecological communities or migratory species? The Biodiversity Assessment found that the proposal footprint does not include EPBC Act listed threatened ecological communities. No threatened flora species or communities listed under the EPBC Act would be potentially impacted by the proposal. Some threatened and/or migratory (terrestrial) fauna may use habitat within the proposal footprint. The loss of habitat is unlikely to cause a significant impact to any threatened fauna species occurring within or near the proposal footprint due to the scope and location of the works adjacent to existing road infrastructure, existing impacts of roadside edge effects and the remaining vegetation in the locality providing a continuing corridor for movement.	☐ Yes	☑ No
Would the proposal require the removal of any other vegetation? The extent of affected vegetation is discussed above. The proposal would result in the removal of about 0.1 hectares of PCT 1579 and about 0.5 hectares of urban/disturbed vegetation.	☐ Yes	☑ No
Would the proposal affect any tree hollows or hollow logs? The proposal would potentially result in the removal of two of the three hollow bearing trees shown on Figure 3-2. The loss of trees (including hollow bearing trees) would be offset in accordance with the Tree and hollow replacement guidelines (Transport for NSW, 2022).	☑ Yes	☐ No
Are there any known areas of outstanding biodiversity value or areas mapped as ‘littoral rainforest’ or ‘coastal wetland’ under chapter 2 of State Environmental Planning Policy (Resilience and Hazards) 2021 (SEPP (Resilience and Hazards)) in or within the vicinity of the proposed work? None of the areas of outstanding biodiversity value listed under Part 3 of the Biodiversity Conservation Regulation 2017 occur within, or in the vicinity of, the proposal footprint. Areas of “coastal wetlands” regulated by the Resilience and Hazards SEPP are located about 180 metres to the south and about 420 metres to the west of the proposal footprint (refer to Figure 2-7). The associated “coastal wetland	☑ Yes	☐ No

Description of existing environmental and potential impacts		
proximity area" is located about 80 metres to the south and 320 metres to the west of the proposal footprint. There would be no direct impact on these areas and the safeguards proposed in Section 3.1 and 3.2 address the potential for indirect (water quality impacts) on these wetland areas.		
Would the proposal provide any additional barriers to the movement of wildlife? PCT 684 within the study area has been identified as part of a Rehabilitation Corridor by Lake Macquarie City Council, which is defined as partially cleared native vegetation and crossing points that are strategically located and could be rehabilitated to enhance fauna movement. PCT 684 would not be cleared as part of the proposal. The vegetation along the M1 Motorway (recorded as predominantly urban/exotic) is identified as a Corridor of Partially Cleared Remnant Vegetation. The M1 Motorway already acts as a barrier to movement, therefore the limited clearing of vegetation within the proposal footprint is unlikely to present any new impacts on wildlife connectivity. The proposal represents an extension of an existing wall along a busy motorway where the presence or movement of fauna is already restricted.	☐ Yes	☑ No
Would the proposal disturb any natural waterways or aquatic habitat? Impacts on hydrology and water quality are discussed in Section 3.2.	☐ Yes	☑ No
Would the proposal disturb any crevices or other locations (such as on bridges and culverts) for potential bat habitat? The proposal would involve extension of a pipe culvert mid-way along the noise wall alignment. Whilst no bats were identified in the field survey, a mitigation measure has been included to address potential impacts on any bats which could be using the culvert.	☑ Yes	☐ No

<u>Groundwater dependant ecosystems</u>

A small part of the proposal site is mapped as moderate potential groundwater dependant ecosystem. Geotechnical investigations carried out to support the design encountered groundwater in one borehole at a depth of 8.6 metres Australian Height Datum (AHD) (5.4 metres below ground level).

The proposal requires only minor clearing of native vegetation, it will not substantially alter topography. Proposed excavation is limited and not likely to result in substantial groundwater drawdown (with the piling depth expected to be up to about 4.5 metres). Based on the small scale of development, the proposal is considered unlikely to substantially impact groundwater dependent ecosystems.

<u>Weeds</u>

Weeds identified within and adjacent to the proposal footprint include:

- *Cotoneaster glaucophyllus* – subject to general biosecurity duty
- *Lantana camara* – subject to general biosecurity duty, prohibition on dealings and recommendation for regional containment
- *Paspalum dilatatum*
- *Bamboo sp* – subject to general biosecurity duty
- *Jacaranda sp*

Description of existing environmental and potential impacts

The proposal has the potential to spread weeds during vegetation removal and through the movement of vehicles and machinery into or out of the site. Safeguards have been proposed to address these potential impacts.

Invasion and spread of pathogens and disease

During construction, the proposal has the potential to cause both the spread of pathogens and disease, however none were detected during the survey. There is a risk of spreading fungus and diseases through the introduction and movement of soil. Standard hygiene management measures during construction are proposed to minimise this risk.

Fauna injury and mortality

The clearing of vegetation may result in injury or death to resident fauna. Species at risk include ground-dwelling species such as snakes, lizards, and small mammals. There is also the risk of displaced fauna succumbing to predation, or stress induced by competing with existing resident populations for resources, particularly shelter / refuge habitat. Safeguards have been proposed to address this risk.

Noise, light and vibration

The proposal footprint has been affected by noise, light and vibration from the adjoining M1 Motorway. As the proposal is for a noise wall, the impacts of noise, light and vibration from passing vehicles during the operation phase would not be different to existing impacts.

Figure 3-2: Proposed vegetation removal

Safeguards

Safeguards to be implemented are:

F1	Pre-clearing surveys will be carried out in accordance with Guide 1: Pre-clearing process of the Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects (RTA, 2011).
F2	Native vegetation removal will be minimised through pre-construction planning.
F3	Exclusion zones will be established as per Guide 2: Biodiversity Guidelines Protecting and managing biodiversity on RTA projects (RTA, 2011).
F4	Vegetation removal would be carried out in accordance with Guide 4: Clearing of vegetation and removal of bushrock of the Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects (RTA, 2011).
F5	Native vegetation would be re-established in accordance with Guide 3: Re-establishment of native vegetation of the Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects (RTA, 2011).
F6	Habitat will be replaced or re-instated in accordance with Guide 5: Re-use of woody debris and bushrock.
F7	Fauna that may be present on site during works will be managed in accordance with Guide 9: Fauna handling of the Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects (RTA, 2011).
F8	Inspections for the presence of any sheltering native species would be carried out under vehicles and machinery prior to their use.
F9	Weed species would be managed in accordance with Guide 6: Weed management of the Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects (RTA, 2011) and the Biosecurity Act 2015 (general duty to prevent, eliminate or minimise any biosecurity risk). This would include disposing of weeds and weed contaminated soil at an appropriate waste management facility.
F11	If unexpected threatened fauna or flora species are discovered, stop works immediately and follow the Unexpected Threatened Species Find Procedure in Pre-clearing process of the Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects (RTA, 2011).
F12	The Best Practice Hygiene Protocols in Guide 7: Pathogen management of the Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects (RTA, 2011) will be implemented.
F13	The loss of trees (including hollow bearing trees) would be offset in accordance with the Tree and hollow replacement guidelines (Transport for NSW, 2022).

3.8 Trees

Description of existing environmental and potential impacts		
Does the proposal involve pruning, trimming or removal of any tree/s?	☑ Yes	☐ No

The proposal would involve some tree removal (including some mature trees) as part of proposed native vegetation clearing (refer to Section 3.7).		
Do the trees form part of a streetscape, an avenue or roadside planting?	☐ Yes	☑ No
Have the trees been planted by a community group, Landcare group or by council or is the tree a memorial or part of a memorial group e.g. has a plaque?	☐ Yes	☑ No
Do the trees form part of a heritage listing or have other heritage value?	☐ Yes	☑ No

Safeguards

Safeguards to be implemented are included below and in Section 3.7 (Biodiversity).

3.9 Traffic and transport

Description of existing environmental and potential impacts		
Is the proposal likely to result in detours or disruptions to traffic flow (vehicular, cycle and pedestrian) or access during construction? No detours are needed for the proposal. The proposal would involve short-term lane closures and a reduced speed limit on the northbound carriageway, resulting in some disruptions and delays to traffic flow. Any lane closures would need to be the subject of a Road Occupancy Licence. No property accesses would be affected by the proposal.	☑ Yes	☐ No
Is the proposal likely to result in detours or disruptions to traffic flow (vehicular, cycle and pedestrian) or access during operation?	☐ Yes	☑ No
Is the proposal likely to affect any other transport nodes or transport infrastructure (e.g. bus stops, bus routes) in the surrounding area? Or result in detours or disruptions to traffic flow (vehicular, cycle and pedestrian) or access during operation?	☐ Yes	☑ No

Safeguards

Safeguards to be implemented are:

TT1	During construction traffic and/or pedestrian movements would be managed in accordance with *Traffic control at work sites – Technical manual* (version 6.1, 2022) as necessary.

3.10 Socio-economic

Description of existing environmental and potential impacts		
Is the proposal likely to impact on local business?	☐ Yes	☑ No
Is the proposal likely to require any property acquisition?	☐ Yes	☑ No

Description of existing environmental and potential impacts		
Is the proposal likely to alter any access for properties (either temporarily or permanently)?	☐ Yes	☑ No
Is the proposal likely to alter any on-street parking arrangements (either temporarily or permanently)?	☐ Yes	☑ No
Is the proposal likely to change pedestrian movements or pedestrian access (either temporarily or permanently)?	☐ Yes	☑ No
Is the proposal likely to impact on any items or places of social value to the community (either temporarily or permanently)?	☐ Yes	☑ No
Is the proposal likely to reduce or change visibility of any businesses, farms, tourist attractions or the like (either temporarily or permanently)?	☐ Yes	☑ No

Safeguards

Safeguards to be implemented are:

S1	All complaints received during the work are to be recorded on a complaints register and attended to promptly.

3.11 Landscape character and visual amenity

Description of existing environmental and potential impacts		
Is the proposed work over or near an important physical or cultural element or landscape? (e.g. heritage items and areas, distinctive or historic built form, National Parks, conservation areas, scenic highways etc)? The proposal is located within a motorway corridor which has existing noise walls to the north and south. The proposal would therefore be consistent with the existing landscape character.	☐ Yes	☑ No
Would the proposal obstruct or intrude upon the character or views of a valued landscape or urban area. For example, locally significant topography, a rural landscape or a park, a river, lake or the ocean or a historic or distinctive townscape or landmark? At the subject location the motorway corridor is visually enclosed by existing noise walls, mounds and roadside vegetation. Viewing opportunities to and from the corridor are limited.	☐ Yes	☑ No
Would the proposal require the removal of mature trees or stands of vegetation, either native or introduced? The proposal would require some vegetation removal as described in Section 3.7. The vegetation removal would be noticeable but is considered negligible. Most viewers would experience the change at speed would not experience a reduction in the quality of the driving / riding experience. Over time, regeneration of vegetation would make the change less noticeable.	☑ Yes	☐ No

Description of existing environmental and potential impacts		
Would the proposal result in large areas of shotcrete visible from the road or adjacent properties?	☐ Yes	☑ No
Would the proposal involve new noise walls or visible changes to existing noise walls? The proposal involves the construction of a new noise wall between two existing sections of noise wall. No pattern is proposed, and the colour of the new wall would have minimal contrast to the adjacent existing walls. The new section of noise wall would be visible to motorists (who would experience it at speed) and residents on Currans Road (who would benefit from improved acoustic amenity). Over time, regeneration of vegetation would make the noise wall less noticeable.	☑ Yes	☐ No
Would the proposal involve the removal or reuse of large areas of road corridor, landscape, either verges or medians?	☐ Yes	☑ No
Would the proposal involve substantial changes to the appearance of a bridge (including piers, girders, abutments and parapets) that are visible from the road or residential areas?	☐ Yes	☑ No
If involving lighting, would the proposal create unwanted light spillage on residential properties at night (in construction or operation)? Lighting would be required for the proposed night work. Lighting would be directed at the work area and there would be limited potential for impacts on residential properties due to distance and screening vegetation.	☐ Yes	☑ No
Would any new structures or features to be constructed result in over-shadowing to adjoining properties or areas? The setback from the property boundary and the north-south orientation of the wall means that solar access for adjacent properties would not be substantially affected.	☐ Yes	☑ No

Safeguards

Safeguards to be implemented are:

V1	Working areas are to be maintained, kept free of rubbish and cleaned up at the end of each working day.
V2	All construction related material and equipment will be removed from the proposal footprint at the completion of work and disturbed areas restored.
V3	Construction site lighting will be oriented to minimise the risk of light spill impacts on any nearby residences.

3.12 Waste

Description of existing environmental and potential impacts		
Is the proposal likely to generate >200 tonnes of waste material (contaminated and /or non-contaminated material)? The proposal would result in some waste. It is anticipated that the proposal would result in the generation of the following waste streams: • General waste • Mulched vegetation • Concrete waste • Spoil from piling activities. Waste would be classified and either reused (where permitted) or disposed of at an appropriately licenced facility.	☑ Yes	☐ No
Is the proposal likely to require a licence from EPA?	☐ Yes	☑ No
Is the proposal likely to require the removal of asbestos?	☐ Yes	☑ No

Safeguards

Safeguards to be implemented are:

M1	Resource management hierarchy principles are to be followed: • Avoid unnecessary resource consumption as a priority • Avoidance is followed by resource recovery (including reuse of materials, reprocessing, recycling and energy recovery) • Disposal is undertaken as a last resort (in accordance with the *Waste Avoidance & Resource Recovery Act 2001*).
M2	Waste material is to be reused in accordance with any waste exemptions or disposed of legally in accordance with its waste classification.
M3	There is to be no disposal or re-use of construction waste on to other land.

4. Consideration of State and Commonwealth environmental factors

4.1 Environmental Planning and Assessment Regulation 2021 checklist

The following factors, listed in both the *Guidelines for Division 5.1 Assessments* (DPE, 2022) and section 171(2) of the Environmental Planning and Assessment Regulation 2021, have been considered to assess the likely impacts of the proposal on the natural and built environment. This consideration is required to comply with sections 5.5 and 5.7 of the EP&A Act.

Environmental factor	Impact
(a) Any environmental impact on a community? The proposal would have a minor and short-term impact on community attributable to construction noise, lane closures and delays and construction related visual impacts. Safeguards have been proposed to address identified potential impacts. Over the long-term, the community would benefit from improved acoustic amenity.	Negative (minor and short-term) Positive (long-term)
(b) Any transformation of a locality? The proposal would result in some transformation of the locality in the short-term due to visual impacts associated with construction works. Over the longer term the proposal is unlikely to be noticeable on the broader motorway context.	Negative (minor and short-term)
(c) Any environmental impact on the ecosystems of a locality? The proposal would have limited impact on ecosystems. Impacts on threatened species, communities and/or their habitats were assessed as unlikely to be significant. Refer to Section 3.7.	Negative (minor and short-term)
(d) Any reduction of the aesthetic, recreational, scientific or other environmental quality or value of a locality? The proposal would result in a minor and short-term reduction in the aesthetic value of the locality as a result of construction related activities.	Negative (minor and short-term)
(e) Any effect on a locality, place or building having aesthetic, anthropological, archaeological, architectural, cultural, historical, scientific or social significance or other special value for present or future generations? The proposal would not affect any known Aboriginal sites or listed non-Aboriginal heritage items. The proposal site is disturbed and is likely to have low archaeological potential.	Nil
(f) Any impact on habitat of any protected animals (within the meaning of the *Biodiversity Conservation Act 2016*)? The proposal would result in the removal of some sheltering and foraging resources for bats, small mammals, birds and insects. The proposed safeguards are considered adequate to minimise impacts on protected animals.	Negative (minor short-term)

Environmental factor	Impact
(g) Any endangering of any species of animal, plant or other form of life, whether living on land, in water or in the air? The proposal would not endanger any species of animal, plant or other form of life.	Nil
(h) Any long-term effects on the environment? Long-term negative impacts would be primarily associated with vegetation removal (which would have minor biodiversity and visual impacts). Over the longer term the proposal would improve acoustic amenity for nearby residents.	Negative and positive (long-term)
(i) Any degradation of the quality of the environment? There would be potential for minor, short-term impacts on the quality of the environment including amenity (air quality and noise), visual and potential water quality impacts. Safeguards have been proposed to address the potential impacts. The minor impacts of vegetation removal are longer term but would be offset in accordance with the Tree and hollow replacement guidelines (Transport for NSW, 2022).	Negative (minor short-term)
(j) Any risk to the safety of the environment? The proposal would not result in a risk to the safety of the environment.	Nil
(k) Any reduction in the range of beneficial uses of the environment? The proposal would not reduce the range of beneficial uses of the environment.	Nil
(l) Any pollution of the environment? Minor, short-term risks to water quality would be present in the event of a spill or release of material from the work site during construction. Safeguards have been proposed to address the risk of pollution.	Negative (minor short-term and long-term)
(m) Any environmental problems associated with the disposal of waste? The proposal would result in some waste as noted in Section 3.12. Waste generated would be transported from the proposal footprint, tracked and disposed of legally.	Nil
(n) Any increased demands on resources, natural or otherwise which are, or are likely to become, in short supply? The proposal would not increase demand for resources which are, likely to become, in short supply.	Nil
(o) Any cumulative environmental effect with other existing or likely future activities? Noting the relatively small scale of the proposal and the absence of other nearby projects, no cumulative environmental effects as a result of existing or likely future activities have been identified.	Nil
(p) Any impact on coastal processes and coastal hazards, including those under projected climate change conditions? The proposal would not influence coastal processes and/or coastal hazards.	Nil

Environmental factor	Impact
(q) Any impact on applicable local strategic planning statements, regional strategic plans or district strategic plans made under the Act, Division 3.1? The nominated regional strategic plan is the Hunter Regional Plan 2036. As the proposal is for local level noise abatement, it does not directly align (but is not inconsistent) with many of the directions in the Hunter Regional Plan. Improving acoustic amenity does however support Direction 17: Create healthy built environments through good design. The Lake Macquarie Council Local Strategic Planning Statement (August 2019) aims to guide the growth of Lake Macquarie City in a way that is consistent with identified community values. Improving acoustic amenity supports the Statement's direction towards enhanced liveability.	Positive (short-term and long-term)
(r) Any impact on other relevant environmental factors? In considering the potential impacts of this proposal all relevant environmental factors have been considered, refer to Chapter 3 of this assessment.	Nil

4.2 Matters of National Environmental Significance checklist

Under the environmental assessment provisions of the EPBC Act, the following matters of national environmental significance are required to be considered to:

- Assist in determining whether the proposal should be referred to the Australian Government Department of Agriculture, Water and the Environment
- For nationally listed threatened species, ecological communities and migratory species, whether the impacts are significant and should be assessed via a Project REF.

Factor	Impact
(a) Any impact on a World Heritage property? The proposal would not impact on World Heritage property given the nature of the proposal and lack of proximity.	Nil
(b) Any impact on a National Heritage place? The proposal would not impact on a National Heritage place given the nature of the proposal and lack of proximity.	Nil
(c) Any impact on a wetland of international importance (often called 'Ramsar' wetlands)? The proposal is not within the catchment of a Ramsar wetland.	Nil
(d) Any impact on nationally threatened species, ecological communities or migratory species? A number of Commonwealth listed threatened species have the potential to occur in the local area. The nature, scale and location of the proposal are such that impacts on these species or their habitats are not expected. Indirect impacts are also not expected.	Nil

Factor	Impact
The Biodiversity Assessment found that the proposal footprint does not include EPBC Act listed TECs. No threatened flora species or communities listed under the EPBC Act would be potentially impacted by the proposal.	
(e) Any impact on a Commonwealth marine area? There would be no environmental impact on a Commonwealth marine area.	Nil
(f) Does the proposal involve a nuclear action (including uranium mining)? The proposal does not involve a nuclear action.	Nil
Additionally, any impact (direct or indirect) on the environment of Commonwealth land?	Nil

5. Summary of safeguards and environmental management measures

This section provides a summary of the site specific environmental safeguards and management measures identified in described in chapters 3 and 4 of this REF. These safeguards will be implemented to reduce potential environmental impacts throughout construction and operation. A framework for managing the potential impacts is provided with reference to environmental management plans and relevant Transport QA specifications. Any potential licence and/or approval requirements required prior to construction are also listed

Table 5-1: Summary of site-specific safeguards for proposed work

Safeguards for the proposed work		
Soil	E1	Erosion and sediment control measures are to be implemented and maintained to: • Prevent sediment moving off-site and sediment laden water entering any water course, drainage lines, or drain inlets • Reduce water velocity and capture sediment on site • Minimise the amount of material transported from site to surrounding pavement surfaces • Divert clean water around the site (in accordance with the Landcom/Department of Housing *Managing Urban Stormwater, Soils and Construction Guidelines* (the Blue Book)).
	E2	Erosion and sedimentation controls are to be checked and maintained on a regular basis (including clearing of sediment from behind barriers) and records kept and provided on request.
	E3	Erosion and sediment control measures are not to be removed until the work is complete and areas stabilised.
	E4	A progressive erosion and sediment control plan is to be prepared for the works.
	E5	Parking of vehicles and storage of plant/equipment is to occur only within the designated proposal footprints.
	E6	Existing ground cover vegetation will be retained to the greatest extent possible to minimise the area of exposed soils.
	E7	If suspected contamination is identified all work would cease and the Transport for NSW Project Manager contacted immediately.
Waterways and water quality	W1	There is to be no release of dirty water into drainage lines and waterways.
	W2	Water quality controls measures are to be used to prevent any materials (e.g. grout, sediment etc) entering drainage or waterways.
	W3	Plant and equipment will be inspected regularly to ensure there are no leakages of fuel, oil and hydraulic fluid.
	W4	All fuels, chemicals and liquids will be stored in an impervious bunded area within the compound site when not in use.

Safeguards for the proposed work		
	W5	If refuelling of plant and equipment is required on site it will take place on flat ground only using 20 litre drums within a bunded area large enough to contain 120 per cent of the container's contents.
	W6	If an incident (e.g. spill) occurs, the Environmental Incident Procedure (Transport for NSW, 2021) is to be followed and the Transport for NSW Contract Manager and Environment Manager notified immediately.
	W7	An emergency spill kit is to be kept on site and maintained throughout the construction work. The spill kit must be appropriately sized for the volume of substances and include an absorbent boom suitable for deployment in the waterway. All staff are to be made aware of the location of the spill kit and trained in its use.
	W8	Visual monitoring of local water quality (ie turbidity, hydrocarbon spills/slicks) is to be undertaken on a regular basis to identify any potential spills or deficient silt curtains or erosion and sediment controls.
Noise and vibration	N1	The standard mitigation measures prescribed in Appendix B of the Roads and Maritime *Construction Noise and Vibration Guideline* (Roads and Maritime Services, 2016) will be implemented where relevant.
	N2	A letterbox drop notification for night works will occur at least five business days prior to works starting for residential receivers within 460 metres of works. The notification will detail work activities, dates and hours, impacts (including any changed traffic arrangements) and mitigation measures. It will also include a contact number for enquiries and complaints.
	N3	Where possible, the noisiest works will be carried out before 11pm.
Air quality	A1	Work will not be carried out during strong winds or in weather conditions where high level of dust or air borne particulates are likely.
	A2	Vehicles transporting waste or other materials that may produce odours or dust are to be covered during transportation.
	A3	Measures (including watering or covering exposed areas) are to be used to minimise or prevent air pollution and dust.
Aboriginal Heritage	AH1	If Aboriginal heritage items are uncovered during the works, all works in the vicinity of the find must cease and the Transport for NSW Aboriginal Community and Heritage Partner and regional environment manager contacted immediately. Steps in the Transport for NSW Unexpected Archaeological Finds Procedure must be followed.
	AH2	If the scope of the proposal changes or the extent of the disturbance area changes then the Transport for NSW Aboriginal Community and Heritage Partner and regional environment manager should be contacted immediately.
Non-Aboriginal Heritage	H1	If unexpected archaeological remains are uncovered during the works, all works must cease in the vicinity of the material/find and the steps in the Standard Management Procedure: Unexpected Heritage Items (Roads and Maritime Services, 2015) must be followed. The Transport for NSW Environment Manager must be contacted immediately.

Safeguards for the proposed work		
Biodiversity	F1	Pre-clearing surveys will be carried out in accordance with Guide 1: Pre-clearing process of the Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects (RTA, 2011).
	F2	Native vegetation removal will be minimised through pre-construction planning.
	F3	Exclusion zones will be established as per Guide 2: Biodiversity Guidelines Protecting and managing biodiversity on RTA projects (RTA, 2011).
	F4	Vegetation removal would be carried out in accordance with Guide 4: Clearing of vegetation and removal of bushrock of the Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects (RTA, 2011).
	F5	Native vegetation would be re-established in accordance with Guide 3: Re-establishment of native vegetation of the Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects (RTA, 2011).
	F6	Habitat will be replaced or re-instated in accordance with Guide 5: Re-use of woody debris and bushrock.
	F7	Fauna that may be present on site during works will be managed in accordance with Guide 9: Fauna handling of the Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects (RTA, 2011).
	F8	Inspections for the presence of any sheltering native species would be carried out under vehicles and machinery prior to their use.
	F9	Weed species would be managed in accordance with Guide 6: Weed management of the Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects (RTA, 2011) and the Biosecurity Act 2015 (general duty to prevent, eliminate or minimise any biosecurity risk). This would include disposing of weeds and weed contaminated soil at an appropriate waste management facility.
	F11	If unexpected threatened fauna or flora species are discovered, stop works immediately and follow the Roads and Maritime Services *Unexpected Threatened Species Find Procedure i*n the *Roads and Maritime Services Biodiversity Guidelines 2011 – Guide 1 (Pre-clearing process).*
	F12	To prevent the spread of Myrtle Rust, the Best Practice Hygiene Protocols in Guide 7: Pathogen management of the Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects (RTA, 2011) will be implemented.
	F13	The loss of trees (including hollow bearing trees) would be offset in accordance with the Tree and hollow replacement guidelines (Transport for NSW, 2022).
Traffic and transport	TT1	During construction traffic and/or pedestrian movements would be managed in accordance with *Traffic control at work sites – Technical manual* (version 6.1, 2022) as necessary.

Safeguards for the proposed work		
Socio-economic	S1	All complaints received during the work are to be recorded on a complaints register and attended to promptly.
Landscape character and visual amenity	V1	Working areas are to be maintained, kept free of rubbish and cleaned up at the end of each working day.
	V2	All construction related material and equipment will be removed from the proposal footprint at the completion of work and disturbed areas restored.
	V3	Construction site lighting will be oriented to minimise the risk of light spill impacts on any nearby residences.
Waste	M1	Resource management hierarchy principles are to be followed: • Avoid unnecessary resource consumption as a priority • Avoidance is followed by resource recovery (including reuse of materials, reprocessing, recycling and energy recovery) • Disposal is undertaken as a last resort (in accordance with the *Waste Avoidance & Resource Recovery Act 2001*).
	M2	Waste material is to be reused in accordance with any waste exemptions or disposed of legally in accordance with its waste classification.
	M3	There is to be no disposal or re-use of construction waste on to other land.

5.1 Licensing and approvals

A Road Occupancy Licence would be required if traffic control (short-term lane closures) is needed.
No other licensing or approval requirements have been identified for the proposal.

6. Certification, review and decision

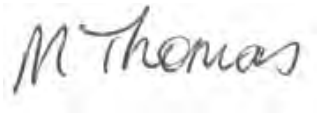
6.1 Certification

This minor works REF provides a true and fair review of the proposal in relation to its potential effects on the environment. It addresses to the fullest extent possible all matters affecting or likely to affect the environment as a result of the proposal.

Prepared by:

Stuart Hill
Environmental Consultant
Hills Environmental
23 September 2022

Minor Works REF reviewed by:



Meredith Thomas
Environmental Consultant
Hills Environmental
23 September 2022

6.2 Environment staff review

The Minor Works REF has been reviewed and considered against the requirements of sections 5.5 and 5.7 of the EP&A Act.

In considering the proposal this assessment has examined and taken into account to the fullest extent possible, all matters affecting or likely to affect the environment by reason of that activity as addressed in the Minor Works REF and associated information. This assessment is considered to be in accordance with the factors required to be considered under section 171 of the Environmental Planning and Assessment Regulation 2021.

The proposal described in the Minor Works REF will have some environmental impacts which can be ameliorated satisfactorily. Having regard to the safeguard and management measures proposed, this assessment has considered that these impacts are unlikely to be significant and therefore an approval for the proposal does not need to be sought under Division 5.2 of the EP&A Act.

The assessment has considered the potential impacts of the activity on areas of outstanding value and on threatened species, ecological communities or their habitats for both terrestrial and aquatic species as defined by the *Biodiversity Conservation Act 2016* and the *Fisheries Management Act 1994*.

The proposal described in the Minor Works REF will not affect areas of outstanding value. The activity described in the Minor Works REF will not significantly affect threatened species ecological communities or their habitats. Therefore, a species impact statement is not required.

The assessment has also addressed the potential impacts on the activity on matters of national environmental significance and any impacts on the environment of Commonwealth land and concluded that there will be no significant impacts. Therefore there is no need for a referral to be made to the Australian Government Department of Agriculture, Water and the Environment for a decision by the Commonwealth Minister for the Environment on whether assessment and approval is required under the *Environment Protection and Biodiversity Conservation Act 1999*.

The Minor Works REF is considered to meet all relevant requirements.

6.3 Environment staff recommendation

It is recommended that the proposal to construct a noise wall adjacent to the M1 Pacific Motorway at Cooranbong as described in this Minor Works REF proceed subject to the implementation of all safeguards identified in the Minor Works REF and compliance with all other relevant statutory approvals, licences, permits and authorisations.

The Minor Works REF has examined and taken into account to the fullest extent possible all matters likely to affect the environment by reason of the activity and established that the activity is not likely to significantly affect the environment or threatened species, ecological communities or their habitats.

The Minor Works REF has concluded that there will be no significant impacts on matters of national environmental significance or any impacts on the environment of Commonwealth land.

The Minor Works REF determination will remain current for five years until October 2027 at which time it shall lapse if works have not been physically commenced.

Recommended by:

Name: Renae Martin
Position: Environment and Sustainability Manager

Date: 07/10/22

Noted by:

Name: Willamina Warner
Position: A/Senior Project Manager

Date: 07/10/22

6.4 Determination

In accordance with the above recommendation and sections 5.5 and 5.7 of the EP&A Act, I determine that Transport for NSW may:

- proceed with the activity

Name: David Pattison
Position: Senior Manager Project Services North

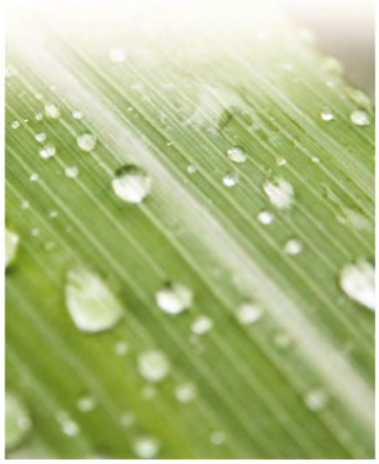
Date:

Appendix A

Biodiversity Assessment Report

APPENDIX F – 19-095 Cooranbong Noise Wall Biodiversity Assessment Report (2019)

20th May 2019



Olga Gurko

Project Manager

MU Group

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ngh@nghenvironmental.com.au
www.nghenvironmental.com.au

Reviewer: BT
Date: 080519

Dear Olga,

RE – 19-095 Cooranbong Noise Wall Biodiversity Assessment

NGH Environmental has undertaken a biodiversity assessment of the proposed works associated with a geotechnical assessment and construction of a proposed noise wall along a section of the M1 Pacific Motorway, Cooranbong (the proposal).

This analysis is based on rapid site inspection including assessment of habitat presence for threatened species. This assessment includes:

- Methodology;
- Biodiversity values of the study area;
- Mitigation measures.

Please do not hesitate to contact me should you have any questions on the attached information.

Yours sincerely,

Mitch Palmer

Technical Lead - Ecology

0418 632 748

NGH Environmental Pty Ltd

1 INTRODUCTION

1.1 PROPOSAL BACKGROUND

In response to a high number of complaints from residents, Roads and Maritime Services (Roads and Maritime) conducted noise monitoring at affected dwellings on the western side of the M1 Pacific Motorway (M1) at Cooranbong. As part of the Noise Abatement Program (NAP) aimed at mitigating noise for eligible dwellings and sensitive receivers exposed to high levels of road noise, Roads and Maritime Environment Branch Sydney Region intends to develop a strategic design for a noise wall along the western side of the M1 near Currans Road.

Traffic data for the M1 about 12.5 km south of the proposed work area shows Average Annual Daily Traffic (AADT) 60 m south of Hue Hue Road, Wyee, was 24,910 (northbound) vehicles per day in 2018. The proposed work area is around 4.7 km south of the Freemans Drive interchange and is adjacent to a small low-density residential area (Figure 1-1).

To accommodate the free movement of geotechnical and surveys teams between the M1 and affected properties on Currans Road as well as the construction of the noise wall, Roads and Maritime propose to trim and remove some roadside vegetation behind the M1 kerb (the proposal).

1.2 LOCATION OF THE ACTIVITY AND DEFINITIONS

The biodiversity study area is approximately 3 ha and lies between the property boundary of the southernmost property on Currans Road to the Marshall Street overbridge (Figure 1-1). This study area includes all land between the M1 kerb and property fences. Within the study area, the area of vegetation trimming and removal is anticipated to not exceed 170 m^2 for the geotechnical investigations and a maximum linear removal of up to 0.47 ha for the construction of the noise wall which is referred to as the proposed work area. The study locality is defined as the area within a 10 km radius of the study area.

1.3 SCOPE OF THE REPORT

The purpose of this report is to assess the likely impacts of the proposal to species, populations and communities listed as threatened under the *Biodiversity Conservation Act 2016* (BC Act), *Fisheries Management Act 1994* (FM Act) and Matters of National Environmental Significance (MNES) listed under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

Figure 1-1 Study area

Figure 1-2 Locality

1.4 LEGISLATIVE CONTEXT

1.4.1 NSW Environmental Planning and Assessment Act 1979 (EP&A Act)

Division 5.1 of The *Environmental Planning and Assessment Act 1979* (EP&A Act) provides the framework for the assessment of projects that are carried out by or on behalf of a public authority. Division 5.1 applies to projects where the proponent is the determining authority (usually a local council), as is the case with this proposal.

Section 1.7 of the EP&A Act in accordance with Part 7 of the BC Act requires that the significance of the impact of the proposal on terrestrial and aquatic threatened species, populations and ecological communities is assessed as follows:

- Division 5.1 (and Division 4.1 where relevant) – a five-part test (otherwise known as a Test of Significance) is prepared in accordance with Section 1.7 of the EP&A Act.

The proposal is being assessed under Division 5.1 of the EP&A Act.

1.4.2 NSW Biodiversity Conservation Act 2016 (BC Act)

The BC Act outlines the framework for addressing impacts on biodiversity from development and clearing and sets out to:

- Conserve biological diversity and promote ecologically sustainable development
- Prevent the extinction and promote the recovery of threatened species, populations and ecological communities
- Protect the habitat of those species, populations and ecological communities that are endangered
- Eliminate or manage certain threatening processes
- Ensure proper assessment of activities impacting threatened species, populations and ecological communities
- Encourage the conservation of threatened species, populations and ecological communities through co-operative management.

Together with the *Biodiversity Conservation Regulation 2017*, it establishes a framework to avoid, minimise and offset impacts on biodiversity from development through the Biodiversity Offsets Scheme (BOS). The BOS creates a transparent, consistent and scientifically based approach to biodiversity assessment and offsetting for all types of development that are likely to have a significant impact on biodiversity. It also establishes biodiversity stewardship agreements, which are voluntary in-perpetuity agreements entered into by landholders, to secure offset sites.

Significance of impact

The BOS applies to activities assessed under Part 5 of the EP&A Act, if the proponent chooses to opt-in to the BOS.

As this proposal is assessed under Division 5.1 of the EP&A Act, if work is likely to impact on a listed (threatened) species or ecological community, s7.3 of the BC Act contains five factors that can be used to determine whether the impact on the entity will be significant or not. Where a significant impact is likely

to occur, a Species Impact Statement (SIS) or, if the proponent elects, a Biodiversity Development Assessment Report (BDAR) must be prepared for projects assessed under Division 5.1 of the EP&A Act and entry to the BOS. The content of an SIS is outlined in s7.20 and s7.21 of the BC Act and includes requesting the Chief Executive's requirements.

Section 4 discusses the potential impacts of the proposal on threatened species, populations or Threatened Ecological Communities (TECs) in the vicinity of the proposed work area.

1.4.3 State Environmental Planning Policy No. 44 – Koala Habitat Protection

State Environmental Planning Policy No. 44 – Koala Habitat Protection (SEPP 44) encourages the conservation and management of natural vegetation that provides habitat for Koalas. Koalas are listed under the BC Act as a vulnerable species. SEPP 44 applies to each local government area listed in Schedule 1. The proposed work area is located within City of Lake Macquarie LGA which is listed on Schedule 1.

Key to the application of SEPP 44 is the determining of "core Koala habitat" and 'potential Koala habitat". For land to be considered core Koala habitat there must be a resident population of Koalas as evidenced by breeding females and recent sightings and records. For land to be considered potential Koala habitat, it must contain native vegetation that has at least one of the trees species listed under Schedule 2, and that species must comprise at least 15% of the total number of trees in the upper or lower strata.

There are 19 records of Koala within the locality on the Office of Environment and Heritage's (OEH) BioNet Atlas. The study area contains one Koala feed tree in the form of *Eucalyptus microcorys (*Tallowwood), which make up only 1% of vegetation present within the study area.

Given that the study area is adjacent to the M1, leading to a high risk of vehicle-related mortality, no koalas or evidence of koalas were recorded, and there is a low percentage of koala feed trees present, the study area does not constitute core Koala habitat.

In light of the above, SEPP 44 is not considered further in this assessment.

1.4.4 Environment Protection and Biodiversity Conservation (EPBC) Act 1999 (CWTH)

Local government projects must address and consider potential impacts on nationally listed threatened species, populations, ecological communities and migratory species, including application of the "avoid, minimise, mitigate and offset" hierarchy to determine if a referral to the Federal Department of the Environment and Energy is required.

The EPBC Act protects nationally and internationally important flora, fauna, ecological communities and heritage places, which are defined in the EPBC Act as Matters of National Environmental Significance (MNES).

MNES relevant to the proposal are:

- Wetlands of international importance
- Nationally threatened species and ecological communities
- Migratory species
- Commonwealth marine areas.

Significance of impacts is determined in accordance with the *Significance impact guidelines 1.1 – matters of national environmental significance* (Department of the Environment, 2013).

If via the completion of an Assessment of Significance, a proposal is considered likely to have a significant impact on a MNES, the proposal is referred to the Federal Environment Minister. The referral process involves a decision on whether or not the proposal is a controlled action. When a proposal is declared a controlled action, approval from the Minister is required. Further information on the referral and approval process is available at http://www.environment.gov.au/protection/environment-assessments/assessment-and-approval-process.

2 METHODS

2.1 PERSONNEL

The field survey was conducted across the study area by a senior ecologist on 11 March 2019.

2.2 BACKGROUND RESEARCH

Database searches were undertaken prior to commencement of field surveys to collect and review information on the presence or likelihood of occurrence of:

- Threatened and protected terrestrial and aquatic flora and fauna species and their habitat
- Endangered populations
- Threatened ecological communities
- Important habitat for migratory species
- Areas of outstanding biodiversity value (AOBVs).

Table 2-1 Summary of searches

Resource	Target	Search date	Search area
OEH BioNet Atlas (BioNet)	Threatened flora and fauna species, populations and ecological communities listed under the BC Act	12/02/19	10 km radius of the study area
OEH BioNet Vegetation Classification (BioNet VC)	Plant Community Type (PCT) identification.	12/02/19	Study area
EPBC Act Protected Matters Search Tool (PMST)	Threatened flora and fauna, endangered populations and ecological communities and migratory species	12/02/19	10 km radius of the study area
DPI Weed Wise	Priority weeds declared in the Hunter Region which encompasses City of Lake Macquarie LGA.	12/02/19	Hunter region
Bureau of Meteorology National Atlas of Groundwater Dependant Ecosystems	Vegetation communities that are likely to rely on groundwater.	24/04/19	Study area

2.3 FIELD SURVEY

The aims of the field survey was to ground-truth the results of the background research and habitat assessment. A random meander survey as well as 18 rapid assessment plots of the study area were conducted to identify the following:

- Native flora species and vegetation communities present
- Potential of threatened species presence identified during background searches with targeted transect surveys undertaken where suitable habitat is present

- Opportunistic fauna sightings
- Weed species present and their abundance.

Appendix A contains a list of the flora and fauna species observed.

2.3.1 Habitat Assessment

Appendix B contains the results of BioNet and PMST searches. These threatened species and communities were evaluated for their potential to occur in the proposed work area based on habitat assessments undertaken in the field. This approach assumes that if suitable habitat is present within the study area, and local records occur, the study area has potential to harbour those species. The habitat evaluation approach increases the integrity of the survey to determine presence or absence of threatened species, and reduces limitations relating to survey timing or cryptic species that are difficult to detect in surveys.

2.3.2 Flora survey

The objectives of the flora survey were to:

- Identify whether threatened species are present, or have the potential to occur, within the study area
- Determine vegetation communities present within the study area, their condition and extent
- Identify potential TECs and determine their extent and condition
- Assess the distribution and abundance of priority weeds at the study area.

An assessment and description of the vegetation communities present within the study area was undertaken with reference to the structure and condition of previous vegetation mapping (Bell, 2016). Plant Community Types (PCTs) in accordance with the BioNet Vegetation Classification, were then identified via analysis of floristic data collected using the PCT Identification Tool (OEH 2019).

Within areas of suitable habitat, targeted searches for those threatened flora species, populations or ecological communities of state or national significance were undertaken. Targeted searches were undertaken for the species shown in Table 2-2.

Although a number of flora species were observed during the random meander (Appendix A), an exhaustive flora species inventory of the study area was not undertaken as surveys focused on dominant species in each stratum to determine vegetation communities present and habitat condition, and therefore likelihood of threatened species being present.

Table 2-2 Threatened flora requiring survey

Family	Species	Common name	Listing	Records within study locality
Elaeocarpaceae	*Tetratheca juncea*	Black-eyed Susan	V-BC Act V- EPBC Act	1761
Myrtaceae	*Angophora inopina*	Charmhaven Apple	V-BC Act V- EPBC Act	540
Myrtaceae	*Melaleuca biconvexa*	Biconvex Paperbark	V-BC Act V- EPBC Act	349

2.3.3 *Targeted fauna survey*

The objectives of the fauna survey were to assess the habitat present (particularly for threatened species) within the study area in relation to the presence or absence of the following attributes:

- Habitat value (leaf litter, fallen timber, ground cover extent and type)
- Condition of vegetation
- Floristic diversity of vegetation
- Presence of hollow-bearing trees
- Presence of species-specific foraging or breeding habitat.

Opportunistic fauna surveys were conducted across the study area. Detection of a variety of fauna species was limited, however, opportunistic sightings of common fauna and their traces (e.g. scats, tracks, scratches) when observed were recorded.

2.4 LIMITATIONS

A thorough search of areas to be affected by the proposal was undertaken. As the flora field survey were undertaken in March, the flora species lists reflect plant species usually detectable during early autumn only, and therefore there is the potential for some flora species that were not in flower at the time of the survey to have gone undetected. However, the lists are considered sufficient to identify vegetation communities present within the proposed work area and therefore to evaluate the probability of threatened flora species to occur.

The proposed work area is relatively small which allowed for a thorough search of most areas to be affected by the proposal. Many fauna species are nocturnal or active at dawn/dusk and therefore are not able to be located during daytime surveys. However, detailed habitat assessments were made within the proposed work area, so local occurrence of fauna can be predicted. A precautionary approach has been taken as to the likelihood of the presence of threatened species so flora and fauna species unlikely to be detected during the time of the survey are assessed.

Noise levels from road traffic can affect the ability to detect bird species by aural detection during bird surveys. To account for the interference of traffic noise and survey timing, a habitat evaluation has been utilised to determine the likelihood of threatened species occurring within the study area. This precautionary approach assumes threatened species could occur within the study area if habitat and site conditions are appropriate, even if the species was not detected.

3 EXISTING ENVIRONMENT

The study area is located with the Sydney Basin IBRA bioregion and the Wyong IBRA subregion. The study area is within the Mitchell landscape known as the Gosford - Cooranbong Coastal Slopes, and is located on Narrabeen Sandstone and has an elevation of approximately 18 metres.

Common woodland bird species such as Laughing Kookaburra (*Dacelo novaeguineae*), Rainbow Lorikeet (*Trichoglossus haematodus)*, Grey Fantail (*Rhipidura albiscapa)*, Bell Miner (*Manorina melanophrys*) and Superb Fairy-wren (*Malurus cyaneus*) were recorded during the field survey, as well as common frog species including Eastern Common Froglet (*Crinia signifera)*, Eastern Dwarf Tree Frog (*Litoria fallax)* and Verreaux's Tree Frog (*Litoria verreaux)*.

3.1 PLANT COMMUNITY TYPES

A total of 76 flora species were recorded within the study area, including 21 exotic species (28%) (Appendix A).

Assigning a PCT in accordance with the BioNet Vegetation Classification was undertaken by comparing key attributes such as dominant species, structure, known distribution, soil landscape, and landform to a list of potential PCTs generated using the PCT Identification Tool (OEH 2019). This process revealed that the study area is most likely to contain the following PCTs:

PCT 684 – Blackbutt – Narrow leaved Mahogany shrubby open forest of the coastal ranges (Cooranbong Blackbutt Tall Forest - Bell 2016)

Upper stratum – *Eucalyptus pilularis*

Mid storey – *Allocasuarina torulosa, Persoonia linearis, Glochidion ferdinandi, Callistemon salignus, Dodonaea triquetra,*

Groundcover – *Themeda triandra, Pteridium esculentum, Adiantum aethiopicum, Leucopogon juniperinus, Entolasia stricta, Dianella caerulea, Eustrephus latifolius*

Dominated by Blackbutt (*Eucalyptus pilularis*) on the undulating valley flats around Cooranbong and Martinsville. Co-occurring species include Forest Oak *Allocasuarina torulosa,* Narrow-leaved Geebung (*Persoonia linearis*) and Cheese Tree (*Glochidion ferdinandi*) with occasional Willow Bottlebrush (*Callistemon salignus*) in the mid layer, over a rich herb and grass layer.

Figure 3-1 PCT 684 within the south west portion of the study area

PCT 1579 – Smooth Barked Apple – Turpentine – Blackbutt open forest on ranges of the Central Coast (Coastal Plains Smooth-barked Apple Woodland- Bell 2016)

Upper stratum – *Angophora costata*, *Eucalyptus pilularis, Corymbia gummifera.*

Mid storey – *Allocasuarina torulosa, Persoonia linearis, Banksia spinulosa* var. *collina*

Groundcover - *Pteridium esculentum, Entolasia stricta, Leucopogon juniperinus, Dianella caerulea, Lomandra longifolia,*

Dominated by a canopy of Sydney Red Gum (*Angophora costata*) occurring with Red Bloodwood (*Corymbia gummifera*) and Blackbutt. Co-occurring species include Forest Oak, Narrow-leaved Geebung and *Banksia spinulosa* var. *collina* over a rich herb and grass layer.

Figure 3-2 PCT 1579 within the central portion of the study area

Urban/Disturbed Vegetation

This vegetation consists of combination of planted vegetation associated with landscaping along the M1 and nearby residences as well as environmental weeds and garden escapees. Along the M1 embankment and existing, it is dominated by Forest Oak and *Banksia spinulosa* var. *collina* interspersed with a high cover of exotic species and environmental weeds such as *Lantana camara* (Lantana)*, Cotoneaster glaucophyllus, Paspalum dilatatum, Bamboo sp, Jacaranda sp.* Along the edge of the existing noise wall, a dominance of Lantana*, Cotoneaster glaucophyllus, Paspalum dilatatum* in association with pioneering native groundcover species such *Imperata cylindrica* (Blady Grass) and *Oplismenus imbecillis* (Basket Grass) occurs. Immature canopy species occur along the existing noise wall and include *Eucalyptus microcorys* (Tallowwood)*, E. acmenoides* (White Mahogany)*, Corymbia maculata* (Spotted Gum) and *Casuarina glauca* (Swamp Oak).

Figure 3-3 Urban and disturbed vegetation

Vegetation mapping of the study area is presented in Figure 3-4.

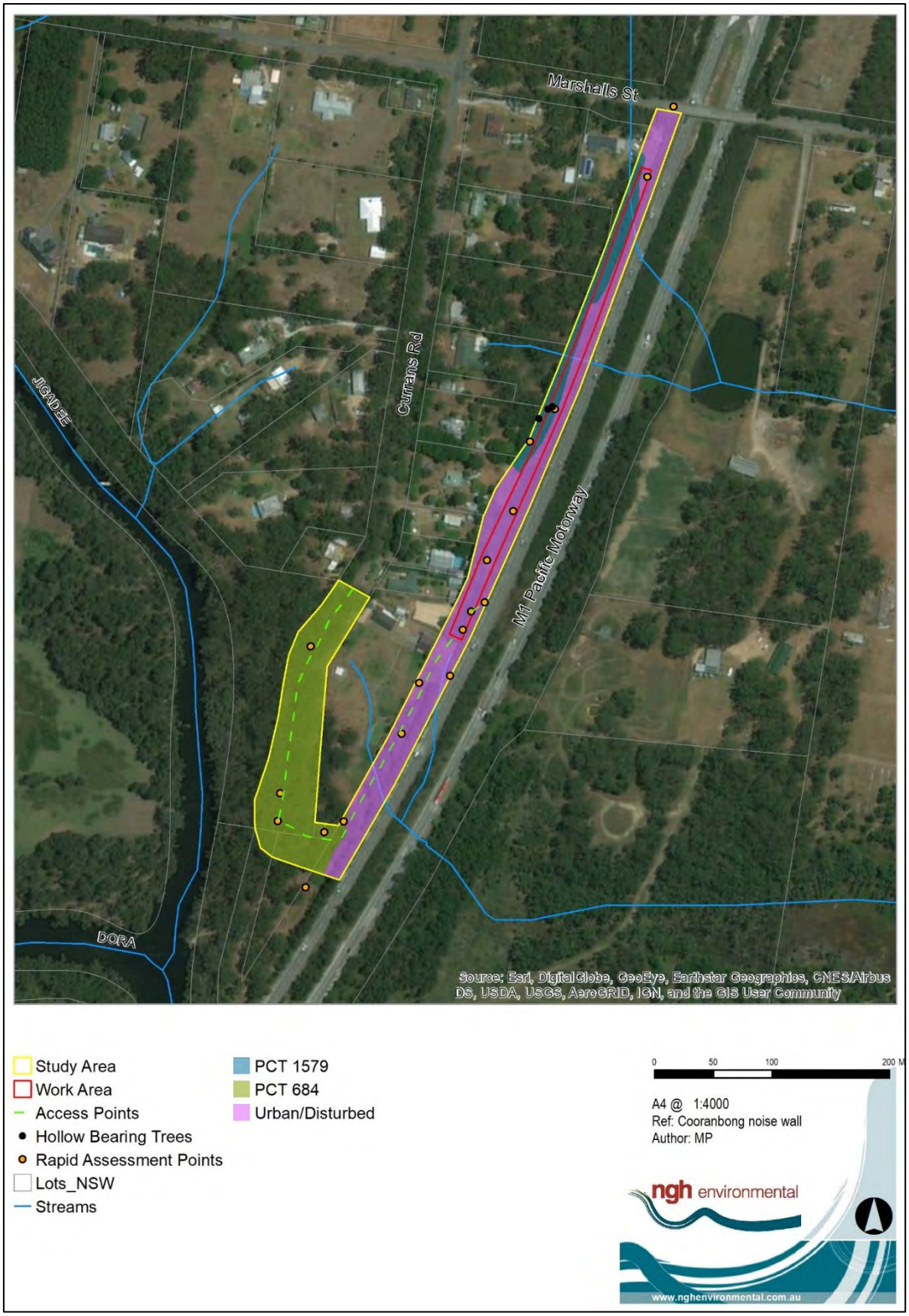

Figure 3-4 Vegetation mapping within the study area

3.2 THREATENED ECOLOGICAL COMMUNITIES

Searches of NSW BioNet identified 16 TECs with potential to occur within the locality, and the PMST identified three TECs with potential to occur (Appendix B). According to the BioNet Vegetation Classification, PCT 684 and PCT 1579 do not meet the description of any TECs protected under the BC Act or EPBC Act.

3.3 GROUNDWATER DEPENDENT ECOSYSTEMS

A search of the Bureau of Meteorology's National Atlas of Groundwater Dependent Ecosystems (GDEs) shows that there are no aquatic GDEs within the study area. Habitat within the study area is classified as low to high potential terrestrial GDE (from regional assessment). These are ecosystems that rely on the subsurface presence of groundwater and they include all vegetation ecosystems. No subterranean GDEs (i.e. cave and aquifer ecosystems) have been analysed within the study area.

3.4 THREATENED SPECIES AND POPULATIONS

3.4.1 Threatened flora

The BioNet and PMST search tool identified 26 threatened flora species with potential to occur within the locality (Appendix B). Although some of these species returned a high number of records, none of these are proximal to the study area. The closest are of *Melaleuca biconvexa* (Biconvex Paperbark) and *Angophora inopina* (Charmhaven Apple). These conspicuous species would be readily identifiable, therefore, given they were not detected, they are considered unlikely to occur. *Tetratheca juncea* (Black-eyed Susan) also has nearby records (approx. 1km north) in large numbers and were not readily identifiable when surveys were undertaken given flowering time of the species. However, potential habitat for this species is considered non-optimal due to large amounts of disturbance and condition of the vegetation with the proposed works area.

Targeted surveys did not detect any threatened flora species and the habitat assessment (Appendix C) did not determine any as having a moderate or high likelihood of occurring within the study area. Accordingly, no Tests of Significance (ToS) under the BC Act or Assessment of Significance (AoS) under the EPBC Act have been undertaken for threatened flora.

3.4.2 Threatened fauna

The BioNet and PMST search tool identified 69 state and/or nationally listed threatened fauna species with the potential to occur within the locality (Appendix B). No threatened fauna species were recorded during the field survey. Mobile species, including threatened microbats, may very rarely visit the study area to investigate potential foraging opportunities. However, this would be on a transient basis only and not permanently for roosting or breeding. Additionally, the majority of the site is located adjacent to the M1 and is subject to considerable existing traffic and noise impacts.

Given no threatened fauna are considered as having a moderate or high likelihood of occurring within the proposed work area, no ToS or AoS have been undertaken for threatened fauna.

3.4.3 Fauna habitat

Although areas of native vegetation provide nesting and foraging habitat for avifauna, arboreal species and microbats, with exception to south western portion of the study area (PCT 684), fauna habitat within the study area is generally poor in quality which is characteristic of vegetation in close proximity to major infrastructure. Three hollow-bearing trees that contained small hollows were recorded within PCT 1579 (Figure 3-4), however, they are considered unlikely to provide breeding habitat for a range of hollow-dependent species. No other breeding/roosting structures such as nests or dreys were observed. Fallen timber (in excess of 100 mm diameter) and leaf litter was present on occasion, that would provide habitat for small, commonly occurring ground fauna such as small mammals and reptiles.

3.4.4 Aquatic habitat

Dora Creek and Jigadee Creek occur to the south and west of the study area, but do not occur within the proposed work area. Both creeks are identified as Key Fish Habitat (NSW DPI) and would not be directly or indirectly impacted.

3.5 BIODIVERSITY VALUES MAP ANDAREAS OF OUTSTANDING BIODIVERSITY VALUE

The Biodiversity Values Map has identified the northern end of the study area near the corner of Marshall Street and the M1 as containing biodiversity values which are defined as threatened species or communities with potential for serious and irreversible impacts. There are also a couple of small patches along Currans Road, also within the study area, that are mapped. It is not anticipated that the proposal will significantly impact upon threatened species or communities with potential for serious and irreversible impacts.

No Areas of Outstanding Biodiversity Value occur within the study area.

3.6 WILDLIFE CONNECTIVITY CORRIDORS

Wildlife corridors are connections across the landscape that link areas of larger habitat. They support natural processes that occur in a healthy environment, including the movement of species to find resources, such as food and water. Corridors can contribute to the resilience of the landscape in a changing climate and help to reduce future greenhouse gas emissions by storing carbon in native vegetation.

PCT 684 within the study area has been identified as part of a Rehabilitation Corridor (Lake Macquarie City Council 2016) which is defined as partially cleared native vegetation and crossing points that are strategically located and could be rehabilitated to enhance fauna movement. The vegetation along the M1 (recorded as predominantly urban/exotic) is identified as a Corridor of Partially Cleared Remnant Vegetation, defined as an area of vegetation that is not in an intact state, can include areas that have had the canopy thinned, the understorey mown or have a high component of exotic trees and shrubs, and can include regenerating areas.

3.7 MATTERS OF NATIONAL ENVIRONMENTAL SIGNIFICANCE

No threatened flora species or communities (Appendix B) listed under the EPBC Act are considered to be potentially impacted by the proposal. Some threatened and/or migratory (terrestrial) fauna may utilise

habitat within the proposed work area, threatened species evaluations have been undertaken for these species. Marine species were not assessed further in this assessment due to the lack of marine habitat within the study area.

No world heritage or national heritage places occur within the 10 kilometres of the study area. There are no wetlands of international importance located within 10 kilometres of the study area.

4 IMPACT ASSESSMENT

4.1 CONSTRUCTION IMPACTS

4.1.1 Removal of native vegetation

The amount of vegetation to be cleared for the proposed works area is approximately 170 m^2 (0.01 ha) for the proposed geotechnical works and a maximum of 4700 m^2 (0.47 ha) of potential clearing for the construction of the proposed noise wall. Table 4-1 summaries the impacts to the vegetation communities observed within the study area. The vast majority of the works would result in impacts to vegetation already subjected to previous disturbance and along the embankment of the M1. Impacts on vegetation would be restricted to the loss of ground cover and midstorey shrubs, and it is not anticipated that large immature or mature canopy species would be required to be removed. No TECs occur within the study area or would be impacted by the proposal.

Table 4-1 Impacts to vegetation

Local vegetation mapping (Bell 2016)	(PCT)	Potential TEC?	Total Study Area (ha)	Total Impacted (ha)
Cooranbong Blackbutt Tall Forest - Bell 2016)	PCT 684 – *Blackbutt – Narrow leaved Mahogany shrubby open forest of the coastal ranges*	No	1.07	-
Coastal Plains Smooth-barked Apple Woodland - Bell 2016)	PCT 1579 – *Smooth Barked Apple – Turpentine – Blackbutt open forest on ranges of the Central Coast*	No	0.32	0.1
N/A	Urban/Disturbed	No	1.36	0.37
Total			**2.75**	**0.47**

4.1.2 Removal of threatened fauna habitat

The proposed works may result in the loss of a maximum linear removal of 0.47 ha of non-optimal foraging and roosting habitat. As previously mentioned, the proposed works would result in the loss of predominantly exotic vegetation as well as groundcover and midstorey shrubs such as immature regenerating Forest Oak and *Banksia* sp. Three (3) hollow-bearing trees exist within the proposed works area, however, would not be removed. Minimal logs or other fallen timber is present within the proposed works area, and where it does occur, is within the embankment in close proximity to the M1. This habitat may be used for foraging and roosting on occasion by common and threatened fauna moving or residing through the area. A threatened species evaluation (Appendix C) determined a list of potential threatened species that may utilise the study area on occasion for foraging or as a corridor for movement, however, all have a low likelihood of occurrence. The study area is most likely utilised by common and more mobile transient species that are disturbance tolerant.

The loss of habitat is unlikely to cause a significant impact to any threatened fauna species occurring within or near the study area due to the scope and location of the works adjacent to existing road infrastructure, impacts of roadside edge effects and the remaining vegetation providing a continuing corridor for movement.

4.1.3 Removal of threatened flora

Twenty-six threatened flora species listed under the BC and EPBC Acts were recorded previously or predicted to occur within the locality of the proposal. However, no individuals of any threatened flora species were detected during the site survey nor are any considered likely to occur. Given this, no further assessment into potential impacts to threatened flora is deemed necessary.

4.1.4 Injury and mortality

Although considered unlikely, the potential for wildlife injury or death could occur during the construction phase of the proposal. The clearing of vegetation may result in injury or death to resident fauna. Species at risk include ground-dwelling species such as snakes, lizards, and small mammals. There is also the risk of displaced fauna succumbing to predation, or stress induced by competing with existing resident populations for resources, particularly shelter / refuge habitat.

In summary, injury and mortality of fauna could occur during construction activities, including:

- During construction, when vegetation and habitat are being cleared
- Machinery and plant
- Construction traffic.

4.2 INDIRECT/OPERATIONAL IMPACTS

4.2.1 Wildlife connectivity and habitat fragmentation

The main section of the proposed work area is bordered by the M1 to the east, and residential housing to the west. The remaining section which lies to the south of Currans Road, is bordered by native vegetation to the west, with Jigadee Creek beyond. The M1 already acts as a barrier to movement, therefore the limited clearing of vegetation at the proposed work area is unlikely to present any new impacts with regards to wildlife connectivity. Other fauna species may be impacted during the operational phase of the proposal (i.e. roadkill risks), however, this is an existing impact with the presence of a major road and high-quality habitat in the locality. Construction of a noise wall will present a small barrier for fauna once constructed. As a noise wall is already present within the study area, and the proposal represents an extension of the existing wall along a busy motorway and that the presence or movement of fauna is already restricted, it is not anticipated that construction of the noise wall would represent a significant impact on connectivity or habitat fragmentation.

Due to the scope of the proposed works and limited clearing of vegetation, impacts to connectivity or further fragmentation of vegetation is not considered significant.

4.2.2 Edge effects on adjacent native vegetation and habitat

Edge effects are diverse physical and biotic alterations associated with the artificial boundaries of fragments and are dominant drivers of change in many fragmented landscapes (Laurance & Peres 2006, Ewers *et al. 2007*, Laurance *et al.* 2007). Edge effects can have serious impacts on species diversity and composition, community dynamics, and ecosystem functioning (Saunders *et al.* 1991, Laurance *et al.* 2007). The proposal would be unlikely to exacerbate existing edge effects, in addition to considering the presence of habitat to the south and west of the proposed work area, impacts are considered negligible.

4.2.3 Invasion and spread of weeds

The proposal has the potential to facilitate and spread weeds during vegetation removal and through the movement of vehicles and machinery into or out of the site. Weeds are easily transported as seeds and propagules on machinery brought to the site. Equally, they can be carried away to other areas from the site or spread within it. If weeds are not controlled prior to work commencing, then there is the potential for spread throughout the site during and following construction.

Rehabilitation of disturbed areas and ongoing weed management after the completion of construction activities would limit the establishment and spread of weed species during operation.

4.2.4 Invasion and spread of pathogens and disease

During construction, the proposal has the potential to cause both the spread of pathogens and disease, however none were detected during the survey. There is a risk of spreading fungus and diseases through the introduction and movement of soil. Standard hygiene management measures during construction would minimise this risk.

4.3 IMPACT SUMMARY

Table 4-2 Summary of impacts

Impact	Biodiversity values	Nature of impact Direct, indirect, cumulative	Extent of impact Site based, Local, Regional, State, National	Duration Short term Long term	Does the proposal constitute or exacerbate a key threatening process?	Confidence in assessment Known, Unknown, unpredictable or irreversible
Removal of native vegetation	Native vegetation	Direct	Site based	Long term	• Clearing of native vegetation (BC Act) • Land clearance (EPBC Act)	Known
Removal of threatened fauna habitat	No threatened species likely to be affected.	Direct/indirect	Site based	Long term	• Clearing of native vegetation • Bushrock removal • Loss of hollow-bearing trees • Removal of dead wood and dead trees	Unpredictable
Removal of threatened flora	No threatened species likely to be affected.	Direct	Site based	Long term	• Clearing of native vegetation • Land clearance (EPBC Act)	Unpredictable
Injury and mortality of fauna	Fauna	Direct	Site based	Short term and long term	None	Unpredictable
Fragmentation of identified biodiversity links and habitat corridors	Fauna	Direct/Indirect	Local	Long term	• Clearing of native vegetation • Land clearance (EPBC Act)	Known
Edge effects on adjacent native vegetation and habitat	Flora and fauna	Indirect	Local	Long term	• Clearing of native vegetation • Land clearance (EPBC Act) • Loss of hollow-bearing trees • Removal of dead wood and dead trees	Unpredictable
Invasion and spread of weeds	Flora and fauna	Indirect	Site based	Short term	• Invasion, establishment and spread of *Lantana camara* • Loss and degradation of native plant and animal habitat by invasion of escaped garden plants, including aquatic plants	Known
Invasion and spread of pathogens	Flora and fauna	Indirect	Site based	Short term	• Infection of native plants by *Phytophthora cinnamomi*	Unpredictable

Impact	Biodiversity values	Nature of impact Direct, indirect, cumulative	Extent of impact Site based, Local, Regional, State, National	Duration Short term Long term	Does the proposal constitute or exacerbate a key threatening process?	Confidence in assessment Known, Unknown, unpredictable or irreversible
and disease					• Introduction and Establishment of Exotic Rust Fungi of the order Pucciniales pathogenic on plants of the family Myrtaceae • Infection by psittacine circoviral (beak and feather) disease affecting endangered psittacine species and populations	

5 AVOID, MINIMISE AND MITIGATE IMPACTS

5.1 AVOIDANCE AND MINIMISATION

The proposed works have been designed to minimise vegetation clearing, where possible, and minimise potential impacts to specific threatened species that may be present at the proposed work area on occasion.

5.2 MITIGATION MEASURES

The proposed works would use these mitigation measures (Table 5-1) to assist with managing the impacts on biodiversity during construction works.

Table 5-1 Mitigation measures

Impact	Mitigation measures	Timing and duration	Likely efficacy of mitigation	Residual impacts anticipated
Removal of native vegetation	Native vegetation removal to be to the minimum extent necessary	Detailed design	Effective	None
	Pre-clearing surveys will be undertaken in accordance with *Guide 1: Pre-clearing process* of the *Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects* (RTA 2011).	Prior to construction	Effective	
	Vegetation removal will be undertaken in accordance with *Guide 4: Clearing of vegetation and removal of bushrock* of the *Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects* (RTA 2011).	During construction	Effective	
	The unexpected species find procedure is to be followed under *Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects* (RTA 2011) if threatened ecological communities, not assessed in the biodiversity assessment, are identified in the proposed work area.	During construction	Proven	
Removal of threatened species habitat and habitat features Injury and mortality of fauna	Habitat removal will be undertaken in accordance with *Guide 4: Clearing of vegetation and removal of bushrock* of the *Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects* (RTA 2011).	During construction	Effective	None
	The unexpected species find procedure is to be followed under *Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects* (RTA 2011) if threatened fauna, not assessed in the biodiversity assessment, are identified in the proposed work area.	During construction	Proven	
Removal of threatened plants	The unexpected species find procedure is to be followed under *Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects* (RTA 2011) if threatened flora species, not assessed in the biodiversity assessment, are identified in the proposed work area.	During construction	Proven	None
Changes to hydrology	Changes to existing surface water flows will be minimised through detailed design.	Detailed design	Effective	None
Fragmentation of identified habitat corridors	Connectivity measures will be implemented in accordance with the *Wildlife Connectivity Guidelines for Road Projects* (RTA 2011).	Detailed design, during construction and post construction	Effective	None
Edge effects on adjacent native vegetation and habitat	Exclusion zones will be set up at the limit of clearing in accordance with *Guide 2: Exclusion zones* of the *Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects* (RTA 2011).	During construction	Effective	None

Impact	Mitigation measures	Timing and duration	Likely efficacy of mitigation	Residual impacts anticipated
Invasion and spread of weeds	Weed species will be managed in accordance with *Guide 6: Weed management* of the *Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects* (RTA 2011).	During construction	Effective	None
Invasion and spread of pathogens and disease	Pathogens will be managed in accordance with *Guide 2: Exclusion zones* of the *Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects* (RTA 2011).	During construction	Effective	None

6 CONCLUSION

The proposed work would contribute to the direct loss of a maximum linear removal of 0.47 ha containing predominantly urban/disturbed vegetation and low condition native vegetation adjacent to the M1. The proposed work area is currently subject to edge effects along M1. Three (3) hollow-bearing trees containing small hollows were observed, however, would not be removed by the proposal. No TECs are present within the study area. No threatened species were recorded on site nor are any considered likely to occur.

With the effective implementation of safeguards and mitigation measures identified in this Biodiversity Assessment, risk of impacts to biodiversity is considered negligible.

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APPENDIX A SPECIES RECORDED

A.1 FLORA

Family	E	Scientific Name	Common Name	Status	
				BC	EPBC
Myrtaceae		*Eucalyptus pilularis*	Blackbutt		
Myrtaceae		*Angophora costata*	Sydney Red Gum		
Phyllanthaceae		*Glochidion ferdinandi*	Cheese Tree		
Proteaceae		*Persoonia linearis*	Narrow-leaved Geebung	P	
Myrtaceae		*Corymbia gummifera*	Red Bloodwood		
Fabaceae (Caesalpinioideae)	*	*Senna pendula var. glabrata*			
Vitaceae		*Cissus antarctica*	Water Vine		
Ericaceae		*Leucopogon juniperinus*	Prickly Beard-heath		
Asteraceae	*	*Bidens pilosa*	Cobbler's Pegs		
Poaceae	*	*Sporobolus africanus*	Parramatta Grass		
Poaceae	*	*Paspalum dilatatum*	Paspalum		
Verbenaceae	*	*Lantana camara*	Lantana		
Oleaceae	*	*Olea europaea*	Common Olive		
Malvaceae	*	*Sida rhombifolia*	Paddy's Lucerne		
Myrtaceae		*Callistemon salignus*	Willow Bottlebrush		
Casuarinaceae		*Allocasuarina torulosa*	Forest Oak		
Dennstaedtiaceae		*Pteridium esculentum*	Bracken		
Poaceae		*Entolasia stricta*	Wiry Panic		
Lobeliaceae		*Pratia purpurascens*	Whiteroot		
Adiantaceae		*Adiantum aethiopicum*	Common Maidenhair	P	
Myrtaceae		*Leptospermum juniperinum*	Prickly Tea-tree		
Poaceae		*Cynodon dactylon*	Common Couch		
Convolvulaceae		*Dichondra repens*	Kidney Weed		
Poaceae	*	*Setaria parviflora*			
Myrtaceae		*Melaleuca linariifolia*	Flax-leaved Paperbark		
Poaceae		*Imperata cylindrica*	Blady Grass		
Acanthaceae	*	*Thunbergia alata*	Black-eyed Susan		
Poaceae		*Microlaena stipoides*	Weeping Grass		
Fabaceae (Mimosoideae)		*Acacia filicifolia*	Fern-leaved Wattle		
Ranunculaceae		*Clematis aristata*	Old Man's Beard		
Poaceae		*Echinopogon ovatus*	Forest Hedgehog Grass		
Pittosporaceae		*Pittosporum undulatum*	Sweet Pittosporum		

Family	E	Scientific Name	Common Name	Status	
				BC	EPBC
Fabaceae (Faboideae)		*Desmodium varians*	Slender Tick-trefoil		
Fabaceae (Mimosoideae)		*Acacia longifolia*			
Santalaceae		*Exocarpos cupressiformis*	Cherry Ballart		
Poaceae		*Themeda triandra*			
Sapindaceae		*Dodonaea triquetra*	Large-leaf Hop-bush		
Proteaceae		*Grevillea robusta*	Silky Oak		
Myrtaceae		*Leptospermum polygalifolium subsp. polygalifolium*			
Asteraceae	*	*Hypochaeris radicata*	Catsear		
Luzuriagaceae		*Eustrephus latifolius*	Wombat Berry		
Fabaceae (Faboideae)		*Glycine clandestina*	Twining glycine		
Cyperaceae		*Lepidosperma laterale*			
Acanthaceae		*Pseuderanthemum variabile*	Pastel Flower		
Myrtaceae		*Eucalyptus globoidea*	White Stringybark		
Myrtaceae		*Eucalyptus acmenoides*	White Mahogany		
Myrtaceae		*Eucalyptus microcorys*	Western Grey Box		
Myrtaceae		*Corymbia maculata*	Spotted Gum		
Solanaceae	*	*Solanum mauritianum*	Wild Tobacco Bush		
Commelinaceae		*Commelina cyanea*	Native Wandering Jew		
Poaceae	*	*Paspalum urvillei*	Vasey Grass		
Poaceae	*	*Eragrostis spp.*	A Lovegrass		
Casuarinaceae		*Casuarina glauca*	Swamp Oak		
Cyperaceae		*Cyperus gracilis*	Slender Flat-sedge		
Poaceae		*Oplismenus imbecillis*			
Violaceae		*Viola hederacea*	Ivy-leaved Violet		
Apocynaceae		*Parsonsia straminea*	Common Silkpod		
Bignoniaceae	*	*Jacaranda spp.*			
Cyperaceae	*	*Cyperus eragrostis*	Umbrella Sedge		
Asteraceae	*	*Ageratina adenophora*	Crofton Weed		
Phytolaccaceae	*	*Phytolacca octandra*	Inkweed		
Lomandraceae		*Lomandra longifolia*	Spiny-headed Mat-rush		
Proteaceae		*Banksia spinulosa*	Hairpin Banksia	P	
Poaceae	*	*Bambusa spp.*	Unidentified bamboo		
Fabaceae (Mimosoideae)		*Acacia ulicifolia*	Prickly Moses		
Zamiaceae		*Macrozamia communis*	Burrawang	P	
Poaceae		*Phragmites spp.*			
Malaceae	*	*Cotoneaster glaucophyllus*			
Phyllanthaceae		*Breynia oblongifolia*	Coffee Bush		

Family	E	Scientific Name	Common Name	Status	
				BC	EPBC
Apiaceae		*Platysace linearifolia*			
Fabaceae (Faboideae)		*Daviesia ulicifolia*	Gorse Bitter Pea		
Fabaceae (Faboideae)		*Podolobium ilicifolium*	Prickly Shaggy Pea		
Lamiaceae		*Clerodendrum tomentosum*	Hairy Clerodendrum		
Liliaceae	*	*Lilium formosanum*	Formosan Lily		
Verbenaceae	*	*Verbena bonariensis*	Purpletop		

A.2 FAUNA

Scientific Name	Common name	Status	
		BC Act	EPBC Act
Rhipidura leucophrys	Willie Wagtail	-	-
Dacelo novaeguineae	Laughing Kookaburra	-	-
Acanthorhynchus tenuirostris	Eastern Spinebill	-	-
Malurus cyaneus	Superb Fairy Wren	-	-
Manorina melanophrys	Bell Miner	-	-
Trichoglossus haematodus	Rainbow Lorikeet	-	-
Crinia signifera	Eastern Common Froglet	-	-
Litoria fallax	Eastern Dwarf Tree Frog	-	-
Litoria verreauxi	Verreaux's Tree Frog	-	-

APPENDIX B DATABASE SEARCHES

B.1 OEH BIONET ATLAS

Data from the BioNet Atlas website, which holds records from a number of custodians. The data are only indicative and cannot be considered a comprehensive inventory, and may contain errors and omissions. Species listed under the Sensitive Species Data Policy may have their locations denatured (^ rounded to 0.1Â°; ^^ rounded to 0.01Â°). Copyright the State of NSW through the Office of Environment and Heritage. Search criteria : Licensed Report of all Valid Records of Threatened (listed on TSC Act 1995) or Commonwealth listed Entities in selected area [North: -33.00 West: 151.36 East: 151.59 South: -33.18] returned a total of 4,669 records of 86 species.

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Kingdom	Class	Family	Scientific Name	Common Name	NSW status	Comm. status	Records
Animalia	Amphibia	Myobatrachidae	*Crinia tinnula*	Wallum Froglet	V,P		43
Animalia	Amphibia	Myobatrachidae	*^^Mixophyes balbus*	Stuttering Frog	E1,P,2	V	63
Animalia	Amphibia	Myobatrachidae	*^^Mixophyes iteratus*	Giant Barred Frog	E1,P,2	E	31
Animalia	Amphibia	Myobatrachidae	*Pseudophryne australis*	Red-crowned Toadlet	V,P		20
Animalia	Amphibia	Hylidae	*Litoria aurea*	Green and Golden Bell Frog	E1,P	V	1
Animalia	Amphibia	Hylidae	*Litoria brevipalmata*	Green-thighed Frog	V,P		13
Animalia	Reptilia	Cheloniidae	*Caretta caretta*	Loggerhead Turtle	E1,P	E	2
Animalia	Reptilia	Cheloniidae	*Chelonia mydas*	Green Turtle	V,P	V	77
Animalia	Reptilia	Elapidae	*Hoplocephalus stephensii*	Stephens' Banded Snake	V,P		11
Animalia	Aves	Anatidae	*Oxyura australis*	Blue-billed Duck	V,P		1
Animalia	Aves	Anatidae	*Stictonetta naevosa*	Freckled Duck	V,P		1
Animalia	Aves	Columbidae	*Ptilinopus regina*	Rose-crowned Fruit-Dove	V,P		2
Animalia	Aves	Columbidae	*Ptilinopus superbus*	Superb Fruit-Dove	V,P		1
Animalia	Aves	Ciconiidae	*Ephippiorhynchus asiaticus*	Black-necked Stork	E1,P		18

Kingdom	Class	Family	Scientific Name	Common Name	NSW status	Comm. status	Records
Animalia	Aves	Ardeidae	*Ixobrychus flavicollis*	Black Bittern	V,P		5
Animalia	Aves	Accipitridae	*Haliaeetus leucogaster*	White-bellied Sea-Eagle	V,P	C	35
Animalia	Aves	Accipitridae	*Hieraaetus morphnoides*	Little Eagle	V,P		2
Animalia	Aves	Accipitridae	*Lophoictinia isura*	Square-tailed Kite	V,P,3		2
Animalia	Aves	Accipitridae	*Pandion cristatus*	Eastern Osprey	V,P,3		9
Animalia	Aves	Falconidae	*Falco subniger*	Black Falcon	V,P		1
Animalia	Aves	Burhinidae	*Burhinus grallarius*	Bush Stone-curlew	E1,P		4
Animalia	Aves	Haematopodidae	*Haematopus fuliginosus*	Sooty Oystercatcher	V,P		1
Animalia	Aves	Haematopodidae	*Haematopus longirostris*	Pied Oystercatcher	E1,P		3
Animalia	Aves	Scolopacidae	*Calidris canutus*	Red Knot	P	E,C,J,K	1
Animalia	Aves	Scolopacidae	*Calidris ferruginea*	Curlew Sandpiper	E1,P	CE,C,J,K	1
Animalia	Aves	Scolopacidae	*Numenius madagascariensis*	Eastern Curlew	P	CE,C,J,K	1
Animalia	Aves	Turnicidae	*Turnix maculosus*	Red-backed Button-quail	V,P		1
Animalia	Aves	Laridae	*Sternula albifrons*	Little Tern	E1,P	C,J,K	1
Animalia	Aves	Cacatuidae	*Callocephalon fimbriatum*	Gang-gang Cockatoo	V,P,3		40
Animalia	Aves	Cacatuidae	*^^Calyptorhynchus lathami*	Glossy Black-Cockatoo	V,P,2		102
Animalia	Aves	Psittacidae	*Glossopsitta pusilla*	Little Lorikeet	V,P		50
Animalia	Aves	Psittacidae	*Lathamus discolor*	Swift Parrot	E1,P,3	CE	25
Animalia	Aves	Psittacidae	*Neophema pulchella*	Turquoise Parrot	V,P,3		4
Animalia	Aves	Strigidae	*Ninox connivens*	Barking Owl	V,P,3		1
Animalia	Aves	Strigidae	*Ninox strenua*	Powerful Owl	V,P,3		58

Kingdom	Class	Family	Scientific Name	Common Name	NSW status	Comm. status	Records
Animalia	Aves	Tytonidae	*Tyto novaehollandiae*	Masked Owl	V,P,3		37
Animalia	Aves	Tytonidae	*Tyto tenebricosa*	Sooty Owl	V,P,3		37
Animalia	Aves	Climacteridae	*Climacteris picumnus victoriae*	Brown Treecreeper (eastern subspecies)	V,P		6
Animalia	Aves	Acanthizidae	*Chthonicola sagittata*	Speckled Warbler	V,P		1
Animalia	Aves	Meliphagidae	*Anthochaera phrygia*	Regent Honeyeater	E4A,P	CE	28
Animalia	Aves	Meliphagidae	*Epthianura albifrons*	White-fronted Chat	V,P		1
Animalia	Aves	Pomatostomidae	*Pomatostomus temporalis temporalis*	Grey-crowned Babbler (eastern subspecies)	V,P		1
Animalia	Aves	Neosittidae	*Daphoenositta chrysoptera*	Varied Sittella	V,P		35
Animalia	Aves	Artamidae	*Artamus cyanopterus cyanopterus*	Dusky Woodswallow	V,P		8
Animalia	Aves	Petroicidae	*Petroica boodang*	Scarlet Robin	V,P		3
Animalia	Aves	Estrildidae	*Stagonopleura guttata*	Diamond Firetail	V,P		1
Animalia	Mammalia	Dasyuridae	*Dasyurus maculatus*	Spotted-tailed Quoll	V,P	E	23
Animalia	Mammalia	Dasyuridae	*Phascogale tapoatafa*	Brush-tailed Phascogale	V,P		2
Animalia	Mammalia	Phascolarctidae	*Phascolarctos cinereus*	Koala	V,P	V	19
Animalia	Mammalia	Burramyidae	*Cercartetus nanus*	Eastern Pygmy-possum	V,P		1
Animalia	Mammalia	Petauridae	*Petaurus australis*	Yellow-bellied Glider	V,P		282
Animalia	Mammalia	Petauridae	*Petaurus norfolcensis*	Squirrel Glider	V,P		154
Animalia	Mammalia	Pseudocheiridae	*Petauroides volans*	Greater Glider	P	V	37

Kingdom	Class	Family	Scientific Name	Common Name	NSW status	Comm. status	Records
Animalia	Mammalia	Potoroidae	*Potorous tridactylus*	Long-nosed Potoroo	V,P	V	2
Animalia	Mammalia	Macropodidae	*Macropus parma*	Parma Wallaby	V,P		2
Animalia	Mammalia	Macropodidae	*Petrogale penicillata*	Brush-tailed Rock-wallaby	E1,P	V	4
Animalia	Mammalia	Pteropodidae	*Pteropus poliocephalus*	Grey-headed Flying-fox	V,P	V	93
Animalia	Mammalia	Emballonuridae	*Saccolaimus flaviventris*	Yellow-bellied Sheathtail-bat	V,P		5
Animalia	Mammalia	Molossidae	*Mormopterus norfolkensis*	Eastern Freetail-bat	V,P		65
Animalia	Mammalia	Vespertilionidae	*Chalinolobus dwyeri*	Large-eared Pied Bat	V,P	V	6
Animalia	Mammalia	Vespertilionidae	*Falsistrellus tasmaniensis*	Eastern False Pipistrelle	V,P		9
Animalia	Mammalia	Vespertilionidae	*Kerivoula papuensis*	Golden-tipped Bat	V,P		13
Animalia	Mammalia	Vespertilionidae	*Miniopterus australis*	Little Bentwing-bat	V,P		94
Animalia	Mammalia	Vespertilionidae	*Miniopterus schreibersii oceanensis*	Eastern Bentwing-bat	V,P		57
Animalia	Mammalia	Vespertilionidae	*Myotis macropus*	Southern Myotis	V,P		37
Animalia	Mammalia	Vespertilionidae	*Scoteanax rueppellii*	Greater Broad-nosed Bat	V,P		34
Animalia	Mammalia	Vespertilionidae	*Vespadelus troughtoni*	Eastern Cave Bat	V,P		1
Animalia	Mammalia	Muridae	*Pseudomys gracilicaudatus*	Eastern Chestnut Mouse	V,P		1
Animalia	Mammalia	Muridae	*Pseudomys novaehollandiae*	New Holland Mouse	P	V	3
Plantae	Flora	Asteraceae	*Rutidosis heterogama*	Heath Wrinklewort	V	V	6
Plantae	Flora	Elaeocarpaceae	*Tetratheca juncea*	Black-eyed Susan	V	V	1761
Plantae	Flora	Fabaceae (Mimosoideae)	*Acacia bynoeana*	Bynoe's Wattle	E1	V	72

Kingdom	Class	Family	Scientific Name	Common Name	NSW status	Comm. status	Records
Plantae	Flora	Juncaginaceae	*Maundia triglochinoides*		V		12
Plantae	Flora	Lobeliaceae	*Isotoma fluviatilis subsp. fluviatilis*			X	1
Plantae	Flora	Myrtaceae	*Angophora inopina*	Charmhaven Apple	V	V	540
Plantae	Flora	Myrtaceae	*Callistemon linearifolius*	Netted Bottle Brush	V,3		3
Plantae	Flora	Myrtaceae	*Eucalyptus parramattensis subsp. parramattensis*	Eucalyptus parramattensis C. Hall. subsp. parramattensis in Wyong and Lake Macquarie local government areas	E2		4
Plantae	Flora	Myrtaceae	*Melaleuca biconvexa*	Biconvex Paperbark	V	V	349
Plantae	Flora	Myrtaceae	*Rhodamnia rubescens*	Scrub Turpentine	E4A		23
Plantae	Flora	Myrtaceae	*Rhodomyrtus psidioides*	Native Guava	E4A		2
Plantae	Flora	Myrtaceae	*Syzygium paniculatum*	Magenta Lilly Pilly	E1	V	2
Plantae	Flora	Orchidaceae	*^^Cryptostylis hunteriana*	Leafless Tongue Orchid	V,P,2	V	16
Plantae	Flora	Orchidaceae	*^^Diuris praecox*	Rough Doubletail	V,P,2	V	1
Plantae	Flora	Orchidaceae	*^^Genoplesium insigne*	Variable Midge Orchid	E4A,P,2	CE	21
Plantae	Flora	Polygonaceae	*Persicaria elatior*	Tall Knotweed	V	V	1
Plantae	Flora	Proteaceae	*Grevillea parviflora subsp. parviflora*	Small-flower Grevillea	V	V	122

Scientific Name	Common Name	NSW status	Comm. status	Records

Coastal Saltmarsh in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	Coastal Saltmarsh in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	E3	V	P
Coastal Upland Swamp in the Sydney Basin Bioregion	Coastal Upland Swamp in the Sydney Basin Bioregion	E3	E	K
Freshwater Wetlands on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	Freshwater Wetlands on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	E3		K
Hunter Lowland Redgum Forest in the Sydney Basin and New South Wales North Coast Bioregions	Hunter Lowland Redgum Forest in the Sydney Basin and New South Wales North Coast Bioregions	E3		K
Kincumber Scribbly Gum Forest in the Sydney Basin Bioregion	Kincumber Scribbly Gum Forest in the Sydney Basin Bioregion	E4B		K
Littoral Rainforest in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	Littoral Rainforest in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	E3	CE	P
Low woodland with heathland on indurated sand at Norah Head	Low woodland with heathland on indurated sand at Norah Head	E3		K
Lower Hunter Spotted Gumâ€"Ironbark Forest in the Sydney Basin Bioregion	Lower Hunter Spotted Gumâ€"Ironbark Forest in the Sydney Basin Bioregion	E3		K
Lowland Rainforest in the NSW North Coast and Sydney Basin Bioregions	Lowland Rainforest in the NSW North Coast and Sydney Basin Bioregions	E3	CE	K
Quorrobolong Scribbly Gum Woodland in the Sydney Basin Bioregion	Quorrobolong Scribbly Gum Woodland in the Sydney Basin Bioregion	E3		K

River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	E3		K
Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	E3	E	K
Swamp Sclerophyll Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	Swamp Sclerophyll Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	E3		K
Sydney Freshwater Wetlands in the Sydney Basin Bioregion	Sydney Freshwater Wetlands in the Sydney Basin Bioregion	E3		K
Themeda grassland on seacliffs and coastal headlands in the NSW North Coast, Sydney Basin and South East Corner Bioregions	Themeda grassland on seacliffs and coastal headlands in the NSW North Coast, Sydney Basin and South East Corner Bioregions	E3		K
Umina Coastal Sandplain Woodland in the Sydney Basin Bioregion	Umina Coastal Sandplain Woodland in the Sydney Basin Bioregion	E3		K

P = predicted, K = known

B.2 EPBC PROTECTED MATTERS

Australian Government
Department of the Environment and Energy

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected.

Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

Information is available about Environment Assessments and the EPBC Act including significance guidelines, forms and application process details.

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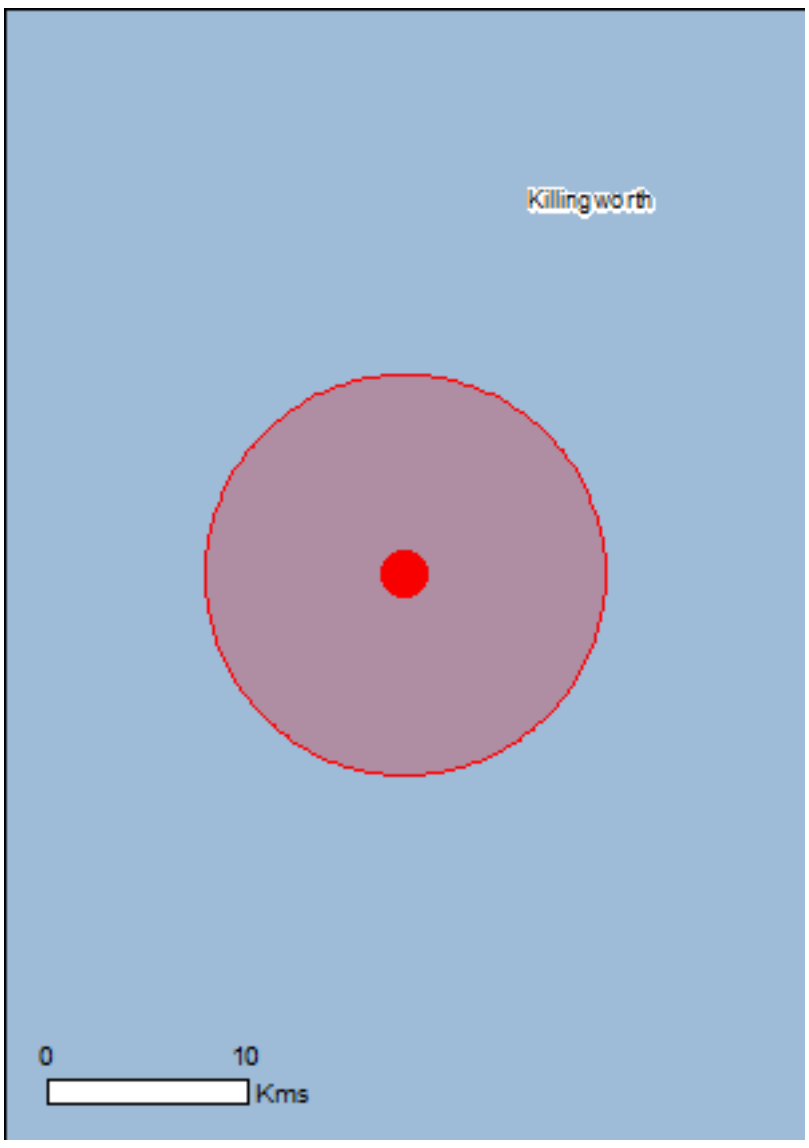

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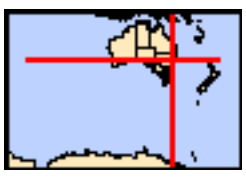

Summary

Matters of National Environmental Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance:	1
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	3
Listed Threatened Species:	65
Listed Migratory Species:	46

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at http://www.environment.gov.au/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Land:	2
Commonwealth Heritage Places:	None
Listed Marine Species:	50
Whales and Other Cetaceans:	1
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have nominated.

State and Territory Reserves:	7
Regional Forest Agreements:	1
Invasive Species:	49
Nationally Important Wetlands:	None
Key Ecological Features (Marine)	None

Details

Matters of National Environmental Significance

Wetlands of International Importance (Ramsar) [Resource Information]

Name	Proximity
Hunter estuary wetlands	20 - 30km upstream

Listed Threatened Ecological Communities [Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Name	Status	Type of Presence
Central Hunter Valley eucalypt forest and woodland	Critically Endangered	Community may occur within area
Coastal Swamp Oak (Casuarina glauca) Forest of New South Wales and South East Queensland ecological community	Endangered	Community likely to occur within area
Subtropical and Temperate Coastal Saltmarsh	Vulnerable	Community likely to occur within area

Listed Threatened Species [Resource Information]

Name	Status	Type of Presence
Birds		
Anthochaera phrygia Regent Honeyeater [82338]	Critically Endangered	Species or species habitat known to occur within area
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat known to occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
Dasyornis brachypterus Eastern Bristlebird [533]	Endangered	Species or species habitat likely to occur within area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea antipodensis gibsoni Gibson's Albatross [82270]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area

Name	Status	Type of Presence
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Erythrotriorchis radiatus Red Goshawk [942]	Vulnerable	Species or species habitat known to occur within area
Grantiella picta Painted Honeyeater [470]	Vulnerable	Species or species habitat may occur within area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat known to occur within area
Limosa lapponica baueri Bar-tailed Godwit (baueri), Western Alaskan Bar-tailed Godwit [86380]	Vulnerable	Species or species habitat known to occur within area
Limosa lapponica menzbieri Northern Siberian Bar-tailed Godwit, Bar-tailed Godwit (menzbieri) [86432]	Critically Endangered	Species or species habitat may occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area
Pachyptila turtur subantarctica Fairy Prion (southern) [64445]	Vulnerable	Species or species habitat known to occur within area
Rostratula australis Australian Painted-snipe, Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Species or species habitat may occur within area
Thalassarche bulleri platei Northern Buller's Albatross, Pacific Albatross [82273]	Vulnerable	Species or species habitat may occur within area
Thalassarche cauta cauta Shy Albatross, Tasmanian Shy Albatross [82345]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche cauta steadi White-capped Albatross [82344]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche eremita Chatham Albatross [64457]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area

Name	Status	Type of Presence
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Fish		
Epinephelus daemelii Black Rockcod, Black Cod, Saddled Rockcod [68449]	Vulnerable	Species or species habitat likely to occur within area
Frogs		
Heleioporus australiacus Giant Burrowing Frog [1973]	Vulnerable	Species or species habitat likely to occur within area
Litoria aurea Green and Golden Bell Frog [1870]	Vulnerable	Species or species habitat known to occur within area
Litoria littlejohni Littlejohn's Tree Frog, Heath Frog [64733]	Vulnerable	Species or species habitat likely to occur within area
Mixophyes balbus Stuttering Frog, Southern Barred Frog (in Victoria) [1942]	Vulnerable	Species or species habitat likely to occur within area
Mixophyes iteratus Giant Barred Frog, Southern Barred Frog [1944]	Endangered	Species or species habitat known to occur within area
Mammals		
Chalinolobus dwyeri Large-eared Pied Bat, Large Pied Bat [183]	Vulnerable	Species or species habitat known to occur within area
Dasyurus maculatus maculatus (SE mainland population) Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat known to occur within area
Petauroides volans Greater Glider [254]	Vulnerable	Species or species habitat known to occur within area
Petrogale penicillata Brush-tailed Rock-wallaby [225]	Vulnerable	Species or species habitat known to occur within area
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT) Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Vulnerable	Species or species habitat known to occur within area
Potorous tridactylus tridactylus Long-nosed Potoroo (SE mainland) [66645]	Vulnerable	Species or species habitat likely to occur within area
Pseudomys novaehollandiae New Holland Mouse, Pookila [96]	Vulnerable	Species or species habitat known to occur within area
Pteropus poliocephalus Grey-headed Flying-fox [186]	Vulnerable	Roosting known to occur within area
Plants		
Acacia bynoeana Bynoe's Wattle, Tiny Wattle [8575]	Vulnerable	Species or species habitat known to occur within area
Angophora inopina Charmhaven Apple [64832]	Vulnerable	Species or species habitat known to occur within area

Name	Status	Type of Presence
Asterolasia elegans [56780]	Endangered	Species or species habitat may occur within area
Caladenia tessellata Thick-lipped Spider-orchid, Daddy Long-legs [2119]	Vulnerable	Species or species habitat likely to occur within area
Corunastylis insignis Wyong Midge Orchid 1, Variable Midge Orchid 1 [84692]	Critically Endangered	Species or species habitat likely to occur within area
Cryptostylis hunteriana Leafless Tongue-orchid [19533]	Vulnerable	Species or species habitat known to occur within area
Cynanchum elegans White-flowered Wax Plant [12533]	Endangered	Species or species habitat likely to occur within area
Grevillea parviflora subsp. parviflora Small-flower Grevillea [64910]	Vulnerable	Species or species habitat known to occur within area
Melaleuca biconvexa Biconvex Paperbark [5583]	Vulnerable	Species or species habitat known to occur within area
Pelargonium sp. Striatellum (G.W.Carr 10345) Omeo Stork's-bill [84065]	Endangered	Species or species habitat likely to occur within area
Persoonia hirsuta Hairy Geebung, Hairy Persoonia [19006]	Endangered	Species or species habitat may occur within area
Pterostylis gibbosa Illawarra Greenhood, Rufa Greenhood, Pouched Greenhood [4562]	Endangered	Species or species habitat may occur within area
Rhizanthella slateri Eastern Underground Orchid [11768]	Endangered	Species or species habitat may occur within area
Rutidosis heterogama Heath Wrinklewort [13132]	Vulnerable	Species or species habitat known to occur within area
Syzygium paniculatum Magenta Lilly Pilly, Magenta Cherry, Daguba, Scrub Cherry, Creek Lilly Pilly, Brush Cherry [20307]	Vulnerable	Species or species habitat known to occur within area
Tetratheca juncea Black-eyed Susan [21407]	Vulnerable	Species or species habitat known to occur within area
Thesium australe Austral Toadflax, Toadflax [15202]	Vulnerable	Species or species habitat may occur within area
Reptiles		
Caretta caretta Loggerhead Turtle [1763]	Endangered	Foraging, feeding or related behaviour known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area

Name	Status	Type of Presence
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Hoplocephalus bungaroides Broad-headed Snake [1182]	Vulnerable	Species or species habitat likely to occur within area
Natator depressus Flatback Turtle [59257]	Vulnerable	Foraging, feeding or related behaviour known to occur within area

Listed Migratory Species [Resource Information]

* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
Migratory Marine Birds		
Anous stolidus Common Noddy [825]		Species or species habitat may occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Calonectris leucomelas Streaked Shearwater [1077]		Species or species habitat known to occur within area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Fregata ariel Lesser Frigatebird, Least Frigatebird [1012]		Species or species habitat likely to occur within area
Fregata minor Great Frigatebird, Greater Frigatebird [1013]		Species or species habitat likely to occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Species or species habitat may occur within area
Thalassarche cauta Tasmanian Shy Albatross [89224]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Thalassarche eremita Chatham Albatross [64457]	Endangered	Foraging, feeding or related behaviour likely to occur within area

Name	Threatened	Type of Presence
Thalassarche impavida		
Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris		
Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche salvini		
Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche steadi		
White-capped Albatross [64462]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Migratory Marine Species		
Caretta caretta		
Loggerhead Turtle [1763]	Endangered	Foraging, feeding or related behaviour known to occur within area
Chelonia mydas		
Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Dermochelys coriacea		
Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area
Dugong dugon		
Dugong [28]		Species or species habitat may occur within area
Eretmochelys imbricata		
Hawksbill Turtle [1766]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Lamna nasus		
Porbeagle, Mackerel Shark [83288]		Species or species habitat likely to occur within area
Manta alfredi		
Reef Manta Ray, Coastal Manta Ray, Inshore Manta Ray, Prince Alfred's Ray, Resident Manta Ray [84994]		Species or species habitat may occur within area
Manta birostris		
Giant Manta Ray, Chevron Manta Ray, Pacific Manta Ray, Pelagic Manta Ray, Oceanic Manta Ray [84995]		Species or species habitat may occur within area
Natator depressus		
Flatback Turtle [59257]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Sousa chinensis		
Indo-Pacific Humpback Dolphin [50]		Species or species habitat likely to occur within area
Migratory Terrestrial Species		
Cuculus optatus		
Oriental Cuckoo, Horsfield's Cuckoo [86651]		Species or species habitat may occur within area
Hirundapus caudacutus		
White-throated Needletail [682]		Species or species habitat known to occur within area
Monarcha melanopsis		
Black-faced Monarch [609]		Species or species habitat known to occur within area
Monarcha trivirgatus		
Spectacled Monarch [610]		Species or species habitat known to occur

Name	Threatened	Type of Presence within area
[Motacilla flava](#) Yellow Wagtail [644]		Species or species habitat likely to occur within area
[Myiagra cyanoleuca](#) Satin Flycatcher [612]		Species or species habitat known to occur within area
[Rhipidura rufifrons](#) Rufous Fantail [592]		Species or species habitat known to occur within area
Migratory Wetlands Species		
[Actitis hypoleucos](#) Common Sandpiper [59309]		Species or species habitat known to occur within area
[Calidris acuminata](#) Sharp-tailed Sandpiper [874]		Species or species habitat known to occur within area
[Calidris canutus](#) Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area
[Calidris ferruginea](#) Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
[Calidris melanotos](#) Pectoral Sandpiper [858]		Species or species habitat likely to occur within area
[Gallinago hardwickii](#) Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
[Limosa lapponica](#) Bar-tailed Godwit [844]		Species or species habitat known to occur within area
[Numenius madagascariensis](#) Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area
[Pandion haliaetus](#) Osprey [952]		Breeding known to occur within area
[Pluvialis fulva](#) Pacific Golden Plover [25545]		Species or species habitat likely to occur within area
[Tringa nebularia](#) Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area

Other Matters Protected by the EPBC Act

Commonwealth Land [Resource Information]

The Commonwealth area listed below may indicate the presence of Commonwealth land in this vicinity. Due to the unreliability of the data source, all proposals should be checked as to whether it impacts on a Commonwealth area, before making a definitive decision. Contact the State or Territory government land department for further information.

Name
Commonwealth Land - Australian Postal Commission
Commonwealth Land - Australian Telecommunications Commission

Listed Marine Species [Resource Information]

* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.

Name	Threatened	Type of Presence
Birds		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area
Anous stolidus Common Noddy [825]		Species or species habitat may occur within area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea alba Great Egret, White Egret [59541]		Breeding known to occur within area
Ardea ibis Cattle Egret [59542]		Species or species habitat may occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat known to occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat likely to occur within area
Calonectris leucomelas Streaked Shearwater [1077]		Species or species habitat known to occur within area
Diomedea antipodensis Antipodean Albatross [64458]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea gibsoni Gibson's Albatross [64466]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area

Name	Threatened	Type of Presence
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Fregata ariel Lesser Frigatebird, Least Frigatebird [1012]		Species or species habitat likely to occur within area
Fregata minor Great Frigatebird, Greater Frigatebird [1013]		Species or species habitat likely to occur within area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat may occur within area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area
Hirundapus caudacutus White-throated Needletail [682]		Species or species habitat known to occur within area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat known to occur within area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area
Monarcha trivirgatus Spectacled Monarch [610]		Species or species habitat known to occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat likely to occur within area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area
Pachyptila turtur Fairy Prion [1066]		Species or species habitat known to occur within area
Pandion haliaetus Osprey [952]		Breeding known to occur within area
Pluvialis fulva Pacific Golden Plover [25545]		Species or species

Name	Threatened	Type of Presence
		habitat likely to occur within area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area
Rostratula benghalensis (sensu lato) Painted Snipe [889]	Endangered*	Species or species habitat likely to occur within area
Thalassarche bulleri Buller's Albatross, Pacific Albatross [64460]	Vulnerable	Species or species habitat may occur within area
Thalassarche cauta Tasmanian Shy Albatross [89224]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Thalassarche eremita Chatham Albatross [64457]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche sp. nov. Pacific Albatross [66511]	Vulnerable*	Species or species habitat may occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable*	Foraging, feeding or related behaviour likely to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area
Mammals		
Dugong dugon Dugong [28]		Species or species habitat may occur within area
Reptiles		
Caretta caretta Loggerhead Turtle [1763]	Endangered	Foraging, feeding or related behaviour known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Natator depressus Flatback Turtle [59257]	Vulnerable	Foraging, feeding or related behaviour known to occur within area

Whales and other Cetaceans		[Resource Information]
Name	Status	Type of Presence
Mammals		
Sousa chinensis Indo-Pacific Humpback Dolphin [50]		Species or species habitat likely to occur within area

Extra Information

State and Territory Reserves	[Resource Information]
Name	State
Forestry Management Areas in Morisset	NSW
Jilliby	NSW
LNE Special Management Zone No1	NSW
Lake Macquarie	NSW
Sugarloaf	NSW
The Hunter Lakes	NSW
Watagans	NSW

Regional Forest Agreements	[Resource Information]

Note that all areas with completed RFAs have been included.

Name	State
North East NSW RFA	New South Wales

Invasive Species	[Resource Information]

Weeds reported here are the 20 species of national significance (WoNS), along with other introduced plants that are considered by the States and Territories to pose a particularly significant threat to biodiversity. The following feral animals are reported: Goat, Red Fox, Cat, Rabbit, Pig, Water Buffalo and Cane Toad. Maps from Landscape Health Project, National Land and Water Resouces Audit, 2001.

Name	Status	Type of Presence
Birds		
Acridotheres tristis Common Myna, Indian Myna [387]		Species or species habitat likely to occur within area
Alauda arvensis Skylark [656]		Species or species habitat likely to occur within area
Anas platyrhynchos Mallard [974]		Species or species habitat likely to occur within area
Carduelis carduelis European Goldfinch [403]		Species or species habitat likely to occur within area
Columba livia Rock Pigeon, Rock Dove, Domestic Pigeon [803]		Species or species habitat likely to occur within area
Lonchura punctulata Nutmeg Mannikin [399]		Species or species habitat likely to occur within area
Passer domesticus House Sparrow [405]		Species or species habitat likely to occur within area

Name	Status	Type of Presence
Passer montanus Eurasian Tree Sparrow [406]		Species or species habitat likely to occur within area
Pycnonotus jocosus Red-whiskered Bulbul [631]		Species or species habitat likely to occur within area
Streptopelia chinensis Spotted Turtle-Dove [780]		Species or species habitat likely to occur within area
Sturnus vulgaris Common Starling [389]		Species or species habitat likely to occur within area
Turdus merula Common Blackbird, Eurasian Blackbird [596]		Species or species habitat likely to occur within area
Frogs		
Rhinella marina Cane Toad [83218]		Species or species habitat known to occur within area
Mammals		
Bos taurus Domestic Cattle [16]		Species or species habitat likely to occur within area
Canis lupus familiaris Domestic Dog [82654]		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Feral deer Feral deer species in Australia [85733]		Species or species habitat likely to occur within area
Lepus capensis Brown Hare [127]		Species or species habitat likely to occur within area
Mus musculus House Mouse [120]		Species or species habitat likely to occur within area
Oryctolagus cuniculus Rabbit, European Rabbit [128]		Species or species habitat likely to occur within area
Rattus norvegicus Brown Rat, Norway Rat [83]		Species or species habitat likely to occur within area
Rattus rattus Black Rat, Ship Rat [84]		Species or species habitat likely to occur within area
Sus scrofa Pig [6]		Species or species habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants		
Alternanthera philoxeroides Alligator Weed [11620]		Species or species

Name	Status	Type of Presence
		habitat likely to occur within area
Anredera cordifolia Madeira Vine, Jalap, Lamb's-tail, Mignonette Vine, Anredera, Gulf Madeiravine, Heartleaf Madeiravine, Potato Vine [2643]		Species or species habitat likely to occur within area
Asparagus aethiopicus Asparagus Fern, Ground Asparagus, Basket Fern, Sprengi's Fern, Bushy Asparagus, Emerald Asparagus [62425]		Species or species habitat likely to occur within area
Asparagus asparagoides Bridal Creeper, Bridal Veil Creeper, Smilax, Florist's Smilax, Smilax Asparagus [22473]		Species or species habitat likely to occur within area
Asparagus plumosus Climbing Asparagus-fern [48993]		Species or species habitat likely to occur within area
Asparagus scandens Asparagus Fern, Climbing Asparagus Fern [23255]		Species or species habitat likely to occur within area
Cabomba caroliniana Cabomba, Fanwort, Carolina Watershield, Fish Grass, Washington Grass, Watershield, Carolina Fanwort, Common Cabomba [5171]		Species or species habitat likely to occur within area
Chrysanthemoides monilifera Bitou Bush, Boneseed [18983]		Species or species habitat may occur within area
Chrysanthemoides monilifera subsp. monilifera Boneseed [16905]		Species or species habitat likely to occur within area
Chrysanthemoides monilifera subsp. rotundata Bitou Bush [16332]		Species or species habitat likely to occur within area
Cytisus scoparius Broom, English Broom, Scotch Broom, Common Broom, Scottish Broom, Spanish Broom [5934]		Species or species habitat likely to occur within area
Eichhornia crassipes Water Hyacinth, Water Orchid, Nile Lily [13466]		Species or species habitat likely to occur within area
Genista monspessulana Montpellier Broom, Cape Broom, Canary Broom, Common Broom, French Broom, Soft Broom [20126]		Species or species habitat likely to occur within area
Genista sp. X Genista monspessulana Broom [67538]		Species or species habitat may occur within area
Lantana camara Lantana, Common Lantana, Kamara Lantana, Large-leaf Lantana, Pink Flowered Lantana, Red Flowered Lantana, Red-Flowered Sage, White Sage, Wild Sage [10892]		Species or species habitat likely to occur within area
Lycium ferocissimum African Boxthorn, Boxthorn [19235]		Species or species habitat likely to occur within area
Nassella neesiana Chilean Needle grass [67699]		Species or species habitat likely to occur within area
Opuntia spp. Prickly Pears [82753]		Species or species habitat likely to occur within area
Pinus radiata Radiata Pine Monterey Pine, Insignis Pine, Wilding		Species or species

Name	Status	Type of Presence
Pine [20780]		habitat may occur within area
Rubus fruticosus aggregate Blackberry, European Blackberry [68406]		Species or species habitat likely to occur within area
Sagittaria platyphylla Delta Arrowhead, Arrowhead, Slender Arrowhead [68483]		Species or species habitat likely to occur within area
Salix spp. except S.babylonica, S.x calodendron & S.x reichardtii Willows except Weeping Willow, Pussy Willow and Sterile Pussy Willow [68497]		Species or species habitat likely to occur within area
Salvinia molesta Salvinia, Giant Salvinia, Aquarium Watermoss, Kariba Weed [13665]		Species or species habitat likely to occur within area
Senecio madagascariensis Fireweed, Madagascar Ragwort, Madagascar Groundsel [2624]		Species or species habitat likely to occur within area
Ulex europaeus Gorse, Furze [7693]		Species or species habitat likely to occur within area

Caveat

The information presented in this report has been provided by a range of data sources as acknowledged at the end of the report.

This report is designed to assist in identifying the locations of places which may be relevant in determining obligations under the Environment Protection and Biodiversity Conservation Act 1999. It holds mapped locations of World and National Heritage properties, Wetlands of International and National Importance, Commonwealth and State/Territory reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete at this stage. Maps have been collated from a range of sources at various resolutions.

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other information sources.

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species distributions have been derived through a variety of methods. Where distributions are well known and if time permits, maps are derived using either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc) together with point locations and described habitat; or environmental modelling (MAXENT or BIOCLIM habitat modelling) using point locations and environmental data layers.

Where very little information is available for species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc). In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More reliable distribution mapping methods are used to update these distributions as time permits.

Only selected species covered by the following provisions of the EPBC Act have been mapped:

- migratory and
- marine

The following species and ecological communities have not been mapped and do not appear in reports produced from this database:

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers

The following groups have been mapped, but may not cover the complete distribution of the species:

- non-threatened seabirds which have only been mapped for recorded breeding sites
- seals which have only been mapped for breeding sites near the Australian continent

Such breeding sites may be important for the protection of the Commonwealth Marine environment.

Coordinates

-33.07732 151.47563

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact Us page.

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APPENDIX C HABITAT ASSESSMENT TABLE

Presence of habitat and likelihood of occurrence criteria

Presence of habitat	Criteria
Present	Potential or known foraging, roosting, nesting, refuge, movement corridor (including movement of genetic material) or other habitat is present within the study area
Marginal	Some suitable habitat is present within the study area
Absent	No potential foraging, roosting, nesting or other habitat is present within the study area.
Likelihood of Occurrence	**Criteria**
Recorded	The species was observed in the study area during the current survey
High	It is highly likely that a species inhabits the study area and is dependent on identified suitable habitat (i.e. for breeding or important life cycle periods such as winter flowering resources), has been recorded recently in the locality (10 kilometres) and is known or likely to maintain resident populations in the study area. Also includes species known or likely to visit the study area during regular seasonal movements or migration.
Moderate	Potential habitat is present in the study area. Species unlikely to maintain sedentary populations, however may seasonally use resources within the study area opportunistically or during migration. The species is unlikely to be dependent (i.e. for breeding or important life cycle periods such as winter flowering resources) on habitat within the study area, or habitat is in a modified or degraded state. Includes cryptic flowering flora species that were not seasonally targeted by surveys and that have not been recorded.
Low	It is unlikely that the species inhabits the study area and has not been recorded recently in the locality (10 kilometres). It may be an occasional visitor, but habitat similar to the study area is widely distributed in the local area, meaning that the species is not dependent (i.e. for breeding or important life cycle periods such as winter flowering resources) on available habitat. Specific habitat is not present in the study area or the species are a non-cryptic perennial flora species that were specifically targeted by surveys and not recorded.
None	Suitable habitat is absent from the study area.

Habitat assessment table

Species	BC Act/ FM Act	EPBC Act	Description of habitat[1]	Number of records (Bionet)	Presence of habitat	Likelihood of occurrence
Threatened Ecological Communities						
Coastal Saltmarsh in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	E	V	Coastal Saltmarsh occurs in the intertidal zone on the shores of estuaries and lagoons that are permanently or intermittently open to the sea. It is frequently found as a zone on the landward side of mangrove stands. Characteristic plants include *Baumea juncea*, Sea Rush (*Juncus krausii* subsp. *australiensis*), Samphire (*Sarcocornia quinqueflora* subsp. *quinqueflora*), Marine Couch (*Sporobolus virginicus*), Streaked Arrowgrass (*Triglochin striata*), Knobby Club-rush (*Ficinia nodosa*), Creeping Brookweed (*Samolus repens*), Swamp Weed (*Selliera radicans*), Seablite (*Suaeda australis*) and Prickly Couch (*Zoysia macrantha*). Occasionally mangroves are scattered through the saltmarsh. Tall reeds may also occur, as well as salt pans. This community occurs in the intertidal zone along the NSW coast.	K	Absent	None
Central Hunter Valley eucalypt forest and woodland		CE	The ecological community occurs in the Hunter Valley region (primarily in the Central Hunter). The Hunter Valley region is mostly in the north east of the Sydney Basin IBRA1Bioregion (SYB). The Hunter Valley region and the ecological community both continue tothe north east into the NSW North Coast IBRA Bioregion (NNC). generally occurs on soils derived from the Permian sedimentary bedrock found on the valley floors and on lower hillslopes and low ridges. The Permian derived soils are dominated by soloths, solodics, yellow podzolics, with limited areas of brown clays and red	K	Absent	None

[1] Information sourced from species profiles on NSW OEH's threatened species database or the Australian Government's Species Profiles and Threats database (SPRAT) unless otherwise stated.

OEH threatened species database: http://www.threatenedspecies.environment.nsw.gov.au/index.aspx
SPRAT: http://www.environment.gov.au/cgi-bin/sprat/public/sprat.pl

Species	BC Act/ FM Act	EPBC Act	Description of habitat[1]	Number of records (Bionet)	Presence of habitat	Likelihood of occurrence
			clays. These soils are typically medium in fertility, relative to nearby Quaternary deep alluvial soils (richer in fertility) and the skeletal soils of the bordering Triassic landscape (poorer in fertility). The Permian sediments are much older than the Triassic sediments; they are finer grained, typically supporting soils with a high clay content (argillaceous), as opposed to the more sandy soils associated with Triassic sediments(Peake, 2015). The ecological community is an open forest or woodland, typically dominated by eucalypt species; it has an open to sparse mid-layer of shrubs and aground layer of grasses, forbs and small shrubs. The composition of the ecological community at a particular site is influenced by the size of the site, recent rainfall, and drought conditions and by its disturbance history (including clearing, grazing and fire).			
Coastal Upland Swamp in the Sydney Basin Bioregion	E	E	The Coastal Upland Swamp in the Sydney Basin Bioregion includes open graminiod heath, sedgeland and tall scrub associated with periodically waterlogged soils on the Hawkesbury sandstone plateaux. The Coastal Upland Swamp is generally associated with soils that are acidic and vary from yellow or grey mineral sandy loams with a shallow organic horizon to highly organic spongy black peat soils with pallid subsoils. The vegetation of the Coastal Upland Swamp may include tall open scrubs, tall closed scrubs, closed heaths, open graminoid heaths, sedgelands and fernlands. Larger examples may include a complex of these structural forms. The flora comprising the upland swamp is diverse there are 73 plant species listed as characterising the ecological community. The total species list is much greater and is likely to exceed 200 species of vascular plants. The Coastal Upland Swamp is endemic to NSW and confined to the Sydney Basin Bioregion. It occurs in the eastern Sydney Basin from the Somersby district in the north to the Robertson district in the	K	Absent	None

Species	BC Act/ FM Act	EPBC Act	Description of habitat[1]	Number of records (Bionet)	Presence of habitat	Likelihood of occurrence
			south. In the north it occurs on the Somersby-Hornsby plateaux, in the the south it occurs on the Woronora plateau. It occurs in elevations from 20 metres to over 600 metres above sea level, with the majority of swamps occurring within 200 and 450 metres elevation.			
Freshwater Wetlands on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	E		Associated with coastal areas subject to periodic flooding and in which standing fresh water persists for at least part of the year in most years. Typically occurs on silts, muds or humic loams in low-lying parts of floodplains, alluvial flats, depressions, drainage lines, backswamps, lagoons and lakes but may also occur in backbarrier landforms where floodplains adjoin coastal sandplains.Generally occur below 20 m elevation on level areas. They are dominated by herbaceous plants and have very few woody species. The structure and composition of the community varies both spatially and temporally depending on the water regime: Those that lack standing water most of the time are usually dominated by dense grassland or sedgeland vegetation, often forming a turf less than 0.5 metre tall and dominated by amphibious plants including *Paspalum distichum* (water couch), *Leersia hexandra* (swamp rice-grass), *Pseudoraphis spinescens* (mud grass) and *Carex appressa* (tussock sedge). Where they are subject to regular inundation and drying the vegetation may include large emergent sedges over 1 metre tall, such as *Baumea articulata*, *Eleocharis equisetina* and *Lepironia articulata*, as well as emergent or floating herbs such as *Hydrocharis dubia* (frogbit), *Philydrum lanuginosum* (frogsmouth), *Ludwigia peploides* subsp. *montevidensis* (water primrose), *Marsilea mutica* (nardoo) and *Myriophyllum* spp. (milfoils). As standing water becomes deeper or more permanent, amphibious and emergent plants become less abundant, while floating and submerged aquatic herbs become more abundant. These latter species include	K	Absent	None

Species	BC Act/ FM Act	EPBC Act	Description of habitat[1]	Number of records (Bionet)	Presence of habitat	Likelihood of occurrence
			Azolla filiculoides var. *rubra*, *Ceratophyllum demersum* (hornwort), *Hydrilla verticillata* (water thyme), *Lemna* spp. (duckweeds), *Nymphaea gigantea* (giant waterlily), *Nymphoides indica* (water snowflake), *Ottelia ovalifolia* (swamp lily) and *Potamageton* spp. (pondweeds). The threatened aquatic plants, *Aldrovanda vesiculosa* and *Najas marina*, also occur within this community. For a comprehensive list of species that characterize the community open the Scientific Determination link in the top right box. Known from along the majority of the NSW coast. However, it is distinct from Sydney Freshwater Wetlands which are associated with sandplains in the Sydney Basin bioregion. Extensively cleared and modified. In the 1990s the extent remaining were: 3% in the NSW North Coast bioregion, 66% in the lower Hunter – Central coast region, 40% on the Cumberland Plain, 70% in the Sydney – South Coast region, and 30% in the Eden region. There is less than 150 ha remaining on the Tweed lowlands (estimate in 1985); about 10,600 ha on the lower Clarence floodplain (in 1982); about 11,200 ha on the lower Macleay floodplain (in 1983); about 3,500 ha in the lower Hunter – Central Hunter region (in 1990s); less than 2,700 ha on the NSW south coast from Sydney to Moruya (in the mid 1990s), including about 660 ha on the Cumberland Plain (in 1998) and about 100 ha on the Illawarra Plain (in 2001); and less than 1000 ha in the Eden region (in 1990).Poorly reserved, known to occur in Ukerebagh, Tuckean, Tabbimoble Swamp, Hexham Swamp, Pambalong and Pitt Town Nature Reserves and Bungawalbin, Scheyville and Seven Mile Beach National Parks.			
Hunter Lowland Redgum Forest in the Sydney Basin and New South Wales North	E		Hunter Lowland Redgum Forest is an open forest where the most common canopy tree species are *Eucalyptus tereticornis* (Forest Red Gum) and *E. punctata* (Grey Gum). Other frequently occurring canopy species are *Angophora*	K	Absent	None

Species	BC Act/ FM Act	EPBC Act	Description of habitat[1]	Number of records (Bionet)	Presence of habitat	Likelihood of occurrence
Coast Bioregions			*floribunda* (Rough-barked Apple), *E. crebra* (Narrow-leaved Ironbark), *E. moluccana* (Grey Box) and *Corymbia maculata* (Spotted Gum). The shrub layer is open and common shrub species include *Breynia oblongifolia* (Coffee Bush), *Leucopogon juniperinus* (Prickly Beard-heath), *Daviesia ulicifolia* (Gorse Bitter Pea) and *Jacksonia scoparia* (Dogwood). The ground cover typically comprises grasses and herbs with common species being *Microlaena stipoides* var. *stipoides* Forest Weeping Grass, *Pratia purpurascens* (Whiteroot), *Lomandra multiflora* (Many-flowered Mat-rush), *Cymbopogon refractus* (Barbed Wire Grass), *Cheilanthes sieberi* (Poison Rock Fern) and *Dichondra repens* (Kidney Weed). Occurs between Muswellbrook, Beresfield, Mulbring and Cessnock in the Lower Hunter in the Sydney Basin and North Coast bioregions. It has been recorded from the Maitland, Cessnock, Port Stephens, Muswellbrook and Singleton LGAs, but may occur elsewhere in these bioregions. Probably less than 500 hectares of this community remains.			
Kincumber Scribbly Gum Forest in the Sydney Basin Bioregion	CE		Kincumber Scribbly Gum Forest is an open forest with a tree canopy dominated by some combination of *Eucalyptus racemosa* (Scribbly Gum), *Angophora costata* (Smooth-barked Apple), *Corymbia gummifera* (Red Bloodwood), *Syncarpia glomulifera* (Turpentine) and *Eucalyptus piperita* (Sydney Peppermint). *Allocasuarina littoralis* (Black Sheoak) and *Glochidion ferdinandi* (Cheese Tree) may be present in the subcanopy. There is a prominent shrub layer which typically includes *Dodonaea triquetra* (Hopbush), *Platylobium formosum*, *Persoonia levis* (Broad-leaved Geebung), *Polyscias sambucifolia* (Elderberry Panax), *Breynia oblongifolia* (Coffee Bush), *Leptospermum polygalifolium* (Lemon-scented Tea-tree), *Banksia spinulosa* var. *collina* (Hill Banksia), *Epacris pulchella*, *Grevillea linearifolia* and *Lomatia silaifolia* (Crinkle Bush). The groundcover comprises herbs, scramblers,	K	Absent	None

Species	BC Act/ FM Act	EPBC Act	Description of habitat[1]	Number of records (Bionet)	Presence of habitat	Likelihood of occurrence
			grasses, sedges and ferns, including *Billardiera scandens* (Appleberry), *Cassytha glabella*, *Dianella caerulea* (Blue Flax Lily), *Entolasia stricta* (Wiry Panic), *Lepidosperma laterale*, *Pratia purpurascens* (Whiteroot), *Pteridium esculentum* (Bracken), *Smilax glyciphylla* (Sweet Sarsaparilla) and *Tetrarrhena juncea* (Wire Grass). Kincumber Scribbly Gum Forest is restricted to a small area on the Bouddi Peninsula on the NSW Central Coast south of Kincumber. It occurs in the Gosford LGA. The total remaining area of Kincumber Scribbly Gum Forest to thought to be less than 100 ha. within an area of about 4 km².			
Littoral Rainforest in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	E	CE	Littoral Rainforest is generally a closed forest, the structure and composition of which is strongly influenced by its proximity to the ocean. The plant species of this community are predominantly rainforest species. Several species have compound leaves, and vines may be a major component of the canopy. These features differentiate littoral rainforest from forest or scrub, but while the canopy is dominated by rainforest species, scattered emergent individuals of sclerophyll species, such as *Angophora costata*, *Banksia integrifolia*, *Eucalyptus botryoides* and *Eucalyptus tereticornis* occur in many stands. There is considerable floristic variation between stands and in particular areas, localised variants may be recognised. The Sutherland Shire Littoral Rainforest Endangered Ecological Community which was listed previously as an endangered ecological community is included within this community. Littoral Rainforest occurs only on the coast and is found at locations in the NSW North Coast Bioregion, Sydney Basin Bioregion and South East Corner Bioregion. Littoral Rainforest is very rare and occurs in many small stands. In total, it comprises less than one percent of the total area of rainforest in NSW. The largest known stand occurs in Iluka Nature Reserve, which is about	P	Absent	None

Species	BC Act/ FM Act	EPBC Act	Description of habitat[1]	Number of records (Bionet)	Presence of habitat	Likelihood of occurrence
			136 hectares in size. Not all stands of this community have been included in mapping for the Environmental Planning Policy 26, Littoral rainforest.			
Low woodland with heathland on indurated sand at Norah Head	E		Low woodland with heathland on indurated sand at Norah Head is a low woodland or heathland with a very open cover of trees up to 3 metres high. Small trees species present include *Melaleuca quinquenervia* (Broad-leaved Paperbark), *Melaleuca sieberi*, *Corymbia gummifera* (Red Bloodwood) and the Endangered *Eucalyptus camfieldii* (Camfield's Stringybark). The dense shrub layer includes *Banksia oblongifolia* (Fern-leaved Banksia), *Hakea dactyloides* (Finger Hakea), *Melaleuca nodosa* (Prickly-leaved Paperbark) and *Allocasuarina distyla*. Common species in the ground layer include *Themeda australis* (Kangaroo Grass), *Leptocarpus tenax*, *Gonocarpus teucrioides* (Raspwort), *Anisopogon avenaceus* (Oat Speargrass) and *Ptilothrix deusta*. Known to occur only near Norah Head, east of Wilfred Barrett Drive, within the Wyong Local Government Area, on the Central Coast of NSW. None of this community is represented within a conservation reserve.	K	Absent	None
Lower Hunter Spotted Gum Ironbark Forest in the Sydney Basin Bioregion	E		This community is dominated by Spotted Gum *Corymbia maculata* and Broad-leaved Ironbark *Eucalyptus fibrosa*, while Grey Gum *E. punctata* and Grey Ironbark *E. crebra* occur occasionally. A number of other eucalypt species occur at low frequency, but may be locally common in the community. One of these species, *E. canaliculata*, intergrades extensively in the area with *E. punctata*. The understorey is marked by the tall shrub, *Acacia parvipinnula*, and by the prickly shrubs, *Daviesia ulicifolia*, *Bursaria spinosa*, *Melaleuca nodosa* and *Lissanthe strigosa*. Other shrubs include *Persoonia linearis*, *Maytenus silvestris* and *Breynia oblongifolia*. The ground layer is diverse; frequent species include *Cheilanthes sieberi*, *Cymbopogon refractus*, *Dianella*	K	Absent	None

Species	BC Act/ FM Act	EPBC Act	Description of habitat[1]	Number of records (Bionet)	Presence of habitat	Likelihood of occurrence
			revoluta, *Entolasia stricta*, *Glycine clandestina*, *Lepidosperma laterale*, *Lomandra multiflora*, *Microlaena stipoides*, *Pomax umbellata*, *Pratia purpurascens*, *Themeda australis* and *Phyllanthus hirtellus*. In an undisturbed condition the structure of the community is typically open forest. If thinning has occurred, it may take the form of woodland or a dense thicket of saplings, depending on post-disturbance regeneration. Lower Hunter Spotted Gum-Ironbark Forest belongs to the Hunter - Macleay Dry Sclerophyll Forests vegetation class of Keith (2004). For a comprehensive list of species that characterise the community open the Scientific Determination link in the top right box. Restricted to a range of approximately 65 km by 35 km centred on the Cessnock - Beresfield area in the Central and Lower Hunter Valley. Within this range, the community was once widespread. A fragmented core of the community still occurs between Cessnock and Beresfield. Remnants occur within the Local Government Areas of Cessnock, Maitland, Singleton, Lake Macquarie, Newcastle and Port Stephens but may also occur elsewhere within the bioregion. Outliers are also present on the eastern escarpment of Pokolbin and Corrabare State Forests on Narrabeen Sandstone.			
Lowland Rainforest in the NSW North Coast and Sydney Basin Bioregions	E	CE	Lowland Rainforest in the NSW North Coast and Sydney Basin Bioregions is an ecological community of subtropical rainforest and some related, structurally complex forms of dry rainforest. Lowland Rainforest, in a relatively undisturbed state, has a closed canopy, characterised by a high diversity of trees whose leaves may be mesophyllous and encompass a wide variety of shapes and sizes. Typically, the trees form three major strata: emergents, canopy and sub-canopy which, combined with variations in crown shapes and sizes results in an irregular canopy appearance. The trees are taxonomically diverse at the genus and family levels, and	K	Absent	None

Species	BC Act/ FM Act	EPBC Act	Description of habitat[1]	Number of records (Bionet)	Presence of habitat	Likelihood of occurrence
			some may have buttressed roots. A range of plant growth forms are present in Lowland Rainforest, including palms, vines and vascular epiphytes. In disturbed stands of this community the canopy cover may be broken, or the canopy may be smothered by exotic vines. The Hawkesbury River notionally marks the southern limit of Lowland Rainforest in the NSW North Coast and Sydney Basin bioregions. South of the Sydney metropolitan area, Lowland Rainforest is replaced by Illawarra Subtropical Rainforest of the Sydney Basin Bioregion, which is listed as an endangered ecological community. Milton Ulladulla Subtropical Rainforest is also a related rainforest endangered ecological community that occurs still further south in the South East Corner Bioregion.			
Quorrobolong Scribbly Gum Woodland in the Sydney Basin Bioregion	E		Quorrobolong Scribbly Gum Woodland is a low shrubby woodland with the overstorey dominated by *Eucalyptus racemosa* (Scribbly Gum). Other tree species present include *E. piperita* (Sydney Peppermint), *E. resinifera* (Red Mahogany), *Angophora costata* (Smooth-barked Apple) and *E. punctata* (Grey Gum). There is usually a well developed shrub layer with common species being *Leptospermum trinervium* (Slender Tea-tree), *Acacia parvipinnula* (Silver-stemmed Wattle), *Persoonia linearis* (Narrow-leaved Geebung) and *Leptospermum polygalifolium* (Tantoon). The ground layer is often sparse and frequently occurring species are *Imperata cylindrica* var. *major* (Blady Grass), *Panicum simile* (Two-colour Panic), *Pratia purpuracens* (Whiteroot), *Lomandra cylindrica* (Needle Mat-rush) and *Dianella revoluta*. Currently known from only a small area between Quorrobolong and Mulbring in the Cessnock local government area, but may also occur elsewhere within the Hunter Valley. The current known extent is about 70 hectares; the pre-European extent is estimated to have been only 160 hectares, reflecting the limited area of the sand	K	Absent	None

Species	BC Act/ FM Act	EPBC Act	Description of habitat[1]	Number of records (Bionet)	Presence of habitat	Likelihood of occurrence
			deposit on which it occurs. Not known to occur within any conservation reserves.			
River-Flat Eucalypt Forest on Coastal Floodplains of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	E		As the name suggests, this EEC is found on the river flats of the coastal floodplains. It has a tall open tree layer of eucalypts, which may exceed 40 m in height, but can be considerably shorter in regrowth stands or under conditions of lower site quality. While the composition of the tree stratum varies considerably, the most widespread and abundant dominant trees include *Eucalyptus tereticornis* (forest red gum), *E. amplifolia* (cabbage gum), *Angophora floribunda* (rough-barked apple) and *A. subvelutina* (broad-leaved apple). *Eucalyptus baueriana* (blue box), *E. botryoides* (bangalay) and *E. elata* (river peppermint) may be common south from Sydney, *E. ovata* (swamp gum) occurs on the far south coast, *E. saligna* (Sydney blue gum) and *E. grandis* (flooded gum) may occur north of Sydney, while *E. benthamii* is restricted to the Hawkesbury floodplain. A layer of small trees may be present, including *Melaleuca decora*, *M. styphelioides* (prickly-leaved teatree), *Backhousia myrtifolia* (grey myrtle), *Melia azaderach* (white cedar), *Casuarina cunninghamiana* (river oak) and *C. glauca* (swamp oak). Scattered shrubs include *Bursaria spinosa*, *Solanum prinophyllum*, *Rubus parvifolius*, *Breynia oblongifolia*, *Ozothamnus diosmifolius, Hymenanthera dentata, Acacia floribunda* and *Phyllanthus gunnii*. The groundcover is composed of abundant forbs, scramblers and grasses including *Microlaena stipoides, Dichondra repens, Glycine clandestina, Oplismenus aemulus, Desmodium gunnii, Pratia purpurascens, Entolasia marginata, Oxalis perennans* and *Veronica plebeia*. The composition and structure of the understorey is influenced by grazing and fire history, changes to hydrology and soil salinity and other disturbance, and may have a substantial component of exotic shrubs, grasses, vines	K	Absent	None

Species	BC Act/ FM Act	EPBC Act	Description of habitat[1]	Number of records (Bionet)	Presence of habitat	Likelihood of occurrence
			and forbs. The combination of features that distinguish River-Flat Eucalypt Forest on Coastal Floodplains from other endangered communities on the coastal floodplains include: its dominance by either a mixed eucalypt canopy or by a single species of eucalypt belonging to either the genus *Angophora* or the sections *Exsertaria* or *Transversaria* of the genus *Eucalyptus*; the relatively low abundance or sub-dominance of *Casuarina* and *Melaleuca* species; the relatively low abundance of *Eucalyptus robusta*; and the prominent groundcover of soft-leaved forbs and grasses. River-Flat Eucalypt Forest on Coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner bioregions includes and replaces Sydney Coastal River-Flat Forest Endangered Ecological Community. Known from parts of the Local Government Areas of Port Stephens, Maitland, Singleton, Cessnock, Lake Macquarie, Wyong, Gosford, Hawkesbury, Baulkham Hills, Blacktown, Parramatta, Penrith, Blue Mountains, Fairfield, Holroyd, Liverpool, Bankstown, Wollondilly, Camden, Campbelltown, Sutherland, Wollongong, Shellharbour, Kiama, Shoalhaven, Palerang, Eurobodalla and Bega Valley but may occur elsewhere in these bioregions. Major examples once occurred on the floodplains of the Hunter, Hawkesbury, Moruya, Bega and Towamba Rivers, although many smaller floodplains and river flats also contain examples of the community. The remaining area is likely to represent much less than 30% of its original range. Recently recorded, major occurrences include: about 2,000 ha in the lower Hunter region; less than 10,000 ha on the NSW south coast from Sydney to Moruya, of which up to about three-quarters occurred on the Cumberland Plain in 1998; and less than 1,000 ha in the Eden region. Small areas of the community are contained within existing conservation reserves, including Blue Mountains, Cattai, Dharug, Georges River, Marramarra, Morton, Deua and Wadbilliga National			

Species	BC Act/ FM Act	EPBC Act	Description of habitat[1]	Number of records (Bionet)	Presence of habitat	Likelihood of occurrence
			Parks, and Gulguer and Mulgoa Nature Reserves, but these are unevenly distributed throughout the range and unlikely to represent the full diversity of the community. The reserved examples are on localised, sheltered river flats between hills, rather than the large open floodplains that comprised the majority of the original habitat.			
Swamp Oak Floodplain Forest of the New South Wales North Coast, Sydney Basin and South East Corner Bioregions	E	E	This community is found on the coastal floodplains of NSW. It has a dense to sparse tree layer in which *Casuarina glauca* (swamp oak) is the dominant species northwards from Bermagui. Other trees including *Acmena smithii* (lilly pilly), *Glochidion* spp. (cheese trees) and *Melaleuca* spp. (paperbarks) may be present as subordinate species, and are found most frequently in stands of the community northwards from Gosford. Tree diversity decreases with latitude, and *Melaleuca ericifolia* is the only abundant tree in this community south of Bermagui. The understorey is characterised by frequent occurrences of vines, *Parsonsia straminea*, *Geitonoplesium cymosum* and *Stephania japonica* var. *discolor*, a sparse cover of shrubs, and a continuous groundcover of forbs, sedges, grasses and leaf litter. The composition of the ground stratum varies depending on levels of salinity in the groundwater. Under less saline conditions prominent ground layer plants include forbs such *Centella asiatica*, *Commelina cyanea*, *Persicaria decipiens* and *Viola banksii*; graminoids such as *Carex appressa*, *Gahnia clarkei*, *Lomandra longifolia*, *Oplismenus imbecillis*; and the fern *Hypolepis muelleri*. On the fringes of coastal estuaries, where soils are more saline, the ground layer may include the threatened grass species, *Alexfloydia repens*, as well as *Baumea juncea*, *Juncus kraussii*, *Phragmites australis*, *Selliera radicans* and other saltmarsh species. Known from parts of the Local Government Areas of Tweed, Byron, Lismore, Ballina, Richmond Valley, Clarence Valley, Coffs Harbour,	K	Absent	None

Species	BC Act/ FM Act	EPBC Act	Description of habitat[1]	Number of records (Bionet)	Presence of habitat	Likelihood of occurrence
			Bellingen, Nambucca, Kempsey, Hastings, Greater Taree, Great Lakes, Port Stephens, Maitland, Newcastle, Cessnock, Lake Macquarie, Wyong, Gosford, Pittwater, Warringah, Hawkesbury, Baulkham Hills, Hornsby, Lane Cove, Blacktown, Auburn, Parramatta, Canada Bay, Rockdale, Kogarah, Sutherland, Penrith, Fairfield, Liverpool, Bankstown, Wollondilly, Camden, Campbelltown, Wollongong, Shellharbour, Kiama, Shoalhaven, Eurobodalla and Bega Valley but may occur elsewhere in these bioregions. Major examples once occurred on the floodplains of the Clarence, Macleay, Hastings, Manning, Hunter, Hawkesbury, Shoalhaven and Moruya Rivers. The extent of the Swamp Oak Floodplain Forest prior to European settlement has not been mapped across its entire range. However, the remaining area of Swamp Oak Floodplain Forest is likely to represent much less than 30% of its original range. Major occurrences include: less than 350 ha on the Tweed lowlands; less than 650 ha on the lower Clarence floodplain; less than 400 ha on the lower Macleay floodplain; less than 3,200 ha in the lower Hunter - central Hunter region; less than 5,200 ha in the Sydney - South Coast region; and less than 1,000 ha in the Eden region. Small areas of Swamp Oak Floodplain Forest are contained within existing conservation reserves, including Stotts Island, Ukerebagh, Tuckean, Pambalong, Wamberal, Towra Point and Cullendulla Creek Nature Reserves and Bongil Bongil, Myall Lakes and Conjola National Parks. These occurrences are unevenly distributed throughout the range and unlikely to represent the full diversity of the community.			
Swamp Sclerophyll Forest on Coastal Floodplains of the New South Wales North Coast, Sydney	E		This swamp community has an open to dense tree layer of eucalypts and paperbarks although some remnants now only have scattered trees as a result of partial clearing. The trees may exceed 25 m in height, but can be considerably shorter in regrowth stands or under conditions of lower site quality	K	Absent	None

Species	BC Act/ FM Act	EPBC Act	Description of habitat[1]	Number of records (Bionet)	Presence of habitat	Likelihood of occurrence
Basin and South East Corner Bioregions			where the tree stratum is low and dense. For example, stands dominated by *Melaleuca ericifolia* typically do not exceed 8 m in height. The community also includes some areas of fernland and tall reedland or sedgeland, where trees are very sparse or absent. The most widespread and abundant dominant trees include *Eucalyptus robusta* (swamp mahogany), *Melaleuca quinquenervia* (paperbark) and, south from Sydney, *Eucalyptus botryoides* (bangalay) and *Eucalyptus longifolia* (woollybutt). Other trees may be scattered throughout at low abundance or may be locally common at few sites, including *Callistemon salignus* (sweet willow bottlebrush), *Casuarina glauca* (swamp oak) and *Eucalyptus resinifera subsp. hemilampra* (red mahogany), *Livistona australis* (cabbage palm) and *Lophostemon suaveolens* (swamp turpentine). A layer of small trees may be present, including *Acacia irrorata* (green wattle), *Acmena smithii* (lilly pilly), *Elaeocarpus reticulatus* (blueberry ash), *Glochidion ferdinandi* (cheese tree), *Melaleuca linariifolia* and *M. styphelioides* (paperbarks). Shrubs include *Acacia longifolia*, *Dodonaea triquetra*, *Ficus coronata*, *Leptospermum polygalifolium subsp. polygalifolium* and *Melaleuca spp.* Occasional vines include *Parsonsia straminea*, *Morinda jasminoides* and *Stephania japonica var. discolor*. The groundcover is composed of abundant sedges, ferns, forbs, and grasses including *Gahnia clarkei*, *Pteridium esculentum*, *Hypolepis muelleri*, *Calochlaena dubia*, *Dianella caerulea*, *Viola hederacea*, *Lomandra longifolia*, *Entolasia marginata* and *Imperata cylindrica*. On sites downslope of lithic substrates or with soils of clay-loam texture, species such as *Allocasuarina littoralis*, *Banksia oblongifolia*, *B. spinulosa*, *Ptilothrix deusta* and *Themeda australis*, may also be present in the understorey. This community is known from parts of the Local Government Areas of Tweed, Byron, Lismore, Ballina, Richmond Valley, Clarence Valley, Coffs			

Species	BC Act/ FM Act	EPBC Act	Description of habitat[1]	Number of records (Bionet)	Presence of habitat	Likelihood of occurrence
			Harbour, Bellingen, Nambucca, Kempsey, Hastings, Greater Taree, Great Lakes and Port Stephens, Lake Macquarie, Wyong, Gosford, Hornsby, Pittwater, Warringah, Manly, Liverpool, Rockdale, Botany Bay, Randwick, Sutherland, Wollongong, Shellharbour, Kiama and Shoalhaven but may occur elsewhere in these bioregions. Major examples once occurred on the floodplains of the Tweed, Richmond, Clarence, Macleay, Hastings and Manning Rivers, although smaller floodplains would have also supported considerable areas of this community. The exact amount of its original extent is unknown but it is much less than 30%. There are less than 350 ha of native vegetation attributable to this community on the Tweed lowlands, less than 2,500 ha on the Clarence floodplain, less than 700 ha on the Macleay floodplain, up to 7,000 ha in the lower Hunter – central coast district, and less than 1,000 ha in the Sydney – South Coast region. Small areas of Swamp Sclerophyll Forest on Coastal Floodplains are contained within existing conservation reserves, including Bungawalbin, Tuckean and Moonee Beach Nature Reserves, and Hat Head, Crowdy Bay, Wallingat, Myall Lakes and Garigal National Parks. These occurrences are unevenly distributed throughout the range and unlikely to represent the full diversity of the community. In addition, wetlands within protected areas are exposed to hydrological changes that were, and continue to be initiated outside their boundaries. Some areas of Swamp Oak Floodplain Forest are protected by State Environmental Planning Policy 14, although this has not always precluded impacts on wetlands from the development of major infrastructure.			
Sydney Freshwater Wetlands in the Sydney Basin Bioregion	E		A complex of vegetation types largely restricted to freshwater swamps in coastal areas. These also vary considerably due to fluctuating water levels and seasonal conditions. Characteristic species include sedges and aquatic	K	Absent	None

Species	BC Act/ FM Act	EPBC Act	Description of habitat[1]	Number of records (Bionet)	Presence of habitat	Likelihood of occurrence
			plants such as Baumea species, Eleocharis sphacelata, Gahnia species, Ludwigia peploides subsp. montevidensis and Persicaria species. Areas of open water may occur where drainage conditions have been altered and there may also be patches of emergent trees and shrubs. Occurs on sand dunes and low-nutrient sandplains along coastal areas in the Sydney Basin bioregion. It is known from the Lake Macquarie, Wyong, Gosford, Pittwater, Warringah, Woollahra, Waverley, Botany, Rockdale, Randwick, Sutherland and Wollongong local government areas, but is likely to occur elsewhere within the bioregion. Has been extensively cleared and filled and remnants are often small and disturbed.			
Themeda grassland on seacliffs and coastal headlands in the NSW North Coast, Sydney Basin and South East Corner Bioregions	E		*Themeda australis* is the dominant species in the *Themeda* Grassland on seacliffs and coastal headlands in the NSW North Coast, Sydney Basin and South East Corner bioregion ecological community. *Themeda australis* is an extremely widespread species, but in this community it may have a distinctive appearance, being prostrate and having glaucous leaves. These features are retained in cultivation and the form is believed to be genetically distinct. *Banksia integrifolia* subsp*. integrifolia*, *Westringia fruticosa* and *Acacia sophorae* occurs as an emergent shrub or as a dense cover where they have recruited over grasslands. Smaller shrubs occur often as prostrate to dwarf forms, most frequently *Pimelea linifolia*, *Hibbertia vestita*, *Pultenaea maritima* and *Westringia fruticosa*. Although a number of woody species are listed as part of the community, these are usually sparsely distributed and may be absent from some stands. In central and south coastal stands tussocks of *Poa poiformis* may be found in some stands of the community, but *Poa poiformis*-dominated tussock grassland is generally found lower on cliffs (closer to the sea and more exposed to spray) and on steeper slopes. Other grasses that occur in the community include *Zoysia*	K	Absent	None

Species	BC Act/ FM Act	EPBC Act	Description of habitat[1]	Number of records (Bionet)	Presence of habitat	Likelihood of occurrence
			macarantha and *Cynodon dactylon*. A number of threatened species occur in some stands of the community, including *Diuris* sp. aff. *chrysantha*, *Pultenaea maritima*, *Rutidosus heterogama*, *Thesium australe* and *Zieria prostrata*. The endangered population of the low growing form of *Zieria smithii* at Diggers Head is found in this community. Herbs in the ground layer include the twining *Polymeria calycina*, succulent *Apium prostratum*, *Senecio pinnatifolius subsp. pinnatifolius* and *Xerochrysum bracteatum*. The community is the major habitat for a number of other species, including *Chamaecrista maritima*, *Plectranthus cremnus* and *Stackhousia spathulata*. *Themeda* Grassland on seacliffs and coastal headlands is found on a range of substrates in the NSW North Coast, Sydney Basin and South East Corner bioregions. Stands on sandstone are infrequent and small. Larger stands are found on old sand dunes above cliffs, as for example at Cape Banks and Henry Head in Botany Bay National Park, and on metasedimentary headlands, as for example at McCauleys Headland in Coffs Coast Regional Park, Look-at-me-now Headland, Dammerels Head and Bare Bluff in Moonee Beach Nature Reserve and Wilson's Headland in Yuraygir National Park. Individual stands of the community are often very small, a few square metres, but at some sites larger stands of up to several hectares or tens of hectares occur. Overall, the community has a highly restricted geographic distribution comprising small, but widely scattered patches.			
Umina Coastal Sandplain Woodland in the Sydney Basin Bioregion	E		A low woodland dominated by trees of Eucalyptus botryoides and Angophora floribunda with a diverse understorey of sclerophyllous shrubs species including *Banksia integrifolia*, *Banksia serrata*, *Monotoca elliptica*, *Macrozamia communis*, *Acacia ulicifolia*, *Platysace lanceolata*, *Acacia suaveolens* and *Allocasuarina littoralis*. *Eucalyptus botryoides* is the dominant	K	Absent	None

Species	BC Act/ FM Act	EPBC Act	Description of habitat[1]	Number of records (Bionet)	Presence of habitat	Likelihood of occurrence
			tree in the zone immediately behind the beach, while *Angophora floribunda* is dominant in the zone beyond up to 2 km from the beach. The community contains many more species and other references should be consulted to identify these. Largely restricted to coastal sands on the Umina, Woy Woy and Ettalong Sandplain, a beach ridge system within the Gosford local government area. Including ecotonal areas, less than 10% (being less than 10 hectares) of the community's estimated original cover of about 80 hectares remains. This comprises four main remnants at Umina, while a few smaller remnant patches and scattered trees around Pearl Beach and Patonga and elsewhere on the 'Peninsula' indicate its former distribution.			
Flora						
Acacia bynoeana Bynoe's Wattle	E1	V	Bynoe's Wattle is a semi-prostrate shrub to a metre high. The phyllodes ('leaves') are shiny, stiff and narrow, 1.5 - 5 cm long and 1 - 3 mm wide. Its seedpods are mature from September to January. The hairy branchlets distinguish the species from the similar and more common Three-veined Wattle (*Acacia trinervata*). Bynoe's wattle is found in central eastern NSW, from the Hunter District (Morisset) south to the Southern Highlands and west to the Blue Mountains. Associated overstorey species include Red Bloodwood, Scribbly Gum, Parramatta Red Gum, Saw Banksia and Narrow-leaved Apple. The species is currently known from about 30 locations, with the size of the populations at most locations being very small (1-5 plants). It has recently been found in the Colymea and Parma Creek areas west of Nowra. The single flower heads, on short hairy stems, appear anytime from September to March.	72	Marginal	Low
Angophora inopina Charmhaven Apple	V	V	The Charmhaven Apple is a small tree that can grow to 8 m in height, and is often multi-stemmed. The bark is grey to grey-	540	Present	Low

Species	BC Act/ FM Act	EPBC Act	Description of habitat[1]	Number of records (Bionet)	Presence of habitat	Likelihood of occurrence
			brown, persistent throughout and consists of short fibres (Hill 1997a). The flowers are creamy white (Benson & McDougall 1998). This species is endemic to the Central Coast region of New South Wales. The known northern limit is near Karuah where a disjunct population occurs; to the south populations extend from Toronto to Charmhaven with the main populations occurring between Morisset and Charmhaven (NSW OEH 2013k). It has also been recorded near Bulahdelah (Winning pers. obs. in HWR Ecological 2002) and at Gwandalan (EPBC 2008/4419). Populations are known at Charmhaven, Vales Point and Doyalson (Benson & McDougall 1998).The largest and most intact stands occur in the Wyong and Lake Macquarie local government areas. Approximately 1250 ha of occupied habitat has been mapped in the Wyong-Southern Lake Macquarie area (NSW OEH 2013k). The known distribution of the species covers an area which is being rapidly developed through urbanisation (NSW Scientific Committee 1998a). This species occurs on deep, white, sandy loam to clay-loam soils on sandstone with some gravelly laterite. This type of substrate is low in nutrients and is periodically water-logged (Benson & McDougall 1998). This species is locally frequent in open, dry sclerophyll woodland of Scribbly Gum (*Eucalyptus haemastoma*) and Red Bloodwood (*Corymbia gummifera*) with some Brown Stringybark (*Eucalyptus capitellata*) and a dense, shrubby understorey (Hill 1997a), including Dwarf Banksia (*Banksia oblongifolia*), Mountain Devil (*Lambertia formosa*) and Finger Hakea (*Hakea dactyloides*) (Benson & McDougall 1998). Other associated trees are Smooth-barked Apple (*Angophora costata*) and Sydney Peppermint (*Eucalyptus piperita*) (Tierney 2004).			
Asterolasia elegans	E	E	A tall, thin shrub to 3 m high. Occurs north of Sydney, in the Baulkham Hills, Hawkesbury and Hornsby local government	0	Marginal	Low

Species	BC Act/ FM Act	EPBC Act	Description of habitat[1]	Number of records (Bionet)	Presence of habitat	Likelihood of occurrence
			areas. Also likely to occur in the western part of Gosford local government area. Known from only seven populations, only one of which is wholly within a conservation reserve. Occurs on Hawkesbury sandstone. Found in sheltered forests on mid- to lower slopes and valleys, e.g. in or adjacent to gullies which support sheltered forest. The canopy at known sites includes Turpentine (*Syncarpia glomulifera subsp. glomulifera),* Smooth-barked Apple *(Angophora costata),* Sydney Peppermint *(Eucalyptus piperita),* Forest Oak *(Allocasuarina torulosa)* and Christmas Bush *(Ceratopetalum gummiferum).* Ecological knowledge about this species is very limited. The species is considered to be fire sensitive and reliant on seed germination after disturbance to maintain populations. A soil seedbank appears to be established by this species, so for a number of years following fire or other disturbance the species may not be apparent, but be present only as seed in the soil. The size of the seedbank depends not only on the amount of seed contributed by mature plants each season, but on the level of dormancy of the seed which can vary from year to year. The longevity of each crop of seed in the soil is probably relatively short (perhaps 5 - 10 years).			
Caladenia tessellata Thick-lipped Spider Orchid	E	V	The Thick Lip Spider Orchid is from a group of orchids characterised by five long spreading petals and sepals around a broad down-curled labellum ('lip'). It has cream-coloured petals with reddish stripes, and the yellowish labellum is broad with a few darker stripes. The long, sparsely-hairy, narrow leaf is about 6 cm long and 5 mm wide. Column base with two prominent yellow glands. The Thick Lip Spider Orchid is known from the Sydney area (old records), Wyong, Ulladulla and Braidwood in NSW Flowers appear between September and November (but apparently generally late September or early October in extant southern populations).	0	Marginal	Low

Species	BC Act/ FM Act	EPBC Act	Description of habitat[1]	Number of records (Bionet)	Presence of habitat	Likelihood of occurrence
			Generally found in grassy sclerophyll woodland on clay loam or sandy soils.			
Callistemon linearifolius Netted Bottle Brush	V,3		This shrub is up to 3-4 m tall, with linear (long and narrow) to linear-lanceolate (lance shaped) leaves 8-10 cm long, and 5-7 mm wide with an sharp tip, thickened margins, and distinct lateral veins. Flowers are clustered into the typical "bottlebrushes" of *Callistemon* species. The brushes are red and usually 9-10 cm long and approximately 50 mm in diameter. The stem upon which the filaments occur are covered in a soft downy hair at flowering. The seed capsules are approximately 7 mm in diameter. Recorded from the Georges River to Hawkesbury River in the Sydney area, and north to the Nelson Bay area of NSW. Recorded in 2000 at Coalcliff in the northern Illawarra. For the Sydney area, recent records are limited to the Hornsby Plateau area near the Hawkesbury River. The species was more widespread in the past, and there are currently only 5-6 populations remaining from the 22 populations historically recorded in the Sydney area. Three of the remaining populations are reserved in Ku-ring-gai Chase National Park, Lion Island Nature Reserve and Spectacle Island Nature Reserve. The species has also been recorded from Yengo National Park.	3	Marginal	Low
Corunastylis insignis Wyong Midge Orchid		CE	The Wyong midge orchid 1 is a perennial orchid. The species has a single leaf which is cylindrical in shape and encloses the flowering stem for most of its length. The Wyong midge orchid 1 occurs within the Wyong Local Government Area on the NSW Central Coast. The species occurs within the Sydney Basin Bioregion and the Hunter-Central Rivers Catchment Management Authority. The species has been recorded from Chain Valley Bay (found at two localities), Charmhaven (found at three localities) and Lakehaven (no flowering plants recorded in the past 10 years). Field inspections throughout 2013 found less than twenty plants across all known localities	0	Marginal	Low

Species	BC Act/ FM Act	EPBC Act	Description of habitat[1]	Number of records (Bionet)	Presence of habitat	Likelihood of occurrence
			(Branwhite, pers. comm., 2013).In December 2013, the primary site at Charmhaven was impacted by construction activities. The Wyong midge orchid 1 occurs in patches of Themeda australis (kangaroo grass) amongst shrubs and sedges in heathland and forest. At Chain Valley Bay, the vegetation associated with the species has been described as 'Dry sclerophyll woodland dominated by Eucalyptus haemastoma (scribbly gum), Corymbia gummifera (red bloodwood), Angophora costata(smooth-barked apple) and Allocasuarina littoralis (black she-oak)' (NSW OEH, 2001). The flowering period of the species is from August to November (Jones, 2006). The species' lifecycle is believed to be similar to other Corunastylis species (see Frawley, 2010) in that it is believed to be a seasonal perennial, which shoots from a dormant underground tuber following winter rain. In the absence of rain during the appropriate season, the species remains dormant. Flowering occurs approximately six weeks after the initialising rain event, usually in September. After setting seed, the aerial portion of the plant withers and the tubers remain dormant until the next substantial winter rainfall.			
Cryptostylis hunteriana Leafless Tongue Orchid	V	V	The Leafless Tongue Orchid has no leaf. It produces an upright flower-stem to 45 cm tall, bearing five to 10 flowers between November and February. The species occurs mostly in coastal heathlands, margins of coastal swamps and sedgelands, coastal forest, dry woodland, and lowland forest. It prefers open areas in the understorey of forested communities. The soils include moist sands, moist to dry clay loam and occasionally in accumulated eucalypt leaves. The larger populations typically occur in woodland dominated by Scribbly Gum (*Eucalyptus sclerophylla*), Silvertop Ash (*E. sieberi),* Red Bloodwood (*Corymbia gummifera*) and Black Sheoak (*Allocasuarina littoralis*); appears to prefer open	16	Absent	Low

Species	BC Act/ FM Act	EPBC Act	Description of habitat[1]	Number of records (Bionet)	Presence of habitat	Likelihood of occurrence
			areas in the understorey of this community and is often found in association with the Large Tongue Orchid (*C. subulata*) and the Tartan Tongue Orchid (*C. erecta*).			
Cynanchum elegans White-flowered Wax Plant	E	E	A climber or twiner with a highly variable form. Mature stems have a fissured corky bark and can grow to 10 metres long and 3.5 cm thick. The leaves are paired (or rarely in threes), ovate to broadly ovate in shape, 1.5 to 10.5 cm long, and 1.5 to 7.5 cm wide. The flowers are white, tubular, and up to 4 mm long and 12 mm wide. The fruit is a dry pointed pod to 8 cm long, which contains up to 45 seeds with long silky hairs attached to one end. The White-flowered Wax Plant usually occurs on the edge of dry rainforest vegetation. Other associated vegetation types include littoral rainforest; Coastal Tea-tree *Leptospermum laevigatum* – Coastal Banksia *Banksia integrifolia* subsp. *integrifolia* coastal scrub; Forest Red Gum *Eucalyptus tereticornis* aligned open forest and woodland; Spotted Gum *Corymbia maculata* aligned open forest and woodland; and Bracelet Honeymyrtle *Melaleuca armillaris* scrub to open scrub. Restricted to eastern NSW where it is distributed from Brunswick Heads on the north coast to Gerroa in the Illawarra region. Flowering occurs between August and May, with a peak in November.	0	Absent	Low
Diuris praecox Rough Doubletail	V	V	A terrestrial herb with two or three linear leaves, 15 - 35 cm long, 3 - 5 mm wide, folded flat together lengthwise. Known from between Bateau Bay and Smiths Lake. Grows on hills and slopes of near-coastal districts in open forests which have a grassy to fairly dense understorey. Exists as subterranean tubers most of the year. It produces leaves and flowering stems in winter.	1	Absent	Low
Eucalyptus parramattensis subsp. parramattensis Eucalyptus	E2		A woodland tree, up to 15 m, but usually to about 8 – 10m in height. There are two separate meta-populations of *E. parramattensis* subsp. *decadens*. The Kurri Kurri meta-	4	Absent	Low

Species	BC Act/ FM Act	EPBC Act	Description of habitat[1]	Number of records (Bionet)	Presence of habitat	Likelihood of occurrence
parramattensis C. Hall. subsp. parramattensis in Wyong and Lake Macquarie local government areas			population is bordered by Cessnock—Kurri Kurri in the north and Mulbring—Abedare in the south. Large aggregations of the subspecies are located in the Tomalpin area. The Tomago Sandbeds meta-population is bounded by Salt Ash and Tanilba Bay in the north and Williamtown and Tomago in the south. Generally occupies deep, low-nutrient sands, often those subject to periodic inundation or where water tables are relatively high. It occurs in dry sclerophyll woodland with dry heath understorey. It also occurs as an emergent in dry or wet heathland. Often where this species occurs, it is a community dominant. In the Kurri Kurri area, *E. parramattensis subsp. decadens* is a characteristic species of 'Kurri Sand Swamp Woodland in the Sydney Basin Bioregion', an endangered ecological community under the BC Act. In the Tomago Sandbeds area, the species is usually associated with the 'Tomago Swamp Woodland' as defined by NSW NPWS (2000). Very little is known about the biology or ecology of this species. Flowers from November to January. Propagation mechanisms are currently poorly known. Seed dispersal is likely to be effected by wind and animals.			
Genoplesium insigne Variable Midge Orchid	CE	CE	A terrestrial orchid with a solitary cylindrical leaf that encloses the flowering stem. Recorded from four localities between Chain Valley Bay and Wyong in Wyong local government area. A small population also occurs within Lake Macquarie LGA. Grows in patches of Themeda australis (Kangaroo Grass) amongst shrubs and sedges in heathland and woodland. The presence of other orchid species and therefore micorrhyza assemblages can, though not always, be an indication of suitable habitat. Associated vegetation at known populations is described as dry sclerophyll woodland dominated by Eucalyptus haemastoma (Scribbly Gum), Corymbia gummifera (Red	21	Absent	Low

Species	BC Act/ FM Act	EPBC Act	Description of habitat[1]	Number of records (Bionet)	Presence of habitat	Likelihood of occurrence
			Bloodwood), Angophora costata (Smooth-barked Apple) and Allocasuarina littoralis (Black She-oak). The species has been recorded in disturbed locations, including in areas lacking upper vegetation strata. Most sites have a mostly native understorey. Population numbers of flowering plants fluctuates between years, with some individuals appearing to remain dormant below ground and emerging under favourable conditions. The number of individuals in the meta-population is therefore an estimate and likely to be around 50 plants - monitoring of the populations through the Saving our Species program is informing population size. Flowering period is typically from September to October, but has been recorded flowering in mid to late November to early December. Note, this species is extremely difficult to locate even when in flower and cannot be definitively identified from leaf alone. Local climatic conditions appears to play a key role in flowering events, with rainfall possibly driving flowering. In drier periods, initial signs of above ground activity may emerge (e.g. leaf and spike), though flowers have been observed to wither in the absence of suitable conditions (e.g. soil moisture).			
Grevillea parviflora subsp. parviflora Small-flower Grevillea	V	V	A low spreading to erect shrub, usually less than a metre high. Sporadically distributed throughout the Sydney Basin with the main occurrence centred around Picton, Appin and Bargo (and possibly further south to the Moss Vale area). Separate populations are also known further north from Putty to Wyong and Lake Macquarie on the Central Coast and Cessnock and Kurri Kurri in the Lower Hunter. Grows in sandy or light clay soils usually over thin shales. Occurs in a range of vegetation types from heath and shrubby woodland to open forest. Canopy species vary greatly with community type but generally are species that favour soils with a strong lateritic	122	Absent	Low

Species	BC Act/ FM Act	EPBC Act	Description of habitat[1]	Number of records (Bionet)	Presence of habitat	Likelihood of occurrence
			influence including *Eucalyptus fibrosa, E. parramattensis, Angophora bakeri* and *Eucalyptus sclerophylla.* Found over a range of altitudes from flat, low-lying areas to upper slopes and ridge crests. Often occurs in open, slightly disturbed sites such as along tracks. Flowering has been recorded between July to December as well as April to May.			
Maundia triglochinoides	V	V	Perennial with rhizomes about 5mm thick and emergent tufts of leaves arising along their length. Leaves are spongy, inflated and triangular in cross section, to 80 cm long, sometimes longer, 5 - 10mm wide. Inflorescence to 10cm long and 2.5 cm wide. Carpels (female parts of flower) 6 - 8mm long, sessile, each with a spreading beak. The fruit is 1cm long to 8mm wide. Restricted to coastal NSW and extending into southern Queensland. The current southern limit is Wyong; former sites around Sydney are now extinct.	12	Absent	Low
Melaleuca biconvexa Biconvex Paperbark	V	V	Biconvex Paperbark is a shrub or small tree, usually up to 10 m tall, though occasionally as high as 20 m. The bark is that of a typical paperbark. The leaves are small, to 18 mm long and 4 mm wide; each leaf has a centre-vein in a groove and the leaf blade curves upwards on either side of this centre-vein. Leaf placement is distinctive, with each pair of leaves emerging at right angles from the branch. Each pair is offset at right angles to the previous pair so the branch has a squarish appearance when looked at 'end-on'. This species' white flowers are usually clustered in dense heads and the fruit is urn-shaped and 3 - 5 mm in diameter. Biconvex Paperbark is only found in NSW, with scattered and dispersed populations found in the Jervis Bay area in the south and the Gosford-Wyong area in the north. Biconvex Paperbark generally grows in damp places, often near streams or low-lying areas on alluvial soils of low slopes or sheltered aspects. Flowering occurs over just 3-4 weeks in September and October and Resprouting occurs following fire.	349	Marginal	Low

Species	BC Act/ FM Act	EPBC Act	Description of habitat[1]	Number of records (Bionet)	Presence of habitat	Likelihood of occurrence
Pelargonium sp. *Striatellum* Omeo Stork's-bill	E	E	*P. striatellum*, is a tufted perennial forb with leaves in basal rosettes arising from fleshy, often extensively branched rhizomes. Plants occur in clonal colonies that may be up to several metres wide. The leaf-stalks are velvety, having short glandular and non-glandular hairs in roughly equal proportions, and with occasional longer non-glandular hairs. The leaves are all or mostly basal (in a rosette), with leaves on the short stems, if present, being opposite. The rosette leaves are on leaf-stalks between 2 and 6 cm long, with leaf blades egg-shaped in outline, between 1 and 2.5 cm long and 1 to 2 cm wide. The leaves are entire or shallowly lobed; most commonly with 5 to 7 lobes and with scalloped margins. The leaf surface is minutely furry along the veins and near the edges. The flowering stems are to 15 cm tall, and terminate with an umbrella-like flower-cluster with 1 to 3 (and sometimes to 7) flowers that are borne on stalks between 1 and 2 cm long. The flowers have 5 petals that are wider at their tips than at their bases and are between 8 and 11 mm long. The flowers are in various shades of pale pink and each petal is marked with darker crimson or purple branching stripes that run down to the center of the flower. Flowers have 10 stamens. The fruit, 10 to 15 mm long, is a dry structure that splits into 5 segments. The fruit is elongated and shaped like a stork's bill, hence the plant's common name. Flowering is from October to March, with the peak flowering occurring in November and December. It occurs at altitudes between 680 to 1030 m. It is known to occur in the local government areas of Goulburn-Mulwaree, Cooma-Monaro, and Snowy River, but may occur in other areas with suitable habitat; these may include Bombala, Eurobodalla, Palerang, Tumbarumba, Tumut, Upper Lachlan, and Yass Valley local government areas.	0	Marginal	Low
Persicaria elatior	V	V	Tall Knotweed is an erect herb to 90 cm tall, with stalked,	1	Absent	Low

Species	BC Act/ FM Act	EPBC Act	Description of habitat[1]	Number of records (Bionet)	Presence of habitat	Likelihood of occurrence
Tall Knotweed			glandular hairs. Tall Knotweed has been recorded in south-eastern NSW (Mt Dromedary (an old record), Moruya State Forest near Turlinjah, the Upper Avon River catchment north of Robertson, Bermagui, and Picton Lakes. In northern NSW it is known from Raymond Terrace (near Newcastle) and the Grafton area (Cherry Tree and Gibberagee State Forests). The species also occurs in Queensland. This species normally grows in damp places, especially beside streams and lakes. Occasionally in swamp forest or associated with disturbance.			
Persoonia hirsuta Hairy Geebung	E	E	The Hairy Geebung is best distinguished by its hairiness - long coarse hairs on flowers and branchlets and short stiff ones on the leaves. It is a spreading shrub with small leaves of variable shape. They are from 6 - 12 mm long, from oblong to narrow in shape and crowded along the stems; they are curled under at the edges. Groups of flowers grow into a leafy shoot. The tubular flowers are yellow or orange and about 1 cm long and also hairy. There are two subspecies - both are considered to be endangered. *Persoonia hirsuta* has a scattered distribution around Sydney. The species is distributed from Singleton in the north, along the east coast to Bargo in the south and the Blue Mountains to the west. *Persoonia hirsuta* has a large area of occurrence, but occurs in small populations, increasing the species' fragmentation in the landscape. Found in sandy soils in dry sclerophyll open forest, woodland and heath on sandstone.	0	Absent	Low
Pterostylis gibbosa Illawarra Greenhood		E	All known populations grow in open forest or woodland, on flat or gently sloping land with poor drainage. In the Illawarra region, the species grows in woodland dominated by Forest Red Gum Eucalyptus tereticornis, Woollybutt E. longifolia and White Feather Honey-myrtle Melaleuca decora. Near Nowra, the species grows in an open forest of Spotted Gum Corymbia maculata, Forest Red Gum and Grey Ironbark E. paniculata. In the Hunter region, the species grows in open	0	Absent	Low

Species	BC Act/ FM Act	EPBC Act	Description of habitat[1]	Number of records (Bionet)	Presence of habitat	Likelihood of occurrence
			woodland dominated by Narrow-leaved Ironbark E. crebra, Forest Red Gum and Black Cypress Pine Callitris endlicheri. The Illawarra Greenhood is a deciduous orchid that is only visible above the ground between late summer and spring, and only when soil moisture levels can sustain its growth. The leaf rosette grows from an underground tuber in late summer, followed by the flower stem in winter. After a spring flowering, the plant begins to die back and seed capsules form (if pollination has taken place).			
Rhizanthella slateri Eastern Underground Orchid			An orchid with a whitish, fleshy underground stem to 15 cm long and 15 mm diameter. Occurs from south-east Queensland to south-east NSW. In NSW, currently known from fewer than 10 locations, including near Bulahdelah, the Watagan Mountains, the Blue Mountains, Wiseman's Ferry area, Agnes Banks and near Nowra. Habitat requirements are poorly understood and no particular vegetation type has been associated with the species, although it is known to occur in sclerophyll forest. Highly cryptic given that it grows almost completely below the soil surface, with flowers being the only part of the plant that can occur above ground. Therefore usually located only when the soil is disturbed. Flowers September to November.	0	Absent	Low
Rhodamnia rubescens Scrub Turpentine	CE		Shrub or small tree to 25 m. Currently known to occur from coastal districts north from Batemans Bay, approximately 280 km south of Sydney, to the Queensland (Qld) border. Populations of the species extend north to Maryborough, Qld. NSW populations of *R. rubescens* are mainly coastal and occasionally extend inland onto escarpments up to 600 m a.s.l. in areas with rainfall of 1,000–1,600 mm (Benson andMcDougall 1998). *Rhodamnia rubescens* flowers in late winter through to spring, with a peak in October, and fruits typically begin to appear in December in the Sydney region (PlantNET 2017). Populations and individuals of R. rubescens	23	Absent	Low

Species	BC Act/ FM Act	EPBC Act	Description of habitat[1]	Number of records (Bionet)	Presence of habitat	Likelihood of occurrence
			are often found in wet sclerophyll associations in rainforest transition zones and creekside riparian vegetation (Benson and McDougall 1998).*Rhodamnia rubescens* commonly occurs in all rainforest subforms except cool temperate rainforest. The species occupies a range of volcanically derived and sedimentary soils and is also a common pioneer species in eucalypt forests (Floyd 1989).In NSW, suitable habitat for *R. rubescensis* likely to occur in the following vegetation classes: Subtropical Rainforests, Northern Warm Temperate Rainforests, Littoral Rainforests, North Coast Wet Sclerophyll Forests(WSF),Northern Hinterland WSF, Northern Escarpment WSF, Southern Lowland WSF and probably the northern patches of South Coast WSF and Southern Escarpment WSF and perhaps easterly patches of Northern Tableland WSF. It may also occur as a pioneer in adjacent areas of dry sclerophyll and grassy woodland associations (Floyd 1989; Keith 2004). *Rhodamnia rubescens* has been documented on herbarium records as occurring in association with *Acacia melanoxylon, Acmena smithii, Breynia oblongifolia, Corymbiaintermedia, Endiandra discolor,Eucalyptusbosistoana,E. tereticornis,Glochidion sumatranum, Guioa semiglauca, Lophostemon suaveolens and Mallotus philippensi.*			
Rhodomyrtus psidioides Native Guava	CE		Shrub or small tree to 12 m high. In New South Wales (NSW), *Rhodomyrtus psidioides* is currently known to occur from Broken Bay, approximately 30 km north of Sydney, to the Queensland (Qld) border. Populations of the species extend north to Gympie, Qld. NSW populations are typically restricted to coastal and sub-coastal areas of low elevation however the species does occur up to c. 120 km inland in the Hunter and Clarence River catchments and along the Border Ranges. Flowers in late spring to early summer, producing fruits in summer (PlantNET 2017). The species occurs in	2	Absent	Low

Species	BC Act/ FM Act	EPBC Act	Description of habitat[1]	Number of records (Bionet)	Presence of habitat	Likelihood of occurrence
			rainforest and its margins with sclerophyll vegetation, often near creeks and drainage lines. *Rhodomyrtus psidiodes* is a pioneer species in disturbed environments (Williams and Adam 2010) and is locally common in disturbed areas, such as regrowth and rainforest margins. In NSW, suitable habitat for *R. psidioides* is likely to occur in the following vegetation classes: Subtropical Rainforests, Northern Warm Temperate Rainforests, Littoral Rainforests, North Coast Wet Sclerophyll Forests and possibly (especially at margins with rainforest types),Northern Hinterland Wet Sclerophyll Forests(Floyd 1989; Keith 2004).The species has been documented on herbarium records as occurring in association with *Acacia bakeri, Archontophoenix cunninghamiana, Argyrodendronspp., Calamusspp., Cryptocarya laevigata, Elaeocarpus grandis, Elaeocarpus kirtonii, Glochidion sumatranum, Livistona australis, Lophostemon confertus, Orites excelsa* and *Pilidiostigma rhytispermum.*			
Rutidosis heterogama Heath Wrinklewort	V	V	It is a small perennial herb to 30 cm tall. Recorded from near Cessnock to Kurri Kurri with an outlying occurrence at Howes Valley. On the Central Coast it is located north from Wyong to Newcastle. There are north coast populations between Wooli and Evans Head in Yuraygir and Bundjalung National Parks. It also occurs on the New England Tablelands from Torrington and Ashford south to Wandsworth south-west of Glen Innes. Grows in heath on sandy soils and moist areas in open forest, and has been recorded along disturbed roadsides.	6	Absent	Low
Syzygium paniculatum Magenta Lilly Pilly	E1	V	A tree to 15 m tall, but is generally 3–8 m high and shrubby in form. Found only in NSW, in a narrow, linear coastal strip from Bulahdelah to Conjola State Forest. Has been recorded in widely scattered small populations along the NSW coast from Booti Booti (near Forster) in the north to Conjola State Forest (near Jervis Bay) in the south. Found in rainforest on	2	Absent	Low

Species	BC Act/ FM Act	EPBC Act	Description of habitat[1]	Number of records (Bionet)	Presence of habitat	Likelihood of occurrence
			sandy soils or stabilised Quaternary sand dunes at low altitudes in coastal areas. Rainforests are often remnant stands of littoral or gallery rainforest. Associated species include *Alphitonia excelsa*, *Acmena smithii*, *Cryptocarya glaucescens*, *Toona ciliata Eucalyptus saligna*, *Ficus fraseri*, *Syzygium oleosum*, *Acmena smithii*, *Cassine* sp., *F. blique*, *Glochidion ferdinandi*, *Endiandra sieberi*, *Synoum glandulosum*, *Podocarpus elatus*, *Notelaea longifolia*, *Guioa semiglauca* and *Pittosporum undulatum.* Is thought to tolerate wet and dry conditions on sands. On the south coast the Magenta Lilly Pilly occurs on grey soils over sandstone, restricted mainly to remnant stands of littoral (coastal) rainforest. On the central coast Magenta Lilly Pilly occurs on gravels, sands, silts and clays in riverside gallery rainforests and remnant littoral rainforest communities. Flowers December to March, with fruit ripe from March to May, occasionally to September.			
Tetratheca juncea Black-eyed Susan	V	V	A low shrub that grows in clumps of single or multiple stems up to 1 m long. Confined to the northern portion of the Sydney Basin bioregion and the southern portion of the North Coast bioregion in the local government areas of Wyong, Lake Macquarie, Newcastle, Port Stephens, Great Lakes and Cessnock. It is usually found in low open forest/woodland with a mixed shrub understorey and grassy groundcover. However, it has also been recorded in heathland and moist forest. Grows in forests with an overstorey of *Angophora costata, Eucalyptus haemastoma, E. globoidea, Corymbia gummifera, and E. capitellata*. Only *T. thymifolia* is known to grow in association with this species. The majority of populations occur on low nutrient soils associated with the Awaba Soil Landscape. While the species has a preference for cooler southerly aspects, it has been found on slopes with a variety of aspects. It generally prefers	1761	Marginal	Low

Species	BC Act/ FM Act	EPBC Act	Description of habitat[1]	Number of records (Bionet)	Presence of habitat	Likelihood of occurrence
			well-drained sites and occurs on ridges, although it has also been found on upper slopes, mid- slopes and occasionally in gullies. Flowering occurs between July and December with the peak flowering period occurring between the start of September to the end of October. Seeds are produced in late spring and mature from November to February. Very cryptic.			
Thesium austral Austral Toadflax	V	V	Austral Toadflax is a small, straggling herb to 40 cm tall. Leaves are pale green to yellow-green, somewhat succulent, 1 - 4 cm long and 0.5 - 1.5 mm wide. Flowers are minute and white, emerging where the leaves meet the stems and appearing in spring. The fruit is small and nut-like, developing in summer. This species is often hidden amongst grasses and herbs. Austral Toad-flax is found in very small populations scattered across eastern NSW, along the coast, and from the Northern to Southern Tablelands. It is also found in Tasmania and Queensland and in eastern Asia. Occurs in grassland on coastal headlands or grassland and grassy woodland away from the coast. Often found in association with Kangaroo Grass (*Themeda australis*). Flowering spring and summer.	0	Absent	Low
Amphibians						
Heleioporus australiacus Giant Burrowing Frog	V	V	The Giant Burrowing Frog is a large, rotund, slow-moving frog that grows to about 10 cm long. It is a powerfully built species with muscular hind limbs and enlarged tubercles on the feet well suited to burrowing. Adult males have enlarged forearms, with a large conical black spine and several small spines on their first finger. Females have reduced arm-musculature compared to males. Tadpoles are large (up to 75 mm) and very dark blue to black. Found in heath, woodland and open dry sclerophyll forest on a variety of soil types except those that are clay based. Spends more than 95% of its time in non-breeding habitat in areas up to 300 m from breeding sites. Whilst in non-breeding habitat it burrows	0	Marginal	Low

Species	BC Act/ FM Act	EPBC Act	Description of habitat[1]	Number of records (Bionet)	Presence of habitat	Likelihood of occurrence
			below the soil surface or in the leaf litter. Individual frogs occupy a series of burrow sites, some of which are used repeatedly. The home ranges of both sexes appear to be non-overlapping suggesting exclusivity of non-breeding habitat. Home ranges are approximately 0.04 ha in size. Individuals move into the breeding site either immediately before or following heavy rain and occupy these sites for up to 10 days. Breeding habitat of this species is generally soaks or pools within first or second order streams. They are also commonly recorded from 'hanging swamp' seepage lines and where small pools form from the collected water. When breeding, frogs will call from open spaces, under vegetation or rocks or from within burrows in the creek bank. Males show strong territoriality at breeding sites. This species breeds mainly in autumn, but has been recorded calling throughout the year.			
Crinia tinnula Wallum Froglet	V		Wallum Froglets are found along the coastal margin from Litabella National Park in south-east Queensland to Kurnell in Sydney. Wallum Froglets are found in a wide range of habitats, usually associated with acidic swamps on coastal sand plains. They typically occur in sedgelands and wet heathlands. They can also be found along drainage lines within other vegetation communities and disturbed areas, and occasionally in swamp sclerophyll forests. The species breeds in swamps with permanent water as well as shallow ephemeral pools and drainage ditches. Breeding is thought to peak in the colder months, but can occur throughout the year following rain. Eggs of 1.1-1.2mm are deposited in water with a pH of <6 and tadpoles take 2-6 months to develop into frogs. Wallum Froglets shelter under leaf litter, vegetation, other debris or in burrows of other species. Shelter sites are wet or very damp and often located near the water's edge. Males may call throughout the year and at any time of day, peaking following rain.	43	Marginal	Low

Species	BC Act/ FM Act	EPBC Act	Description of habitat[1]	Number of records (Bionet)	Presence of habitat	Likelihood of occurrence
Litoria aurea Green and Golden Bell Frog	E	V	A relatively large, stout frog, ranging in size from approximately 45 mm to approximately 100 mm snout to vent length. Diagnostic features are a gold or creamish white stripe running along the side, extending from the upper eyelids almost to the groin, with a narrow dark brown stripe beneath it, from nostril to eye. It also has blue or bluish-green colour on the inside of the thighs. The colour of the body varies. Usually a vivid pea-green, splotched with an almost metallic brassy brown or gold. The backs of some individuals may be almost entirely green; in others golden-brown markings may dominate. Inhabits marshes, dams and stream-sides, particularly those containing bullrushes (*Typha spp.*) or spikerushes (*Eleocharis* spp.), Optimum habitat includes water-bodies that are unshaded, free of predatory fish such as Plague Minnow *(Gambusia holbrooki*), have a grassy area nearby and diurnal sheltering sites available.	1	Absent	Low
Litoria brevipalmata Green-thighed Frog	V		Isolated localities along the coast and ranges from just north of Wollongong to south-east Queensland. Green-thighed Frogs occur in a range of habitats from rainforest and moist eucalypt forest to dry eucalypt forest and heath, typically in areas where surface water gathers after rain. It prefers wetter forests in the south of its range, but extends into drier forests in northern NSW and southern Queensland. Breeding occurs following heavy rainfall from spring to autumn, with larger temporary pools and flooded areas preferred. Frogs may aggregate around breeding sites and eggs are laid in loose clumps among waterplants, including water weeds. The larvae are free swimming. The frogs are thought to forage in leaf-litter.	13	Absent	Low
Litoria littlejohni Littlejohn's Tree Frog	V	V	Occurs in scattered locations between the Watagan Mountains in eastern New South Wales and Buchan in north-east Victoria. It occurs within the Hunter-Central Rivers, Southern Rivers (NSW) and East Gippsland (Victoria) Natural	0	Absent	Low

Species	BC Act/ FM Act	EPBC Act	Description of habitat[1]	Number of records (Bionet)	Presence of habitat	Likelihood of occurrence
			Resource Management Regions. Inhabits forest, coastal woodland and heath from 100 to 950 m above sea level, but is not associated with any specific vegetation types. This species breeds in the upper reaches of permanent streams and in perched swamps. Non-breeding habitat is heath based forests and woodlands where it shelters under leaf litter and low vegetation, and hunts for invertebrate prey either in shrubs or on the ground. Breeding is triggered by heavy rain and can potentially occur all year, but is usually from late summer to early spring. Eggs and tadpoles are mostly found in still or slow flowing pools that receive extended exposure to sunlight, but will also use temporary isolated pools.			
Mixophyes balbus Stuttering Frog	E	V	Stuttering Barred Frogs occur along the east coast of Australia from southern Queensland to the north-eastern Victoria. The species has suffered a marked decline in distribution and abundance, particularly in south-east NSW. It is the only *Mixophyes* species that occurs in south-east NSW and in recent surveys it has only been recorded at three locations south of Sydney. Found in rainforest and wet, tall open forest in the foothills and escarpment on the eastern side of the Great Dividing Range. Outside the breeding season adults live in deep leaf litter and thick understorey vegetation on the forest floor. Feed on insects and smaller frogs. Breed in streams during summer after heavy rain. Eggs are laid on rock shelves or shallow riffles in small, flowing streams. As the tadpoles grow they move to deep permanent pools and take approximately 12 months to metamorphose.	63	Absent	Low
Mixophyes iteratus Giant Barred Frog	E	E	Giant Barred Frogs are very large (up to 115mm long) and powerfully built. They are blotched light and dark brown above and are well-camoflaged in leaf litter. Limbs have dark crossbars and the hind sides of the thighs are black with yellow spots. The pupil is vertical and the iris is golden. The call is a deep gutteral 'ork'. The Giant Barred Frog can be	31	Marginal	Low

Species	BC Act/ FM Act	EPBC Act	Description of habitat[1]	Number of records (Bionet)	Presence of habitat	Likelihood of occurrence
			most easily distinguished from other barred frog species by the call and the distinctive eye colour. The Giant Barred Frog is distributed along the coast and ranges from Eumundi in south-east Queensland to Warrimoo in the Blue Mountains. Declines appear to have occurred at the margins of the species' range, with no recent records south of the Hawkesbury River and disappearances from a number of streams in QLD. Northern NSW, particularly the Coffs Harbour-Dorrigo area, is a stronghold. Moist riparian habitats such as rainforest or wet sclerophyll forest are favoured for the deep leaf litter that they provide for shelter and foraging, as well as open perching sites on the forest floor. However, Giant Barred Frogs will also sometimes occur in other riparian habitats, such as those in drier forest or degraded riparian remnants, and even occasionally around dams. Breeding takes place from late spring to summer. Once eggs are laid and fertilised in the water, the female kicks them out of the water where they stick onto a suitable bank (e.g. overhanging or steeply sloped). Hatchlings drop or wriggle into the water. Tadpoles grow to about 11cm and it may take up to 14 months between egg laying and the completion of metamorphosis. Although generally found within about 20m of the stream, outside the breeding season, the Giant Barred Frog may disperse away from the stream (e.g. 50m or further).			
Pseudophryne australis Red-crowned Toadlet	V		The Red-crowned Toadlet is an unmistakable small frog, usually measuring less than 30 mm long. It is dark brown to black, with distinctive reddish-orange patches, one between the eyes and one along the rump. It also has a white patch at the base of each arm. The belly is marbled black and white. The tadpoles are black and reach about 25 mm. The short, grating and "squelchy" call can be heard all year round. The Red-crowned Toadlet has a restricted distribution. It is	20	Absent	Low

Species	BC Act/ FM Act	EPBC Act	Description of habitat[1]	Number of records (Bionet)	Presence of habitat	Likelihood of occurrence
			confined to the Sydney Basin, from Pokolbin in the north, the Nowra area to the south, and west to Mt Victoria in the Blue Mountains.			
Reptiles						
Hoplocephalus bungaroides Broad-headed Snake	E	V	The Broad-headed Snake is generally black above with yellow spots forming narrow, irregular cross-bands. Other yellow scales may link these cross-bands laterally to form a straight or zigzagged stripe along the body. These cross-bands help distinguish it from the similar-looking but harmless juvenile Diamond Python. Its head is flattened on top and distinct from the body. The belly is grey or greyish-black. The average length is about 60 cm, with a maximum of around 150 cm. The Broad-headed Snake is largely confined to Triassic and Permian sandstones, including the Hawkesbury, Narrabeen and Shoalhaven groups, within the coast and ranges in an area within approximately 250 km of Sydney. Shelters in rock crevices and under flat sandstone rocks on exposed cliff edges during autumn, winter and spring. Moves from the sandstone rocks to shelters in crevieces or hollows in large trees within 500m of escarpments in summer. Is nocturnal.	0	Absent	Low
Hoplocephalus stephensii Stephens' Banded Snake	V		Stephens' Banded Snake is a medium-sized partly tree-dwelling snake up to one metre long. Distributed along the coast and ranges from Southern Queensland to Gosford in NSW. Rainforest and eucalypt forests and rocky areas up to 950 m in altitude. Stephens' Banded Snake is nocturnal, and shelters between loose bark and tree trunks, amongst vines, or in hollow trunks limbs, rock crevices or under slabs during the day. At night it hunts frogs, lizards, birds and small mammals.	11	Absent	Low
Fish						
Epinephelus daemelii		V	Adult black cod can grow to 2 m in length and at least 80 kg	0	Absent	Low

Species	BC Act/ FM Act	EPBC Act	Description of habitat[1]	Number of records (Bionet)	Presence of habitat	Likelihood of occurrence
Black Rockcod			in weight, but it is more common to see smaller fish (up to 1m/30kg). A large, reef-dwelling, carnivorous grouper species. They are found in warm temperate and subtropical parts of the south-western Pacific, and naturally occurred along the entire NSW coast including Lord Howe Island. Adult black cod are usually found in caves, gutters and beneath bomboras on rocky reefs. They are territorial and often occupy a particular cave for life. Small juveniles are often found in coastal rock pools, and larger juveniles around rocky shores in estuaries. Black cod are opportunistic carnivores, eating mainly other fish and crustaceans. They can change from one colour pattern to another in just a few seconds. They are usually black in estuaries and banded around clear water reefs.			
Birds						
Anthochaera phrygia Regent Honeyeater	CE	CE	The Regent Honeyeater is a striking and distinctive, medium-sized, black and yellow honeyeater with a sturdy, curved bill. Adults weigh 35 - 50 grams, are 20 - 24 cm long and have a wings-pan of 30 cm. Its head, neck, throat, upper breast and bill are black and the back and lower breast are pale lemon in colour with a black scalloped pattern. Its flight and tail feathers are edged with bright yellow. There is a characteristic patch of dark pink or cream-coloured facial-skin around the eye. Sexes are similar, though males are larger, darker and have larger patch of bare facial-skin. The call is a soft metallic bell-like song; birds are most vocal in non-breeding season. The Regent Honeyeater mainly inhabits temperate woodlands and open forests of the inland slopes of south-east Australia. Birds are also found in drier coastal woodlands and forests in some years. Once recorded between Adelaide and the central coast of Queensland, its range has contracted dramatically in the last 30 years to between north-eastern Victoria and south-eastern	28	Marginal	Low

Species	BC Act/ FM Act	EPBC Act	Description of habitat[1]	Number of records (Bionet)	Presence of habitat	Likelihood of occurrence
			Queensland. There are only three known key breeding regions remaining: north-east Victoria (Chiltern-Albury), and in NSW at Capertee Valley and the Bundarra-Barraba region. In NSW the distribution is very patchy and mainly confined to the two main breeding areas and surrounding fragmented woodlands. The Regent Honeyeater is a generalist forager, although it feeds mainly on the nectar from a relatively small number of eucalypts that produce high volumes of nectar. Key eucalypt species include Mugga Ironbark, Yellow Box, White Box and Swamp Mahogany. Other tree species may be regionally important. For example the Lower Hunter Spotted Gum forests have recently been demonstrated to support regular breeding events. Flowering of associated species such as Thin-leaved Stringybark *Eucalyptus eugenioides* and other Stringybark species, and Broad-leaved Ironbark *E. fibrosa* can also contribute important nectar flows at times. Nectar and fruit from the mistletoes *Amyema miquelii*, *A. pendula* and *A. cambagei* are also utilised. When nectar is scarce lerp and honeydew can comprise a large proportion of the diet. Insects make up about 15% of the total diet and are important components of the diet of nestlings. There are three known key breeding areas, two of them in NSW - Capertee Valley and Bundarra-Barraba regions. The species breeds between July and January in Box-Ironbark and other temperate woodlands and riparian gallery forest dominated by River Sheoak. Regent Honeyeaters usually nest in horizontal branches or forks in tall mature eucalypts and Sheoaks. An open cup-shaped nest is constructed of bark, grass, twigs and wool by the female. Two or three eggs are laid and incubated by the female for 14 days. Nestlings are brooded and fed by both parents at an average rate of 23 times per hour and fledge after 16 days. Fledglings fed by both parents 29 times per hour.			

Species	BC Act/ FM Act	EPBC Act	Description of habitat[1]	Number of records (Bionet)	Presence of habitat	Likelihood of occurrence
Artamus cyanopterus cyanopterus Dusky Woodswallow	V		The dusky woodswallow is a medium-sized bird (16-19.5 cm, 35 g), with a longish tail. Mostly dark grey-brown, merging to blackish on the tail, with a small black-brown mask. Bluish bill with a black tip. Upper-wings are a dark blue-grey with a white leading edge. Conspicuous white corners on the tail. In flight the dark grey-brown under-body contrasts with the whitish under-wing. Juveniles may be distinguished by white streaking on the body and whitish tips on wing feathers. Immature individuals are similar to adults but retain pale-tipped wing feathers. No seasonal variation in appearance is evident, and sexes are alike. Calls consist of brassy chirps, chirups, a soft low 'vut vut' and a brisk 'peet peet'. Also known to mimic other birds, including the rufous whistler and grey shrike-thrush. Dusky woodswallows are widespread in eastern, southern and south western Australia. The species occurs throughout most of New South Wales, but is sparsely scattered in, or largely absent from, much of the upper western region. Most breeding activity occurs on the western slopes of the Great Dividing Range.	8	Marginal	Low
Botaurus poiciloptilus Australasian Bittern		E	The Australasian Bittern is a large, stocky bird, reaching up to 75 cm in length. It has a long, thick neck and a straight, brownish-yellow bill. Its upper surface is mottled brown and its undersurface is buff, with dark brown stripes, except for a pale throat. The eyes are yellow and there is a pale eyebrow. The feet and legs are pale green. Australasian Bitterns are widespread but uncommon over south-eastern Australia. In NSW they may be found over most of the state except for the far north-west. Favours permanent freshwater wetlands with tall, dense vegetation, particularly bullrushes (*Typha* spp.) and spikerushes (*Eleocharis* spp.) Breeding occurs in summer from October to January; nests are built in secluded places in densely-vegetated wetlands on a platform of reeds; there are usually six olive-brown eggs to a clutch.	0	Absent	Low

Species	BC Act/ FM Act	EPBC Act	Description of habitat[1]	Number of records (Bionet)	Presence of habitat	Likelihood of occurrence
Burhinus grallarius Bush Stone-curlew	E		The Bush Stone-curlew stands about 55 cm tall. It has a grey to light brown back, marked with black blotches, and a streaked rump. It has buff and white underparts with dark streaks, and a black band that runs from near its eye down its neck. This species has large, bright yellow eyes and a hunch-shouldered stance on long spindly legs. When disturbed it lies flat on the ground, with its head and neck outstretched. Its call is a loud eerie wailing "wee-loo", mostly heard at night. The Bush Stone-curlew is found throughout Australia except for the central southern coast and inland, the far south-east corner, and Tasmania. Only in northern Australia is it still common however and in the south-east it is either rare or extinct throughout its former range.	4	Absent	Low
Calidris canutus Red Knot	P	E	A medium-sized stocky shorebird (to 25 cm in length) with a short straight bill, long wings extending beyond the tip of the tail at rest and short black legs. Plain grey above and white below in non-breeding plumage. In flight it shows a pale wing-bar on the upper wing and a lightly barred white rump. In breeding plumage the mantle and shoulders become variably dark-centred with red patches, and the belly, breast and face become reddish. The Red Knot is a non-breeding migratory visitor from Arctic regions of Siberia. It is capable of flying non-stop between north-eastern China and northern Australia. Birds arrive between September and October and leave between March and April, with a small number of individuals overwintering. In NSW it is recorded in small numbers along some of the major river estuaries and sheltered embayments of the coastline, in particular the Hunter River estuary. This environment is used as a staging area for birds to rest and replenish fat resources; large numbers arrive in September then most move south to Victoria by October. The Red Knot is a rare visitor to wetlands away from the coast with a few records (mostly during	1	Absent	Low

Species	BC Act/ FM Act	EPBC Act	Description of habitat[1]	Number of records (Bionet)	Presence of habitat	Likelihood of occurrence
			southward migration) as far west as Lake Menindee and the Riverina. Mainly occurs in small numbers on intertidal mudflats, estuaries, bays, inlets, lagoons, harbours and sandflats and sandy beaches of sheltered coasts. It is occasionally found on sandy ocean beaches or shallow pools on exposed wave-cut rock platforms and is a rare visitor to terrestrial saline wetlands and freshwater swamps. Birds roost on sandy beaches, spits, islets and mudflats close to feeding grounds, usually in open areas. Rarely found on inland lakes or swamps.			
Calidris ferruginea Curlew Sandpiper	E	CE	The Curlew Sandpiper is a small (18-23 cm), highly-gregarious, migratory shorebird with a medium-length, down-curved bill and longish black legs. During most of their time in Australia, adult birds are in non-breeding plumage, which is a nondescript mottled grey above and paler below, with indistinct white eyebrows and a white rump. In flight there is a white line along the centre of the upper-wings. In breeding plumage the face and underparts are chestnut, and the upperparts are mottled chestnut and black. The down-curved bill distinguishes it from the other similar-sized sandpipers. Many other shorebirds of this size have similar colouration and are easily cofused with the Curlew Sandpiper, but they differ in bill shape, length or colour; leg colour or length; and some lack a white wing bar or white rump. The Curlew Sandpiper is distributed around most of the Australian coastline (including Tasmania). It occurs along the entire coast of NSW, particularly in the Hunter Estuary, and sometimes in freshwater wetlands in the Murray-Darling Basin. Inland records are probably mainly of birds pausing for a few days during migration. It roosts on shingle, shell or sand beaches; spits or islets on the coast or in wetlands; or sometimes in salt marsh, among beach-cast seaweed, or on rocky shores. It forages in or at the edge of shallow water,	1	Absent	Low

Species	BC Act/ FM Act	EPBC Act	Description of habitat[1]	Number of records (Bionet)	Presence of habitat	Likelihood of occurrence
			occasionally on exposed algal mats or waterweed, or on banks of beach-cast seagrass or seaweed.			
Callocephalon fimbriatum Gang-gang Cockatoo	V		Gang-gang Cockatoos are one of the more distinctive and charismatic members of Australia's avifauna. These birds are primarily slate-grey, with the males easily identified by their scarlet head and wispy crest, while females have a grey head and crest and feathers edged with salmon pink on the underbelly. They range in length from 32 to 37 cm, with a wingspan of 62 to 76 cm. The call has been likened to a creaking gate or cork being pulled from a bottle. The Gang-gang Cockatoo is distributed from southern Victoria through south- and central-eastern New South Wales. In New South Wales, the Gang-gang Cockatoo is distributed from the south-east coast to the Hunter region, and inland to the Central Tablelands and south-west slopes. It occurs regularly in the Australian Capital Territory. It is rare at the extremities of its range, with isolated records known from as far north as Coffs Harbour and as far west as Mudgee.	40	Marginal	Low
Calyptorhynchus lathami Glossy Black-Cockatoo	V		The species is uncommon although widespread throughout suitable forest and woodland habitats, from the central Queensland coast to East Gippsland in Victoria, and inland to the southern tablelands and central western plains of NSW, with a small population in the Riverina. An isolated population exists on Kangaroo Island, South Australia. Dependent on large hollow-bearing eucalypts for nest sites. One or two eggs are laid between March and August. Inhabits open forest and woodlands of the coast and the Great Dividing Range up to 1000 m in which stands of she-oak species, particularly Black She-oak (*Allocasuarina littoralis*), Forest She-oak (*A. torulosa*) or Drooping She-oak (*A. verticillata*) occur. In the Riverina area, inhabits open woodlands dominated by Belah (*Casuarina cristata*). Feeds almost exclusively on the seeds of several species of she-oak	102	Present	Low

Species	BC Act/ FM Act	EPBC Act	Description of habitat[1]	Number of records (Bionet)	Presence of habitat	Likelihood of occurrence
			(Casuarina and *Allocasuarina* species), shredding the cones with the massive bill.			
Chthonicola sagittate Speckled Warbler	V		The Speckled Warbler is a small well-camouflaged very heavily streaked ground-dwelling bird related to the scrubwrens, reaching a length of 13cm. The back, wings and tail are grey-brown, with soft dark streaks. The black crown is distinctively streaked with buff. The underparts are pale and particularly heavily streaked. The face is off-white with streaking on the ear coverts. The male has a black upper margin to the brow, while the female has a rufous upper edge to the brow. The dark tail is held horizontally, although in flight the spread tail shows a wide black band above white tips of the outer tail feathers. The call is an undulating rich, trilled, warbling mix of clear sharp whistles and mellow notes. The alarm call is a harsh churring chatter. The Speckled Warbler has a patchy distribution throughout south-eastern Queensland, the eastern half of NSW and into Victoria, as far west as the Grampians. The species is most frequently reported from the hills and tablelands of the Great Dividing Range, and rarely from the coast. There has been a decline in population density throughout its range, with the decline exceeding 40% where no vegetation remnants larger than 100 ha survive.	1	Marginal	Low
Climacteris picumnus victoriae Brown Treecreeper (eastern subspecies)	V		The Brown Treecreeper is endemic to eastern Australia and occurs in eucalypt forests and woodlands of inland plains and slopes of the Great Dividing Range. It is less commonly found on coastal plains and ranges. The western boundary of the range of *Climacteris picumnus victoriae* runs approximately through Corowa, Wagga Wagga, Temora, Forbes, Dubbo and Inverell and along this line the subspecies intergrades with the arid zone subspecies of Brown Treecreeper *Climacteris picumnus picumnus* which then occupies the remaining parts of the state. The eastern subspecies lives in eastern NSW in	6	Marginal	Low

Species	BC Act/ FM Act	EPBC Act	Description of habitat[1]	Number of records (Bionet)	Presence of habitat	Likelihood of occurrence
			eucalypt woodlands through central NSW and in coastal areas with drier open woodlands such as the Snowy River Valley, Cumberland Plains, Hunter Valley and parts of the Richmond and Clarence Valleys.The population density of this subspecies has been greatly reduced over much of its range, with major declines recorded in central NSW and the northern and southern tablelands. Declines have occurred in remnant vegetation fragments smaller than 300 hectares that have been isolated or fragmented for more than 50 years. Found in eucalypt woodlands (including Box-Gum Woodland) and dry open forest of the inland slopes and plains inland of the Great Dividing Range; mainly inhabits woodlands dominated by stringybarks or other rough-barked eucalypts, usually with an open grassy understorey, sometimes with one or more shrub species; also found in mallee and River Red Gum (*Eucalyptus camaldulensis*) Forest bordering wetlands with an open understorey of acacias, saltbush, lignum, cumbungi and grasses; usually not found in woodlands with a dense shrub layer; fallen timber is an important habitat component for foraging; also recorded, though less commonly, in similar woodland habitats on the coastal ranges and plains.			
Daphoenositta chrysoptera Varied Sittella	V		The Varied Sittella is a small (10 cm) songbird with a sharp, slightly upturned bill, short tail, barred undertail, and yellow eyes and feet. In flight the orange wing-bar and white rump are prominent. In NSW most individuals have a grey head and are streaked with dark brown, but in the extreme north-east they have a white head, and in the extreme south-west a black cap. Varied Sittellas are more active and acrobatic among branches than the larger treecreepers. They fly into the heads of trees, typically working their way down branches and trunk with constant motion. The Varied Sittella is sedentary and inhabits most of mainland Australia except	35	Marginal	Low

Species	BC Act/ FM Act	EPBC Act	Description of habitat[1]	Number of records (Bionet)	Presence of habitat	Likelihood of occurrence
			the treeless deserts and open grasslands. Distribution in NSW is nearly continuous from the coast to the far west. The Varied Sittella's population size in NSW is uncertain but is believed to have undergone a moderate reduction over the past several decades.			
Dasyornis brachypterus Eastern Bristlebird		E	Cryptic in nature, Eastern Bristlebirds are medium-sized, long-tailed, brown and rufous birds. They are shy and cryptic and mostly occur in dense, coastal vegetation. Although secretive, they are occasionally seen scampering across open clearings and are easily located by their loud, melodic song and a harsh, sharp alarm-call. The plumage of the Eastern Bristlebird is dull brownish above and lighter grey below, with rufous wings. The tail comprises about half the bird's total length of 21 cm and may appear to be distinctively frayed. The wings are very short and rounded. The legs are long and strong. The face is paler and the eye is bright red. The strong 'bristles' at the base of the bill can be seen at close range. The distribution of the Eastern Bristlebird has contracted to three disjunct areas of south-eastern Australia. There are three main populations: Northern - southern Queensland/northern NSW, Central - Barren Ground NR, Budderoo NR, Woronora Plateau, Jervis Bay NP, Booderee NP and Beecroft Peninsula and Southern - Nadgee NR and Croajingalong NP in the vicinity of the NSW/Victorian border. Two eggs are laid during August to February; producing more than one clutch a year is rare, and recruitment into the population is low. Nests are elliptical domes constructed on or near the ground amongst dense vegetation Habitat for central and southern populations is characterised by dense, low vegetation including heath and open woodland with a heathy understorey. In northern NSW the habitat occurs in open forest with dense tussocky grass understorey and sparse mid-storey near rainforest ecotone; all of these	0	Absent	Low

Species	BC Act/ FM Act	EPBC Act	Description of habitat[1]	Number of records (Bionet)	Presence of habitat	Likelihood of occurrence
			vegetation types are fire prone.			
Ephippiorhynchus asiaticus Black-necked Stork	E		The Black-necked Stork is the only species of stork found in Australia. The distinctive black-and-white waterbird stands an impressive 1.3m tall and has a wingspan of around 2m. The head and neck are black with an iridescent green and purple sheen. The massive bill, short tail and parts of the wings are also black and the long legs are a conspicuous orange-red to bright red. The rest of the body is white. Females have a yellow eye, the males dark-brown. Juvenile birds are generally brown. Black-necked Storks are usually seen singly or in pairs in NSW, occasionally in loose family groups. In flight, they may intersperse their slow, heavy wingbeats with short glides, or soar on thermals. Storks are generally silent. The species *Ephippiorhynchus asiaticus* comprises two subspecies, *E. a. asiaticus* in India and south-east Asia, and *E. a. australis* in Australia and New Guinea. In Australia, Black-necked Storks are widespread in coastal and subcoastal northern and eastern Australia, as far south as central NSW (although vagrants may occur further south or inland, well away from breeding areas). In NSW, the species becomes increasingly uncommon south of the Clarence Valley, and rarely occurs south of Sydney. Since 1995, breeding has been recorded as far south as Buladelah.	18	Absent	Low
Epthianura albifrons White-fronted Chat	V		The White-fronted Chat is an endemic Australian passerine bird, 12 cm in length and weighing approximately 13 g. It has a short slender bill, long spindly legs, a short square-tipped tail and rounded wings. Classified as a honeyeater it is most similar in form to its close relatives, the Orange Chat, Yellow Chat and Crimson Chat from which it is easily distinguished by its black and white colouration. The male's plumage is more striking than the females; juvenile plumage is most similar to the female. A distinctive 'tang, tang' is used as a contact call. The White-fronted Chat is found across the	1	Marginal	Low

Species	BC Act/ FM Act	EPBC Act	Description of habitat[1]	Number of records (Bionet)	Presence of habitat	Likelihood of occurrence
			southern half of Australia, from southernmost Queensland to southern Tasmania, and across to Western Australia as far north as Carnarvon. Found mostly in temperate to arid climates and very rarely sub-tropical areas, it occupies foothills and lowlands up to 1000 m above sea level. In NSW, it occurs mostly in the southern half of the state, in damp open habitats along the coast, and near waterways in the western part of the state. Along the coastline, it is found predominantly in saltmarsh vegetation but also in open grasslands and sometimes in low shrubs bordering wetland areas.			
Erythrotriorchis radiatus Red Goshawk		V	The Red Goshawk is a large, reddish-brown hawk with long and broad wings, deeply 'fingered' wing-tips, and heavy yellow legs. This unique Australian endemic raptor is distributed sparsely through northern and eastern Australia, from the western Kimberley Division of northern Western Australia to north-eastern Queensland and south to far north-eastern NSW, and with scattered records in central Australia. The species is very rare in NSW, extending south to about 30°S, with most records north of this, in the Clarence River Catchment, and a few around the lower Richmond and Tweed Rivers. Formerly, it was at least occasionally reported as far south as Port Stephens. Red Goshawks inhabit open woodland and forest, preferring a mosaic of vegetation types, a large population of birds as a source of food, and permanent water, and are often found in riparian habitats along or near watercourses or wetlands. In NSW, preferred habitats include mixed subtropical rainforest, Melaleuca swamp forest and riparian Eucalyptus forest of coastal rivers. Adults appear to occupy territories throughout the year and breeding territories are traditionally used from year to year. Adults have large home-ranges, estimated in the Northern Territory to be as great as about 120 km2 for females and	0	Marginal	Low

Species	BC Act/ FM Act	EPBC Act	Description of habitat[1]	Number of records (Bionet)	Presence of habitat	Likelihood of occurrence
			200 km2 for males. Red Goshawks mainly eat medium to large birds, including species as large as Australian Brush-turkeys, Kookaburras, Tawny Frogmouths, Sulphur-crested Cockatoos and Rainbow Lorikeets, but they also take mammals, reptiles and insects. Red Goshawks usually hunt from concealed or, less often, exposed perches, but also fly close above or through forest or woodland searching for prey. They often hunt from perches early in the morning and late in the day and tend to hunt more on the wing at other times of the day. The breeding behaviour of Red Goshawks is not well known. Breeding is likely to be in spring and summer in southern Queensland and NSW. The birds lay clutches of 1-2 eggs between July and September, in a stick nest in a tall tree (>20 m tall) within 1 km of a watercourse or wetland. Young fledge around November and December. In winter in eastern Australia, the birds appear to move from nesting sites in the ranges to coastal plains, where they are associated with permanent wetlands.			
Falco subniger Black Falcon	V		The Black Falcon is widely, but sparsely, distributed in New South Wales, mostly occurring in inland regions. Some reports of 'Black Falcons' on the tablelands and coast of New South Wales are likely to be referable to the Brown Falcon. In New South Wales there is assumed to be a single population that is continuous with a broader continental population, given that falcons are highly mobile, commonly travelling hundreds of kilometres (Marchant & Higgins 1993). The Black Falcon occurs as solitary individuals, in pairs, or in family groups of parents and offspring.	1	Absent	Low
Glossopsitta pusilla Little Lorikeet	V		The Little Lorikeet is a small (16-19 cm; 40 g) bright green parrot, with a red face surrounding its black bill and extending to the eye. The undertail is olive-yellow with a partly concealed red base, and the underwing coverts are bright green. The mantle is imbued with light brown. The call	50	Present	Low

Species	BC Act/ FM Act	EPBC Act	Description of habitat[1]	Number of records (Bionet)	Presence of habitat	Likelihood of occurrence
			in flight is diagnostically different from other lorikeets, being a shrill and rolling screech: 'zit-zit' or 'zzet'. Although difficult to observe while foraging high in treetops, a flock's constantly chattering contact calls give it away. Flight is fast, direct and through or above the canopy. The Little Lorikeet is distributed widely across the coastal and Great Divide regions of eastern Australia from Cape York to South Australia. NSW provides a large portion of the species' core habitat, with lorikeets found westward as far as Dubbo and Albury. Nomadic movements are common, influenced by season and food availability, although some areas retain residents for much of the year and 'locally nomadic' movements are suspected of breeding pairs.			
Grantiella picta Painted Honeyeater		V	The Painted Honeyeater is small (16 cm) and distinctive, with a black head and back and white underparts with dark streaks on the flanks. The wings and tail are black with bright yellow edgings. The distinctive bill is pink with a dark tip. The female is greyer on the upperparts and has less streaking on the flanks. The Painted Honeyeater is nomadic and occurs at low densities throughout its range. The greatest concentrations of the bird and almost all breeding occurs on the inland slopes of the Great Dividing Range in NSW, Victoria and southern Queensland. During the winter it is more likely to be found in the north of its distribution. Inhabits Boree/ Weeping Myall (*Acacia pendula*), Brigalow (*A. harpophylla*) and Box-Gum Woodlands and Box-Ironbark Forests. A specialist feeder on the fruits of mistletoes growing on woodland eucalypts and acacias. Prefers mistletoes of the genus Amyema. Nest from spring to autumn in a small, delicate nest hanging within the outer canopy of drooping eucalypts, she-oak, paperbark or mistletoe branches.	0	Marginal	Low
Haematopus	V		The Sooty Oystercatcher is an unmistakable, large wader,	1	Absent	Low

Species	BC Act/ FM Act	EPBC Act	Description of habitat[1]	Number of records (Bionet)	Presence of habitat	Likelihood of occurrence
fuliginosus Sooty Oystercatcher			reaching 50 cm in length. Like the Pied Oystercatcher, the Sooty Oystercatcher has a bright orange-red bill, eye-ring and iris, and coral pink legs and feet. However, the Sooty Oystercatcher has entirely black plumage. Sexes are separable when together, with the female having a longer, more slender bill. The call is similar to the Pied Oystercatcher's, although sharper and more piercing. Gives a loud whistling call before taking flight, and a piercing call if an intruder approaches the nest. Sooty Oystercatchers are found around the entire Australian coast, including offshore islands, being most common in Bass Strait. Small numbers of the species are evenly distributed along the NSW coast. The availability of suitable nesting sites may limit populations.			
Haematopus longirostris Pied Oystercatcher	E		The Pied Oystercatcher is an unmistakable, large, black and white wader, reaching 50 cm in length. The sexes are similar, yet may be separable when together with the female having a slightly longer, more slender bill. When not in flight, the Pied Oystercatcher appears entirely black above, with white underparts. The back, head and breast are black, and the belly, rump and tail are white. The tail is tipped black. The wings are black with a narrow white bar on the upperwing and white underwing coverts. The eye-ring, iris and bill of the Pied Oystercatcher are brilliant scarlet and its legs are stout and coral pink. The most often heard call is a loud, sharp, high-pitched 'kurvee-kurvee-kurvee', usually given in alarm, which increases in pitch and rapidity when a nest site is approached. The South Island Pied Oystercatcher (*H. finschi*) has recently been recorded as a vagrant in NSW. This New Zealand native can be distinguished by a combination of subtle differences, including a shorter bill and legs and differences in the extent of white on the back and wings. The species is distributed around the entire Australian coastline, although it is most common in coastal Tasmania and parts of	3	Absent	Low

Species	BC Act/ FM Act	EPBC Act	Description of habitat[1]	Number of records (Bionet)	Presence of habitat	Likelihood of occurrence
			Victoria, such as Corner Inlet. In NSW the species is thinly scattered along the entire coast, with fewer than 200 breeding pairs estimated to occur in the State. 'Pied' Oystercatchers are occasionally recorded on Lord Howe island but it is uncertain which species is involved.			
Haliaeetus leucogaster White-bellied Sea-Eagle	V	Marine	White-bellied Sea-Eagles are a common sight in coastal and near coastal areas of Australia. Birds form permanent pairs that inhabit territories throughout the year. Their loud "goose-like" honking call is a familiar sound, particularly during the breeding season. Birds are normally seen, perched high in a tree, or soaring over waterways and adjacent land. In addition to Australia, the species is found in New Guinea, Indonesia, China, south-east Asia and India. The White-bellied Sea-Eagle feeds mainly off aquatic animals, such as fish, turtles and sea snakes, but it takes birds and mammals as well. It is a skilled hunter, and will attack prey up to the size of a swan. Sea-Eagles also feed on carrion (dead prey) such as sheep and fish along the waterline. They harass smaller birds, forcing them to drop any food that they are carrying. Sea-Eagles feed alone, in pairs or in family groups. White-bellied Sea-Eagles build a large stick nest, which is used for many seasons in succession. The nest can be located in a tree up to 30m above the ground, but may be also be placed on the ground or on rocks, where there are no suitable trees. At the start of the breeding season (May to October), the nest is lined with fresh green leaves and twigs. The female carries out most of the incubation of the two white eggs, but the male performs this duty from time to time.	35	Marginal	Low
Hieraaetus morphnoides Little Eagle	V		The Little Eagle is a medium-sized bird of prey that occurs in two colour forms: either pale brown with an obscure underwing pattern, or dark brown on the upper parts and pale underneath, with a rusty head and a distinctive	2	Marginal	Low

Species	BC Act/ FM Act	EPBC Act	Description of habitat[1]	Number of records (Bionet)	Presence of habitat	Likelihood of occurrence
			underwing pattern of rufous leading edge, pale 'M' marking and black-barred wingtips. Both forms have a black-streaked head with a slight crest, a pale shoulder band on the upperwings, a rather short and square-tipped barred tail, and feathered legs. The Little Eagle is found throughout the Australian mainland excepting the most densely forested parts of the Dividing Range escarpment. It occurs as a single population throughout NSW.			
Ixobrychus flavicollis Black Bittern	V		The Black Bittern is a heron, dark grey to black in colour, with buff streaks on the throat and a characteristic yellow streak on the sides of the head and down the neck. The female is paler than the male, with a more yellow wash on the underparts. The species has a characteristic booming call that is mainly heard during the breeding season, at day or night. The colour alone readily distinguishes it from the other two much paler bittern species. The Black Bittern has a wide distribution, from southern NSW north to Cape York and along the north coast to the Kimberley region. The species also occurs in the south-west of Western Australia. In NSW, records of the species are scattered along the east coast, with individuals rarely being recorded south of Sydney or inland.	5	Absent	Low
Lathamus discolour Swift Parrot	E	CE	The Swift Parrot is small parrot about 25 cm long. It is bright green with red around the bill, throat and forehead. The red on its throat is edged with yellow. Its crown is blue-purple. There are bright red patches under the wings. One of most distinctive features from a distance is its long (12 cm), thin tail, which is dark red. This distinguishes it from the similar lorikeets, with which it often flies and feeds. Can also be recognised by its flute-like chirruping or metallic "kik-kik-kik" call. Breeds in Tasmania during spring and summer, migrating in the autumn and winter months to south-eastern Australia from Victoria and the eastern parts of South Australia to	25	Marginal	Low

Species	BC Act/ FM Act	EPBC Act	Description of habitat[1]	Number of records (Bionet)	Presence of habitat	Likelihood of occurrence
			south-east Queensland. In NSW mostly occurs on the coast and south west slopes. Migrates to the Australian south-east mainland between March and October. No breeding in NSW. Favoured feed trees include winter flowering species such as Swamp Mahogany *Eucalyptus robusta*, Spotted Gum *Corymbia maculata*, Red Bloodwood *C. gummifera*, Mugga Ironbark *E. sideroxylon*, and White Box *E. albens*.			
Lophoictinia isura Square-tailed Kite	V		The Square-tailed Kite is a reddish, medium-sized, long-winged raptor, about the size of a Little Eagle or harrier. Adults have a white face with thick black streaks on the crown and finer streaks elsewhere. The saddle, rump and central upper tail coverts are blackish with grey-brown barring. The underparts are predominantly grey-brown with black tips on the grey, square-tipped tail and wing edges. A key character in flight is the long fingered, upswept wings with a large white patch at the base of the barred 'fingers'. The Square-tailed Kite ranges along coastal and subcoastal areas from south-western to northern Australia, Queensland, NSW and Victoria. In NSW, scattered records of the species throughout the state indicate that the species is a regular resident in the north, north-east and along the major west-flowing river systems. It is a summer breeding migrant to the south-east, including the NSW south coast, arriving in September and leaving by March.	2	Marginal	Low
Neophema pulchella Turquoise Parrot	V		The male Turquoise Parrot is a highly distinctive bird with bright green upperparts and a turquoise-blue crown and face. Its shoulders are turquoise-blue, grading to deep blue at the flight-feathers. It has a chestnut-red patch on the upper-wing. The upper-breast of the Turquoise Parrot has an orange tint, while the yellow abdomen may have an orange centre. Females and immature individuals are generally duller, have whitish lores, a green, rather than yellow throat and breast and no red on the shoulder and upper-wing area.	4	Marginal	Low

Species	BC Act/ FM Act	EPBC Act	Description of habitat[1]	Number of records (Bionet)	Presence of habitat	Likelihood of occurrence
			It should not be confused with other parrots in the region. The call of the Turquoise Parrot in flight is a tinkling sound, while at other times it may emit a sharp "sit-sit" alarm call. The Turquoise Parrot's range extends from southern Queensland through to northern Victoria, from the coastal plains to the western slopes of the Great Dividing Range.			
Ninox connivens Barking Owl	V		The Barking Owl is medium-sized owl (42 cm, 650 g), smaller than the similar Powerful Owl and larger than the Southern Boobook. It has bright yellow eyes and no facial-disc. Upperparts are brown or greyish-brown, and the white breast is vertically streaked with brown. The large talons are yellow. Males are typically larger than their mate and have a more square crown. The quick, dog-like 'wook-wook' territorial call is diagnostic, but the yapping of foxes and dogs is sometimes attributed to this species. Pairs of birds perform call-and-answer duets, the male's tone being the deeper, which often rise to an excited rapid pitch. This species is also famous for a rarely use high-pitched tremulous scream that has earned it the name 'screaming-woman bird'. The Barking Owl is found throughout continental Australia except for the central arid regions. Although common in parts of northern Australia, the species has declined greatly in southern Australia and now occurs in a wide but sparse distribution in NSW. Core populations exist on the western slopes and plains and in some northeast coastal and escarpment forests. Many populations crashed as woodland on fertile soils was cleared over the past century, leaving linear riparian strips of remnant trees as the last inhabitable areas. Surveys in 2001 demonstrated that the Pilliga Forest supported the largest population in southern Australia. The owls sometimes extend their home range into urban areas, hunting birds in garden trees and insects attracted to streetlights.	1	Absent	Low

Species	BC Act/ FM Act	EPBC Act	Description of habitat[1]	Number of records (Bionet)	Presence of habitat	Likelihood of occurrence
Ninox strenua Powerful Owl	V		The Powerful Owl is endemic to eastern and south-eastern Australia, mainly on the coastal side of the Great Dividing Range from Mackay to south-western Victoria. In NSW the Powerful Owl lives in forests and woodlands occurring in the coastal, escarpment, tablelands and western slopes environments. Specific habitat requirements include eucalypt forests and woodlands on productive sites on gentle terrain; a mosaic of moist and dry types, with mesic gullies and permanent streams; presence of leafy sub-canopy trees or tall shrubs for roosting; presence of large old trees to provide nest hollows. Optimal habitat includes a tall shrub layer and abundant hollows supporting high densities of arboreal marsupials. Roosts in groves of dense mid-canopy trees or tall shrubs in sheltered gullies, typically on wide creek flats and at the heads of minor drainage lines, but also adjacent to cliff faces and below dry waterfalls. Species commonly used for roosting include the She-oaks *Allocasuarina* spp., rainforest species such as Coachwood *Ceratopetalum apetalum*, Lilly Pilly *Acmena smithii* and Sassafras *Doryphora sassafras*, Black Wattle *Acacia melanoxylon*, Turpentine *Syncarpia glomulifera* and eucalypts. Roosting sites are commonly among small groves of up to 2 ha of similar-sized trees with dense foliage in the height range 3-15 m. Nests in old hollow eucalypts in unlogged, unburnt gullies and lower slopes within 100 m of streams or minor drainage lines, with hollows.	58	Present	Low
Oxyura australis Blue-billed Duck	V		The Blue-billed Duck is endemic to south-eastern and south-western Australia. It is widespread in NSW, but most common in the southern Murray-Darling Basin area. Birds disperse during the breeding season to deep swamps up to 300 km away. It is generally only during summer or in drier years that they are seen in coastal areas. The Blue-billed Duck prefers deep water in large permanent wetlands and	1	Absent	Low

Species	BC Act/ FM Act	EPBC Act	Description of habitat[1]	Number of records (Bionet)	Presence of habitat	Likelihood of occurrence
			swamps with dense aquatic vegetation. The species is completely aquatic, swimming low in the water along the edge of dense cover. It will fly if disturbed, but prefers to dive if approached. Blue-billed Ducks will feed by day far from the shore, particularly if dense cover is available in the central parts of the wetland. They feed on the bottom of swamps eating seeds, buds, stems, leaves, fruit and small aquatic insects such as the larvae of midges, caddisflies and dragonflies. Blue-billed Ducks are partly migratory, with short-distance movements between breeding swamps and overwintering lakes with some long-distance dispersal to breed during spring and early summer. Blue-billed Ducks usually nest solitarily in Cumbungi over deep water between September and February. They will also nest in trampled vegetation in Lignum, sedges or Spike-rushes, where a bowl-shaped nest is constructed. The most common clutch size is five or six. Males take no part in nest-building or incubation. Young birds disperse in April-May from their breeding swamps in inland NSW to non-breeding areas on the Murray River system and coastal lakes.			
Pandion cristatus Eastern Osprey	V		The Eastern Osprey is a large, water-dependent bird of prey, distinctive in flight and when perched. Despite its wing-span of up to 1.7 m, it is noticeably smaller than the White-bellied Sea-eagle. In flight it can be recognised by its distinctly bowed wings that are dark brown above, and barred underneath, and with white underwing coverts. Perched, the upperparts are dark brown and the underparts are white. The female has a dark streaky collar. The head is mainly white with a blackish stripe through the eye. The Osprey has a global distribution with four subspecies previously recognised throughout its range. However, recent studies have identified that there are two species of Osprey - the Western Osprey (*P. halietus*) with three subspecies occurring	9	Absent	Low

Species	BC Act/ FM Act	EPBC Act	Description of habitat[1]	Number of records (Bionet)	Presence of habitat	Likelihood of occurrence
			in Europe, Asia and the Americas and the Eastern Osprey (*P. cristatus*) occurring between Sulawesi (in Indonesia), Australia and New Caledonia. Eastern Ospreys are found right around the Australian coast line, except for Victoria and Tasmania. They are common around the northern coast, especially on rocky shorelines, islands and reefs. The species is uncommon to rare or absent from closely settled parts of south-eastern Australia. There are a handful of records from inland areas.			
Petroica boodang Scarlet Robin	V		The Scarlet Robin is a small Australian robin that reaches 13 cm in length. The male has a black head and upperparts, with a conspicuous white forehead patch, white wing stripes and white tail-edges. The male has a bright scarlet-red chest and a white belly. The female is pale brown, darker above, and has a dull reddish breast and whitish throat. The whitish mark on the female's forehead is smaller than the male's. The female Scarlet Robin also has white wing and tail markings. Immature males resemble females. The main call of Scarlet Robin is a soft, warbling trill. The Scarlet Robin is found from south east Queensland to south east South Australia and also in Tasmania and south west Western Australia. In NSW, it occurs from the coast to the inland slopes. After breeding, some Scarlet Robins disperse to the lower valleys and plains of the tablelands and slopes. Some birds may appear as far west as the eastern edges of the inland plains in autumn and winter.	3	Marginal	Low
Pomatostomus temporalis temporalis Grey-crowned Babbler (eastern subspecies)	V		The Grey-crowned Babbler is the largest of the four Australian babblers, reaching to 30 cm long. Its distinctive bill is scimitar-shaped, long and heavy. The broad white eyebrow and a pale grey crown-stripe are other distinguishing characters. A dark band passes from the bill through the eye, separating the pale throat and brow to giving a 'masked' look. It has dark greyish-brown upperparts and is paler brown	1	Absent	Low

Species	BC Act/ FM Act	EPBC Act	Description of habitat[1]	Number of records (Bionet)	Presence of habitat	Likelihood of occurrence
			on the underparts, grading to a whitish throat. It is distinctive in flight, showing white tips to the tail feathers, and orange-buff patches in the broad, rounded wings. Young birds have dark brown eyes, with the iris becoming paler with age, reaching a yellow colour by about three years. This species has a loud and often repeated 'ya-hoo' call which is a duet between the male and female (the female says 'ya' and the male answers with 'hoo'). It is used to maintain the bond between the pair and as a territorial call. The 'ya-hoo' duet sequence is repeated rapidly, up to thirty times in a row. The Grey-crowned Babbler is distinctly larger than the three other babbler species and is also the only one to possess the distinctive rufous wing patches. The Grey-crowned Babbler has two distinctive subspecies that intergrade to the south of the Gulf of Carpentaria. West of here the subspecies rubeculus, formerly considered a separate species (Red-breasted Babbler) is still widespread and common. The eastern subspecies (*temporalis* occurs from Cape York south through Queensland, NSW and Victoria and formerly to the south east of South Australia. This subspecies also occurs in the Trans-Fly Region in southern New Guinea. In NSW, the eastern sub-species occurs on the western slopes of the Great Dividing Range, and on the western plains reaching as far as Louth and Balranald. It also occurs in woodlands in the Hunter Valley and in several locations on the north coast of NSW. It may be extinct in the southern, central and New England tablelands.			
Ptilinopus regina Rose-crowned Fruit-Dove	V		Rose-crowned Fruit-doves are small, colourful rainforest pigeons to 24 cm in length. Males have a rose crown edged with yellow, and the head and breast are blue-grey, spotted white. The upper parts are grey-green, the tail-tip yellow and the abdomen are orange. Females are mostly grey-green. The call is a loud, explosive, repeated 'hookcoo' which becomes	2	Marginal	Low

Species	BC Act/ FM Act	EPBC Act	Description of habitat[1]	Number of records (Bionet)	Presence of habitat	Likelihood of occurrence
			faster and on declining notes as a rapid 'coocoocoocoocoo'. Coast and ranges of eastern NSW and Queensland, from Newcastle to Cape York. Vagrants are occasionally found further south to Victoria.			
Ptilinopus superbus Superb Fruit-Dove	V		The Superb Fruit-dove is a small pigeon, approximately 24 cm in length. The male is brightly coloured, with golden-green upperparts, a brilliant orange-vermilion neck, and a rich purple crown. The tail is short and tipped with white. The throat and breast are grey with a lilac tinge, and a broad black band on the lower breast separates the grey breast from the creamy-white belly and green flanks. The female is light green on the back, has a small purple spot on the crown, and no dark breast band. The call is a distinctive cooing, rising in pitch and volume to a loud and clear 'whoop, whoop'. Also gives a low 'oom' in a steady sequence. The Superb Fruit-dove occurs principally from north-eastern in Queensland to north-eastern NSW. It is much less common further south, where it is largely confined to pockets of suitable habitat as far south as Moruya. There are records of vagrants as far south as eastern Victoria and Tasmania.	1	Marginal	Low
Rostratula australis Australian Painted Snipe		E	The Australian Painted Snipe is small freshwater wader, with a long bill that droops slightly at the tip. The female has a chestnut-black hood with a bold white eye-patch and a cream stripe along the middle of the crown. The back and wings are patterned bronzy-greenish-grey with a few cream streaks and the underparts are white. The male is slightly smaller and has greyer, less contrasting patterns, but also has large cream spots on the wings. The Australian Painted Snipe is restricted to Australia. Most records are from the south east, particularly the Murray Darling Basin, with scattered records across northern Australia and historical records from around the Perth region in Western Australia. In NSW many records are from the Murray-Darling Basin including the	0	Absent	Low

Species	BC Act/ FM Act	EPBC Act	Description of habitat[1]	Number of records (Bionet)	Presence of habitat	Likelihood of occurrence
			Paroo wetlands, Lake Cowal, Macquarie Marshes, Fivebough Swamp and more recently, swamps near Balldale and Wanganella. Other important locations with recent records include wetlands on the Hawkesbury River and the Clarence and lower Hunter Valleys. Prefers fringes of swamps, dams and nearby marshy areas where there is a cover of grasses, lignum, low scrub or open timber. Nests on the ground amongst tall vegetation, such as grasses, tussocks or reeds. The nest consists of a scrape in the ground, lined with grasses and leaves.			
Stagonopleura guttata Diamond Firetail	V		The Diamond Firetail is a large (length 10 to 12 cm, weight 17 grams), striking finch with a bright red bill, and red eyes and rump. The white throat and lower breast are separated by a broad black breast-band that extends into the strongly white-spotted, black flanks. It has a grey back and head, and ashy-brown wings. The call is a plaintive, drawn-out, nasal 'twoo-wheee'. Flight is low and direct, with slight undulations. Given good views it should not be confused with any other species. The Diamond Firetail is endemic to south-eastern Australia, extending from central Queensland to the Eyre Peninsula in South Australia. It is widely distributed in NSW, with a concentration of records from the Northern, Central and Southern Tablelands, the Northern, Central and South Western Slopes and the North West Plains and Riverina. Not commonly found in coastal districts, though there are records from near Sydney, the Hunter Valley and the Bega Valley. This species has a scattered distribution over the rest of NSW, though is very rare west of the Darling River.	1	Marginal	Low
Sternula albifrons Little Tern	E	C	The Little Tern is a small, slender, migratory or partly migratory seabird. At less than 25 cm long it is two-thirds to half the size of any other south-eastern tern. Pale grey upperparts contrast with the white chest, underbelly and the moderately long, deeply forked tail (80 - 110 mm). The Little	1	Absent	Low

Species	BC Act/ FM Act	EPBC Act	Description of habitat[1]	Number of records (Bionet)	Presence of habitat	Likelihood of occurrence
			Tern has a black cap and black outer wing-edges. During breeding the bill (26 - 32 mm) and legs change from black to yellow, and a black wedge appears from the bill to the eye. During non-breeding, the Little Tern's black cap shrinks to a black nape and its bill becomes black. Migrating from eastern Asia, the Little Tern is found on the north, east and south-east Australian coasts, from Shark Bay in Western Australia to the Gulf of St Vincent in South Australia. In NSW, it arrives from September to November, occurring mainly north of Sydney, with smaller numbers found south to Victoria. It breeds in spring and summer along the entire east coast from Tasmania to northern Queensland, and is seen until May, with only occasional birds seen in winter months.			
Stictonetta naevosa Freckled Duck	V		The Freckled Duck is found primarily in south-eastern and south-western Australia, occurring as a vagrant elsewhere. It breeds in large temporary swamps created by floods in the Bulloo and Lake Eyre basins and the Murray-Darling system, particularly along the Paroo and Lachlan Rivers, and other rivers within the Riverina. The duck is forced to disperse during extensive inland droughts when wetlands in the Murray River basin provide important habitat. The species may also occur as far as coastal NSW and Victoria during such times. Prefer permanent freshwater swamps and creeks with heavy growth of Cumbungi, Lignum or Tea-tree. During drier times they move from ephemeral breeding swamps to more permanent waters such as lakes, reservoirs, farm dams and sewage ponds. Generally rest in dense cover during the day, usually in deep water. Feed at dawn and dusk and at night on algae, seeds and vegetative parts of aquatic grasses and sedges and small invertebrates. Nesting usually occurs between October and December but can take place at other times when conditions are favourable. Nests are usually located in dense vegetation at or near water level.	1	Absent	Low

Species	BC Act/ FM Act	EPBC Act	Description of habitat[1]	Number of records (Bionet)	Presence of habitat	Likelihood of occurrence
Turnix maculosus Red-backed Button-quail	V	•	The Red-backed Button-quail is recorded only infrequently in NSW, with most records from the North Coast Bioregion; there are historical records south as far as Sydney and three outlying records from western NSW (a breeding record from Finley in 1954; the Macquarie Marshes in 1955; and Coolabah in 2000). In NSW, said to occur in grasslands, heath and crops. Said to prefer sites close to water, especially when breeding. The species has been observed associated with the following grasses (in various vegetation formations): speargrass *Heteropogon*, Blady Grass *Imperata cylindrica*, *Triodia*, *Sorghum*, and Buffel Grass *Cenchrus ciliaris*. Observations of populations in other parts of its range suggest the species prefers sites near water, including grasslands and sedgelands near creeks, swamps and springs, and wetlands. Red-backed Button-quail usually breed in dense grass near water, and nests are made in a shallow depression sparsely lined with grass and ground litter. The timing of breeding is not well known. In NSW, clutches recorded October to mid-February, but elsewhere in Australia, clutches recorded from late November to as late as May-June. It appears only the male incubates the clutch and tends the young, which are precocial. Red-backed Button-quail are nocturnal and crepuscular in their activity, and forage on the ground. They eat seeds and insects, but little is known of their diet.	1	Marginal	Low
Tyto novaehollandiae Masked Owl	V		Extends from the coast where it is most abundant to the western plains. Lives in dry eucalypt forests and woodlands from sea level to 1100 m. Habitat for this species is also widespread throughout the dry eucalypt forests of the tablelands, western slopes and the undulating wet-dry forests of the coast. Optimal habitat includes an open understorey and a mosaic of sparse (grassy) and dense (shrubby) ground cover on gentle terrain. Roosts in hollows	37	Absent	Low

Species	BC Act/ FM Act	EPBC Act	Description of habitat[1]	Number of records (Bionet)	Presence of habitat	Likelihood of occurrence
			in live or occasionally dead eucalypts; dense foliage in gullies; and caves. Nest in old hollow eucalypts, live or dead, in a variety of topographic positions, with hollows greater than 40 cm wide and greater than 100 cm deep. Hollow entrances are at least 3 m above ground, in trees of at least 90 cm diameter at breast height. A specialist predator of terrestrial mammals, particularly native rodents. Home range has been estimated as 400-1000 ha according to habitat productivity.			
Tyto tenebricosa Sooty Owl	V		A medium-sized owl to 45 cm long, with dark eyes set in a prominent flat, heart-shaped facial disc. Dark sooty-grey in colour, with large eyes in a grey face, fine white spotting above and below, and a pale belly. The plumage of the fledglings is similar to the adult, but has tufts of down on the head and underparts. Occupies the easternmost one-eighth of NSW, occurring on the coast, coastal escarpment and eastern tablelands. Territories are occupied permanently. Occurs in rainforest, including dry rainforest, subtropical and warm temperate rainforest, as well as moist eucalypt forests. Nests in very large tree-hollows.	37	Marginal	Low
Mammals						
Cercartetus nanus Eastern Pygmy-possum	V		Eastern Pygmy-possums are tiny (15 to 43 grams) active climbers, with almost bare, prehensile (capable of curling and gripping) tails, and big, forward-pointing ears. They are light-brown above and white below. Adults have a head and body length between 70 - 110 mm and a tail length between 75 - 105 mm. The Eastern Pygmy-possum is found in south-eastern Australia, from southern Queensland to eastern South Australia and in Tasmania. In NSW it extents from the coast inland as far as the Pilliga, Dubbo, Parkes and Wagga Wagga on the western slopes.	1	Present	Low
Chalinolobus dwyeri Large-eared Pied Bat	V	V	A small to medium-sized bat with long, prominent ears and glossy black fur. The lower body has broad white fringes	6	Marginal –	Low

Species	BC Act/ FM Act	EPBC Act	Description of habitat[1]	Number of records (Bionet)	Presence of habitat	Likelihood of occurrence
			running under the wings and tail-membrane, meeting in a V-shape in the pubic area. This species is one of the wattled bats, with small lobes of skin between the ears and corner of the mouth. Found mainly in areas with extensive cliffs and caves, from Rockhampton in Queensland south to Bungonia in the NSW Southern Highlands. Roosts in caves (near their entrances), crevices in cliffs, old mine workings and in the disused, bottle-shaped mud nests of the Fairy Martin (*Petrochelidon ariel*), frequenting low to mid-elevation dry open forest and woodland close to these features. Females have been recorded raising young in maternity roosts (c. 20-40 females) from November through to January in roof domes in sandstone caves and overhangs. Can be found in well-timbered areas containing gullies.		Foraging only	
Dasyurus maculatus Spotted-tailed Quoll	V	E	The Spotted-tailed Quoll is about the size of a domestic cat, from which it differs most obviously in its shorter legs and pointed face. The average weight of an adult male is about 3500 grams and an adult female about 2000 grams. It has rich-rust to dark-brown fur above, with irregular white spots on the back and tail, and a pale belly. The spotted tail distinguishes it from all other Australian mammals, including other quoll species. Individual animals use hollow-bearing trees, fallen logs, small caves, rock outcrops and rocky-cliff faces as den sites. Use communal 'latrine sites', often on flat rocks among boulder fields, rocky cliff-faces or along rocky stream beds or banks. Such sites may be visited by multiple individuals and can be recognised by the accumulation of the sometimes characteristic 'twisty-shaped' faeces deposited by animals.	23	Marginal	Low
Falsistrellus tasmaniensis Eastern False Pipistrelle	V		The Eastern False Pipistrelle is relatively large with a head-body length of about 65 mm. It weighs up to 28 grams. It is dark to reddish-brown above and paler grey on its underside. It has long slender ears set well back on the head and some	9	Marginal – Foraging only	Low

Species	BC Act/ FM Act	EPBC Act	Description of habitat[1]	Number of records (Bionet)	Presence of habitat	Likelihood of occurrence
			sparse hair on the nose. The Eastern False Pipistrelle is found on the south-east coast and ranges of Australia, from southern Queensland to Victoria and Tasmania.			
Kerivoula papuensis Golden-tipped Bat	V		The Golden-tipped Bat has dark brown, curly fur with bright golden tips. The distinctively coloured fur extends along the wings, legs and tail. It has a short, pointed, over-hanging muzzle and pointy, funnel-shaped ears. Adults weigh about 6 grams and have a wingspan of about 25 cm. The Golden-tipped Bat is distributed along the east coast of Australia in scattered locations from Cape York Peninsula in Queensland to south of Eden in southern NSW. It also occurs in New Guinea.	13	Marginal – Foraging only	Low
Macropus parma Parma Wallaby	V		Once occurred from north-eastern NSW to the Bega area in the southeast. Their range is now confined to the coast and ranges of central and northern NSW from the Gosford district to the Queensland border. Preferred habitat is moist eucalypt forest with thick, shrubby understorey, often with nearby grassy areas, rainforest margins and occasionally drier eucalypt forest. Typically feed at night on grasses and herbs in more open eucalypt forest and the edges of nearby grassy areas. During the day they shelter in dense cover.	2	Marginal	Low
Miniopterus australis Little Bentwing-bat	V		Moist eucalypt forest, rainforest or dense coastal banksia scrub. Little Bent-wing bats roost in caves, tunnels and sometimes tree hollows during the day, and at night forage for small insects beneath the canopy of densely vegetated habitats. They often share roosting sites with the Common Bent-wing bat and, in winter, the two species may form mixed clusters. In NSW the largest maternity colony is in close association with a large maternity colony of Common Bentwing-bats (*M. schreibersii*) and appears to depend on the large colony to provide the high temperatures needed to rear its young.	94	Marginal – Foraging only	Low

Species	BC Act/ FM Act	EPBC Act	Description of habitat[1]	Number of records (Bionet)	Presence of habitat	Likelihood of occurrence
Miniopterus schreibersii oceanensis Eastern Bentwing-bat	V		Eastern Bent-wing Bats occur along the east and north-west coasts of Australia. Caves are the primary roosting habitat, but also use derelict mines, storm-water tunnels, buildings and other man-made structures. Form discrete populations centred on a maternity cave that is used annually in spring and summer for the birth and rearing of young. Maternity caves have very specific temperature and humidity regimes. At other times of the year, populations disperse within about 300 km range of maternity caves. Cold caves are used for hibernation in southern Australia. Breeding or roosting colonies can number from 100 to 150,000 individuals. Hunt in forested areas, catching moths and other flying insects above the tree tops.	57	Marginal – Foraging only	Low
Mormopterus norfolkensis Eastern Freetail-bat	V		The Eastern Freetail-bat has dark brown to reddish brown fur on the back and is slightly paler below. Like other freetail-bats it has a long (3 - 4 cm) bare tail protruding from the tail membrane. Freetail-bats are also known as mastiff-bats, having hairless faces with wrinkled lips and triangular ears. They weigh up to 10 grams. The Eastern Freetail-bat is found along the east coast from south Queensland to southern NSW.	65	Marginal	Low
Myotis macropus Southern Myotis	V		This species is now most often referred to as *Myotis macropus* or the Southern Myotis, but has previously been called the Large-footed Myotis (*M. adversus*). It has disproportionately large feet; more than 8 mm long, with widely-spaced toes which are distinctly hairy and with long, curved claws. It has dark-grey to reddish brown fur above and is paler below. It weighs up to 15 grams and has a wingspan of about 28 cm. The Southern Myotis is found in the coastal band from the north-west of Australia, across the top-end and south to western Victoria. It is rarely found more than 100 km inland, except along major rivers.	37	Marginal – Foraging only	Low

Species	BC Act/ FM Act	EPBC Act	Description of habitat[1]	Number of records (Bionet)	Presence of habitat	Likelihood of occurrence
Petauroides volans Greater Glider	P	V	The greater glider is the largest gliding possum in Australia, with a head and body length of 35–46 cm and a long furry tail measuring 45–60 cm. The greater glider has thick fur that increases its apparent size. Its fur colour is white or cream below and varies from dark grey, dusky brown through to light mottled grey and cream above. It has large furry ears and a short snout. Arboreal nocturnal marsupial, largely restricted to eucalypt forests and woodlands. It is primarily folivorous, with a diet mostly comprising eucalypt leaves, and occasionally flowers. It is typically found in highest abundance in taller, montane, moist eucalypt forests with relatively old trees and abundant hollows. Favours forests with a diversity of eucalypt species, due to seasonal variation in its preferred tree species.	37	Marginal	Low
Petaurus australis Yellow-bellied Glider	V		The Yellow-bellied Glider is a large, active, sociable and vocal glider. Adults weigh 450 - 700 grams, have a head and body length of about 30 cm and a large bushy tail that is about 45 cm long. It has grey to brown fur above with a cream to yellow belly, which is paler in young animals. The dark stripe down the back is characteristic of the group. It has a large gliding membrane that extends from the wrist to the ankle. It has a loud, distinctive call, beginning with a high-pitched shriek and subsiding into a throaty rattle. The Yellow-bellied Glider is found along the eastern coast to the western slopes of the Great Dividing Range, from southern Queensland to Victoria.	282	Present	Low
Petaurus norfolcensis Squirrel Glider	V		Adult Squirrel Gliders have a head and body length of about 20 cm. They have blue-grey to brown-grey fur above, white on the belly and the end third of the tail is black. There is a dark stripe from between the eyes to the mid-back and the tail is soft and bushy averaging about 27 cm in length. Squirrel Gliders are up to twice the size of Sugar Gliders, their facial markings are more distinct and they nest in bowl-	154	Present	Low

Species	BC Act/ FM Act	EPBC Act	Description of habitat[1]	Number of records (Bionet)	Presence of habitat	Likelihood of occurrence
			shaped, leaf lined nests in tree hollows. Squirrel Gliders are also less vocal than Sugar Gliders.			
Petrogale penicillata Brush-tailed Rock-wallaby	E	V	The range of the Brush-tailed Rock-wallaby extends from south-east Queensland to the Grampians in western Victoria, roughly following the line of the Great Dividing Range. The species' range is now fragmented, particularly in the south where they are now mostly found as small isolated populations dotted across their former range. In NSW they occur from the Queensland border in the north to the Shoalhaven in the south, with the population in the Warrumbungle Ranges being the western limit. Occupy rocky escarpments, outcrops and cliffs with a preference for complex structures with fissures, caves and ledges facing north. Throughout their range, Brush-tailed Rock-wallabies feed on a wide variety of grasses and shrubs, and have flexible dietary requirements. Shelter or bask during the day in rock crevices, caves and overhangs and are most active at night. Highly territorial and have strong site fidelity with an average home range size of about 15 ha. Live in family groups of 2 – 5 adults and usually one or two juvenile and sub-adult individuals. Dominant males associate and breed with up to four females. Breeding is likely to be continuous, at least in the southern populations, with no apparent seasonal trends in births.	4	Absent	Low
Phascogale tapoatafa Brush-tailed Phascogale	V		The Brush-tailed Phascogale is tree-dwelling marsupial carnivore. The Brush-tailed Phascogale has a patchy distribution around the coast of Australia. In NSW it is mainly found east of the Great Dividing Range although there are occasional records west of the divide. Prefer dry sclerophyll open forest with sparse groundcover of herbs, grasses, shrubs or leaf litter. Also inhabit heath, swamps, rainforest and wet sclerophyll forest. Agile climber foraging preferentially in rough barked trees of 25 cm DBH or greater.	2	Present	Low

Species	BC Act/ FM Act	EPBC Act	Description of habitat[1]	Number of records (Bionet)	Presence of habitat	Likelihood of occurrence
			Feeds mostly on arthropods but will also eat other invertebrates, nectar and sometimes small vertebrates. Females have exclusive territories of approximately 20 - 40 ha, while males have overlapping territories often greater than 100 ha. Nest and shelter in tree hollows with entrances 2.5 - 4 cm wide and use many different hollows over a short time span. Mating occurs May - July; males die soon after the mating season whereas females can live for up to three years but generally only produce one litter.			
Phascolarctos cinereus Koala	V	V	The Koala is an arboreal marsupial with fur ranging from grey to brown above, and is white below. It has large furry ears, a prominent black nose and no tail. It spends most of its time in trees and has long, sharp claws, adapted for climbing. Adult males weigh 6 - 12 kg and adult females weigh 5 - 8 kg. During breeding, males advertise with loud snarling coughs and bellows. In NSW it mainly occurs on the central and north coasts with some populations in the west of the Great Dividing Range. Inhabit eucalypt woodlands and forests. Generally solitary, but have complex social hierarchies based on a dominant male with a territory overlapping several females and sub-ordinate males on the periphery.	19	Absent	Low
Potorous tridactylus Long-nosed Potoroo	V	V	Adult long-nosed potoroos weigh up to 1.6 kg (740 - 1640 grams) and have a head and body length of about 360 mm and a tail length between 200 - 260 mm. Its fur is greyish-brown above and light grey below. It is distinguished from the slightly larger, but very similar long-footed potoroo in a number of subtle ways including its shorter tail (less than 250 mm long) and smaller hind-foot (shorter than its head). Also, unlike the long-footed potoroo the long-nosed potoroo lacks a leathery pad on the sole of its foot, just behind the inner toe (a hallucal pad). In NSW it is generally restricted to coastal heaths and forests east of the Great Dividing Range, with an annual rainfall exceeding 760 mm. Inhabits coastal	2	Present	Low

Species	BC Act/ FM Act	EPBC Act	Description of habitat[1]	Number of records (Bionet)	Presence of habitat	Likelihood of occurrence
			heaths and dry and wet sclerophyll forests. Dense understorey with occasional open areas is an essential part of habitat, and may consist of grass-trees, sedges, ferns or heath, or of low shrubs of tea-trees or melaleucas. A sandy loam soil is also a common feature. Breeding peaks typically occur in late winter to early summer and a single young is born per litter. Adults are capable of two reproductive bouts per annum.			
Pseudomys gracilicaudatus Eastern Chestnut Mouse	V		The Eastern Chestnut Mouse is a large, stocky mouse, up to twice the body length of a House Mouse, and three to four times the weight. It is chestnut-brown above and grey underneath. Its feet, which have long brown hairs on top and are pale beneath, distinguish it from the similar and coexisting Swamp Rat *Rattus lutreolus*, which has all-dark feet, and the Bush Rat *Rattus fuscipes*, with pink feet. Its sparsely hairy tail also differs from the naked tails of the two rats. In NSW the Eastern Chestnut Mouse mainly occurs north from the Hawkesbury River area as scattered records along to coast and eastern fall of the Great Dividing Range extending north into Queensland. There are however isolated records in the Jervis bay area.	1	Marginal	Low
Pseudomys novaehollandiae New Holland Mouse	P	V	The New Holland Mouse is a small native rodent similar in size and appearance to the introduced House Mouse. It can be distinguished from the House Mouse by its dusky-brown tail which is longer than the rest of the body and darker on the dorsal surface, the absence of a notch on the upper incisors, and the absence of a distinctive 'mousy' odour. Known to inhabit open heathlands, woodlands and forests with a heathland understorey and vegetated sand dunes.	3	Absent	Low
Pteropus poliocephalus Grey-headed Flying-fox	V	V	The Grey-headed Flying-fox is the largest Australian bat, with a head and body length of 23 - 29 cm. It has dark grey fur on the body, lighter grey fur on the head and a russet collar	93	Present – Foraging only	Low

Species	BC Act/ FM Act	EPBC Act	Description of habitat[1]	Number of records (Bionet)	Presence of habitat	Likelihood of occurrence
			encircling the neck. The wing membranes are black and the wingspan can be up to 1 m. It can be distinguished from other flying-foxes by the leg fur, which extends to the ankle. Grey-headed Flying-foxes are generally found within 200 km of the eastern coast of Australia. Occur in subtropical and temperate rainforests, tall sclerophyll forests and woodlands, heaths and swamps as well as urban gardens and cultivated fruit crops. Roosting camps are generally located within 20 km of a regular food source and are commonly found in gullies, close to water, in vegetation with a dense canopy. Annual mating commences in January and conception occurs in April or May; a single young is born in October or November.			
Saccolaimus flaviventris Yellow-bellied Sheathtail-bat	V		The Yellow-bellied Sheathtail-bat is a wide-ranging species found across northern and eastern Australia. In the most southerly part of its range - most of Victoria, south-western NSW and adjacent South Australia - it is a rare visitor in late summer and autumn. There are scattered records of this species across the New England Tablelands and North West Slopes. Roosts singly or in groups of up to six, in tree hollows and buildings; in treeless areas they are known to utilise mammal burrows. When foraging for insects, flies high and fast over the forest canopy, but lower in more open country. Forages in most habitats across its very wide range, with and without trees; appears to defend an aerial territory. Breeding has been recorded from December to mid-March, when a single young is born. Seasonal movements are unknown; there is speculation about a migration to southern Australia in late summer and autumn.	5	Marginal – Foraging only	Low
Scoteanax rueppellii Greater Broad-nosed Bat	V		The Greater Broad-nosed Bat is a large powerful bat, up to 95 mm long, with a broad head and a short square muzzle. It is dark reddish-brown to mid-brown above and slightly paler below. It is distinguished from other broad-nosed bats by its	34	Marginal – Foraging only	Low

Species	BC Act/ FM Act	EPBC Act	Description of habitat[1]	Number of records (Bionet)	Presence of habitat	Likelihood of occurrence
			greater size. While similar to the Eastern False Pipistrelle *Falsistrellus tasmaniensis*, it differs by having only two (not four) upper incisors. The Greater Broad-nosed Bat is found mainly in the gullies and river systems that drain the Great Dividing Range, from north-eastern Victoria to the Atherton Tableland. It extends to the coast over much of its range. In NSW it is widespread on the New England Tablelands, however does not occur at altitudes above 500 m.			
Vespadelus troughtoni Eastern Cave Bat	V		The Eastern Cave Bat is found in a broad band on both sides of the Great Dividing Range from Cape York to Kempsey, with records from the New England Tablelands and the upper north coast of NSW. The western limit appears to be the Warrumbungle Range, and there is a single record from southern NSW, east of the ACT. A small chestnut-brown bat with rufous tones on the head, and darker wings. It has smallish, conical ears and a short, up-tipped nose. The species is very difficult to separate from several other closely related species that occur in similar areas.	1	Marginal – Foraging only	Low
Migratory						
Apus pacificus Fork-tailed Swift		M	In NSW, the Fork-tailed Swift is recorded in all regions. Many records occur east of the Great Divide, however, a few populations have been found west of the Great Divide. These are widespread but scattered further west of the line joining Bourke and Dareton. Sightings have been recorded at Milparinka, the Bulloo River and Thurloo Downs	0	Absent	Low
Cuculus optatus Oriental Cuckoo		M	The exact extent of its wintering range is uncertain due to its secretive habits and the difficulty of separating it from the Himalayan cuckoo and other similar species. It is believed to include the Malay Peninsula, Indonesia, the Philippines, New Guinea, western Micronesia, the Solomon Islands and northern and eastern Australia with occasional birds reaching New Zealand. It has occurred as a vagrant in Ukraine, Israel			

Species	BC Act/ FM Act	EPBC Act	Description of habitat[1]	Number of records (Bionet)	Presence of habitat	Likelihood of occurrence
			and Alaska. It mainly inhabits forests, occurring in coniferous, deciduous and mixed forest.			
Hirundapus caudacutus White-throated Needletail		M	White-throated Needletails often occur in large numbers over eastern and northern Australia. They arrive in Australia from their breeding grounds in the northern hemisphere in about October each year and leave somewhere between May and August. The White-throated Needletail feeds on flying insects, such as termites, ants, beetles and flies. It has now been observed that birds will roost in trees. White-throated Needletails are non-breeding migrants in Australia.	0	Absent	Low
Monarcha melanopsis Black-faced Monarch		M	The Black-faced Monarch is widespread in eastern Australia. In New South Wales and the Australian Capital Territory, the species occurs around the eastern slopes and tablelands of the Great Divide, inland to Coutts Crossing, Armidale, Widden Valley, Wollemi National Park, Wombeyan Caves and Canberra. It is rarely recorded farther inland (e.g. Munghorn Gap Nature Reserve, January 1995, and Maules Creek, 50 km south-east of Narrabri, December 1994). The Black-faced Monarch mainly occurs in rainforest ecosystems, including semi-deciduous vine-thickets, complex notophyll vine-forest, tropical (mesophyll) rainforest, subtropical (notophyll) rainforest, mesophyll (broadleaf) thicket/shrubland, warm temperate rainforest, dry (monsoon) rainforest and (occasionally) cool temperate rainforest.	0	Marginal	Low
Monarcha trivirgatus Spectacled Monarch		M	Found in Australia, Indonesia, and Papua New Guinea. Its natural habitats are subtropical or tropical moist lowland forests, subtropical or tropical mangrove forests, and subtropical or tropical moist montane forests.	0	Marginal	Low
Motacilla flava Yellow Wagtail		M	This species occupies a range of damp or wet habitats with low vegetation, from damp meadows, marshes, waterside	0	Marginal	Low

Species	BC Act/ FM Act	EPBC Act	Description of habitat[1]	Number of records (Bionet)	Presence of habitat	Likelihood of occurrence
			pastures, sewage farms and bogs to damp steppe and grassy tundra. In the north of its range it is also found in large forest clearings. It breeds from April to August, although this varies with latitude. The nest is a grass cup lined with hair and placed on or close to the ground in a shallow scrape. Normally it lays four to six eggs. It feeds on a wide variety of terrestrial and aquatic invertebrates as well as some plant material, particularly seeds. The species is almost wholly migratory with European populations wintering in sub-Saharan Africa, central and eastern populations mainly migrate to South Asia with some moving to Africa. The species is resident in Egypt.			
Myiagra cyanoleuca Satin Flycatcher		M	The Satin Flycatcher is found along the east coast of Australia from far northern Queensland to Tasmania, including south-eastern South Australia. It is also found in New Guinea. The Satin Flycatcher is found in tall forests, preferring wetter habitats such as heavily forested gullies, but not rainforests. The Satin Flycatcher is a migratory species, moving northwards in winter to northern Queensland and Papua New Guinea, returning south to breed in spring.	0	Marginal	Low
Rhipidura rufifrons Rufous Fantail		M	The Rufous Fantail is found in northern and eastern coastal Australia, being more common in the north. It is also foind in New Guinea, the Solomon Islands, Sulawesi and Guam. The Rufous Fantail is found in rainforest, dense wet forests, swamp woodlands and mangroves, preferring deep shade, and is often seen close to the ground. During migration, it may be found in more open habitats or urban areas. Strongly migratory in the south of its range, it moves northwards in winter, and virtually disappears from Victoria and New South Wales at this time.	0	Marginal	Low

Job Description: Digital Terrain Modelling and Cadastral Overlay

Road Number and Name: M1 PACIFIC MOTORWAY

Project Location: M1 MOTORWAY ADJACENT TO CURRANS ROAD - COORANBONG

RMS Project Number: 14.2166.0511.0446

Surveyor: Aurecon Australasia Pty Ltd

Date: 2/9/2019

Project Impact

To be destroyed
Safe
Vulnerable

Survey Control Mark Register - HV4281 - MGA Zone 56

MX Mark ID	Mark	Type	MGA Grid Coordinates		Combined Scale Factor	MGA		Source	AHD	AHD		Source	Date	Project Impact	Comments
			Easting	Northing		Class	Order			Class	Order				
PM 31932	PM 31932	Permanent Mark	357417.297	6338437.748	0.999842	B	2	SCIMS	27.018	LC	L3	SCIMS	30/8/2019		
PM 31935	PM 31935	Permanent Mark	357772.135	6338392.592	0.999842	B	2	SCIMS	18.233	LC	L3	SCIMS	30/8/2019		
SS 32817	SS 32817	State Survey Mark	357333.251	6338036.177	0.999844	B	U	AURECON	17.272	LC	L3	AURECON	30/8/2019		
CB01	CB01	Concrete Nail	357396.209	6337942.845	0.999845	C	3	AURECON	10.549	LC	L3	AURECON	30/8/2019		
CB02	CB02	Concrete Nail	357422.672	6337995.119	0.999845	C	3	AURECON	11.171	LC	L3	AURECON	30/8/2019		
CB03	CB03	Concrete Nail	357448.045	6338049.895	0.999844	C	3	AURECON	11.774	LC	L3	AURECON	30/8/2019		
CB04	CB04	Concrete Nail	357472.163	6338105.283	0.999844	C	3	AURECON	12.381	LC	L3	AURECON	30/8/2019		
CB05	CB05	Concrete Nail	357495.023	6338160.181	0.999844	C	3	AURECON	12.976	LC	L3	AURECON	30/8/2019		
CB06	CB06	Concrete Nail	357517.919	6338216.975	0.999844	C	3	AURECON	13.583	LC	L3	AURECON	30/8/2019		
CB07	CB07	Concrete Nail	357539.001	6338270.859	0.999844	C	3	AURECON	14.174	LC	L3	AURECON	30/8/2019		
CB08	CB08	Concrete Nail	357560.322	6338327.042	0.999844	C	3	AURECON	14.762	LC	L3	AURECON	30/8/2019		
CB09	CB09	Concrete Nail	357577.168	6338372.568	0.999844	C	3	AURECON	15.253	LC	L3	AURECON	30/8/2019		
CB10	CB10	Steel Spike	357409.341	6337996.87	0.999844	C	3	AURECON	15.879	C	3	AURECON	30/8/2019		
CB11	CB11	Steel Spike	357416.224	6338017.201	0.999844	C	3	AURECON	17.926	C	3	AURECON	30/8/2019		
CB12	CB12	Steel Spike	357421.462	6338037.179	0.999843	C	3	AURECON	19.737	C	3	AURECON	30/8/2019		
CB13	CB13	Steel Spike	357430.109	6338061.265	0.999843	C	3	AURECON	21.127	C	3	AURECON	30/8/2019		
CB14	CB14	Steel Spike	357435.283	6338077.098	0.999843	C	3	AURECON	21.733	C	3	AURECON	30/8/2019		
CB15	CB15	Steel Spike	357445.287	6338096.368	0.999843	C	3	AURECON	21.704	C	3	AURECON	30/8/2019		
CB16	CB16	Steel Spike	357453.368	6338112.814	0.999843	C	3	AURECON	20.948	C	3	AURECON	30/8/2019		
CB17	CB17	Steel Spike	357468.933	6338137.38	0.999843	C	3	AURECON	19.025	C	3	AURECON	30/8/2019		
CB18	CB18	Steel Spike	357481.022	6338155.933	0.999844	C	3	AURECON	17.321	C	3	AURECON	30/8/2019		
CB19	CB19	Steel Spike	357491.867	6338181.769	0.999844	C	3	AURECON	15.573	C	3	AURECON	30/8/2019		
CB20	CB20	Steel Spike	357498.202	6338201.484	0.999844	C	3	AURECON	14.853	C	3	AURECON	30/8/2019		
CB21	CB21	Steel Spike	357502.38	6338219.379	0.999844	C	3	AURECON	14.066	C	3	AURECON	30/8/2019		
CB22	CB22	Steel Spike	357507.847	6338233.358	0.999844	C	3	AURECON	12.755	C	3	AURECON	30/8/2019		
CB23	CB23	Steel Spike	357517.558	6338262.462	0.999844	C	3	AURECON	13.880	C	3	AURECON	30/8/2019		
CB24	CB24	Steel Spike	357525.997	6338287.098	0.999844	C	3	AURECON	14.134	C	3	AURECON	30/8/2019		
CB25	CB25	Steel Spike	357536.522	6338315.655	0.999844	C	3	AURECON	14.986	C	3	AURECON	30/8/2019		
CB26	CB26	Steel Spike	357544.654	6338339.966	0.999844	C	3	AURECON	15.658	C	3	AURECON	30/8/2019		
CB30	CB30	Concrete Nail	357597.221	6338420.678	0.999842	C	3	AURECON	23.689	C	3	AURECON	30/8/2019		
CB31	CB31	Steel Spike	357364.577	6337920.807	0.999845	C	3	AURECON	7.804	C	3	AURECON	30/8/2019		
CB32	CB32	Steel Spike	357296.42	6337995.18	0.999845	C	3	AURECON	14.096	C	3	AURECON	30/8/2019		
CB33	CB33	Steel Spike	357491.863	6338444.613	0.999842	C	3	AURECON	24.559	C	3	AURECON	30/8/2019		
CB34	CB34	Steel Spike	357657.98	6338419.717	0.999842	C	3	AURECON	23.447	C	3	AURECON	30/8/2019		
CB35	CB35	Steel Spike	357401.747	6338378.611	0.999842	C	3	AURECON	24.110	C	3	AURECON	30/8/2019		
CB36	CB36	Steel Spike	357349.995	6338169.513	0.999843	C	3	AURECON	21.198	C	3	AURECON	30/8/2019		
CB37	CB37	Steel Spike	357403.438	6337976.671	0.999845	C	3	AURECON	13.745	C	3	AURECON	30/8/2019		

Appendix B

Construction noise estimator results

Distanced Based Assessment (Construction Scenario)

Please pick from drop-down list in orange cells

Noise area category		R4
RBL or L_{A90} Background level (dB(A))	**Day**	55
	Evening	50
	Night	45
$L_{Aeq(15minute)}$ Noise Mangement Level (dB(A))	**Day**	65
	Day (OOHW)	60
	Evening	55
	Night	50
Scenario		Retaining walls / noise walls
Is there line of sight to receiver?		Yes

Steps for Screening Assessment:

1. Schedule noisy works to occur in standard hours where possible or before 11pm and implement Standard Measures.
2. Select the representative noise area category. The worksheet titled 'Representative Noise Environ.' provides a number of examples to help select the noise area category.
3. Select the scenario. If not found in drop-down list, refer to 'Source List' and select a representative scenario with similar plant combination.
4. Is there line of sight to receiver? Select the appropriate scenario from the drop down list .

Identify and implement standard mitigation measures where feasible and reasonable. Include any shielding implemented as part of the standard mitigation measures by changing the selection in the 'Is there line of sight to receiver' drop-down list. Solid barrier can be in the form of road cutting, solid construction hoarding, acoustic curtain, timber lapped and capped fence, shipping container, site office, etc. Please note that vegetation and trees are not considered to be a form of solid barrier and any gaps would compromise the acoustic integrity of the solid barrier.

6. Determine if there are any receivers (both residential and non-residential receivers) within the affected distance for each relevant time period . Consider background noise measurements to check assumption in Step #2 if:

(a) there are many affected receivers and the impact duration at any one receiver is more than 3 weeks; or

(b) there are a few affected receivers and the impact duration at any one receiver is more than 6 weeks.

Note that consideration need to be given to the construction staging plan when determining impact duration.

7. Identify if there are any receivers within the additional mitigation measures distances and identify feasible and reasonable measures at each receiver
8. Where night works are involved, identify sleep disturbance affected distance.
9. Document the outcomes of these steps.

(Note that suitable noise management levels for other noise-sensitive businesses not identified in the Construction Noise Estimator should be investigated on a project-by-project basis. Please

Abbreviation	Measure
N	Notification
SN	Specific notifications
PC	Phone calls
IB	Individual briefings
RO	Respite offer
R1	Respite period 1
R2	Respite period 2
DR	Duration respite
AA	Alternative accommodation
V	Verification

Note that spot check verification of noise levels and individual briefings are not required for projects with less than 3 weeks impact duration

Residential receiver

			$L_{Aeq(15minute)}$ noise level above background (L_{A90})										$L_{Aeq(15minute)}$ 75 dB(A) or greater (Highly affected)			Sleep disutrbance L_{Amax} 65 dB(A)
			5 to 10 dB(A)			10 to 20 dB(A)			20 to 30 dB(A)			> 30 dB(A)				
			Noticeable			Clearly audible			Moderately intrusive			Highly intrusive				
		Affected distance (m)	Measures	Within distance (m)	Mitigation level (dB(A))	Measures	Within distance (m)	Mitigation level (dB(A))	Measures	Within distance (m)	Mitigation level (dB(A))	Measures	Within distance (m)	Mitigation level (dB(A))	Measures	Within distance (m)	Mitigation level (dB(A))	Affected distance (m)
Undeveloped green fields, rural areas with isolated dwellings	**Day**	115							N, PC, RO	35	75	N, PC, RO	35	75	N, PC, RO	35	75	
	Day (OOHW)	170				N, R1, DR	115	65	N, R1, DR	35	75	N, R1, DR, PC, SN	20	80	N, PC, RO	35	75	
	Evening	250				N, R1, DR	170	60	N, R1, DR	65	70	N, R1, DR, PC, SN	20	80	N, PC, RO	35	75	
	Night	360	N	360	50	N, R2, DR	250	55	N, PC, SN, R2, DR	115	65	AA, N, PC, SN, R2, DR	35	75	N, PC, RO	35	75	270
	Highly Affected	35													N, PC, RO	35	75	
Developed settlements (urban and suburban)	**Day**	130							N, PC, RO	40	75	N, PC, RO	40	75	N, PC, RO	40	75	
	Day (OOHW)	200				N, R1, DR	130	65	N, R1, DR	40	75	N, R1, DR, PC, SN	15	85	N, PC, RO	35	75	
	Evening	305				N, R1, DR	200	60	N, R1, DR	75	70	N, R1, DR, PC, SN	25	80	N, PC, RO	40	75	
	Night	460	N	460	50	N, R2, DR	305	55	N, PC, SN, R2, DR	130	65	AA, N, PC, SN, R2, DR	40	75	N, PC, RO	40	75	330
	Highly Affected	40													N, PC, RO	40	75	
Propagation across a valley / over water	**Day**	150							N, PC, RO	40	75	N, PC, RO	40	75	N, PC, RO	40	75	
	Day (OOHW)	250				N, R1, DR	150	65	N, R1, DR	40	75	N, R1, DR, PC, SN	15	85	N, PC, RO	40	75	
	Evening	405				N, R1, DR	250	60	N, R1, DR	90	70	N, R1, DR, PC, SN	25	80	N, PC, RO	40	75	
	Night	630	N	630	50	N, R2, DR	405	55	N, PC, SN, R2, DR	150	65	AA, N, PC, SN, R2, DR	40	75	N, PC, RO	40	75	440
	Highly Affected	40													N, PC, RO	40	75	

Non-residential receiver
Undeveloped green fields, rural areas with isolated dwellings

				$L_{Aeq(15minute)}$ noise level above NML						LAeq(15minute) 75 dB(A) or greater (Highly affected)		
				<10 dB(A)			10 to 20 dB(A)					
	Period	NML	Affected distance (m)	Measure	Within distance (m)	Mitigation level (dB(A))	Measure	Within distance (m)	Mitigation level (dB(A))	Measure	Within distance (m)	Mitigation level (dB(A))
Classroom at schools and other educational institutions	**Day**	55	250				N	115	65	N, PC, RO	35	75
Hospital wards and operating theatres	**Day**	65	115							N, PC, RO	35	75
Place of worship	**Day**	55	250				N	115	65	N, PC, RO	35	75
Active recreation	**Day**	65	115							N, PC, RO	35	75
Passive recreation	**Day**	60	170				N	65	70	N, PC, RO	35	75
Industrial premise	**Day**	75	35							N, PC, RO	35	75
Offices, retail outlets	**Day**	70	65							N, PC, RO	35	75

				$L_{Aeq(15minute)}$ noise level above NML											
				< 5 dB(A)			5 to 15 dB(A)			15 to 25 dB(A)			> 25 dB(A)		
	Period	NML	Affected distance (m)	Measure	Within distance (m)	Mitigation level (dB(A))	Measure	Within distance (m)	Mitigation level (dB(A))	Measure	Within distance (m)	Mitigation level (dB(A))	Measure	Within distance (m)	Mitigation level (dB(A))
Hospital wards and operating theatres	**Evening**	65	115				N, R1, DR	65	70	N, R1, DR	20	80	N, R1, DR, PC, SN	6	90
	Night	65	115	N	115	65	N, R2, NR	65	70	N, PC, SN, R2, DR	20	80	AA, N, PC, SN, R2, DR	6	90
Place of worship	**Evening**	55	250				N, R1, DR	170	60	N, R1, DR	65	70	N, R1, DR, PC, SN	20	80
	Night	55	250	N	250	55	N, R2, NR	170	60	N, PC, SN, R2, DR	65	70	AA, N, PC, SN, R2, DR	20	80
Active recreation	**Evening**	65	115				N, R1, DR	65	70	N, R1, DR	20	80	N, R1, DR, PC, SN	6	90
Passive recreation	**Evening**	60	170				N, R1, DR	115	65	N, R1, DR	35	75	N, R1, DR, PC, SN	11	85
Industrial premise	**Evening**	75	35				N, R1, DR	20	80	N, R1, DR	6	90	N, R1, DR, PC, SN	2	100
	Night	75	35	N	35	75	N, R2, NR	20	80	N, PC, SN, R2, DR	6	90	AA, N, PC, SN, R2, DR	2	100
Offices, retail outlets	**Evening**	70	65				N, R1, DR	35	75	N, R1, DR	11	85	N, R1, DR, PC, SN	4	95
	Night	70	65	N	65	70	N, R2, NR	35	75	N, PC, SN, R2, DR	11	85	AA, N, PC, SN, R2, DR	4	95

Non-residential receiver
Developed settlements (urban and suburban)

				$L_{Aeq(15minute)}$ noise level above NML						LAeq(15minute) 75 dB(A) or greater (Highly affected)		
				<10 dB(A)			10 to 20 dB(A)					
	Period	NML	Affected distance (m)	Measure	Within distance (m)	Mitigation level (dB(A))	Measure	Within distance (m)	Mitigation level (dB(A))	Measure	Within distance (m)	Mitigation level (dB(A))
Classroom at schools and other educational institutions	**Day**	55	305				N	130	65	N, PC, RO	40	75
Hospital wards and operating theatres	**Day**	65	130							N, PC, RO	40	75
Place of worship	**Day**	55	305				N	130	65	N, PC, RO	40	75
Active recreation	**Day**	65	130							N, PC, RO	40	75
Passive recreation	**Day**	60	200				N	75	70	N, PC, RO	40	75
Industrial premise	**Day**	75	40							N, PC, RO	40	75
Offices, retail outlets	**Day**	70	75							N, PC, RO	40	75

				$L_{Aeq(15minute)}$ noise level above NML											
				< 5 dB(A)			5 to 15 dB(A)			15 to 25 dB(A)			> 25 dB(A)		
	Period	NML	Affected distance (m)	Measure	Within distance (m)	Mitigation level (dB(A))	Measure	Within distance (m)	Mitigation level (dB(A))	Measure	Within distance (m)	Mitigation level (dB(A))	Measure	Within distance (m)	Mitigation level (dB(A))
Hospital wards and operating theatres	**Evening**	65	130				N, R1, DR	75	70	N, R1, DR	22	80	N, R1, DR, PC, SN	7	90
	Night	65	130	N	130	65	N, R2, NR	75	70	N, PC, SN, R2, DR	22	80	AA, N, PC, SN, R2, DR	7	90
Place of worship	**Evening**	55	305				N, R1, DR	200	60	N, R1, DR	75	70	N, R1, DR, PC, SN	22	80
	Night	55	305	N	305	55	N, R2, NR	200	60	N, PC, SN, R2, DR	75	70	AA, N, PC, SN, R2, DR	22	80
Active recreation	**Evening**	65	130				N, R1, DR	75	70	N, R1, DR	22	80	N, R1, DR, PC, SN	7	90
Passive recreation	**Evening**	60	200				N, R1, DR	130	65	N, R1, DR	40	75	N, R1, DR, PC, SN	13	85
Industrial premise	**Evening**	75	40				N, R1, DR	22	80	N, R1, DR	7	90	N, R1, DR, PC, SN	2	100
	Night	75	40	N	40	75	N, R2, NR	22	80	N, PC, SN, R2, DR	7	90	AA, N, PC, SN, R2, DR	2	100
Offices, retail outlets	**Evening**	70	75				N, R1, DR	40	75	N, R1, DR	13	85	N, R1, DR, PC, SN	4	95
	Night	70	75	N	75	70	N, R2, NR	40	75	N, PC, SN, R2, DR	13	85	AA, N, PC, SN, R2, DR	4	95

Non-residential receiver
Propagation across a valley / over water

				$L_{Aeq(15minute)}$ noise level above NML						LAeq(15minute) 75 dB(A) or greater (Highly affected)		
	Standard hours			<10 dB(A)			10 to 20 dB(A)					
	Period	NML	Affected distance (m)	Measure	Within distance (m)	Mitigation level (dB(A))	Measure	Within distance (m)	Mitigation level (dB(A))	Measure	Within distance (m)	Mitigation level (dB(A))
Classroom at schools and other educational institutions	Day	55	405				N	130	65	N, PC, RO	40	75
Hospital wards and operating theatres	Day	65	150							N, PC, RO	40	75
Place of worship	Day	55	405				N	130	65	N, PC, RO	40	75
Active recreation	Day	65	150							N, PC, RO	40	75
Passive recreation	Day	60	250				N	75	70	N, PC, RO	40	75
Industrial premise	Day	75	40							N, PC, RO	40	75
Offices, retail outlets	Day	70	90							N, PC, RO	40	75

				$L_{Aeq(15minute)}$ noise level above NML											
	OOHW			< 5 dB(A)			5 to 15 dB(A)			15 to 25 dB(A)			> 25 dB(A)		
	Period	NML	Affected distance (m)	Measure	Within distance (m)	Mitigation level (dB(A))	Measure	Within distance (m)	Mitigation level (dB(A))	Measure	Within distance (m)	Mitigation level (dB(A))	Measure	Within distance (m)	Mitigation level (dB(A))
Hospital wards and operating theatres	Evening	65	150				N, R1, DR	90	70	N, R1, DR	22	80	N, R1, DR, PC, SN	7	90
	Night	65	150	N	150	65	N, R2, NR	90	70	N, PC, SN, R2, DR	22	80	AA, N, PC, SN, R2, DR	7	90
Place of worship	Evening	55	405				N, R1, DR	250	60	N, R1, DR	75	70	N, R1, DR, PC, SN	22	80
	Night	55	405	N	405	55	N, R2, NR	250	60	N, PC, SN, R2, DR	75	70	AA, N, PC, SN, R2, DR	22	80
Active recreation	Evening	65	150				N, R1, DR	90	70	N, R1, DR	22	80	N, R1, DR, PC, SN	7	90
Passive recreation	Evening	60	250				N, R1, DR	150	65	N, R1, DR	40	75	N, R1, DR, PC, SN	13	85
Industrial premise	Evening	75	40				N, R1, DR	25	80	N, R1, DR	7	90	N, R1, DR, PC, SN	2	100
	Night	75	40	N	40	75	N, R2, NR	25	80	N, PC, SN, R2, DR	7	90	AA, N, PC, SN, R2, DR	2	100
Offices, retail outlets	Evening	70	90				N, R1, DR	40	75	N, R1, DR	13	85	N, R1, DR, PC, SN	4	95
	Night	70	90	N	90	70	N, R2, NR	40	75	N, PC, SN, R2, DR	13	85	AA, N, PC, SN, R2, DR	4	95

Appendix C

Aboriginal cultural heritage advice

26 July 2022

Willamina Warner
Project Engineer
Transport for NSW

Dear Willamina,

Preliminary assessment results for M1 Motorway Noise Wall - Cooranbong based on Stage 1 of the *Procedure for Aboriginal cultural heritage consultation and investigation* (the procedure).

The project, as described in the Stage 1 assessment checklist (see attached), was assessed as being unlikely to have an impact on Aboriginal cultural heritage.

The assessment is based on the following due diligence considerations:

- The project is unlikely to harm known Aboriginal objects or places.
- The AHIMS search did not indicate moderate to high concentrations of Aboriginal objects or places in the study area. Three Aboriginal sites were identified, however, they are located outside of the study area.
- The study area does contain landscape features that indicate the presence of Aboriginal objects, based on the Office of Environment and Heritage's *Due diligence Code of Practice for the Protection of Aboriginal objects in NSW* and the Transport for NSW procedure, however, the cultural heritage potential of the study area appears to be reduced due to past disturbance in the form construction of the M1 Motorway.
- There is an absence of sandstone rock outcrops likely to contain Aboriginal art.
- All access to the works areas will be via disturbed zones i.e. M1 Motorway

Your project may proceed in accordance with the environmental impact assessment process, as relevant, and all other relevant approvals.

If the scope of your project changes you must contact me and your regional Environment Officer Natalie Elvers to reassess any potential impacts on Aboriginal cultural heritage.

If any potential Aboriginal objects (including skeletal remains) are discovered during the course of the project, all works in the vicinity of the find must cease. Follow the steps outlined in the Transport for NSW *Unexpected Archaeological Finds Procedure*.

Transport for NSW

Lvl 6, 6 Stewart Ave Newcastle West NSW 2302
T 0428 683 845 | **E** lee.davison@transport.nsw.gov.au

For further assistance in this matter do not hesitate to contact me.

Yours sincerely

Lee Davison
Aboriginal Community and Heritage Partner

Figure 1: Proposal Location and footprint

Appendix D

Correspondence

Re: Upcoming work on M1 Pacific Motorway noise wall at Cooranbong

24 March 2022

Dear Resident,

Transport for NSW is planning construction of a new noise wall between existing noise walls on the M1 Pacific Motorway at Cooranbong from May 2022.

Work will include vegetation clearing, earthworks to improve drainage, piling and installation of concrete panels.

In order to carry out the work, access to the road corridor will be required directly behind your property on Currans Road, where the noise wall will be built.

Prior to work commencing, any materials that you have stored within the road corridor must be removed to allow works to proceed as planned. We are asking that the material be removed before the end of April 2022.

A notification letter will be distributed to your property ahead of work starting, with more information including start date, work hours and the duration of the work

If you have any questions about the project or removing stored items, please contact 0438 852 542 or email Willamina.Warner@transport.nsw.gov.au

Sincerely,

Willamina Warner,

Project Engineer,

0438 852 542

Appendix E

Database searches

Data from the BioNet Atlas website, which holds records from a number of custodians. The data are only indicative and cannot be considered a comprehensive inventory, and may contain errors and omissions. Species listed under the Sensitive Species Data Policy may have their locations denatured (^ rounded to 0.1°C; ^^ rounded to 0.01°C.
Search criteria : Public Report of all Valid Records of Threatened (listed on BC Act 2016) or Commonwealth listed
Report generated on 15/05/2022 4:57 PM

Kingdom	Class	Family	Species Code	Scientific Name	Exotic	Common Name	NSW status	Comm. status	Records	Info
Animalia	Amphibia	Myobatrachidae	3073	*^Mixophyes balbus*		Stuttering Frog	E1,P,2	V	43	
Animalia	Amphibia	Myobatrachidae	3075	*^Mixophyes iteratus*		Giant Barred Frog	E1,P,2	E	30	
Animalia	Amphibia	Myobatrachidae	3116	*Pseudophryne australis*		Red-crowned Toadlet	V,P		2	
Animalia	Amphibia	Hylidae	3166	*Litoria aurea*		Green and Golden Bell Frog	E1,P	V	75	
Animalia	Amphibia	Hylidae	3169	*Litoria brevipalmata*		Green-thighed Frog	V,P		9	
Animalia	Reptilia	Elapidae	2677	*Hoplocephalus stephensii*		Stephens' Banded Snake	V,P		3	
Animalia	Aves	Apodidae	0334	*Hirundapus caudacutus*		White-throated Needletail	P	V,C,J,K	4	
Animalia	Aves	Ciconiidae	0183	*Ephippiorhynchus asiaticus*		Black-necked Stork	E1,P		6	
Animalia	Aves	Accipitridae	0226	*Haliaeetus leucogaster*		White-bellied Sea-Eagle	V,P		4	
Animalia	Aves	Accipitridae	0230	*^^Lophoictinia isura*		Square-tailed Kite	V,P,3		1	
Animalia	Aves	Accipitridae	8739	*^^Pandion cristatus*		Eastern Osprey	V,P,3		2	
Animalia	Aves	Cacatuidae	0268	*^^Callocephalon fimbriatum*		Gang-gang Cockatoo	V,P,3	E	9	
Animalia	Aves	Cacatuidae	0265	*^Calyptorhynchus lathami*		Glossy Black-Cockatoo	V,P,2		39	
Animalia	Aves	Psittacidae	0260	*Glossopsitta pusilla*		Little Lorikeet	V,P		10	
Animalia	Aves	Psittacidae	0309	*^^Lathamus discolor*		Swift Parrot	E1,P,3	CE	10	
Animalia	Aves	Psittacidae	0302	*^^Neophema pulchella*		Turquoise Parrot	V,P,3		3	
Animalia	Aves	Strigidae	0248	*^^Ninox strenua*		Powerful Owl	V,P,3		21	
Animalia	Aves	Tytonidae	0250	*^^Tyto novaehollandiae*		Masked Owl	V,P,3		3	
Animalia	Aves	Tytonidae	9924	*^^Tyto tenebricosa*		Sooty Owl	V,P,3		10	
Animalia	Aves	Meliphagidae	0603	*Anthochaera phrygia*		Regent Honeyeater	E4A,P	CE	6	
Animalia	Aves	Neosittidae	0549	*Daphoenositta chrysoptera*		Varied Sittella	V,P		10	
Animalia	Aves	Artamidae	8519	*Artamus cyanopterus cyanopterus*		Dusky Woodswallow	V,P		2	

Animalia	Mammalia	Dasyuridae	1008	*Dasyurus maculatus*	Spotted-tailed Quoll	V,P	E	5	
Animalia	Mammalia	Dasyuridae	1017	*Phascogale tapoatafa*	Brush-tailed Phascogale	V,P		2	
Animalia	Mammalia	Phascolarctidae	1162	*Phascolarctos cinereus*	Koala	V,P	E	11	
Animalia	Mammalia	Petauridae	1136	*Petaurus australis*	Yellow-bellied Glider	V,P		81	
Animalia	Mammalia	Petauridae	1137	*Petaurus norfolcensis*	Squirrel Glider	V,P		37	
Animalia	Mammalia	Pseudocheiridae	1133	*Petauroides volans*	Greater Glider	P	V	8	
Animalia	Mammalia	Macropodidae	1215	*Petrogale penicillata*	Brush-tailed Rock-wallaby	E1,P	V	2	
Animalia	Mammalia	Pteropodidae	1280	*Pteropus poliocephalus*	Grey-headed Flying-fox	V,P	V	33	
Animalia	Mammalia	Molossidae	1329	*Micronomus norfolkensis*	Eastern Coastal Free-tailed Bat	V,P		12	
Animalia	Mammalia	Vespertilionidae	1353	*Chalinolobus dwyeri*	Large-eared Pied Bat	V,P	V	3	
Animalia	Mammalia	Vespertilionidae	1372	*Falsistrellus tasmaniensis*	Eastern False Pipistrelle	V,P		3	
Animalia	Mammalia	Vespertilionidae	1357	*Myotis macropus*	Southern Myotis	V,P		4	
Animalia	Mammalia	Vespertilionidae	1369	*Phoniscus papuensis*	Golden-tipped Bat	V,P		2	
Animalia	Mammalia	Vespertilionidae	1361	*Scoteanax rueppellii*	Greater Broad-nosed Bat	V,P		11	
Animalia	Mammalia	Miniopteridae	1346	*Miniopterus australis*	Little Bent-winged Bat	V,P		20	
Animalia	Mammalia	Miniopteridae	3330	*Miniopterus orianae oceanensis*	Large Bent-winged Bat	V,P		9	
Animalia	Mammalia	Muridae	1455	*Pseudomys novaehollandiae*	New Holland Mouse	P	V	1	
Plantae	Flora	Asteraceae	1643	*Rutidosis heterogama*	Heath Wrinklewort	V	V	303	
Plantae	Flora	Campanulaceae	7963	*Isotoma fluviatilis subsp. fluviatilis*			X	1	
Plantae	Flora	Elaeocarpaceae	6206	*Tetratheca juncea*	Black-eyed Susan	V	V	219	
Plantae	Flora	Fabaceae (Mimosoideae)	3728	*Acacia bynoeana*	Bynoe's Wattle	E1	V	7	
Plantae	Flora	Juncaginaceae	3363	*Maundia triglochinoides*		V		5	
Plantae	Flora	Myrtaceae	9619	*Angophora inopina*	Charmhaven Apple	V	V	218	
Plantae	Flora	Myrtaceae	4007	*^^Callistemon linearifolius*	Netted Bottle Brush	V,3		1	

Plantae	Flora	Myrtaceae	8959	*Eucalyptus parramattensis subsp. parramattensis*	Eucalyptus parramattensis C. Hall. subsp. parramattensis in Wyong and Lake Macquarie local government areas	E2		1	
Plantae	Flora	Myrtaceae	6809	*Melaleuca biconvexa*	Biconvex Paperbark	V	V	31	
Plantae	Flora	Myrtaceae	4283	*Rhodamnia rubescens*	Scrub Turpentine	E4A	CE	8	
Plantae	Flora	Myrtaceae	4284	*Rhodomyrtus psidioides*	Native Guava	E4A		1	
Plantae	Flora	Myrtaceae	4293	*Syzygium paniculatum*	Magenta Lilly Pilly	E1	V	2	
Plantae	Flora	Orchidaceae	11806	*^Corybas dowlingii*	Red Helmet Orchid	E1,P,2		3	
Plantae	Flora	Orchidaceae	13987	*^Genoplesium insigne*	Variable Midge Orchid	E4A,P,2	CE	10	
Plantae	Flora	Proteaceae	10009	*Grevillea parviflora subsp. parviflora*	Small-flower Grevillea	V	V	21	

AHIMS Web Services (AWS)
Search Result

Your Ref/PO Number : M1 Cooranbong

Client Service ID : 677125

Stuart J Hill Pty Ltd

23 Kinchega Court
Wattle Grove New South Wales 2173

Attention: Stuart Hill

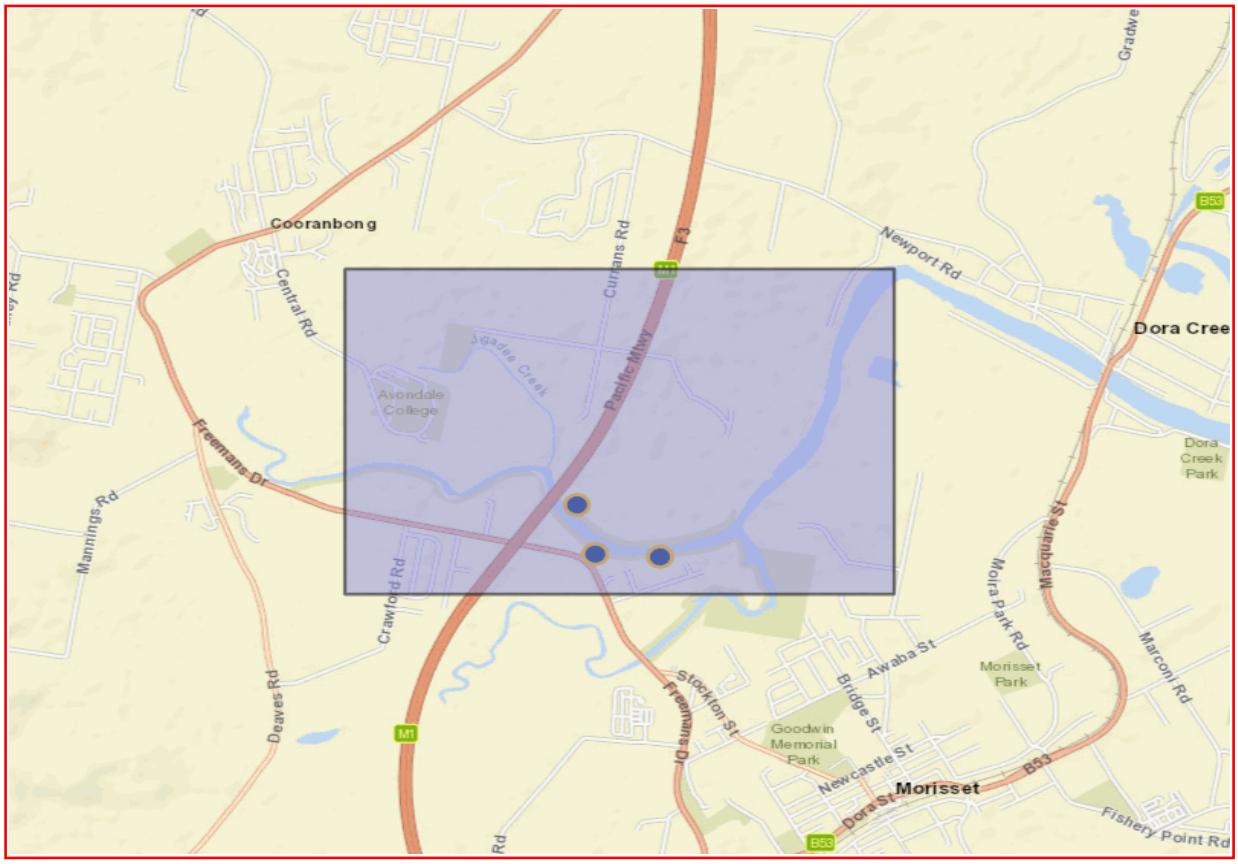
Email: stuart@hillsenvironmental.com.au

Date: 22 April 2022

Dear Sir or Madam:

AHIMS Web Service search for the following area at Lat, Long From : -33.0968, 151.4579 - Lat, Long To : -33.0788, 151.4888, conducted by Stuart Hill on 22 April 2022.

The context area of your search is shown in the map below. Please note that the map does not accurately display the exact boundaries of the search as defined in the paragraph above. The map is to be used for general reference purposes only.



A search of Heritage NSW AHIMS Web Services (Aboriginal Heritage Information Management System) has shown that:

3	**Aboriginal sites are recorded in or near the above location.**
0	**Aboriginal places have been declared in or near the above location. ***

If your search shows Aboriginal sites or places what should you do?

- You must do an extensive search if AHIMS has shown that there are Aboriginal sites or places recorded in the search area.
- If you are checking AHIMS as a part of your due diligence, refer to the next steps of the Due Diligence Code of practice.
- You can get further information about Aboriginal places by looking at the gazettal notice that declared it. Aboriginal places gazetted after 2001 are available on the NSW Government Gazette (https://www.legislation.nsw.gov.au/gazette) website. Gazettal notices published prior to 2001 can be obtained from Heritage NSW upon request

Important information about your AHIMS search

- The information derived from the AHIMS search is only to be used for the purpose for which it was requested. It is not be made available to the public.
- AHIMS records information about Aboriginal sites that have been provided to Heritage NSW and Aboriginal places that have been declared by the Minister;
- Information recorded on AHIMS may vary in its accuracy and may not be up to date. Location details are recorded as grid references and it is important to note that there may be errors or omissions in these recordings,
- Some parts of New South Wales have not been investigated in detail and there may be fewer records of Aboriginal sites in those areas. These areas may contain Aboriginal sites which are not recorded on AHIMS.
- Aboriginal objects are protected under the National Parks and Wildlife Act 1974 even if they are not recorded as a site on AHIMS.
- This search can form part of your due diligence and remains valid for 12 months.

Level 6, 10 Valentine Ave, Parramatta 2150
Locked Bag 5020 Parramatta NSW 2124
Tel: (02) 9585 6345

ABN 34 945 244 274
Email: ahims@environment.nsw.gov.au
Web: www.heritage.nsw.gov.au

AHIMS Web Services (AWS)

Extensive search - Site list report

Your Ref/PO Number : M1 Cooranbong

Client Service ID : 679125

SiteID	SiteName	Datum	Zone	Easting	Northing	Context	Site Status **	SiteFeatures	SiteTypes	Reports
45-3-1132	Dora Creek;Dora Creek North Bank;Beauty Point	AGD	56	357200	6337300	Open site	Valid	Artefact : -	Open Camp Site	305
	Contact	**Recorders**	Len Dyall					**Permits**		
45-3-4344	BP1 AFT	GDA	56	357745	6337178	Open site	Valid	Artefact : -		
	Contact	**Recorders**	Mrs.Angela Besant,Mrs.Angela Besant,Insite Heritage Pty Ltd,Insite Heritage Pty Lt					**Permits**	4835	
45-3-1133	Dora Creek;Dora Creek South Bank;Beauty Point;	AGD	56	357300	6337000	Open site	Valid	Artefact : -	Open Camp Site	305
	Contact	**Recorders**	Len Dyall					**Permits**		

**** Site Status**

Valid - The site has been recorded and accepted onto the system as valid

Destroyed - The site has been completely impacted or harmed usually as consequence of permit activity but sometimes also after natural events. There is nothing left of the site on the ground but proponents should proceed with caution.

Partially Destroyed - The site has been only partially impacted or harmed usually as consequence of permit activity but sometimes also after natural events. There might be parts or sections of the original site still present on the ground

Not a site - The site has been originally entered and accepted onto AHIMS as a valid site but after further investigations it was decided it is NOT an aboriginal site. Impact of this type of site does not require permit but Heritage NSW should be notified

Report generated by AHIMS Web Service on 02/05/2022 for Stuart Hill for the following area at Lat, Long From : -33.0968, 151.4579 - Lat, Long To : -33.0788, 151.4888. Number of Aboriginal sites and Aboriginal objects found is 3

Search Results

1 result found.

Cooranbong Post Office (former) 41 Martinsville Rd		Cooranbong, NSW, Australia	(Registered) Register of the National Estate (Non-statutory archive)

Report Produced: Sun May 15 15:57:47 2022

Heritage Search Result

Date: 15/05/2022

Item Name	Location	LGA	SHR Id	Item Type	Record Owner
Auditorium	50 Central Road COORANBONG NSW 2265	Lake Macquarie		Built	LGOV
Bethel Hall	50 Central Road COORANBONG NSW 2265	Lake Macquarie		Built	LGOV
Catholic Church and Cemetery	6 Martinsville Road COORANBONG NSW 2265	Lake Macquarie		Built	LGOV
College Hall	50 Central Road COORANBONG NSW 2265	Lake Macquarie		Built	LGOV
Cottage	661 Freemans Drive COORANBONG NSW 2265	Lake Macquarie		Built	LGOV
Former post office	41 Martinsville Road COORANBONG NSW 2265	Lake Macquarie		Built	LGOV
Grave - Frost's Rest	154 Mannings Road COORANBONG NSW 2265	Lake Macquarie		Built	LGOV
House	9 Kings Road COORANBONG NSW 2265	Lake Macquarie		Built	LGOV
House	85 Kings Road COORANBONG NSW 2265	Lake Macquarie		Built	LGOV
House - Sunnyside	27 Avondale Road COORANBONG NSW 2265	Lake Macquarie		Built	LGOV
House - The Laurels	50 Central Road COORANBONG NSW 2265	Lake Macquarie		Built	LGOV
House - Three Bells	597 Freemans Drive COORANBONG NSW 2265	Lake Macquarie		Built	LGOV
North Coorumbung Cemetery	200 Martinsville Road COORANBONG NSW 2265	Lake Macquarie		Built	LGOV
Sanitarium Dairy Farm	15 Central Road COORANBONG NSW 2265	Lake Macquarie		Landscape	LGOV

Sanitarium Health Foods factory	40, 50, 70 and 80 Central Road COORANBONG NSW 2265	Lake Macquarie		Built	LGOV
Science Hall	50 Central Road COORANBONG NSW 2265	Lake Macquarie		Built	LGOV
Suspension Footbridge	Off Victory Street (crosses Dora Creek) COORANBONG NSW 2265	Lake Macquarie		Built	LGOV
Water Tower	15 Central Road COORANBONG NSW 2265	Lake Macquarie		Built	LGOV

Australian Government
Department of Agriculture, Water and the Environment

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Please see the caveat for interpretation of information provided here.

Report created: 16-May-2022

Summary

Matters of National Environment Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance (Ramsar	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	3
Listed Threatened Species:	43
Listed Migratory Species:	16

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at http://www.environment.gov.au/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Lands:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	21
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have

State and Territory Reserves:	None
Regional Forest Agreements:	1
Nationally Important Wetlands:	None
EPBC Act Referrals:	3
Key Ecological Features (Marine):	None
Biologically Important Areas:	None
Bioregional Assessments:	1
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

Listed Threatened Ecological Communities [Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.
Status of Vulnerable, Disallowed and Ineligible are not MNES under the EPBC Act.

Community Name	Threatened Category	Presence Text	Buffer Status
Coastal Swamp Oak (Casuarina glauca) Forest of New South Wales and South East Queensland ecological community	Endangered	Community likely to occur within area	In feature area
Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland	Endangered	Community known to occur within area	In feature area
River-flat eucalypt forest on coastal floodplains of southern New South Wales and eastern Victoria	Critically Endangered	Community likely to occur within area	In feature area

Listed Threatened Species [Resource Information]

Status of Conservation Dependent and Extinct are not MNES under the EPBC Act.
Number is the current name ID.

Scientific Name	Threatened Category	Presence Text	Buffer Status
BIRD			
Anthochaera phrygia Regent Honeyeater [82338]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat likely to occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat likely to occur within area	In feature area
Callocephalon fimbriatum Gang-gang Cockatoo [768]	Endangered	Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Charadrius leschenaultii](#)			
Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat likely to occur within area	In feature area
[Falco hypoleucos](#)			
Grey Falcon [929]	Vulnerable	Species or species habitat may occur within area	In feature area
[Grantiella picta](#)			
Painted Honeyeater [470]	Vulnerable	Species or species habitat likely to occur within area	In feature area
[Hirundapus caudacutus](#)			
White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area	In feature area
[Lathamus discolor](#)			
Swift Parrot [744]	Critically Endangered	Species or species habitat known to occur within area	In feature area
[Numenius madagascariensis](#)			
Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat likely to occur within area	In feature area
[Pycnoptilus floccosus](#)			
Pilotbird [525]	Vulnerable	Species or species habitat may occur within area	In feature area
[Rostratula australis](#)			
Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area	In feature area
FROG			
[Litoria aurea](#)			
Green and Golden Bell Frog [1870]	Vulnerable	Species or species habitat likely to occur within area	In feature area
[Mixophyes balbus](#)			
Stuttering Frog, Southern Barred Frog (in Victoria) [1942]	Vulnerable	Species or species habitat may occur within area	In feature area
[Mixophyes iteratus](#)			
Giant Barred Frog, Southern Barred Frog [1944]	Vulnerable	Species or species habitat likely to occur within area	In feature area
MAMMAL			

Scientific Name	Threatened Category	Presence Text	Buffer Status
Chalinolobus dwyeri			
Large-eared Pied Bat, Large Pied Bat [183]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Dasyurus maculatus maculatus (SE mainland population)			
Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population) [75184]	Endangered	Species or species habitat known to occur within area	In feature area
Petauroides volans			
Greater Glider [254]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Petaurus australis australis			
Yellow-bellied Glider (south-eastern) [87600]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Petrogale penicillata			
Brush-tailed Rock-wallaby [225]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT)			
Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Endangered	Species or species habitat known to occur within area	In feature area
Potorous tridactylus tridactylus			
Long-nosed Potoroo (northern) [66645]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Pseudomys novaehollandiae			
New Holland Mouse, Pookila [96]	Vulnerable	Species or species habitat known to occur within area	In feature area
Pteropus poliocephalus			
Grey-headed Flying-fox [186]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
PLANT			
Acacia bynoeana			
Bynoe's Wattle, Tiny Wattle [8575]	Vulnerable	Species or species habitat known to occur within area	In feature area
Angophora inopina			
Charmhaven Apple [64832]	Vulnerable	Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Caladenia tessellata Thick-lipped Spider-orchid, Daddy Long-legs [2119]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Cryptostylis hunteriana Leafless Tongue-orchid [19533]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Cynanchum elegans White-flowered Wax Plant [12533]	Endangered	Species or species habitat likely to occur within area	In feature area
Eucalyptus camfieldii Camfield's Stringybark [15460]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Euphrasia arguta [4325]	Critically Endangered	Species or species habitat may occur within area	In feature area
Grevillea parviflora subsp. parviflora Small-flower Grevillea [64910]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Melaleuca biconvexa Biconvex Paperbark [5583]	Vulnerable	Species or species habitat known to occur within area	In feature area
Persicaria elatior Knotweed, Tall Knotweed [5831]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Persoonia hirsuta Hairy Geebung, Hairy Persoonia [19006]	Endangered	Species or species habitat may occur within area	In feature area
Pterostylis gibbosa Illawarra Greenhood, Rufa Greenhood, Pouched Greenhood [4562]	Endangered	Species or species habitat may occur within area	In buffer area only
Rhizanthella slateri Eastern Underground Orchid [11768]	Endangered	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Rhodamnia rubescens Scrub Turpentine, Brown Malletwood [15763]	Critically Endangered	Species or species habitat likely to occur within area	In feature area
Rhodomyrtus psidioides Native Guava [19162]	Critically Endangered	Species or species habitat likely to occur within area	In feature area
Rutidosis heterogama Heath Wrinklewort [13132]	Vulnerable	Species or species habitat known to occur within area	In feature area
Syzygium paniculatum Magenta Lilly Pilly, Magenta Cherry, Daguba, Scrub Cherry, Creek Lilly Pilly, Brush Cherry [20307]	Vulnerable	Species or species habitat known to occur within area	In feature area
Tetratheca juncea Black-eyed Susan [21407]	Vulnerable	Species or species habitat known to occur within area	In feature area
Thesium australe Austral Toadflax, Toadflax [15202]	Vulnerable	Species or species habitat may occur within area	In feature area

Listed Migratory Species			[Resource Information]
Scientific Name	Threatened Category	Presence Text	Buffer Status
Migratory Marine Birds			
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area	In feature area
Migratory Terrestrial Species			
Cuculus optatus Oriental Cuckoo, Horsfield's Cuckoo [86651]		Species or species habitat may occur within area	In feature area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area	In feature area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Motacilla flava](#) Yellow Wagtail [644]		Species or species habitat likely to occur within area	In feature area
[Myiagra cyanoleuca](#) Satin Flycatcher [612]		Species or species habitat known to occur within area	In feature area
[Rhipidura rufifrons](#) Rufous Fantail [592]		Species or species habitat likely to occur within area	In feature area
[Symposiachrus trivirgatus as Monarcha trivirgatus](#) Spectacled Monarch [83946]		Species or species habitat may occur within area	In feature area
Migratory Wetlands Species			
[Actitis hypoleucos](#) Common Sandpiper [59309]		Species or species habitat likely to occur within area	In feature area
[Calidris acuminata](#) Sharp-tailed Sandpiper [874]		Species or species habitat likely to occur within area	In feature area
[Calidris ferruginea](#) Curlew Sandpiper [856]	Critically Endangered	Species or species habitat likely to occur within area	In feature area
[Calidris melanotos](#) Pectoral Sandpiper [858]		Species or species habitat may occur within area	In feature area
[Charadrius leschenaultii](#) Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat likely to occur within area	In feature area
[Gallinago hardwickii](#) Latham's Snipe, Japanese Snipe [863]		Species or species habitat likely to occur within area	In feature area
[Numenius madagascariensis](#) Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Pandion haliaetus			
Osprey [952]		Species or species habitat known to occur within area	In buffer area only

Other Matters Protected by the EPBC Act

Listed Marine Species			[Resource Information]
Scientific Name	Threatened Category	Presence Text	Buffer Status
Bird			
Actitis hypoleucos			
Common Sandpiper [59309]		Species or species habitat likely to occur within area	In feature area
Apus pacificus			
Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area	In feature area
Bubulcus ibis as Ardea ibis			
Cattle Egret [66521]		Species or species habitat may occur within area overfly marine area	In feature area
Calidris acuminata			
Sharp-tailed Sandpiper [874]		Species or species habitat likely to occur within area	In feature area
Calidris ferruginea			
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat likely to occur within area overfly marine area	In feature area
Calidris melanotos			
Pectoral Sandpiper [858]		Species or species habitat may occur within area overfly marine area	In feature area
Charadrius leschenaultii			
Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat likely to occur within area overfly marine area	In feature area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area	In feature area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area overfly marine area	In feature area
Lathamus discolor Swift Parrot [744]	Critically Endangered	Species or species habitat known to occur within area overfly marine area	In feature area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area	In feature area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area overfly marine area	In feature area
Motacilla flava Yellow Wagtail [644]		Species or species habitat likely to occur within area overfly marine area	In feature area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area overfly marine area	In feature area
Neophema chrysostoma Blue-winged Parrot [726]		Species or species habitat may occur within area overfly marine area	In feature area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Pandion haliaetus](#) Osprey [952]		Species or species habitat known to occur within area	In buffer area only
[Rhipidura rufifrons](#) Rufous Fantail [592]		Species or species habitat likely to occur within area overfly marine area	In feature area
[Rostratula australis as Rostratula benghalensis (sensu lato)](#) Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area overfly marine area	In feature area
[Symposiachrus trivirgatus as Monarcha trivirgatus](#) Spectacled Monarch [83946]		Species or species habitat may occur within area overfly marine area	In feature area

Extra Information

Regional Forest Agreements [Resource Information]

Note that all areas with completed RFAs have been included.

RFA Name	State	Buffer Status
North East NSW RFA	New South Wales	In feature area

EPBC Act Referrals [Resource Information]

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Controlled action				
Open cut coal mine and extension to underground mine.	2006/2542	Controlled Action	Completed	In feature area
Not controlled action				
Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed	In feature area
Not controlled action (particular manner)				
Multipurpose Centre Dora St Lot 122 DP 881828 Morisset	2003/1084	Not Controlled Action (Particular Manner)	Post-Approval	In feature area

Bioregional Assessments

SubRegion	BioRegion	Website	Buffer Status

SubRegion	BioRegion	Website	Buffer Status
Hunter	Northern Sydney Basin	BA website	In feature area

Caveat

1 PURPOSE

This report is designed to assist in identifying the location of matters of national environmental significance (MNES) and other matters protected by the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) which may be relevant in determining obligations and requirements under the EPBC Act.

The report contains the mapped locations of:

- World and National Heritage properties;
- Wetlands of International and National Importance;
- Commonwealth and State/Territory reserves;
- distribution of listed threatened, migratory and marine species;
- listed threatened ecological communities; and
- other information that may be useful as an indicator of potential habitat value.

2 DISCLAIMER

This report is not intended to be exhaustive and should only be relied upon as a general guide as mapped data is not available for all species or ecological communities listed under the EPBC Act (see below). Persons seeking to use the information contained in this report to inform the referral of a proposed action under the EPBC Act should consider the limitations noted below and whether additional information is required to determine the existence and location of MNES and other protected matters.

Where data are available to inform the mapping of protected species, the presence type (e.g. known, likely or may occur) that can be determined from the data is indicated in general terms. It is the responsibility of any person using or relying on the information in this report to ensure that it is suitable for the circumstances of any proposed use. The Commonwealth cannot accept responsibility for the consequences of any use of the report or any part thereof. To the maximum extent allowed under governing law, the Commonwealth will not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance

3 DATA SOURCES

Threatened ecological communities

For threatened ecological communities where the distribution is well known, maps are generated based on information contained in recovery plans, State vegetation maps and remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species

Threatened, migratory and marine species distributions have been discerned through a variety of methods. Where distributions are well known and if time permits, distributions are inferred from either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc.) together with point locations and described habitat; or modelled (MAXENT or BIOCLIM habitat modelling) using

Where little information is available for a species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc.).

In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More detailed distribution mapping methods are used to update these distributions

4 LIMITATIONS

The following species and ecological communities have not been mapped and do not appear in this report:

- threatened species listed as extinct or considered vagrants;
- some recently listed species and ecological communities;
- some listed migratory and listed marine species, which are not listed as threatened species; and
- migratory species that are very widespread, vagrant, or only occur in Australia in small numbers.

The following groups have been mapped, but may not cover the complete distribution of the species:

- listed migratory and/or listed marine seabirds, which are not listed as threatened, have only been mapped for recorded
- seals which have only been mapped for breeding sites near the Australian continent

The breeding sites may be important for the protection of the Commonwealth Marine environment.

Refer to the metadata for the feature group (using the Resource Information link) for the currency of the information.

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact Us page.

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