Transport for NSW

Pacific Highway and Chain Valley Bay Road Intersection Upgrade

Minor works review of environmental factors

March 2025

transport.nsw.gov.au

NSW GOVERNMENT

Acknowledgement of Country

Transport for NSW acknowledges the Darkinjung and Awabakal people, the traditional custodians of the land on which the Pacific Highway and Chain Valley Bay Road Intersection Upgrade 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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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 clause 171 of the Environmental Planning and Assessment Regulation 2021, Guidelines for Division 5.1 Assessments (Department of Planning and Environment, 2022), the *Biodiversity Conservation Act 2016* (BC Act), the *Fisheries Management Act 1994* (FM Act) and the *Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth)* (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.

The following terms are used in the MWREF to define assessment areas and boundaries:

- construction footprint: the construction footprint refers to the area that would be directly impacted by the proposal. This comprises the operational and construction areas of the proposal and any other areas that would be temporarily disturbed, including ancillary facilities. The construction footprint is shown in Figure 2-2
- site compound and stockpile: the site compound and stockpiles refer to the area of about 0.42 of Lot 100, DP 1044282 north of the construction footprint zoned C3 – Environmental Management, owned and managed by the Darkinjung Local Aboriginal Land Council. This area will be used for the site compound and stockpiles.
- study area: the construction footprint buffered (50 metres) to consider potential direct and indirect impacts associated with construction and/or operation of the proposal. The study area was used to inform the Aboriginal heritage, non-Aboriginal heritage, biodiversity and cumulative impact desktop investigation
- survey area (study area in the BAR): the survey area refers to the portion of land that encompasses biodiversity surveys undertaken. The survey area extends as far as is necessary to assess all important biodiversity values known and likely to occur within the impact area and includes the impact area and any additional areas which are likely to be affected by the proposal, either directly or indirectly. In this case, the survey area is defined as the impact area including a 20 metre buffer from construction footprint, and a 10 metre buffer from the site compound and stockpiles. This area is unique to the biodiversity assessment.

2. The proposal

2.1 Description

2.1.1 Proposal location

Table 2-1: Proposal location details

Location details	
Title	Pacific Highway and Chain Valley Bay Road Intersection Upgrade
File number	PS210909
Road name and number	HW10 Pacific Highway and Chain Valley Bay Road Intersection
Closest crossroad(s)	HW10 Pacific Highway and Chain Valley Bay Road Intersection
Local government area	Central Coast Council
Transport for NSW region	North Region

The location of the proposal is shown in Figure 2-1.

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PS210909
HW10 Pacific Highway and Chain Valley Bay Road Intersection Upgrade

Figure 2-1
Location of the proposal

Legend

- Watercourses
- Roads
- Study area
- National Parks and Wildlife Service managed land
- Waterbodies

0 1,000 2,000 3,000 4,000
Metres

Coordinate system: GDA2020 MGA Zone 56

Scale ratio correct when printed at A3

GDA 2020

1:80,000 Date: 2/12/2024

Data sources: SEED, Geoscience Australia

2.1.2 Proposal description

Transport proposes to upgrade the intersection of the Pacific Highway and Chain Valley Bay Road at Lake Munmorah, in the Central Coast local government area (LGA) (the proposal). The proposal would involve upgrading the existing intersection to traffic signals, providing a dual turning lane out of Chain Valley Bay Road, and providing active transport upgrades and connections. While the current intersection design is able to accommodate the current traffic demand of the area, the proposal is needed to satisfactorily accommodate future traffic demand from both current approved developments and future proposed development. An overview of the proposal is shown in Figure 2-2.

Key features of the proposal include:

- installing traffic signals at all approaches to the existing Pacific Highway and Chain Valley Bay Road intersection
- installing a dual turning lane out of Chain Valley Bay Road onto the Pacific Highway
- retaining the existing U-turn facilities
- lengthening the existing turning lane from the Pacific Highway southbound into Chain Valley Bay Road
- relocating the existing bus stop along the southbound lane of Chain Valley Bay Road to the east of the intersection along northbound lane of Pacific Highway
- installing a *Disability Discrimination Act 1992* (DDA) compliant, dedicated footpath, connecting the intersection to the existing bus stop and footpath alongside the southbound lanes of the Pacific Highway
- installing a DDA compliant shared user path alongside the northbound lane of the Pacific Highway, connecting the relocated bus stop to the intersection and existing pedestrian facilities, while providing a connection for cyclists to enter and exit the northbound lane of the Pacific Highway as well as Chain Valley Bay Road, utilising the combination with on-road cycle lanes and designated off road cycle path
- installing signalised pedestrian and cyclist crossings at the northern and eastern approaches of the intersection
- ancillary works (such as reinstating road furniture and road signs)
- relocating and adjusting utilities.

The key features of the proposal are shown in Figure 2-3.

Property acquisition and temporary leases

The proposal would not require any property acquisition at this stage.

However, Transport would require temporary lease of a small portion (about 0.42 hectares (ha)) of Lot 100, DP 1044282 north of the Pacific Highway to accommodate the site compound and stockpile areas. Temporary lease options have been discussed with Darkinjung Local Aboriginal Land Council (LALC) as part of ongoing consultation. The main site compound and stockpile area (SC1) comprises of a lease area and a license area. The license area (0.041 ha) provides access to the northern lease area (0.34 ha) within Lot 100, DP 1044282. The lease area and license area are separated by a blue line in Figure 2-2.

Ongoing consultation carried out with Darkinjung LALC for the proposal is outlined in Section2.4.3. Potential impact to land use and property associated with temporary leases for the proposal is assessed in Section 3.9.

HW10 Pacific Highway and Chain Valley Bay Road Intersection Upgrade

Figure 2-2
Proposal overview

Legend

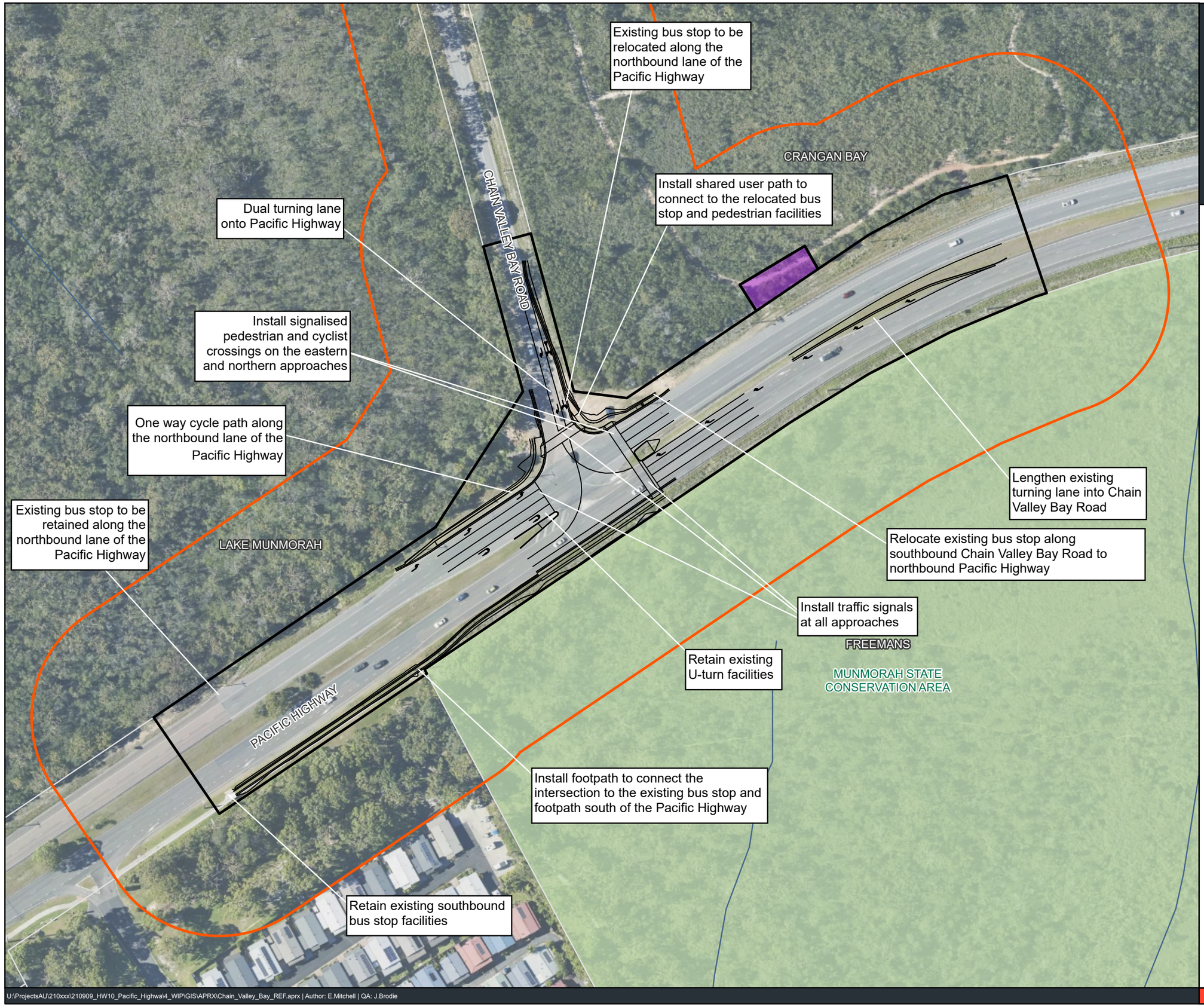
- Construction footprint
- Study area (construction footprint with 50 metre buffer)
- Site compound and stockpile areas
- Cadastre (surveyed)
- Watercourse
- Waterbody
- National Parks and Wildlife Service managed land

0 60 120
Meters

Coordinate system: GDA2020 MGA Zone 56
Scale ratio correct when printed at A3

1:2,500 Date: 18/03/2025

Data sources: TfNSW, NSWSS, Geoscience Australia
Australia latest: Metromap 2024



wsp

HW10 Pacific Highway and Chain Valley Bay Road Intersection Upgrade

Figure 2-3
Key features of the proposal

Legend

- Construction footprint
- Study area (construction footprint with 50 metre buffer)
- Site compound and stockpile areas
- Cadastre (surveyed)
- Watercourse
- Waterbody
- National Parks and Wildlife Service managed land

0 30 60
Meters

Coordinate system: GDA2020 MGA Zone 56
Scale ratio correct when printed at A3

1:1,500 Date: 18/03/2025

GDA 2020

Data sources: TfNSW, NSWSS, Geoscience Australia
Australia latest: Metromap 2024

2.1.3 Construction method

Construction of the proposal is expected to involve the construction method, provided in indicative staging with indicative plant and equipment, described in Table 2-2.

Table 2-2: Construction scenarios and activities of the proposal

Construction scenario	Indicative activities	Indicative plant and equipment
Site establishment and vegetation clearing	• setting up traffic control • establishing environmental controls • demarcating the extents of works • establishing site compound and stockpile areas • vegetation clearing and tree removal.	• road and traffic control (traffic control vehicles) • temporary traffic barriers • day makers/lanterns • excavator • hurricane fencing and gates • pole driver/truck mounted auger • concrete truck • generator • chainshaw • mulcher • slasher.
Utility adjustments	• locating existing utilites • relocating utilities where impacted by the proposal.	• excavator • crane.
Earthworks	• excavating soil • stockpiling excavated material • waste classifying excavated material • re-using excavated material where suitable • legally disposing of unsuitable material.	• excavator • truck and dog • pad-foot roller • oscillating roller • vibratory roller • watercart.
Drainage works	• installing new drainage infrastructure • connecting to existing drainage infrastructure.	• excavator • truck and dog.
Traffic Control	• installing traffic control signals and associated works.	• road and traffic control (traffic control vehicles) • day makers/lanterns • temporary traffic barriers.
Pavement works	• placing, compacting and finishing road materials including unbound crushed rock and cementitious bound crushed rock materials • placing, compacting and finishing asphalt road surface base layers, including milling of existing surface to key into existing surface levels.	• excavator • grader • pad-foot roller • oscillating roller • truck and trailer • watercart • asphalt profiler • paver • insulated body trucks • vibrating rollers • daymakers.
Supporting infrastructure works	• forming and pouring concrete medians • forming and pouring concrete bus stop • forming and pouring concrete pathways.	• body truck • concrete supply trucks • vibrating plant • crew light vehicles.

Construction scenario	Indicative activities	Indicative plant and equipment
Finishing work	• line marking • constructing kerb and guttering • constructing signalising pedestrian and cyclist crossings • installing safety barriers • installing street lighting and sign posting • rehabilitattion and stablisation of exposed surfaces.	• small crane • semi-trailer • body truck • concrete supply trucks • vibrating plant • crew light vehicles.
Demobilisation	• decommissioning and rehabilitating disturbed areas within the construction footprint, including site compound and stockpile areas • removing plant and equipment from the construction foorprint, site compound and stockpiles • removing environmental, safety and traffic controls.	• small excavator • water cart • crew light vehicles.

Construction hours and duration

Where practicable, construction work would occur during the following standard working hours:

- Monday to Friday: 7:00am to 6:00pm
- Saturday: 8:00am to 1:00pm.

Work outside of standard construction hours would be required to minimise traffic impacts during peak times. When required, out of standard working hours would be between 6:00pm and 7:00am, Sunday to Thursday.

Construction staging

The construction of the proposal would be carried out in five separate stages apart from the site mobilisation (18 days) and demobilisation (10 days). Construction stages and the requirement for day/night works is detailed in Table 2-3.

Table 2-3: Construction staging and proposed day/night works

Stage	Indicative time required (days)	Number of day and night work required (day/night)	
		Day	Night
Stage 1: South bound shoulder	19	18	1
Stage 2: Road crossings and median preparation	31	0	31
Stage 3: Northern corner widening	72	69	3
Stage 4: Southern corner widening	19	18	1
Stage 5: Median/splitter island	5	0	5

2.1.4 Proposal objectives

The objectives of the proposal are:

- improve efficiency of the intersection of Pacific Highway and Chain Valley Bay Road, including to facilitate future predicted traffic demand
- improve safety of the Pacific Highway and Chain Valley Bay Road intersection by separating traffic flow and regulating turning movements in and out of Chain Valley Bay Road to reduce the likelihood and severity of intersection crashes
- provide DDA compliant dedicated footpath and shared user path connections between the intersection and nearby bus stops
- support future residential growth in the Lake Munmorah area by providing efficient transport corridor.

2.1.5 Ancillary facilities

Ancillary facilities expected to be required during construction of the proposal are detailed in Table 2-4. Site photos of the proposed site compound and stockpile areas are included as Image 2-1 to Image 2-3.

Table 2-4: Ancillary facilities

Ancillary facilities		
Will the proposal require the use or installation of a compound site? The proposal would require establishment of two site compound and stockpile areas. The location of the site compound and stockpile areas are shown in Figure 2-2. A main site compound and stockpile area would be established about 240 metres north of the Pacific Highway and Chain Valley Bay Road intersection (referred to as site compound and stockpile area 1 or 'SC1'). SC1 would be about 3,820 square metres (m^2) in size (or 0.38 ha), and would include site facilities including worker amenities, offices, toilets, material storage and stockpiling. During design refinement, the size of SC1 was reduced. Note that the biodiversity assessment has assessed the original footprint of SC1 prior to the refinement. As such, the biodiversity assessment is considered to be conservative. Entry and exit for construction vehicles to SC1 would be from Chain Valley Bay Road, via an access track about 240 metres north of the intersection. This location would minimise impacts to road users along Chain Valley Bay Road associated with construction vehicles entering and exiting the site compound and stockpile area. A strip of vegetation that exists between SC1 and Chain Valley Bay Road would be retained as part of the proposal, to provide a visual screen and minimise visual impacts to road users. Regrowth vegetation within the SC1 and access track footprint would be retained, where practicable. The site compound and stockpile area would be securely fenced along its boundary. A smaller site compound and stockpile area (referred to as site compound and stockpile area 2 or 'SC2') would be established immediately north of the road corridor of the Pacific Highway, to the east of the intersection. The location of SC2 has been selected due to the existing access point from the Pacific Highway present at this location. The area of SC2 (362m^2 or 0.036ha in size) has also been historically disturbed. SC2 is located in closer proximity to the construction footprint than SC1, and as such, would also be used for vehicle parking (including light vehicles) and for short term storage of plant and equipment, if required. These compound and stockpile areas (including access tracks) have been chosen due to their proximity to the construction footprint, historical disturbance, minimal regrading and imported gravel required to flatten the area and minimal vegetation disturbance required. Image 2-1 to Image 2-3 show the disturbed nature of the proposed site compound and stockpile areas. The selection of the site compound and stockpile area locations would meet Transport's ideal criteria for ancillary facilities being: • more than 50 metres from waterways • areas of low ecological and heritage conservation significance (refer to Section 3.5 and 3.7) • areas requiring no significant clearing of native vegetation beyond that already required for the proposal • areas that minimise impact on amenity of the closest sensitive receiver • located on relatively-level ground.	Yes ☒	No ☐
Will the proposal require the use or installation of a stockpile site? Stockpiling activities would occur within the site compound and stockpile areas, and would be contained within the boundary of SC1, and SC2 if required. Stockpiling activities for the proposal would include stockpiling of spoil material, for classification and reuse where practicable, or for disposal offsite. Stockpiling activities would be carried out in accordance with Transport's *Stockpile Site Management Guideline* (EMS-TG-10). SC1 and SC2 would be levelled and established as a hardstand area, with erosion and sediment controls to be installed within the site compound and stockpile areas (and along the boundary) prior to construction commencing. Erosion and sediment controls to be implemented during construction are considered in Section 3.1.	Yes ☒	No ☐
Are any other ancillary facilities required (e.g. temporary plants, parking areas, access tracks)? No other ancillary facilities would be required.	Yes ☐	No ☒

Image 2-1: The proposed Site compound and stockpile area 1 looking east

Image 2-2: The proposed Site compound and stockpile area 1 looking northeast

Image 2-3: The proposed Site compound and stockpile area 2 looking west

2.1.6 Proposed date of commencement

Construction of the proposal is intended to begin during Q1 of 2025.

2.1.7 Estimated length of construction period

To avoid total closure of the Pacific Highway during construction of the proposal, construction activities would be staged and are expected to take up to eight months.

2.2 Need and options

The Pacific Highway (HW10) between Swansea and Bushells Ridge is an arterial route along the southeastern side of Lake Macquarie within the Central Coast LGA. It connects to the Pacific Motorway in the south via Doyalson Link Road and follows the eastern side of Lake Macquarie to Newcastle. HW10 provides connections to a range of centres and services within the Central Coast region.

Chain Valley Bay, a suburb within the Central Coast Council LGA, is expected to undergo significant uplift in residential housing over the coming decade. There are approved and proposed plans for low density and medium density residential dwellings as part of greenfield land releases in the area around Chain Valley Bay Road and Mulloway Road. While the current intersection design can accommodate the current traffic demand, it is unlikely that the intersection would be able to satisfactorily accommodate future traffic demand following completion of the greenfield residential developments in the area.

Key benefits of the proposal would include:

- improved level of service of the intersection and ability for the intersection to accommodate future expected traffic demands
- improved road user safety
- improved access, and safer facilities for pedestrians and cyclists
- support growth of the surrounding residential areas.

2.2.1 Options considered

Traffic modelling confirmed that there were opportunities to achieve a significant improvement in operation of the intersection with the projected future increases in dwellings in the Lake Munmorah area. As such, Transport completed strategic investigations that considered numerous design options.

Investigations that considered numerous design options with different traffic signal configurations were completed, and through an option selection workshop, key Transport stakeholders selected the preferred option. The preferred option is upgrading the intersection to traffic signals, adding a dual turning lane in Chain Valley Bay Road, and providing active transport upgrades and connections.

The options considered for the proposal included:

- **Option 1:** The 'Do-nothing' option. Under a 'Do-nothing' option the intersection at the Pacific Highway and Chain Valley Bay Road would remain in its current state and configuration. This option would reduce temporary impacts to road users from construction activities and would remove the potential for environmental impacts during construction as under this option no work would be carried out. However, the 'do-nothing' option would not improve efficiency and safety of the Pacific Highway and Chain Valley Bay Road intersection. Transport has identified the need for improving the intersection to accommodate for future traffic volumes. The 'Do-nothing' option was not considered feasible as it would not meet these requirements.
- **Option 2:** The 'Intersection upgrade' option. Option 2 involves upgrading the intersection to traffic signals on all approaches, providing an additional dual turning lane out of Chain Valley Bay Road, retaining existing U-turn facilities, installing dedicated footpath and shared user path connections between the intersection and nearby bus stops, and providing crossings for pedestrians and cyclists on the northern and eastern approaches.

The preferred option is Option 2 as it meets the objectives of the proposal. See Table 2-5 for the assessment of options.

Table 2-5: Assessment of options

Objectives	Option 1	Option 2
Improve efficiency of the intersection of Pacific Highway / Chain Valley Bay Road and facilitate future predicted traffic demand.	As Option 1 involves no changes to the current intersection, it would not improve the efficiency of the intersection. This option would not improve the intersection's capacity for future predicted traffic demand. **Does not meet objective.**	Option 2 would improve the efficiency of the intersection by the addition of a new turning lane out of Chain Valley Bay Road, lengthening the existing turning lane into Chain Valley Bay Road, and installation of traffic signals. This option would improve the intersection's capacity for future predicted traffic demand in 2031. **Meets objective.**
Reduce likelihood and severity of intersection crashes by separating traffic volumes and regulating turning movements in and out of Chain Valley Bay Road.	As Option 1 involves no changes to the current intersection, it would not reduce the likelihood and severity of intersection crashes. **Does not meet objective.**	Option 2 would reduce the likelihood and severity of intersection crashes by the use of traffic signals, and through installing pedestrian footpaths, shared user paths and crossings for pedestrians and cyclists on the northern and eastern approaches of the intersection. **Meets objective.**
Provide DDA compliant dedicated footpath and shared user path connections between the intersection and nearby bus stops and Parktrees Village.	As Option 1 involves no changes to the current intersection, it would not provide safe paths or areas for pedestrians, cyclists and bus users. **Does not meet objective.**	Option 2 would provide DDA compliant pedestrian footpath, shared user path and crossings for pedestrians and cyclists on the northern and eastern approaches of the intersection. This option would also provide connection of the footpath and shared user path from the intersection to nearby bus stops. **Meets objective.**

Objectives	Option 1	Option 2
Support future residential growth in the Lake Munmorah area	As Option 1 involves no changes to the current intersection, it would not support future residential growth in the Lake Munmorah area. **Does not meet objective.**	Option 2 would support future residential growth in the Lake Munmorah area by increasing the traffic capacity of the intersection, while improving safety for pedestrians, cyclists, and other road users. **Meets objective.**

An analysis of Option 1 (do-nothing) against the proposal objectives found that this option would not improve the efficiency of the intersection and accommodate future predicted traffic demand. As Transport has identified the need to improve the intersection to accommodate for future traffic volumes, the 'Do-nothing' option is not consistent with the proposal objectives and is not considered the preferred option.

An analysis of Option 2 (upgrade the intersection to traffic signals, additional turning lane out of Chain Valley Bay Road, lengthened turning lane into Chain Valley Bay Road and active transport upgrades) against the proposal objectives found that this option is consistent with the proposal objectives. Option 2 is considered the preferred option as it would improve the efficiency of the intersection and accommodate future predicted traffic demand.

2.2.2 Justification for the proposal

Upgrading the Pacific Highway and Chain Valley Bay Road intersection would best achieve the objectives of the proposal and meet Transport's requirements, based on the assessment of options. Upgrading the Chain Valley Bay Road and Pacific Highway intersection would improve efficiency and safety of the intersection for road users and would facilitate improved efficiency for predicted future traffic volumes. The intersection upgrade would support current and predicted residential growth in the Lake Munmorah area and would improve accessibility and safety of the intersection for road users, pedestrians and cyclists, as well as improve connectivity and accessibility to public transport.

2.3 Statutory and planning framework

2.3.1 Environmental Planning and Assessment Act 1979

The *Environmental Planning and Assessment Act 1979 Act* (EP&A Act) provides the statutory basis for planning and environmental assessment in NSW. The proposal is subject to the environmental impact assessment and planning approval requirements of Division 5.1 of this Act, that contains provisions for activities undertaken by public authorities.

In accordance with section 5.5 of the EP&A Act, Transport, as the proponent and determining authority, must examine and take into account to the fullest extent possible all matters affecting or likely to affect the environment by reason of the proposal. Section 171 of the Environmental Planning and Assessment Regulation 2021 (EP&A Regulation) defines the factors that must be considered when determining if an activity assessed under Division 5.1 of the EP&A Act would have a significant impact on the environment.

This MWREF constitutes an examination and consideration of matters affecting or likely to affect the environment by reason of the proposal, thereby fulfilling Transport's requirements under section 5.5. of the EP&A Act. Chapter 3 of this MWREF provides an assessment of the proposal in accordance with the factors outlined in section 171 of the EP&A Regulation.

2.3.2 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. This includes roads and road infrastructure facilities, and port, wharf or boating facilities.

Section 2.109 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.

As such, the proposal does not require development consent or approval under:

- State Environmental Planning Policy (Resilience and Hazards) 2021
- State Environmental Planning Policy (Precincts – Eastern Harbour City) 2021

- State Environmental Planning Policy (Precincts – Central River City) 2021
- State Environmental Planning Policy (Precincts – Western Parkland City) 2021
- State Environmental Planning Policy (Precincts – Regional) 2021
- State Environmental Planning Policy (Planning Systems) 2021.

2.3.3 State Environmental Planning Policy (Biodiversity and Conservation) 2021

Chapter 3 and Chapter 4 of State Environmental Planning Policy (Biodiversity and Conservation) 2021 ('SEPP (Biodiversity and Conservation') aim to encourage the proper 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.

Chapter 4 Koala Habitat Protection applies to land within LGAs listed under Schedule 2 of the Policy. The study area falls within the Central Coast LGA, which is listed under Schedule 2, it is considered that Chapter 4 of the SEPP 2021 may apply to the study area if the study area contains core koala habitat. The study area was not assessed as core koala habitat as there are no records of the species within 2.5 kilometres within the past 18 years, and no evidence of koala activity was recorded during the field surveys.

Nonetheless, impacts to the koala and its habitat have been considered as part of the broader biodiversity assessment (summarised within Section 3.7) for this MWREF.

2.3.4 State Environmental Planning Policy (Resilience and Hazards) 2021

State Environmental Planning Policy (Resilience and Hazards) 2021 (Resilience and Hazards SEPP) aims to promote an integrated and coordinated approach to land use planning in the coastal zone in a manner consistent with the objects of the *Coastal Management Act 2016* (CM Act).

The Resilience and Hazards SEPP identifies and maps four coastal management areas, defined in the CM Act as coastal wetlands and littoral rainforests areas, coastal vulnerability areas, coastal environment areas and coastal use areas. The Resilience and Hazards SEPP also specifies development controls to help protect and manage these sensitive coastal environments and to manage risks from coastal hazards and support appropriate development.

An area of coastal wetlands is located about 265 metres south of the construction footprint within Munmorah State Conservation Area (Munmorah SCA). The proposal is not expected to impact the mapped coastal wetlands due to the separation distance between the construction footprint and the wetlands, and with the implementation of mitigation measures during construction of the proposal. Assessment of potential indirect impacts to the coastal wetland and sensitive areas are discussed in Sections 3.1 and 3.2.

2.3.5 Other relevant legislation and environmental planning instruments

Commonwealth legislation

Environment Protection and Biodiversity Conservation Act 1999

Under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) a referral is required to the Australian Government for proposed actions that have potential to significantly impact on matters of national environmental significance (MNES) or the environment of Commonwealth Land. MNES and Commonwealth Land are considered in Appendix A and Biodiversity Assessment Report (Appendix B).

One threatened flora species; *Tetratheca juncea* (Black-eyed Susan) listed as Vulnerable under the EPBC Act was identified within the study area. Five threatened ecological communities (TECs) had the potential to occur within the survey area. The assessment of the proposal's impact on MNES and the environment of Commonwealth Land found that it is unlikely that the proposal would result in a significant impact on these matters. Accordingly, the proposal has not been referred to the Australian Government Department of Climate Change, Energy, the Environment and Water under the EPBC Act.

Native Title Act 1993

The *Native Title Act 1993* (Native Title Act) recognises and protects native title. The Native Title Act covers actions affecting native title and processes for determining whether native title exists and compensation for actions affecting native title. It establishes the Native Title Registrar, the National Native Title Tribunal, the Register of Native Title Claims and the Register of Indigenous Land Use Agreements, and the National Native Title Register. Under the Native Title Act, a future act includes proposed public infrastructure on land or waters that affects native title rights or interest.

A search of the following was carried out in July 2024 for the Central Coast LGA:

- Register of Native Title Claims
- Native Title Register
- Register of Indigenous Land Use Agreements
- Native Title applications and determinations database.

The results indicated one Native Title Determination (NND2019/003), relating to Lot 100 DP 1044282 within the site compound and stockpiles, exists. The determination was that native title does not exist on this land.

Other relevant NSW legislation

Biodiversity Conservation Act 2016

The *Biodiversity Conservation Act 2016* (BC Act) provides for conservation and protection of threatened species, populations, ecological communities of animals and plants, and Areas of Outstanding Biodiversity Value through specific objectives relating to the conservation of biodiversity and promoting ecologically sustainable development.

Part 7 of the BC Act requires that significance of the impact on threatened species, populations and endangered ecological communities listed under the BC Act or *Fisheries Management Act 1994* (FM Act), are assessed using a five-part test. Where a significant impact is likely to occur, a Species Impact Statement (SIS) or Biodiversity Development Assessment Report (BDAR) must be prepared.

A Biodiversity Assessment Report has been prepared for the proposal and is provided in Appendix B. The findings of the report are discussed in Section 3.7.

The Biodiversity Assessment Report concluded that the proposal is not likely to have a significant impact on Areas of Outstanding Biodiversity Value, TECs or threatened species or migratory species listed under the BC Act. Neither a SIS nor BDAR are required for the proposal.

Roads Act 1993

The *Roads Act 1993* (Roads Act) regulates the carrying out of various activities in, on and over public roads. Under section 138 of the Roads Act, applicants are required to obtain approval from the relevant road authority for erection of a structure, carrying out of work on or over a public road, or digging up or disturbing the surface of a road. Part 4 of the Roads Act sets out the provisions for the closing of public roads, including notification procedures.

The proposal involves construction work on the Pacific Highway, that is a classified State road under the Roads Act and under the care and control of Transport. Chain Valley Bay Road and nearby intersecting side streets (for example, Cocos Palm Drive) are unclassified local roads under the care and control of Central Coast Council.

Under section 71 of the Roads Act, a roads authority may carry out road work on any public road for which it is the road authority and on any other land under its control. Under schedule 2 clause 5(1), section 138 does not require a public road authority to obtain a road authority's consent to operate road authority functions in, on or over an unclassified road. Therefore, road authority consent is not required for the proposal. However, a Road Occupancy Licence (ROL) would be obtained for any temporary road or lane closures required during construction of the proposal.

Consultation with Central Coast Council has been carried out in accordance with the SEPP (Transport and Infrastructure) requirements. Central Coast Council did not provide a response. Details of consultation carried out for the proposal are included in Section 2.4.2.

National Parks and Wildlife Act 1974

The *National Parks and Wildlife Act 1974* (NPW Act) regulates control and management of all national parks, historic sites, nature reserves, and Aboriginal areas. The main aim of the NPW Act is to conserve the natural and cultural heritage of NSW. Where works will disturb Aboriginal objects, an Aboriginal Heritage Impact Permit (AHIP) is required. The Stage 1 Procedure for Aboriginal Cultural Heritage Consultation and Investigation (PACHCI) prepared by Transport (September 2024) identifies that the proposal is unlikely to harm known Aboriginal objects or places and therefore an AHIP is not required.

The proposal is not located on land reserved under the NPW Act. However, the Munmorah SCA is located directly south of the construction footprint. Munmorah SCA is mapped as C1 – National Parks and Nature Reserves and is reserved and managed under the NPW Act. No work would occur within the Munmorah SCA, and NSW National Parks and Wildlife Service (NPWS) have been notified of the proposal.

Construction of the proposal has potential to result in indirect impacts to the Munmorah SCA associated with erosion and sediment impacts, water quality impacts and indirect biodiversity impacts. Operation of the proposal is not expected to significantly impact environmental conservation values or land use of the Munmorah SCA; however, the proposal would include alterations and upgrades to existing drainage infrastructure that may periodically drain to the Munmorah SCA.

Potential impacts of the proposal on the Munmorah SCA are considered in relevant sections of Chapter 3 of this MWREF. Consultation with NPWS (through Department of Climate Change, Energy, the Environment and Water (DCCEEW-State)) has been carried out under clause 2.15 of SEPP (Transport and Infrastructure). NPWS advised that they would like to review the MWREF before providing comments and requested all safeguards and mitigations are implemented. The outcomes of these consultation activities are included in Section 2.4 and the full correspondence is provided as Appendix C of this MWREF.

Crown Land Management Act 2016

The *Crown Land Management Act 2016* (Crown Land Act) is intended to ensure that Crown land is managed for the benefit of the people of NSW and to provide for the proper assessment and management of Crown land in accordance with the principles of the Crown Land Act. The Act sets out the conditions under which Crown land is permitted to be occupied, used, sold, leased, licensed or otherwise dealt with.

The road reserves along and encompassing the Pacific Highway and Chain Valley Bay Road are mapped as Crown Lands (NSW Crown Copyright – Department of Planning and Environment, 2024). However, consultation with Transport's Land Information and Corridors team was carried out for the proposal and identified that the road corridors are no longer Crown Land parcels.

Transport's Land Information and Corridors team identified that Chain Valley Bay Road within the construction footprint is a council public road with Central Coast Council as the Roads Authority. Similarly, the Pacific Highway within the construction footprint is a classified State road, dedicated as Public Road with Central Coast Council as the Roads Authority. Therefore, the proposal does not require a permit from, or any further consultation with, NSW Crown Lands. No further assessment of Crown Lands is required.

Fisheries Management Act 1994

The FM Act aims to conserve, protect and manage fisheries, aquatic systems, and habitats in NSW including conserving fish stocks and key fish habitats. The FM Act establishes mechanisms for the listing of threatened species, populations, and ecological communities or key threatening processes, the declaration of critical habitat and impact assessment requirements.

The coastal wetlands about 265 metres south of the construction footprint, within the Munmorah SCA, are mapped as Key Fish Habitat. The proposal does not involve harm to mangroves or other protected marine vegetation, dredging or reclamation or blocking of fish passage and does not involve impact to a Key Fish Habitat waterway. Works for the proposal would not require a permit issued by the Minister in accordance with Part 7 of the FM Act.

The proposal is not expected to indirectly impact Key Fish Habitat due to separation distance between the construction footprint and the wetlands, and with implementation of mitigation measures during construction of the proposal. Assessment of potential indirect impacts to the Munmorah SCA are discussed in Sections 3.1 and 3.2, and Key Fish Habitat is considered in Section 3.7.

Heritage Act 1977

The *Heritage Act 1977* (Heritage Act) aims to protect items of State and local heritage significance and outlines the approval process for development that may impact items of heritage significance. Matters protected under the Heritage Act include (but are not limited to) items listed on the State Heritage Register, the heritage schedules of local council local environmental plans (LEPs), and NSW Government agencies' heritage and conservation registers (section 170 Registers).

No heritage listed items on the State Heritage Inventory, Central Coast Local Environmental Plan 2022 (Central Coast LEP 2022) and Commonwealth Heritage List were located within or directly adjacent to the construction footprint, site compound and stockpiles. Therefore, approval from the Heritage Council of NSW is not required. Further assessment of potential impacts on non-Aboriginal heritage values are discussed in Section 3.6.

Protection of the Environment Operations Act 1997

The *Protection of the Environment Operations Act 1997* (POEO Act) provides the legal framework for management of air, noise, water and waste pollution. Under section 48 of the POEO Act, scheduled activities or scheduled development (as defined in Schedule 1 of the POEO Act) require an Environment Protection Licence (EPL).

Section 35 of Schedule 1 defines road construction development that require an EPL. The proposal would not meet the definition of a scheduled activity for road construction as described in Schedule 1 of the POEO Act, therefore an EPL is not required for the proposal.

Other legislation

Contaminated Land Management Act 1997

The *Contaminated Land Management Act 1997* establishes a process for investigating and remediating land that the NSW Environment Protection Agency (EPA) considers to be contaminated significantly enough to require regulation under Part 3 Division 2 of the Act. A search of the NSW EPA Contaminated land record of notices carried out on 24 July 2024 found no known contaminated sites are located within, or directly next to, the construction footprint or the site compound and stockpiles. Potential contaminants would be managed in accordance with an unexpected finds protocol. Contamination is further discussed in Section 3.1.

Biosecurity Act 2015

The primary object of the *Biosecurity Act 2015* is to provide a framework for the prevention, elimination and minimisation of biosecurity risks posed by biosecurity matter, including pests, diseases and contaminants. Under the *Biosecurity Act 2015*, land managers are required to follow the regional and non-regional duties that have been allocated to each Priority Weed. Weeds are present within the construction footprint and there are three high priority weeds present in the study area:

- *Andropogon virginicus* (Whisky Grass)
- *Hyparrhenia hirta* (Coolatai Grass)
- *Ageratina Adenophora* (Crofton Weed).

Appropriate mitigation measures associated with the spread of weeds and pathogens are included in Section 3.7.

Waste Avoidance and Resource Recovery Act 2001

Objects of the *Waste Avoidance and Resource Recovery Act 2001* include encouraging efficient use of resources and reducing environmental harm in accordance with the principals of Ecologically Sustainable Development (ESD). The Act establishes the waste hierarchy of avoidance, resource recovery and disposal.

Waste would be generated by the proposal, including concrete and road base material, stabilising material, spoil, vegetation, and general waste generated by workers. Waste would be managed through the Construction Environmental Management Plan (CEMP) and disposed of or recycled in accordance with the *Waste Classification Guidelines* (EPA, 2014).

Waste management is further discussed in Section 3.11.

Water Management Act 2000

The *Water Management Act 2000* (WM Act) aims to provide for the sustainable and integrated management of water sources of the State for the benefit of both present and future generations. Works within 40 metres of a waterway generally require a Controlled Activity Approval (Section 91 of the Act); however, an exemption is provided for public authorities under Clause 41 of the Water Management (General) Regulation 2018.

Section 56 of the WM Act requires an access licence for the extraction of groundwater. Section 90 of the WM Act requires a water supply work approval to construct a water supply work at a specific location where groundwater is to be taken. Clause 21 and Schedule 4 of the Water Management (General) Regulation 2018 provides an exemption where extraction of groundwater does not exceed three (3) megalitres (ML). If construction activities require extraction of greater than 3ML of groundwater, then a water access licence may be required.

As a public authority, Transport is exempt from the requirement for a controlled activity approval under clause 41 of the Water Management (General) Regulation 2018. No groundwater is expected to be extracted for the proposal.

The proposal would not include works in or directly next to waterways. Management of potential impacts to water quality in nearby waterways is discussed in Section 3.2.

2.4 Community engagement and agency consultation

2.4.1 SEPP (Transport and Infrastructure) 2021 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:

Table 2-6: Consultation required with Council

Is consultation with Council required under sections 2.10 – 2.12 and 2.14 of the 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? The proposal would have minor impact to the traffic flows along Chain Valley Bay Road. With the implementation of mitigation measures presented in this MWREF, these impacts would be negligible. Council has been contacted during detailed design and as a part of the SEPP (Transport and Infrastructure) consultation to keep them updated about the proposal.	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? The proposal would involve more than a minor or inconsequential excavation of road or adjacent footpath for which Council is the roads authority and responsible for maintenance. Consultation with Council is detailed in Section 2.4.2.	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? A search of the following databases was carried out on 15 May 2024. • Transport section 170 register • NSW Heritage databases • Commonwealth Heritage List, established under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) • Local Environmental Plan(s) heritage items. The database searches found one local heritage item located in the vicinity of the proposal. The 'Farm homestead complex', is a locally listed heritage item located at 89 Carters Road (within Lot 42, DP 801076), about one kilometre to the northwest of the site compound and stockpiles. The item is listed as Item #I23 on the Central Coast Local Environmental Plan 2022. Due to the separation distance between the 'Farm homestead complex' local heritage item and the proposal, no impacts to the heritage item are expected.	Yes ☐	No ☒
Is the proposal within the coastal vulnerability area and inconsistent with a certified coastal management program applying to that land? The proposal is not located within a coastal vulnerability area.	Yes ☐	No ☒
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 Floodplain Development Manual: the management of flood liable land (nsw.gov.au). The Central Coast Council Online Mapping Tool (accessed 15 May 2024) indicates the potential for the extent of a 1 in 100-year flood to occur across a small section of the proposal, at the proposal's eastern extent and central location. The proposal would not change flooding patterns to more than a minor extent. Given Transport is not raising the road level of the intersection, there should not be any afflux increase. The proposed work is an improvement to the capacity of the existing network. As such, the inundation time of a flood even if it was to occur is expected to be reduced.	Yes ☐	No ☒

Table 2-7: Consultation with other public authorities

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

Is consultation with a public authority (other than Council) required under sections 2.13, 2.15 and 2.16 of the 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 Floodplain Development Manual: the management of flood liable land (nsw.gov.au). The Central Coast Council Online Mapping Tool (accessed 15 May 2024) indicates the potential for the extent of a 1 in 100-year flood to occur across a small section of the proposal, at the proposal's eastern extent and central location. As the proposal is for the upgrade of an existing road, the proposal does not comprise more than minor alterations or additions to, or the demolition of a building, emergency works or routine maintenance.		
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? The proposal is located directly adjacent to the Munmorah SCA. However, the proposal is not expected to impact the Munmorah SCA as the works would be limited to the existing road corridor, with acquisition and temporary leasing of land limited to the northern extent of the proposal. NPWS has been consulted about the proposal. The detail of this consultation is provided in Section 2.4.3.	Yes ☒	No ☐
Are the works on land in Zone C1 National Parks and Nature Reserves or in a land use zone equivalent to that zone? The works are not located on land zoned as C1 National Parks and Nature Reserves or equivalent.	Yes ☐	No ☒
Do the works include a fixed or floating structure in or over navigable waters? The works do not involve a fixed or floating structure in or over navigable waters.	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? The works are not 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) The proposal is not located on land within the dark sky region.	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). The works are not located on buffer land located around the defence communications facility near Morundah.	Yes ☐	No ☒
Are the works on land in a mine subsidence district within the meaning of the *Mine Subsidence Compensation Act 1961*? The works are located within the Swansea North Entrance Mine Subsidence District. Subsidence Advisory NSW was consulted as outlined in Section 2.4.3.	Yes ☒	No ☐
Are the works on, or reasonably likely to have an impact on, a part of the Willandra Lakes Region Work Heritage Property? The works are not likely to impact the Willandra Lakes Region Work Heritage Property.	Yes ☐	No ☒
Are the works within a Western City operational area specified in Schedule 2 of the *Western Parkland City Authority Act 2018* with a capital value of $30 million or more? The works are not located within a Western City Operational area.	Yes ☐	No ☒

Table 2-8: Notification of council and occupiers of adjoining land

Do Council and occupiers of adjoining land need to be notified under section 2.111 of the SEPP (Transport and Infrastructure)?		
Does the proposal include a car park intended for the use by commuters using regular bus services? The proposal does not include a car park intended for the use by commuters using regular bus services.	Yes ☐	No ☒
Does the proposal include a bus depot? The proposal does not include a bus depot.	Yes ☐	No ☒

Do Council and occupiers of adjoining land need to be notified under section 2.111 of the SEPP (Transport and Infrastructure)?		
Does the proposal include a permanent road maintenance depot or associated infrastructure, such as garages, sheds, tool houses, storage yards, training facilities and workers amenities? The proposal does not involve a permanent road maintenance depot or associated infrastructure.	Yes ☐	No ☒

2.4.2 Consultation with Central Coast Council

Transport has engaged with Central Coast Council throughout the design of the proposal. Transport conducted an invitation meeting with the council to discuss the proposal and determine which council assets would form part of the proposal. Each stage of the design plans has been sent to the council for review and input in relation to their assets. Transport would continue to provide updates to the council. A TISEPP letter was also sent to the council in accordance with the SEPP (Transport and Infrastructure). The detail of this letter is provided in Appendix C.

2.4.3 Other agency and community engagement

The agencies outlined in Table 2-9 have been consulted regarding the proposal. Detailed consultation with other agencies is provided in Appendix C.

Table 2-9: Consultation with other agencies carried out for the proposal

Consultation details	
Darkinjung Local Aboriginal Land Council	Transport engaged with Darkinjung LALC via phone calls and emails as well as various meetings. This consultation was conducted to create a positive relationship with the LALC and to determine the proposal requirements for acquisition and lease, any potential impacts to the LALC and potential proposal constraints.
NSW Crown Lands	The road reserves along and encompassing the Pacific Highway and Chain Valley Bay Road are mapped as Crown Lands (NSW Crown Copyright – Department of Planning and Environment, 2024). However, consultation with Transport's Land Information and Corridors team was carried out for the proposal and identified that the Pacific Highway and Chain Valley Bay Road road corridors are no longer Crown Land parcels. Therefore, the proposal does not require a permit from, or any further consultation with, NSW Crown Lands.
Local bus providers	Busways operates a number of existing bus stops that are located within the study area. Consultation included a Have Your Say invitation, emails and phone calls to understand bus routes, the patronage of stops and any impact of inputs for design.
NPWS	NPWS were sent a letter in accordance with Section 2.15 of the SEPP (Transport and Infrastructure). The detail of this letter is provided in Appendix C. They were also sent a Have Your Say invitation and engaged via email to determine the use and vehicle type for their access gates as well as any design inputs and constraints. NPWS requested a copy of the MWREF before providing further comments on the proposal. After reviewing the MWREF, NPWS provided acceptance of the proposal. NPWS requested that all safeguards and mitigation measures outlined within this document are implemented.
Subsidence Advisory NSW	Subsidence Advisory was sent a letter in accordance with Section 2.15 of the SEPP (Transport and Infrastructure). The detail of this letter is provided in Appendix C. Subsidence Advisory responded stating that future mining under the construction footprint, site compound and stockpiles is unlikely and that design measures to account for future coal mine subsidence are not required.

Transport carried out consultation with the community and stakeholders on the concept design during November and December 2024. During this consultation period, Transport invited feedback via an online survey, email, and mail. Consultation involved a project update, a project webpage, a media release, and social media posts.

A toll-free 1800 telephone number (1800 763 353) and email address (CentralCoastProjects@transport.nsw.gov.au) were made available to receive and respond to enquiries from the community and interested stakeholders.

A total of 413 responses to the proposal were received during the consultation period, 400 of which were submitted through the online survey tool. The results of the online survey highlight that more than 83 per cent of the respondents strongly support or support the need to upgrade the intersection. Most notable feedback from the consultation related to urgency to deliver the upgrade and danger of the current intersection. Additional feedback on the design included increase of capacity to the intersection treatment, improvements to active transport, and opportunities to improve safety.

The issues raised by the community, government agencies and key stakeholders have been considered in the development of the design and environmental assessment for the proposal (this MWREF).

Transport would continue to consult with key stakeholders as planning for the proposal progresses, including during detailed design and construction. The community will be kept updated on the proposal on the project web page at https://nswroads.work/cvbr.

3. Environmental assessment

This chapter 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 s171 of the Environmental Planning and Assessment Regulation 2021.

The matters of national environmental significance under the *Environment Protection and Biodiversity Conservation Act 1999* (Commonwealth) are also considered in Appendix A. Site-specific safeguards are provided to ameliorate the identified potential impacts.

3.1 Soil

Table 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 western portion of the construction footprint is mapped as Class 5 Acid Sulfate Soil (ASS) according to the ePlanning Spatial Viewer (NSW Crown Copyright – Department of Planning and Environment, 2024). ASS are not typically found in Class 5 areas, which are located within a 500 metre buffer of adjacent areas of Class 1-4 ASS. ASS could be exposed during construction works for the proposal, particularly within the western portion of the construction footprint. However, the risk of exposure would be low. An ASS management plan would be prepared to detail management of potential ASS during construction, if encountered. There are no mapped salinity issues within the construction footprint, construction (NSW DPE, 2024).	Yes ☒	No ☐
Does the proposal involve the disturbance of large areas (e.g., >2ha) for earthworks? The construction footprint, site compound and stockpile areas is about 3 ha in size. It is not expected that the entire proposal area would be subject to excavation or earthworks at one time. Construction of the proposal would be staged, including earthworks. Therefore, the proposal is not expected to require earthworks across an area larger than 2 ha at any one time.	Yes ☐	No ☒
Does the site have constraints for erosion and sedimentation controls such as steep gradients or narrow corridors? The construction footprint is a narrow, linear corridor that encompasses the Pacific Highway road corridor east to west, and extends north along the road corridor of Chain Valley Bay Road. The space between construction footprint and Munmorah SCA is extremely limited. As such, adequate erosion and sediment controls are required. The construction footprint, and proposed construction method, would allow adequate space for provision of erosion and sediment controls within the construction footprint, site compound and stockpiles during construction of the proposal. The site compound and stockpile areas (SC1 and SC2) would have erosion and sediment controls established prior to mobilisation of plant and equipment to site. Erosion and sediment controls would be maintained and monitored throughout the construction phase of the proposal, especially following rainfall events or during prolonged periods of rain. Erosion and sedimentation impacts are not expected during operation of the proposal as disturbed areas would be remediated following completion of construction work. Measures relating to erosion and sediment control during construction of the proposal are outlined in the safeguards table below.	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). The construction footprint, site compound and stockpiles encompasses and is adjoined by C3 Environmental Management land along and within its northern extent. This C3 land is currently owned and managed by Darkinjung LALC. The construction footprint is located immediately north of the Munmorah SCA. The Munmorah SCA contains wetland areas that are mapped as Coastal Wetlands under the State Environmental Planning Policy (Resilience and Hazards) 2021 ('Resilience and Hazards SEPP') about 265 metres south of the construction footprint. Stormwater has potential to enter the surrounding environment during construction of the proposal particularly during prolonged periods of rain. However, erosion and sediment controls would be	Yes ☒	No ☐

Description of existing environmental and potential impacts		
established and maintained within construction footprint, site compound and stockpile areas SC1 and SC2 during construction to contain run-off and stormwater generated from the c. During operation, changes to stormwater velocities, concentrations and output paths are unlikely and stormwater flows are unlikely to change from existing conditions. While sections of kerb and gutter are proposed, this would not significantly increase concentration of stormwater. Slight changes in the median noses would result in negligible changes to flow paths.		
Is there any evidence within or nearby the likely footprint of potential contamination? A search of the NSW Environment Protection Authority (EPA) Contaminated land record of notices carried out on 24 July 2024 found no known contaminated sites are located within, or directly next to, the construction footprint, site compound and stockpiles. The nearest known contaminated site (recorded on the Contaminated land record of notices) is a former service station located 2.7 kilometres northeast from site compound and stockpiles. Due to the separation distance between the construction footprint, site compound and stockpiles and the nearest known contaminated site, the proposal is not expected to be impacted by contamination at the nearest known contaminated site.	Yes ☐	No ☒
Is the likely proposal footprint in or nearby highly sloping landform? The proposal footprint is not in or nearby to a highly sloping landform. However, the topography of the area slopes from the north to the south, with the landform draining to the Munmorah SCA. The Pacific Highway presents an artificial elevation in the landform, designed and constructed to remain passable during localised flood events. Erosion and sedimentation impact during construction of the proposal has potential to impact the surrounding environment if left unmanaged. Erosion and sediment controls would be established prior to construction of the proposal commencing and would be maintained for the duration of the work. The progressive construction staging would minimise the footprint of exposed surfaces where practicable.	Yes ☐	No ☒
Is the proposal likely to result in more than 2.5 ha (area) of exposed soil? The construction footprint, site compound and stockpile areas is about 3 ha in size. It is not expected that the entire proposal area would be subject to excavation or earthworks at one time. Construction of the proposal would be staged, including earthworks. The site compound and stockpile areas (SC1 and SC2) would be about 0.42 ha in size. These areas would be graded and would be hardstand areas for the duration of the construction works. Additionally, erosion and sediment controls would be established and maintained in and around these areas for the duration of the works. Therefore, construction of the proposal is not expected to require earthworks that may result in over 2.5 ha of exposed soil at any one time.	Yes ☐	No ☒

Safeguards

Safeguards to be implemented are:

Soil	
E1	An erosion and sediment control plan (ESCP) will be prepared and implemented as part of the Construction Environmental Management Plan (CEMP) for the proposal. The ESCP will outline erosion and sediment control measures 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 within construction fooprint, site compound and stockpiles • minimise the amount of material transported from the construction footprint, site compound and stockpiles to surrounding pavement surfaces • divert clean water around the construction footprint, site compound and stockpiles. The ESCP and controls will be established and maintained in accordance with the Landcom/Department of Housing *Managing Urban Stormwater, Soils and Construction Guidelines* (the Blue Book).
E2	Erosion and sedimentation controls will 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 will not be removed until the works are complete and areas stabilised.
E4	Work areas will be progressively excavated and stabilised to reduce the total area of exposed soils/surfaces at any one time.
E5	The maintenance of established stockpile sites will be in accordance with the Transport *Stockpile Site Management Guideline* (EMS-TG-10) (2015).

Soil	
E6	If suspected Acid Sulfate Soils are encountered during excavation works for the proposal, all works will cease and the soil will be sampled. If the soil is identified as Acid Sulfate Soils, an Acid Sulfate Soil Management Plan (ASSMP) will be developed in accordance with the *National Acid Sulfate Soils Guidance: National acid sulfate soils identification and laboratory methods manual* (Department of Agriculture and Water Resources, 2018).
E7	An unexpected contamination finds procedure will be included in the CEMP. The procedure will outline the appropriate management procedures to be followed in the event of potential contamination (such as odours, asbestos containing material or visually contaminated materials) being found during construction activities.

3.2 Waterways and water quality

Table 3-2: Waterways and water quality

Description of existing environmental and potential impacts		
Is the proposal located within, adjacent to or near a waterway? The construction footprint, site compound and stockpiles does not encompass waterways or drainage lines. Lake Munmorah is located about 1.3 kilometres south of the construction footprint. Chain Valley Bay, as part of Lake Macquarie is located about 1.7 kilometres northwest of the site compound and stockpiles. An unnamed drainage line is located about 60 metres south of the construction footprint within the Munmorah SCA, which eventually discharges to the coastal wetlands within the SCA. The proposal is not expected to directly impact Lake Munmorah or Lake Macquarie due to the separation distances between the construction footprint, site compound and stockpiles and these waterbodies. Water quality of the unnamed drainage line within Munmorah SCA (and the associated wetlands) has potential to be indirectly impacted during construction of the proposal where contaminated or sediment-laden run-off or spills from the construction footprint, site compound and stockpiles enter the surrounding environment. Erosion and sediment controls would be established within construction footprint, site compound and stockpiles to contain and manage run-off and erosion and sedimentation that has potential to enter the environment during construction works. Spill prevention and management, and fuel/chemical handling and storage would be carried out in accordance with best practice mitigation measures to be implemented within the CEMP. This would include regular inspection of plant and equipment, storage and refuelling of plant and equipment within bunded areas of the site compound and stockpile areas (which would be located over 50 metres from waterways and drainage lines). Operation of the proposal has potential to impact drainage flows from the construction footprint, site compound and stockpiles into the unnamed drainage line located within the Munmorah SCA. This would be associated with altered and/or increased surface water flows as a result of in an increase to impervious surfaces, and upgrades to the existing drainage infrastructure of the intersection and adjoining roads. Flooding is unlikely given the proposal does not include raising the level of the road. The proposed drainage network would provide an increased capacity compared to the current network. As such the duration and inundations times would be marginally reduced.	Yes ☐	No ☒
Is the location known to flood or be prone to water logging? The Central Coast Council Online Mapping Tool indicates the potential for the extent of a 1 in 100-year flood to occur in a small section of the proposal's study area. The proposal has been designed to consider potential flooding and flood immunity. Flooding is unlikely given the proposal does not include raising the level of the road. The proposed drainage network would provide an increased capacity compared to the current network. As such the duration and inundations times would be marginally reduced.	Yes ☐	No ☒
Is the proposal located within a regulated catchments covered by chapter 6 of State Environmental Planning Policy (Biodiversity and Conservation) 2021 (SEPP (Biodiversity and Conservation))? The proposal is not located within or immediately adjacent to water catchment areas identified in Chapter 6 of SEPP (Biodiversity and Conservation). The construction footprint, site compound and stockpiles are not located within a drinking water catchment.	Yes ☐	No ☒
Would the proposal be undertaken on a bridge or ferry? The proposal would not 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 ☒

Construction of the proposal would require the use of water on site for dust suppression and other purposes. Water to be used during construction of the proposal would be delivered via water carts as required.		

Safeguards

Safeguards to be implemented are:

Waterways and water quality	
W1	An ESCP will be prepared and implemented as part of the CEMP for the proposal.
W2	Control measures to minimise the risk of water pollution and impacts to surrounding environment will be included in the ESCP. The following measures will be included to limit sediment, run-off or other contaminants entering watercourses from the construction footprint, site compound and stockpile (including site compounds and stockpile areas): • visual monitoring (i.e. turbidity in stormwater, 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 • sediment fences will be installed, monitored and maintained as needed to contain any sediment or sediment-laden run-off within the construction footprint, site compound and stockpiles • all fuels, chemicals, and liquids would be stored at least 50 metres away from any waterway and stored in an impervious bunded area within the construction footprint, site compound and stockpiles and spill kits must be available • plant and maintenance equipment would be refuelled in impervious bunded areas at least 40m from watercourses, and spill kits must be available • run-off from ancillary sites would be controlled and treated before discharging into downstream waterways • vehicle washdowns and/or concrete truck washouts would be carried out within a designated bunded area of an impervious surface or carried out off-site • vehicle movements would be restricted to designated pathways and hardstand areas • areas exposed for extended periods, such as site compounds and stockpile areas, would be stabilised where possible.
W3	No dirty water will be released off-site.
W4	Water quality control measures will be used to prevent any materials (e.g., concrete, grout, sediment etc.) entering drain inlets or waterways.
W5	Measures to control pollutants from stormwater and spills will be investigated and incorporated in the pavement drainage system at locations where it discharges to receiving drainage lines. Measures aimed at reducing flow rates and potential scour during rain events will be incorporated in the design of the pavement drainage system.
W6	Excess debris from cleaning and washing will be removed using hand tools.
W7	An emergency spill kit will be kept within the construction footprint, site compound and stockpiles at all times. The spill kit will be appropriately sized for the volume of substances at the work site. All staff will be made aware of the location of the spill kit and trained in its use.
W8	If an incident or spill occurs the Transport for NSW Project Manager and Environmental Representative is to be notified immediately and the Incident Management Procedures implemented.
W9	The stormwater drainages constructed as a part of the proposal will connect to existing drains around the site where possible.

3.3 Noise and vibration

Table 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 (i.e., church, school, hospital)? The construction footprint is located at an existing intersection within an existing road corridor. Nearby noise sensitive receivers include over 50s lifestyle accommodation (located south and northwest of the site compound and stockpiles), education facilities (located west of the construction footprint), church located west of the construction footprint, site compound and stockpiles and current or proposed residential and recreational areas (located west, north and south-west of the construction footprint, site compound and stockpiles). The NSW Planning Portal Spatial Viewer indicates the presence of the following sensitive receivers within one kilometre of the construction footprint, site compound and stockpiles: • Private recreation (RE2) – 200 metres southwest • Public recreation (RE1) – 500 metres northwest and 750 metres southwest • General residential (R1) – 250 metres northwest • Low density residential (R2) – 650 metres southwest • Medium density residential (R3) – 300 metres northwest • Infrastructure (SP2 Educational Establishment) – 650 metres southwest. A review of aerial imagery (10 February 2025) indicates that while there are areas zoned as general residential, medium density residential and public recreation to the northwest, no development is currently present. These areas represent areas of future, planned residential development that the proposal seeks to support. Sensitive receivers nearby the construction footprint, site compound and stockpiles are visible in Figure 3-1.	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 of standard construction hours would be required to minimise traffic impacts during peak times. When required, out of standard working hours would be from 6:00pm to 7:00am, Sunday to Thursday.	Yes ☐	No ☒
Is any explosive blasting required for the proposal? No explosive blasting would be required for the proposal.	Yes ☐	No ☒
Would construction noise or vibration from the proposal affect sensitive receivers? Construction noise impacts have been predicted based on Transport's Construction and Maintenance Noise Estimator Tool (CNET tool). The representative noise environment of R2 has been selected based on the location of the proposal in a busy highway and the surrounding suburban style residential areas. The rated background noise levels (RBLs) for this representative noise environment are considered to be 45 dB(A) during day and 35 dB(A) during night. The assessment has considered worst case scenario of construction vehicles operating at the edge of the construction footprint and the receivers being within direct line of sight from the construction footprint, site compound and stockpiles. Multiple noisiest equipment scenarios have been selected based on day and night works in the construction footprint, site compound and stockpiles. First scenario has considered Asphalt profiler as noisiest equipment during night time. The outcomes of this assessment are: • residential receivers within 35 metres of the proposal would be classified as highly affected and would experience sound levels of 75 dB(A), since no receivers are within this distance, no noise catchment area (NCA) is defined as being highly affected • residential receivers within 105 metres of the proposal would receive highly intrusive noise levels of 65 dB(A), these are the receivers within NCA1n in Figure 3-1 • residential receivers within 240 metres of the proposal would receive moderately intrusive noise levels of 55 dB(A), these are the receivers within NCA2n in Figure 3-1 • residential receivers within 545 metres of the proposal would receive clearly audible sound levels of 45 dB(A), these are the receivers within NCA3n in Figure 3-1 • residential receivers within 805 metres of the proposal would receive noticeable sound levels of 40 dB(A), these are the receivers within NCA4n in Figure 3-1.	Yes ☒	No ☐

Description of existing environmental and potential impacts		
The receivers on Wybung Lane are likely to experience highly intrusive noise (i.e., 30 dB(A) greater than RBL) as shown in Figure 3-1. As per the construction program, these receivers would be subject to highly intrusive noise levels for approximately three nights. Multiple receivers within the NCA2n shading located south-west of the construction footprint would experience moderately intrusive sound levels (i.e., 20 dB(A) greater than RBL) and further receivers (within NCA3n shading) on the same area are set to experience clearly audible sound levels (i.e., 10 dB(A) greater than RBL). The safeguards outlined below would be implemented to minimise impacts as much as practicable during night works. Sensitive receivers within NCA1n may be eligible for additional mitigation measures including alternative accommodation. Notification, phone calls, special notifications, duration respite and respite periods. Sensitive receivers within NCA2n may be eligible for notifications, phone calls, special notification, duration respite and respite periods. Sensitive receivers within NCA3n may be eligible for notification, duration respite and respite periods while receivers within NCA4n may be eligible for notifications. The specific details of these mitigation measures would be determined on a cases by case basis. The EPA Road Noise Policy advises that noise events above background levels, rather than peak background noise levels, are likely to cause sleep disturbance/ Noise characteristics that influence sleep disturbance are considered to be the number of noise events heart distinctly above the background level and the peak level and the emergence of these events. Sleep disturbance is only like to impact residences within 185 metres of the proposal. A number of residences to the southwest of the construction footprint are located within the sleep disturbance NCA. Appropriate mitigation measures would be implemented where necessary including notifications, phone calls and respite offers. Second scenario has considered chainsaw as the noisiest equipment for day works. The outcomes of this assessment are: • residential receivers within 30 metres of the proposal would receive highly intrusive noise levels of 75 dB(A), this area is shown as NCA1d in • Figure 3-2 • residential receivers within 85 metres of the proposal would receive moderately intrusive noise levels of 65 dB(A), this area is shown as NCA2d in • Figure 3-2 • classroom at schools and other educational institutions within 200 metres would be affected by the proposal noise, this area is shown as NCA3d in • Figure 3-2. As shown in Figure 3-2, there are no receivers within the highly intrusive noise catchment area (NACA1d). A few receivers are within the moderately intrusive catchment areas (NCA2d). There are no educational institutions or places of worship within the affected areas (NCA3d). The safeguards outlined below would be implemented to minimise impacts as much as practicable during day works. Sensitive receivers within NCA1d and NCA2d may be eligible for notification, duration respite and respite periods while receivers within NCA3d may be eligible for notifications. The specific details of these mitigation measures would be determined on a case by case basis. Vibration resulting from the construction activities is not expected to result in any cosmetic damage to the nearby structures as the proposal is at least 70 metres from the nearest structures. The minimum recommended distance for the proposed works is 25 metres based on use of vibratory roller with the rating of >18 tonnes. Considering the worst-case scenario for vibration, the proposal could result in some human discomfort that would be felt up to a distance of 100 metres.		
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 10 kilometres per hour or installing audio-tactile line markings. None of the mentioned scenarios are applicable to the proposal. However, the introduction of traffic signals may increase frequency of braking and accelerating, and therefore potential for decibel increase and change in the type of noise. Transport would be conducting pre and post construction noise logging to allow further assessment and management of any potential changes.	Yes ☐	No ☒
Would the proposal result in vibration being experienced by any surrounding properties or infrastructure during operation? Operation of the proposal would not result in vibration being experienced by surrounding properties or infrastructure.	Yes ☐	No ☒

wsp

HW10 Pacific Highway and Chain Valley Bay Road Intersection Upgrade

Figure 3-1
Noise impact areas for night works

Legend

- Construction footprint
- Site compound and stockpile areas
- NCA1n - 105 metres
- NCA2n - 240 metres
- NCA3n - 545 metres
- NCA4n - 805 metres
- Sleep disturbance - 185 metres

Coordinate system: GDA2020 MGA Zone 56
Scale ratio correct when printed at A3

1:8,672 Date: 18/03/2025

GDA 2020

Data sources: TfNSW, NSWSS, Geoscience Australia Australia latest: Metromap 2024

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HW10 Pacific Highway and Chain Valley Bay Road Intersection Upgrade

Figure 3-2
Noise impact areas from day works

Legend

- Construction footprint
- Site compound and stockpile areas
- NCA1d - 30 metres
- NCA2d - 85 metres
- NCA3d - 200 metres

Coordinate system: WGS 1984 Web Mercator Auxiliary Sphere
Scale ratio correct when printed at A3

1:4,500 Date: 18/03/2025

GDA 2020

Data sources: TINSW, NSWSS, Geoscience Australia
World Topographic Map: Esri Community Maps Contributors, © OpenStreetMap, Microsoft, Esri, TomTom, Garmin, Foursquare,

Safeguards

Safeguards to be implemented are:

Noise and vibration	
N1	Noise intensive works will be prioritised during normal work hours (i.e. 7am to 6pm Monday to Friday; 8am to 1pm Saturdays). Any work that is performed outside normal work hours or on Sundays or public holidays will have measures in place to minimise noise impacts.
N2	A Construction Noise and Vibration Management Plan (CNVMP) will be prepared as part of the CEMP. This plan will include but not be limited to: • a map indicating the locations of sensitive receivers including residential properties. • a quantitative noise assessment in accordance with the *EPA Interim Construction Noise Guidelines (DECCW, 2009)* • management measures to minimise the potential noise impacts from the quantitative noise assessment and for potential works outside of standard working hours (including implementation of *EPA Interim Construction Noise Guidelines (DECCW, 2009)*) • a risk assessment to determine potential risk for activities likely to affect receivers (for activities undertaken during and outside of standard working hours) • mitigation measures to avoid noise and vibration impacts during construction activities including those associated with truck movements • a process for assessing the performance of the implemented mitigation measures • a process for documenting and resolving issues and complaints • a construction staging program incorporating a program of noise and vibration monitoring for sensitive receivers • a process for updating the plan when activities affecting construction noise and vibration change • identify in toolbox talks where noise and vibration management are required.
N3	An Out of Hours Works (OOHW) management plan will be prepared as a part of the CEMP. The plan will include but not be limited to: • process for preparing Out of Hours Assessments (OOHA) for all works outside normal hours including environmental and community consultation requirements • the works that would be undertaken including machinery • conducting a noise assessment for the proposed works / activities in accordance with Transport procedures • mitigation measures identified by these assessments are to comply with those specified within the *RMS Noise Management Manual – Practice Note VII* • method for assessing the adequacy of the noise assessment • process for noise monitoring during works.
N4	Noise impacts will be minimised in accordance with Transport *Construction and Maintenance Noise Estimator* (EMF-NV-TT-0067) and Transport *Construction Noise and Vibration Guidelines (Roads) 2024* (EMF-NV-GD-0056).
N5	Locate compressors, generators, pumps and any other fixed plant as far from residences as practicable.
N6	Alternatives to reversing alarms will be considered for site equipment subject to WHS compliance requirements and risk assessments.
N7	Vehicle delivery times will be scheduled where feasible to the recommended construction hours to minimise noise impacts from heavy vehicle movements and deliveries.
N8	During work hours, a community liaison phone number and site contact would be provided to enable complaints to be received and responded to.
N9	If deemed necessary, attended compliance noise and vibration monitoring will be undertaken upon receipt of a complaint. Monitoring will be reported as soon as practicable. In the case that exceedances are detected, the situation would be reviewed in order to identify means to minimise the impacts to residences.
N10	Measures will be implemented to minimise or prevent vibration impacts, including: • allowing adequate distance that vibration producing equipment can come to buildings • using non-vibration-producing equipment where practicable.

Noise and vibration	
N11	Construction noise is expected to exceed Noise Management Levels (NMLs) in multiple NCAs for both night and day works. Additional mitigation measures required for each NCA are detailed in the Table below:

NCA	dB(A) above RBL	Exceedance above NML dB(A)	Perception	Additional mitigation measures*
NCA1n	30	25	Highly intrusive	AA, N, PC, SN, R2, DR
NCA2n	20	15	Moderately intrusive	N, PC, SN, R2, DR
NCA3n	10	5	Clearly audible	N, R2, DR
NCA4n	5	0	Noticeable	N
NCA1d	30	25	Highly intrusive	N, PC, RO
NCA2d	20	15	Moderately intrusive	N
NCA3d	NA	NA	Affected	NA

*The codes for additional mitigation measures that might be required are:

AA = Alternative accommodation

N = Notification

PC = Phone calls

SN = Specific Notifications

R2 = Respite period 2

DR = Duration respite

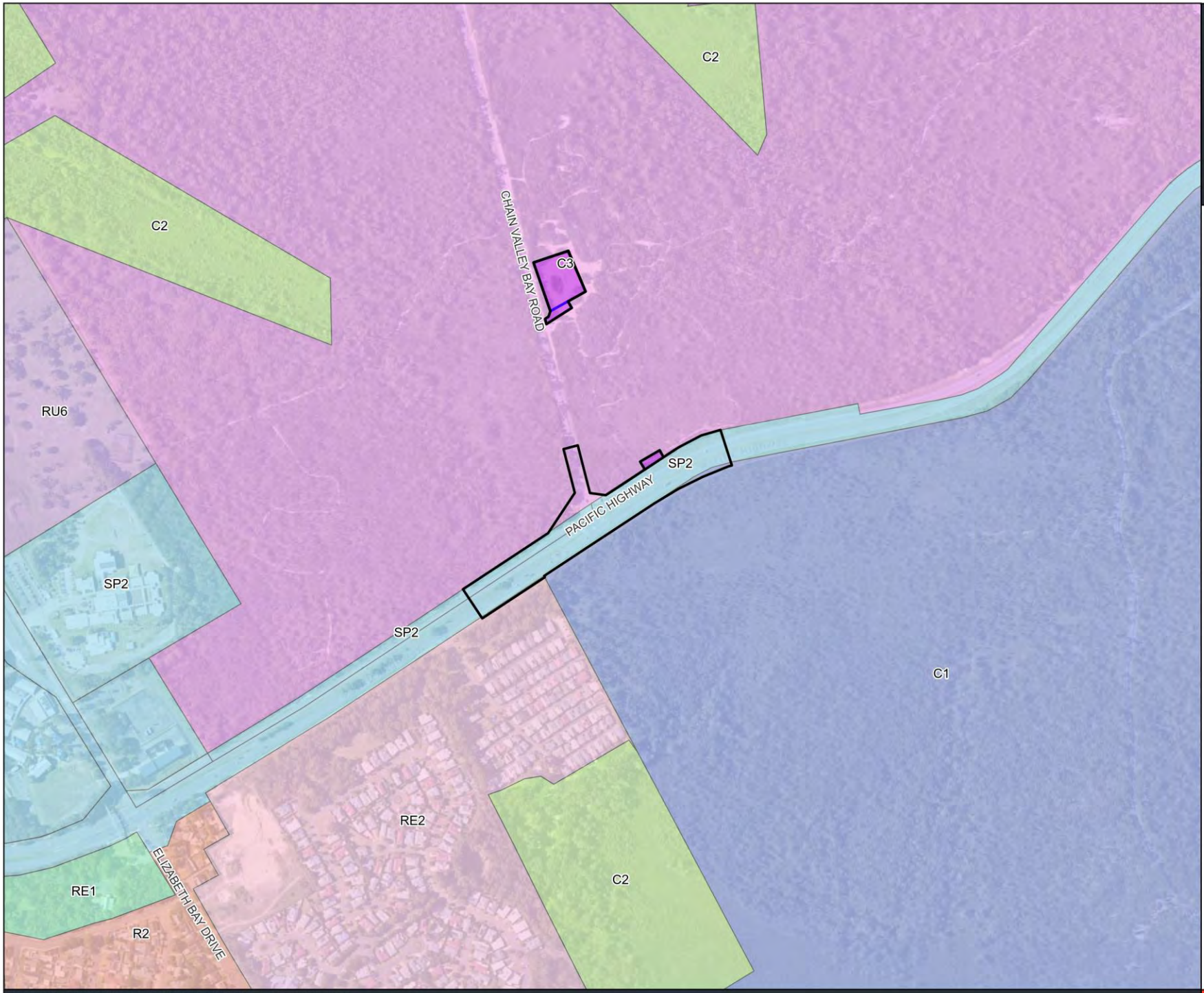
RO = Respite offer

3.4 Air quality

Table 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 the construction footprint, site compound and stockpiles is about 3 ha in size. It is not expected that the entire proposal area would be subject to excavation or earthworks at one time. Construction of the proposal would be staged, including earthworks. Therefore, the proposal would not require earthworks (and exposed surfaces) across an area larger than 2 ha. The site compound and stockpile areas (SC1 and SC2) would be about 0.42 ha in size. These areas would be graded and would be hardstand areas for the duration of the construction works. Additionally, erosion and sediment controls would be established and maintained in and around these areas for the duration of the works. Mitigation measures to minimise and manage potential impacts to air quality would be implemented during construction and would be outlined within the CEMP.	Yes ☐	No ☒
Are there any dust-sensitive receivers located within the vicinity of the proposal during the construction period? The NSW Planning Portal Spatial Viewer indicates the presence of the following sensitive receivers within one kilometre of the construction footprint, site compound and stockpiles: • Private recreation (RE2) – 200 metres southwest (including Parktrees Village) • Public recreation (RE1) – 500 metres northwest and 750 metres southwest • General residential (R1) – 250 metres northwest • Low density residential (R2) – 650 metres south west • Medium density residential (R3) – 300 metres northwest • Infrastructure (SP2 Educational Establishment) – 700 metres southwest • Infrastructure (SP2 Electricity Transmission and Distribution) – 650 metres southwest. Dwellings that are considered sensitive receivers are visibleFig in Figure 3-1. Land use zones are visible in Figure 3-3 A review of aerial imagery (26 November 2024) indicates that while there are areas zoned as general residential, medium density residential and public recreation to the north-west, no development is	Yes ☒	No ☐

Description of existing environmental and potential impacts		
currently present. These areas represent areas of future, planned residential development that the proposal seeks to support. Sensitive receivers including Parktrees Village and other sensitive receivers in the area zoned RE2 – Private Recreation to the south-west of the construction footprint have potential to experience air quality impacts during construction of the proposal. Air quality impacts would be associated with dust generation and emissions from plant and equipment during construction.		
Is there likely to be an emission to air during construction? Use of plant and equipment and earthworks during construction is expected to generate minor, localised impacts to air quality associated with vehicle emissions and dust emissions. Construction plant and equipment to be used during construction of the proposal would include the plant and equipment included in Table 2-2. Construction of the proposal would be staged and therefore simultaneous operation of various equipment is not expected to occur frequently or over long durations. Nonetheless, operation of plant and equipment during construction would generate air quality emissions in the locality. Dust suppression and prevention measures would be implemented during construction of the proposal, to be outlined within the CEMP. Construction of the proposal would be staged to minimise the total area of exposed soils/surfaces where practicable. Dust suppression measures, including spraying exposed surfaces and wetting stockpiles, would be carried out as required during periods of high wind, and earthworks would not be carried out during predicted periods of high wind.	Yes ☒	No ☐
Operation of the proposal is not expected to result in impacts to air quality at or surrounding the construction footprint, site compound and stockpiles. The proposal aims to upgrade the existing Pacific Highway and Chain Valley Bay Road intersection for benefits including to accommodate future traffic growth. While the proposal would accommodate future traffic growth, the proposal itself would not generate additional traffic and thus potential emissions generated by vehicles using the proposal are not required to be considered within the scope of this assessment.		



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HW10 Pacific Highway and Chain Valley Bay Road Intersection Upgrade

Figure 3-3
Land Zoning

Legend

- Construction footprint
- Site compound and stockpile areas

Land Zoning

- C2 - Environmental Conservation
- C3 - Environmental Management
- SP2 - Infrastructure
- R2 - Low Density Residential
- C1 - National Parks and Nature Reserves
- W1 - Natural Waterways
- RE2 - Private Recreation
- RE1 - Public Recreation
- RU6 - Transition

Coordinate system: WGS 1984 Web Mercator Auxiliary Sphere
Scale ratio correct when printed at A3

1:6,000 Date: 18/03/2025

GDA 2020

Data sources: TINSW, NSWSS, Geoscience Australia
World Topographic Map: Esri Community Maps Contributors, © OpenStreetMap, Microsoft, Esri, TomTom, Garmin, Foursquare,

Safeguards

Safeguards to be implemented are:

Air quality	
A1	Measures (including watering or covering exposed areas) will be used to minimise or prevent air pollution and dust.
A2	Earthworks or other works that may impact air quality (including the spraying of paint and other materials) will not be carried out during strong winds or in weather conditions where high levels of dust or air borne particulates are likely.
A3	Vegetation or other materials will not to be burnt within the construction footprint, site compound and stockpiles.
A4	Vehicles and vessels transporting waste or other materials that may produce odours or dust will be covered during transportation.
A5	Stockpiles or areas that may generate dust will be managed to suppress dust emissions in accordance with the Transport *Stockpile Site Management Guideline* (EMS-TG-10).
A6	Plant and equipment used during construction will: • be switched off when not in use • be regularly inspected and maintained to prevent contributing excessive greenhouse gas emissions • be selected to consider more fuel efficient or diesel-powered alternatives • avoid being operated simultaneously to other plant and equipment. Where this is unavoidable, simultaneous operation will be minimised.

3.5 Aboriginal cultural heritage

Potential impacts to Aboriginal cultural heritage have been assessed by Transport in accordance with Stage 1 of the Procedure for Aboriginal cultural heritage consultation and investigation (PACHCI). The preliminary assessment results of the PACHCI are included as Appendix E.

Table 3-5: Aboriginal cultural 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 would require earthworks and excavation activities in areas outside the operational footprint of the existing intersection and road corridor. However, due to the proximity of these areas to the road corridor, it is likely the surrounding areas have historically been subject to ground disturbance activities. The PACHCI results support these findings, stating that the cultural heritage potential of the study area appears to be reduced due to past disturbance.	Yes ☐	No ☒
Has an online Aboriginal Heritage Information Management System (AHIMS) search been completed? A basic AHIMS search was carried out on 14 May 2024. The search identified three known Aboriginal sites located between 850 and 1,000 metres north-west of the site compound and stockpiles.	Yes ☒	No ☐
Is there potential for the proposal to impact on any items of Aboriginal cultural heritage? The PACHCI results indicate that the proposal is unlikely to have an impact on Aboriginal cultural heritage. The assessment is based on the following due diligence considerations: • the proposal is unlikely to harm known Aboriginal objects or places (as informed by the AHIMS search results) • the AHIMS search did not indicate moderate to high concentrations of Aboriginal objects or places in the study area • the study area does not contain landscape features that indicate the presence of Aboriginal objects, based on Heritage NSW's *Due diligence Code of Practice for the Protection of Aboriginal objects in NSW* and the Transport for NSW's procedure • the cultural heritage potential of the study area appears to be reduced due to past disturbance • there is an absence of sandstone rock outcrops likely to contain Aboriginal art.	Yes ☐	No ☒
Would the proposal involve the removal of mature native trees? A number of mature trees would be impacted due to the proposed works. Transports Aboriginal Community and Heritage Partner has determined these trees are not culturally modified and are not of Aboriginal cultural significance.	Yes ☒	No ☐

Description of existing environmental and potential impacts		
Is the proposal consistent with the requirements of Transport's *Procedure for Aboriginal cultural heritage consultation and investigation* (PACHCI)? Potential impacts to Aboriginal cultural heritage have been assessed by Transport in accordance with Stage 1 of the PACHCI. The PACHCI results indicate that the proposal is unlikely to have an impact on Aboriginal cultural heritage. The full PACHCI assessment is included in Appendix E. The proposal may proceed with no further assessment of Aboriginal heritage values required. Potential impacts to unknown Aboriginal heritage values or items would be managed through the implementation of an Unexpected Finds Procedure. Consultation carried out with Aboriginal stakeholders for the proposal is described in Section 2.4.	Yes ☒	No ☐

Safeguards

Safeguards to be implemented are:

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 Aboriginal Community and Heritage Partner and Senior Manager Environment and Sustainability contacted immediately. Refer to steps in the Transport *Unexpected heritage items procedure* (EMF-HE-PR-0076) which must be followed.

3.6 Non-Aboriginal heritage

Table 3-6: Non-Aboriginal heritage

Description of existing environmental and potential impacts		
Have online heritage database searches been completed? A search of the following databases was carried out on 15 May 2024: • Transport section 170 register • NSW Heritage database • Commonwealth Heritage List, established under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) • Local Environmental Plan(s) heritage items.	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? Searches of the relevant heritage databases identified one heritage item, listed on the Central Coast LEP 2022, located in the vicinity of the construction footprint, site compound and stockpiles. The 'Farm homestead complex', is a locally listed heritage item located at 89 Carters Road (within Lot 42, DP 801076), located about one kilometre northwest of the site compound and stockpiles. The item is listed as Item #I23 on the Central Coast Local Environmental Plan 2022. Due to the separation distance between the 'Farm homestead complex' local heritage item and the proposal, no impacts to the heritage item are expected. Additionally, as the proposal is for upgrade of an existing intersection, potential amenity or localised off-site impacts would be temporary in nature and limited to the construction phase of the proposal.	Yes ☒	No ☐
Is the proposal likely to impact trees that form part of a heritage listing or have other heritage value? It is understood vegetation to be removed would not be heritage listed but may have anecdotal/recreational value to Darkinjung and Awabakal people and the LALC.	Yes ☐	No ☒
Is the proposal likely to occur in or near features that indicate potential archaeological remains? The proposal is not likely to occur in any features that indicate archaeological remains. The closest heritage item is located around one kilometre northwest of site compound and stockpiles.	Yes ☐	No ☒

Safeguards

Safeguards to be implemented are:

Non-Aboriginal heritage	
H1	No work will occur within the boundary of the locally listed heritage item the Munmorah State Conservation Area.
H2	If unexpected heritage items are uncovered during the works, all works must cease in the vicinity of the material/find and the steps in the Transport *Unexpected heritage items procedure* (*EMF-HE-PR-0076)* must be followed.

3.7 Biodiversity

Table 3-7: Biodiversity

Description of existing environmental and potential impacts		
Have relevant database searches been carried out? The following searches were carried out: • Protected Matters Search Tool (PMST) (Department of Climate Change, Energy, Environment and Water (DCCEEW) (accessed 17 July 2024), provided in Appendix F • NSW BioNet (Department of Planning, Housing and Infrastructure (DPHI) (10 kilometre survey area buffer, accessed 17 July 2024) • SEED Layer Intersection Tool (accessed 2 August 2024).	Yes ☒	No ☐
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. **BioNet and PCT threatened species record** *Threatened flora* The database search results indicated 27 threatened plant species listed under the BC Act are likely to occur within a 10 kilometre radius of the construction footprint, site compound and stockpiles. These results are shown in Annexure B of Appendix B. Only one of these species, *Tetratheca juncea*, was found in the survey area. A total of 16 individuals were found within the survey area, with none occurring in the construction footprint, site compound and stockpiles. *Threatened fauna* The database search results indicated 72 threatened fauna species and two migratory species listed under the BC Act within 10 kilometres of the construction footprint, site compound and stockpiles. The results are shown in Annexure B of Appendix B. Due to limited fauna habitat within the construction footprint, site compound and stockpiles, a significant impact on any of these species is not expected. **Areas of Outstanding biodiversity value and plant community types (PCTs)** There are no areas of outstanding biodiversity value mapped within the survey area. PCT 3583: Hunter Coast Lowland Scribbly Gum Forest was identified within the construction footprint, site compound, stockpiles and the broader survey area. This PCT is not linked to any TECs. **Matters of National Environmental Significance** The result of the PMST indicates that five TEC's had the potential to occur within the survey area (refer to Table 3-8); however, none of these TEC's were present within the construction footprint, site compound and stockpiles. PCT 3583 was the only vegetation community identified in the construction footprint, site compound and stockpiles. This PCT is not consistent with any TEC's listed under the BC Act or the EPBC Act. Table 3-8: Threatened Ecological Communities (within 10 kilometres of the construction footprint, site compound and stockpiles) according to PMST	Yes ☒	No ☐

Community ID	Community Name	Status
127	Posidonia australis seagrass meadows of the Manning-Hawkesbury Ecoregion	Endangered
154	River-flat eucalypt forest on coastal floodplains of southern New South Wales and eastern Victoria	Critically Endangered
171	Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland	Endangered
118	Subtropical and Temperate Coastal Saltmarsh	Vulnerable

Description of existing environmental and potential impacts				
142	Coastal Swamp Oak (Casuarina glauca) Forest of New South Wales and South East Queensland ecological community	Endangered		
The PMST indicated 49 threatened species have the potential to occur within 10 kilometres of the construction footprint, site compound and stockpiles including 22 plant species and 27 fauna species. An assessment of significance concluded that the proposed activity is unlikely to have a significant impact on threatened or migratory species. *Threatened and migratory species* The PMST indicated that there are 46 listed species (of which 22 are plants species) listed as threatened under the EPBC Act that are predicted to occur within survey area. The search also identified three migratory species having the potential to occur in the survey area. Shorebirds and pelagic species are not considered in this count due to the lack of habitat. These are detailed in Appendix G. *Wetlands of international importance (Ramsar) and areas of world and national heritage* The PMST indicates that there are no Ramsar Wetlands or wetlands of international importance listed within 10 kilometres of the proposal. Due to the short-term nature of the works, and the minimal impacts to vegetation within the construction footprint, site compound and stockpiles, impacts to EPBC Act listed TEC's and threatened species would be minimal.				
Does the proposal involve pruning, trimming or removal of any tree/s? The proposal would require removal of 63 native trees requiring the replacement of 136 trees or payment of $9,250 into Transport's Biodiversity Conservation Fund.			Yes ☒	No ☐
Is the proposal likely to impact nationally listed threatened species, ecological communities or migratory species? One threatened flora species, *Tetratheca juncea*, was identified within the survey area. However, according to the EPBC Act significance assessment, a significant impact is unlikely. Six threatened fauna species listed under the EPBC Act could potentially occur in the survey area and would form part of an important population. However, a significant impact is unlikely.			Yes ☐	No ☒
Would the proposal require the removal of any other vegetation? The proposal would involve the removal of vegetation to construct the proposed works. This would require the removal of 0.84 hectares of Hunter Coast Lowland Scribbly Gum Forest and 0.27 hectares of exotic vegetation. This vegetation is not associated with any TEC's.			Yes ☒	No ☐
Would the proposal require the removal of any tree hollows? The proposal would not require the removal of any tree hollows.			Yes ☐	No ☒
Are there any known areas of outstanding biodiversity value or areas mapped as 'littoral rainforest' or 'coastal wetland' under chapter 2 of SEPP (Resilience and Hazards) in or within the vicinity of the proposed work? There are no areas of littoral rainforest or coastal wetlands mapped within the proposed survey area area. There are no areas of biodiversity value mapped within the construction footprint, site compound and stockpiles.			Yes ☐	No ☒
Would the proposal provide any additional barriers to the movement of wildlife? The proposal would not provide additional barriers to movement of wildlife.			Yes ☐	No ☒
Would the proposal disturb any natural waterways or aquatic habitat? The proposal would not disturb any natural waterways or aquatic habitat. Impacts to Key Fish Habitat is not expected as they are not mapped within the survey area.			Yes ☐	No ☒
Would the proposal impact (directly or indirectly) any potential microbat roosting or breeding habitat such as on bridges and culverts? The proposal would not impact any potential microbat roosting or breeding habitat such as bridges or culverts.			Yes ☐	No ☒

Safeguards

Safeguards to be implemented are:

Biodiversity	
B1	Native vegetation removal will be minimised through detailed design.
B2	Native vegetation will be re-established in accordance with *Guide 3: Re-establishment of native vegetation* of the *Biodiversity Guidelines: Protecting and managing biodiversity on Transport for NSW projects* (Transport for NSW 2024).
B3	The unexpected species find procedure is to be followed under *Biodiversity Guidelines: Protecting and managing biodiversity on Transport for NSW projects* (Transport for NSW 2024) if threatened ecological communities, not assessed in the biodiversity assessment, are identified in the construction footprint, site compound and stockpiles.
B4	Threatened fauna habitat removal will be minimised through detailed design.
B5	Prior to the commencement of works, an inspection of the ephemeral water bodies present within the survey area will be conducted. Pre-clearing surveys will be undertaken in accordance with *Guide 1: Pre-clearing process* of the *Biodiversity Guidelines: Protecting and managing biodiversity on Transport for NSW projects* (Transport for NSW 2024). If these water bodies contain standing water appropriate measures will be taken to capture and relocate potentially occupying fauna in accordance with *Guide 9: Fauna handling of the Biodiversity Guidelines: Protecting and managing biodiversity on Transport for NSW projects (Transport for NSW 2024).*
B6	Fauna will be managed in accordance with *Guide 9: Fauna handling* of the *Biodiversity Guidelines: Protecting and managing biodiversity on Transport for NSW projects* (Transport for NSW 2024).
B7	The unexpected species find procedure is to be followed under *Guide 1: Pre-clearing process* of the *Biodiversity Management Guideline: Protecting and managing biodiversity on Transport for NSW projects* (Transport 2024) if threatened fauna, not assessed in the biodiversity assessment, are identified in the construction footprint, site compound and stockpiles.
B8	Changes to existing surface water flows will be minimised through detailed design.
B9	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 Transport for NSW projects* (Transport for NSW 2024).
B10	Fauna will be managed in accordance with *Guide 9: Fauna* handling of the *Biodiversity Guidelines: Protecting and managing biodiversity on Transport for NSW projects* (Transport for NSW).
B11	Weed species will be managed in accordance *with Guide 6: Weed management* of the *Biodiversity Guidelines: Protecting and managing biodiversity on Transport for NSW projects* (Transport for NSW).
B12	Pathogens will be managed in accordance with *Guide 7: Exclusion zones* of the *Biodiversity Guidelines: Protecting and managing biodiversity on Transport for NSW projects* (Transport for NSW).
B13	Shading and artificial light impacts will be minimised through detailed design.

3.8 Traffic and transport

Table 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 operation? The proposal has been designed and proposed to improve traffic flow (including vehicular, cycle and pedestrian flow) of the Pacific Highway and Chain Valley Bay Road intersection during its operation. The proposal aims to: • improve efficiency of the intersection of Pacific Highway and Chain Valley Bay Road, including to facilitate future predicted traffic demand • improve safety of the Pacific Highway and Chain Valley Bay Road intersection by separating traffic and regulating turning movements in and out of Chain Valley Bay Road to reduce the likelihood and severity of intersection crashes • provide DDA compliant dedicated footpath and shared user path connections between the intersection and nearby bus stops • support future residential growth in the Lake Munmorah area. No detours would be required for this proposal during operation. All existing vehicle movements would be retained in the proposed design. Therefore, the operation of the intersection would not have any disruptions to access roads including Elizabeth Bay Trail North, Cocos Palm Drive and Chain Valley Bay Road.	Yes ☒	No ☐

Description of existing environmental and potential impacts		
The proposed traffic control signals would disturb the vehicular traffic flow of the Pacific Highway. Each phase of the signals would result in stopped wait times for each movement and allow safe and controlled movements. The proposed designated left turn lane out of Chain Valley Bay Road would also increase the efficiency of this portion of the intersection during operation. There are no exiting pedestrian or cyclist facilities connected to the intersection. As such, the operation of the proposed design would improve connectivity. The proposal would connect the intersection to the existing Pacific Highway southbound bus stop and shared path. Traffic control would only be required during construction and would not impact traffic during operation.		
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? Construction of the proposal is expected to result in temporary impact access to public transport routes along the Pacific Highway and Chain Valley Bay Road due to the bus stop relocation. The existing bus stops located along the northbound and southbound lanes of the Pacific Highway would continue to operate during construction as they would not be directly impacted by construction activities for the proposal. The existing bus stop along the southbound lane of Chain Valley Bay Road (directly north of the Pacific Highway and Chain Valley Bay Road intersection) would be closed and decommissioned during construction of the proposal, to be relocated east along the northbound lane of the Pacific Highway. The exiting bus stop along the northbound lane of the Pacific Highway would be retained at its original location. Construction of the proposal would temporarily impact access to public transport services for users of the Chain Valley Bay Road bus stop. Transport would continue to consult with local bus services providers and the construction contractor to ensure bus service providers are aware of the temporary impacts to the bus route, and Transport would notify local residents of the proposal. The proposal has been designed and proposed to improve traffic flow (including vehicular, cycle and pedestrian flow) of the Pacific Highway and Chain Valley Bay Road intersection during its operation.	Yes ☒	No ☐

Safeguards

Safeguards to be implemented are:

Traffic and transport	
T1	Where possible, current traffic movements and property accesses will be maintained during the works. Any disturbance will be minimised to prevent unnecessary traffic delays.
T2	A traffic guidance scheme will be prepared in accordance with Transport *Traffic control at work sites manual* (version 6.1, 2022) and Australian Standard 1742.3 *Manual of uniform control devices.*

3.9 Socio-economic

Table 3-10: Socio-economic

Description of existing environmental and potential impacts		
Is the proposal likely to impact on local business? The proposal would not directly impact local business, as there are no business frontages or access points within the construction footprint, site compound and stockpiles.	Yes ☐	No ☒
Is the proposal likely to require any property acquisition? The proposal would not require any property acquisition. However, Transport would require temporary lease of a small portion (about 0.42 ha) of Lot 100, DP 1044282 to accommodate temporary site compound and stockpile areas to the north of the Pacific Highway. Temporary lease options have been discussed with Darkinjung LALC during ongoing consultation.	Yes ☐	No ☒
Is the proposal likely to alter any access for properties (either temporarily or permanently)? Construction of the proposal would temporarily directly impact access to the Parktrees Village associated with construction traffic detours and lane closures. Construction of the proposal would result in temporary, indirect impacts to access to residential properties in the area, particularly those accessed directly or indirectly from Chain Valley Bay Road, as a result of construction traffic detours and lane closures.	Yes ☒	No ☐

Description of existing environmental and potential impacts		
The proposal would have no operational impact to property access, all existing manoeuvres are retained in the proposal.		
Is the proposal likely to alter any on-street parking arrangements (either temporarily or permanently)? The proposal is not expected to alter formal on-street parking arrangements. Informal parking has been observed to occur north of the existing Pacific Highway and Chain Valley Bay Road intersection within a cleared area having frontage to the Pacific Highway. However, this is not formalised on-street parking and no further assessment is required.	Yes ☐	No ☒
Is the proposal likely to change pedestrian movements or pedestrian access (either temporarily or permanently)? There are no existing formal pedestrian or cyclist facilities within the construction footprint, site compound and stockpiles. During construction, the proposal would change and limit pedestrian and cyclist movements and access within and surrounding the construction footprint, site compound and stockpiles. Traffic Control would provide provision for cyclists to traverse the construction footprint, site compound and stockpiles and provide pedestrian facilities as and where required. The existing bus stops located along the northbound and southbound lanes of the Pacific Highway would continue to operate during construction and operation as they would not be directly impacted by construction activities for the proposal. The existing bus stop along the southbound lane of Chain Valley Bay Road (directly north of the Pacific Highway and Chain Valley Bay Road intersection) would be closed and decommissioned during construction of the proposal, to be relocated east along the northbound lane of the Pacific Highway. Consultation with local bus providers has been carried out. During operation, the proposal would improve pedestrian and cyclist safety of the Pacific Highway and Chain Valley Bay Road intersection, including access to nearby bus stops. The proposal's design provides DDA compliant dedicated footpath and shared user path connections between the intersection and nearby bus stops.	Yes ☒	No ☐
Is the proposal likely to impact on any items or places of social value to the community (either temporarily or permanently)? The proposal is likely to impact items or places of social value to the community during construction. Land to the north of the construction footprint is zoned as C3 Environmental Management, and land to the south of the construction footprint is zoned C1 National Parks and Nature Reserves associated with the Munmorah SCA. Construction of the proposal is expected to result in localised, temporary amenity impacts, as well as traffic and pedestrian access impacts. Potential impacts may be experienced by the local community using the surrounding areas designated for recreational or environmental conservation purposes. Temporary use of a small portion of land within Lot 100, DP 1044282 (owned and managed by Darkinjung LALC) for the site compounds and stockpile areas SC1 and SC2 would also have temporary impacts on the social value of this area. However, due to its location next to the existing road corridor, the impacts to the change of social value are not expected to be significant.	Yes ☒	No ☐
Is the proposal likely to reduce or change visibility of any businesses, farms, tourist attractions or the like (either temporarily or permanently)? The proposal is not likely to reduce visibility of any businesses, farms, tourist attractions or similar land uses during construction or operation of the proposal as there are no business frontages within the construction footprint, site compound and stockpiles. Parktrees Village, an over 50s residential village, may experience a temporary reduction of visibility from the Pacific Highway during construction of the proposal (associated with the presence of plant and equipment within the construction footprint, site compound and stockpiles). However, Parktrees Village is not considered a local business that derives its sole income from street frontage (such as a hospitality or retail premises). Therefore, visibility impacts are not excepted to impact Parktrees Village. Traffic, transport and access impacts to Parktrees Village are considered in Section 3.8.	Yes ☐	No ☒
Is the proposal likely to impact trees planted by a community group, Landcare group or by council or a tree that is a memorial or part of a memorial group e.g., has a plaque?	Yes ☐	No ☒
Is the proposal likely to impact trees that form part of a streetscape, an avenue or roadside planting? The proposal would require removal of vegetation within the road corridor of the Pacific Highway. Vegetation to be removed is classified as native vegetation. This vegetation does not form part of a streetscape, avenue or roadside planting, as the vegetation is likely to have naturally revegetated, seeded from surrounding vegetation. The vegetation may offer amenity value to road users of the Pacific Highway, however given the context of the vegetation (between active highway lanes) amenity value would be low.	Yes ☐	No ☒

Description of existing environmental and potential impacts		
Where vegetation within the road corridor is to be removed and meets the requirement for replacement under Transport's Tree and hollow replacement guidelines (2023), Transport would make a monetary contribute to its Biodiversity Conservation Fund. Vegetation removal and replacement is discussed in Section 3.7.		

Safeguards

Safeguards to be implemented are:

Socio-economic	
C1	Notification will be given to affected community members prior to the works taking place. The notification is to include: • details of the proposal • duration of works and working hours • changed traffic or access arrangements • how to lodge a complaint or obtain more information • contact name and details. Notification should be a minimum of 7 calendar days prior to the start of works.
C2	All complaints will be recorded on a complaints register and attended to promptly.
C3	Existing access for nearby and adjoining properties is to be maintained at all times during the works unless otherwise agreed to by the affected property owner.
C4	The community must be notified of all work outside standard hours which have the potential to impact noise-sensitive receivers. Notification zones have been determined using the *Construction and Maintenance Noise Estimator* (EMF-NV-TT-0067). Notification requirements must comply with Transport *Construction Noise and Vibration Guidelines (Roads) 2024* (EMF-NV-GD-0056).

3.10 Landscape character and visual amenity

Table 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? (For example, heritage items and areas, distinctive or historic built form, National Parks, conservation areas, scenic highways etc.) The construction footprint is located directly north of Munmorah SCA and adjoins C3 Environmental Management land along its northern extent. The site compound and stockpiles encompasses C3 Environmental Management land. The proposal would be visible to road users along the Pacific Highway and Chain Valley Bay Road during construction and operation. Construction of the proposal has potential to impact landscape character and visual amenity within and surrounding , associated with visual, air quality and noise and vibration and impacts. Presence of plant and equipment and exposed surfaces in the construction footprint, site compound and stockpiles during construction would present a changed visual landscape for road users and pedestrians in the area. However, construction impacts associated with earthworks and plant and equipment, as well as construction air quality impacts and noise and vibration impacts, would be temporary and short-term. Off-site impacts would be managed to minimise impacts to off-site receivers including users of the Munmorah SCA, users of the adjoining C3 Environmental Management land, road users and pedestrians.	Yes ☒	No ☐

Operation of the proposal would alter the landscape character of the construction footprint, site compound and stockpiles as a result of upgrades to the Chain Valley Bay Road and Pacific Highway intersection (further described in Section 2.1.2). The proposed upgrades would change the visual environment of the intersection during operation associated with removal of 0.84 ha of native vegetation, installation of traffic signals and signage, changes to existing lane configurations, improvements to active transport, relocation of bus stop, and additional line marking and street furniture. Operation of the proposal would result in moderate changes to the visual character of the intersection. However, the Pacific Highway and Chain Valley Bay Road is an existing intersection, therefore removal of vegetation within or adjacent the existing road corridor and upgrade of the intersection would be considered generally consistent with the existing landscape character of the construction footprint, site compound and stockpiles. While the proposal would result in new road infrastructure in the construction footprint the proposal does not propose a new road. Design of the proposal has been developed in accordance with the urban design principles defined in Transport's Urban Design Policy – Beyond the Pavement (Transport for NSW, 2020).		
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) The proposal would not obstruct or intrude on the character or views of a valued landscape or urban area.	Yes ☐	No ☒
Would the proposal require the removal of mature trees or stands of vegetation, either native or introduced? Construction and operation of the proposal would require removal of 0.84 ha of native vegetation. Vegetation to be removed includes vegetation within the existing road corridor of the Pacific Highway.	Yes ☒	No ☐
Would the proposal result in large areas of shotcrete visible from the road or adjacent properties? The proposal would not 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 would not involve new noise walls or changes to existing noise walls.	Yes ☐	No ☒
Would the proposal involve the removal or reuse of large areas of road corridor, landscape, either verges or medians? The proposal would include changes to the existing lane configuration of the Pacific Highway and Chain Valley Bay Road intersection, including widening and extension of turning lanes in the intersection, and construction into the existing median of northbound and southbound traffic lanes of the Pacific Highway. The works within the median would have a small footprint considering the remaining median in the area that would not be impacted by the proposal. The areas to be impacted within the medians are not landscaped areas and minimal vegetation within the road corridor would be impacted.	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? The proposal would not involve substantial changes to the appearance of a bridge 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)? Construction of the proposal is expected to require periods of night-time works to minimise impacts to traffic along the Pacific Highway. As such, artificial lighting may be required during the night-time period and may result in light spillage to Parktrees Village and other RE1 land to the west of Parktrees Village. Potential impacts from artificial lighting during construction, particularly during the night-time, would be managed in the CEMP to be prepared for the proposal. Measures to minimise and manage the impacts of light spill on nearby receivers would include ensuring lighting used during construction of the proposal is directed away from sensitive receivers, where practical. The detailed design of street lightings would consider impacts to nearby residential receivers.	Yes ☒	No ☐
Would any new structures or features to be constructed, result in over shadowing to adjoining properties or areas?	Yes ☐	No ☒

The proposal would not involve constructing new structures that would result in overshadowing to adjoining properties or areas.		

Safeguards

Safeguards to be implemented are:

Landscape character and visual amenity	
V1	Works will be carried out in accordance with Transport EIA-N04 *Guideline for Landscape Character and visual impact assessment 2020*.
V2	Measures to reduce and manage lighting impacts during construction will be included in the CEMP. Measures will include (but not be limited to) ensuring lighting used during construction of the proposal is directed away from sensitive receivers, where practical.
V3	Construction activities and design of the proposal will consider *Australian Standard AS/NZS 4282:2023 Control of the obtrusive effects of outdoor lighting* to minimise potential impacts of construction lighting on the surrounding environment.

3.11 Waste

Table 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)? Construction of the proposal is expected to generate a maximum of 500 tonnes of waste material (including contaminated and/or non-contaminated material). Nonetheless, all spoil and excavated material would be managed and stockpiled in accordance with Transport's *Stockpile Site Management Guideline* (EMS-TG-10) (2015). Stockpiles would be established and maintained within the two site compound and stockpile areas (SC1 and SC2) required for construction of the proposal (the location of the site compound and stockpile areas are shown in Figure 2-2). Spoil generated during construction would be tested and classified in accordance with the NSW EPA (2014) Waste Classification Guidelines, and would be reused or recycled (where deemed suitable) or disposed of at an appropriately licenced facility.	Yes ☒	No ☐
Is the proposal likely to require a licence from EPA? The proposal does not require a licence from the EPA as the proposal is not considered a scheduled activity under Schedule 1 of the POEO Act. The proposal would not meet the definition of a scheduled activity for road construction as described in Schedule 1 of the POEO Act, therefore an EPL is not required for the proposal.	Yes ☐	No ☒
Is the proposal likely to require the removal of asbestos? The proposal is not likely to require removal of asbestos. If asbestos or other known or suspected contaminated materials are encountered on-site during construction of the proposal, works would cease and an unexpected finds protocol would be followed.	Yes ☐	No ☒

Safeguards

Safeguards to be implemented are:

Waste	
M1	A Waste Management Plan (WMP) will be prepared and implemented as part of the CEMP. The WMP will be prepared following the Transport *Waste management guideline (*EMF-WM-GD-0055*)* and relevant Transport Fact Sheets. Measures outlined in the WMP will include, but not be limited to: • measures to avoid and minimise waste associated with the proposal • procedures for classification of wastes, in accordance with the NSW EPA Waste Classification Guidelines (NSW EPA, 2014) and applicable provisions under the POEO Act, and management options (re-use, recycle, stockpile, disposal) • statutory approvals required for managing both on and off-site waste, or application of any relevant resource recovery exemptions • procedures and requirements for further assessment and testing to characterise materials for on-site reuse and waste classification for off-site disposal • procedures for storage, transport and disposal at an appropriately licenced facility including the identification of suitable temporary storage areas for material awaiting classification • monitoring, record keeping and reporting.
M2	Resource management hierarchy principles will 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 and Resource Recovery Act 2001*).
M3	If vegetation is to be mulched and transported off site for beneficial reuse, it will be assessed for the presence of weeds, pest, and other disease and a Mulch Management Plan prepared in accordance with the NSW EPA *Mulch Order and Exemption*.
M4	Bulk waste (e.g. fill) sent to a site not owned by Transport (excluding EPA licensed landfills and resource recovery facilities) is to have prior formal written approval from the landowner, in accordance with Transports *Waste management guideline* (EMF-WM-GD-0055) and templates EMF-WM-TT-0098 and EMF-WM-TT-0127. This includes waste transported for reuse, recycling, disposal or stockpiling.
M5	If coal tar asphalt is identified and is to be removed, it is to be disposed of to landfill in accordance with Transport *Coal Tar Asphalt Fact Sheet 2022* (EMF-WM-FS-0065).
M6	There is to be no disposal or re-use of construction waste on to other land.
M7	Waste is not to be burnt on site.
M8	Waste material, other than vegetation and tree mulch, is not to be left on site once the works have been completed.
M9	Working areas are to be maintained, kept free of rubbish and cleaned up at the end of each working day.
M10	The management of established stockpile sites will be in accordance with the Transport *Stockpile Site Management Guideline* (EMS-TG-10) (2015).

3.12 Climate change and greenhouse gas emissions

Table 3-13: Climate change and greenhouse gas emissions

Description of existing environmental and potential impacts		
Is the proposal located in an area likely to be permanently or tidally inundated in the future or subject to increased duration and intensity of flooding? The proposal is not located in an area likely to be permanently or tidally inundated in the future, nor an area that is expected to be subject to increased duration and intensity of flooding.	Yes ☐	No ☒
Have opportunities for reduced energy consumption during construction and operation been considered? . Where practicable, Transport would investigate opportunities to reduce energy consumption during construction. Where practicable, contractors and materials would be sourced from locations and suppliers within the Lake Macquarie or Newcastle regions, or from other viable sources such as other nearby infrastructure projects.	Yes ☒	No ☐
Greenhouse gas emissions sources during construction of the proposal are likely to be largest from: • transporting materials and construction staff to the construction footprint, site compound and stockpiles • use of diesel fuel during operation of plant and equipment for construction of the proposal. During operation, emissions sources from the proposal may include: • maintenance of the proposal which includes infrastructure and pavement repairs, and fuel use for the operation of the plant and equipment to perform the maintenance activities • use of the proposal by vehicles • electricity usage for street furniture including lighting, electronic signage and variable message signs.		

Safeguards

Safeguards to be implemented are:

Greenhouse gas emissions and climate change	
GG1	Opportunities for the utilisation of renewable energy or low carbon energy will be further investigated during detailed design.
GG2	Construction contractor staff and materials will be sourced from local suppliers and regions, where practicable.

3.13 Cumulative impact

Table 3-14: Cumulative impact

Description of existing environmental and potential impacts		
Are there other projects and developments in the study area which could add to potential impacts in both construction and operation? A search of the NSW Major Project Planning Portal (July 2024) did not identify any proposed or approved developments located nearby the construction footprint, site compound and stockpiles that would be expected to result in cumulative impacts in the area. Potential cumulative impacts (if they arise) during construction would not be expected to be significant due to the staged, temporary nature of construction impacts associated with the proposal. Noting that there are a number of approved or planned residential developments in the area, there is potential that construction of these projects may overlap with construction of the proposal. Where construction of the proposal overlaps with construction of other projects in the area, the CEMP and associated management plans (and if required, construction staging/method) would be updated to consider, minimise and manage potential cumulative impacts.	Yes ☐	No ☒

Safeguards

Safeguards to be implemented are:

Cumulative impacts

CU1	Where construction of the proposal overlaps with construction of other previously unidentified projects in the area, the owner of the project will be contacted to establish details of the construction method and timeframe. Following receival of further information, the CEMP and associated management plans (and if required, construction staging/method) will be updated to consider, minimise and manage potential cumulative impacts.

4. Summary of safeguards and environmental management measures

4.1 Safeguards and environmental management measures

This section provides a summary of the site-specific environmental safeguards and management measures identified in described in Chapter 3 of this minor works 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 4-1: Summary of site-specific safeguards for proposed work

Factor	Safeguards	
Soil	E1	An erosion and sediment control plan (ESCP) will be prepared and implemented as part of the Construction Environmental Management Plan (CEMP) for the proposal. The ESCP will outline erosion and sediment control measures 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 within construction fooprint, site compound and stockpiles • minimise the amount of material transported from the construction footprint, site compound and stockpiles to surrounding pavement surfaces • divert clean water around the construction footprint, site compound and stockpiles. The ESCP and controls will be established and maintained in accordance with the Landcom/Department of Housing *Managing Urban Stormwater, Soils and Construction Guidelines* (the Blue Book).
	E2	Erosion and sedimentation controls will 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 will not be removed until the works are complete and areas stabilised.
	E4	Work areas will be progressively excavated and stabilised to reduce the total area of exposed soils/surfaces at any one time.
	E5	The maintenance of established stockpile sites will be in accordance with the Transport *Stockpile Site Management Guideline* (EMS-TG-10) (2015).
	E6	If suspected Acid Sulfate Soils are encountered during excavation works for the proposal, all works will cease and the soil will be sampled. If the soil is identified as Acid Sulfate Soils, an Acid Sulfate Soil Management Plan (ASSMP) will be developed in accordance with the *National Acid Sulfate Soils Guidance: National acid sulfate soils identification and laboratory methods manual* (Department of Agriculture and Water Resources, 2018).
	E7	An unexpected contamination finds procedure will be included in the CEMP. The procedure will outline the appropriate management procedures to be followed in the event of potential contamination (such as odours, asbestos containing material or visually contaminated materials) being found during construction activities.
Waterways and water quality	W1	An ESCP will be prepared and implemented as part of the CEMP for the proposal.
	W2	Control measures to minimise the risk of water pollution and impacts to surrounding environment will be included in the ESCP. The following measures will be included to limit sediment, run-off or other contaminants entering watercourses from the construction footprint, site compound and stockpile (including site compounds and stockpile areas): • visual monitoring (i.e. turbidity in stormwater, 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

Factor	Safeguards	
		• sediment fences will be installed, monitored and maintained as needed to contain any sediment or sediment-laden run-off within the construction footprint, site compound and stockpiles • all fuels, chemicals, and liquids would be stored at least 50 metres away from any waterway and stored in an impervious bunded area within the construction footprint, site compound and stockpiles and spill kits must be available • plant and maintenance equipment would be refuelled in impervious bunded areas at least 40m from watercourses, and spill kits must be available • run-off from ancillary sites would be controlled and treated before discharging into downstream waterways • vehicle washdowns and/or concrete truck washouts would be carried out within a designated bunded area of an impervious surface or carried out off-site • vehicle movements would be restricted to designated pathways and hardstand areas • areas exposed for extended periods, such as site compounds and stockpile areas, would be stabilised where possible.
	W3	No dirty water will be released off-site.
	W4	Water quality control measures will be used to prevent any materials (e.g., concrete, grout, sediment etc.) entering drain inlets or waterways.
	W5	Measures to control pollutants from stormwater and spills will be investigated and incorporated in the pavement drainage system at locations where it discharges to receiving drainage lines. Measures aimed at reducing flow rates and potential scour during rain events will be incorporated in the design of the pavement drainage system.
	W6	Excess debris from cleaning and washing will be removed using hand tools.
	W7	An emergency spill kit will be kept within the construction footprint, site compound and stockpiles at all times. The spill kit will be appropriately sized for the volume of substances at the work site. All staff will be made aware of the location of the spill kit and trained in its use.
	W8	If an incident or spill occurs the Transport for NSW Project Manager and Environmental Representative is to be notified immediately and the Incident Management Procedures implemented.
	W9	The stormwater drainages constructed as a part of the proposal will connect to existing drains around the site where possible.
Noise and vibration	N1	Noise intensive works will be prioritised during normal work hours (i.e. 7am to 6pm Monday to Friday; 8am to 1pm Saturdays). Any work that is performed outside normal work hours or on Sundays or public holidays will have measures in place to minimise noise impacts.
	N2	A Construction Noise and Vibration Management Plan (CNVMP) will be prepared as part of the CEMP. This plan will include but not be limited to: • a map indicating the locations of sensitive receivers including residential properties. • a quantitative noise assessment in accordance with the *EPA Interim Construction Noise Guidelines (DECCW, 2009)* • management measures to minimise the potential noise impacts from the quantitative noise assessment and for potential works outside of standard working hours (including implementation of *EPA Interim Construction Noise Guidelines (DECCW, 2009)* • a risk assessment to determine potential risk for activities likely to affect receivers (for activities undertaken during and outside of standard working hours) • mitigation measures to avoid noise and vibration impacts during construction activities including those associated with truck movements • a process for assessing the performance of the implemented mitigation measures • a process for documenting and resolving issues and complaints • a construction staging program incorporating a program of noise and vibration monitoring for sensitive receivers • a process for updating the plan when activities affecting construction noise and vibration change • identify in toolbox talks where noise and vibration management are required.

<table>
<tr><th>Factor</th><th colspan="2">Safeguards</th></tr>
<tr><td></td><td>N3</td><td>An Out of Hours Works (OOHW) management plan will be prepared as a part of the CEMP. The plan will include but not be limited to:
process for preparing Out of Hours Assessments (OOHA) for all works outside normal hours including environmental and community consultation requirements.
the works that would be undertaken including machinery.
conducting a noise assessment for the proposed works / activities in accordance with Transport procedures.
mitigation measures identified by these assessments are to comply with those specified within the RMS Noise Management Manual – Practice Note VII
method for assessing the adequacy of the noise assessment
process for noise monitoring during works.</td></tr>
<tr><td></td><td>N4</td><td>Noise impacts will be minimised in accordance with Transport Construction and Maintenance Noise Estimator (EMF-NV-TT-0067) and Transport Construction Noise and Vibration Guidelines (Roads) 2024 (EMF-NV-GD-0056).</td></tr>
<tr><td></td><td>N5</td><td>Locate compressors, generators, pumps and any other fixed plant as far from residences as practicable.</td></tr>
<tr><td></td><td>N6</td><td>Alternatives to reversing alarms will be considered for site equipment subject to WHS compliance requirements and risk assessments.</td></tr>
<tr><td></td><td>N7</td><td>Vehicle delivery times will be scheduled where feasible to the recommended construction hours to minimise noise impacts from heavy vehicle movements and deliveries.</td></tr>
<tr><td></td><td>N8</td><td>During work hours, a community liaison phone number and site contact would be provided to enable complaints to be received and responded to.</td></tr>
<tr><td></td><td>N9</td><td>If deemed necessary, attended compliance noise and vibration monitoring will be undertaken upon receipt of a complaint. Monitoring will be reported as soon as practicable. In the case that exceedances are detected, the situation would be reviewed in order to identify means to minimise the impacts to residences.</td></tr>
<tr><td></td><td>N10</td><td>Measures will be implemented to minimise or prevent vibration impacts, including:
allowing adequate distance that vibration producing equipment can come to buildings
using non-vibration-producing equipment where practicable</td></tr>
<tr><td></td><td>N11</td><td>Construction noise is expected to exceed Noise Management Levels (NMLs) in multiple NCAs for both night and day works. Additional mitigation measures required for each NCA is detailed in the Table below:
<table>
<tr><th>NCA</th><th>dB(A) above RBL</th><th>Exceedance above NML dB(A)</th><th>Perception</th><th>Additional mitigation measures*</th></tr>
<tr><td>NCA1n</td><td>30</td><td>25</td><td>Highly intrusive</td><td>AA, N, PC, SN, R2, DR</td></tr>
<tr><td>NCA2n</td><td>20</td><td>15</td><td>Moderately intrusive</td><td>N, PC, SN, R2, DR</td></tr>
<tr><td>NCA3n</td><td>10</td><td>5</td><td>Clearly audible</td><td>N, R2, DR</td></tr>
<tr><td>NCA4n</td><td>5</td><td>0</td><td>Noticeable</td><td>N</td></tr>
<tr><td>NCA1d</td><td>30</td><td>25</td><td>Highly intrusive</td><td>N, PC, RO</td></tr>
<tr><td>NCA2d</td><td>20</td><td>15</td><td>Moderately intrusive</td><td>N</td></tr>
<tr><td>NCA3d</td><td>NA</td><td>NA</td><td>Affected</td><td>NA</td></tr>
</table>
*The codes for additional mitigation measures that might be required are:
AA = Alternative accommodation
N = Notification
PC = Phone calls
SN = Specific Notifications
R2 = Respite period 2
DR = Duration respite
RO = Respite offer</td></tr>
</table>

Factor	Safeguards	
Air quality	A1	Measures (including watering or covering exposed areas) will be used to minimise or prevent air pollution and dust.
	A2	Earthworks or other works that may impact air quality (including the spraying of paint and other materials) will not be carried out during strong winds or in weather conditions where high levels of dust or air borne particulates are likely.
	A3	Vegetation or other materials will not to be burnt within the construction footprint, site compound and stockpiles.
	A4	Vehicles and vessels transporting waste or other materials that may produce odours or dust will be covered during transportation.
	A5	Stockpiles or areas that may generate dust will be managed to suppress dust emissions in accordance with the Transport *Stockpile Site Management Guideline* (EMS-TG-10).
	A6	Plant and equipment used during construction will: • be switched off when not in use • be regularly inspected and maintained to prevent contributing excessive greenhouse gas emissions selected to consider more fuel efficient or diesel-powered alternatives • avoid being operated simultaneously to other plant and equipment. Where this is unavoidable, simultaneous operation will be minimised.
Aboriginal cultural heritage	AH1	If Aboriginal heritage items are uncovered during the works, all works in the vicinity of the find must cease and the Transport Aboriginal Community and Heritage Partner and Senior Manager Environment and Sustainability contacted immediately. Refer to steps in the Transport *Unexpected heritage items procedure* (EMF-HE-PR-0076) which must be followed.
Non-Aboriginal heritage	H1	No work will occur within the boundary of the locally listed heritage item the Munmorah State Conservation Area.
	H2	If unexpected heritage items are uncovered during the works, all works must cease in the vicinity of the material/find and the steps in the Transport *Unexpected heritage items procedure* (*EMF-HE-PR-0076)* must be followed.
Biodiversity	B1	Native vegetation removal will be minimised through detailed design.
	B2	Native vegetation will be re-established in accordance with *Guide 3: Re-establishment of native vegetation* of the *Biodiversity Guidelines: Protecting and managing biodiversity on Transport for NSW projects* (Transport for NSW 2024).
	B3	The unexpected species find procedure is to be followed under *Biodiversity Guidelines: Protecting and managing biodiversity on Transport for NSW projects* (Transport for NSW 2024) if threatened ecological communities, not assessed in the biodiversity assessment, are identified in the construction footprint, site compound and stockpiles.
	B4	Threatened fauna habitat removal will be minimised through detailed design.
	B5	Prior to the commencement of works, an inspection of the ephemeral water bodies present within the study area will be conducted. Pre-clearing surveys will be undertaken in accordance with *Guide 1: Pre-clearing process* of the *Biodiversity Guidelines: Protecting and managing biodiversity on Transport for NSW projects* (Transport for NSW 2024). If these water bodies contain standing water appropriate measures will be taken to capture and relocate potentially occupying fauna in accordance with *Guide 9: Fauna handling of the Biodiversity Guidelines: Protecting and managing biodiversity on Transport for NSW projects (Transport for NSW 2024).*
	B6	Fauna will be managed in accordance with *Guide 9: Fauna handling* of the *Biodiversity Guidelines: Protecting and managing biodiversity on Transport for NSW projects* (Transport for NSW 2024).
	B7	The unexpected species find procedure is to be followed under *Guide 1: Pre-clearing process* of the *Biodiversity Management Guideline: Protecting and managing biodiversity on Transport for NSW projects* (Transport 2024) if threatened fauna, not assessed in the biodiversity assessment, are identified in the construction footprint, site compound and stockpiles.
	B8	Changes to existing surface water flows will be minimised through detailed design.

Factor	Safeguards	
	B9	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 Transport for NSW projects* (Transport for NSW 2024).
	B10	Fauna will be managed in accordance with *Guide 9: Fauna* handling of the *Biodiversity Guidelines: Protecting and managing biodiversity on Transport for NSW projects* (Transport for NSW).
	B11	Weed species will be managed in accordance *with Guide 6: Weed management* of the *Biodiversity Guidelines: Protecting and managing biodiversity on Transport for NSW projects* (Transport for NSW).
	B12	Pathogens will be managed in accordance with *Guide 7: Exclusion zones* of the *Biodiversity Guidelines: Protecting and managing biodiversity on Transport for NSW projects* (Transport for NSW).
	B13	Shading and artificial light impacts will be minimised through detailed design.
Traffic and transport	T1	Where possible, current traffic movements and property accesses will be maintained during the works. Any disturbance will be minimised to prevent unnecessary traffic delays.
	T2	A traffic guidance scheme will be prepared in accordance with Transport *Traffic control at work sites manual* (version 6.1, 2022) and Australian Standard 1742.3 *Manual of uniform control devices.*
Socio-economic	C1	Notification will be given to affected community members prior to the works taking place. The notification is to include: • details of the proposal • duration of works and working hours • changed traffic or access arrangements • how to lodge a complaint or obtain more information • contact name and details. Notification should be a minimum of 7 calendar days prior to the start of works.
	C2	All complaints will be recorded on a complaints register and attended to promptly.
	C3	Existing access for nearby and adjoining properties is to be maintained at all times during the works unless otherwise agreed to by the affected property owner.
	C4	The community must be notified of all work outside standard hours which have the potential to impact noise-sensitive receivers. Notification zones must be determined using the *Construction and Maintenance Noise Estimator* (EMF-NV-TT-0067). Notification requirements must comply with Transport *Construction Noise and Vibration Guidelines (Roads) 2024* (EMF-NV-GD-0056).
Landscape character and visual amenity	V1	Works will be carried out in accordance with Transport EIA-N04 *Guideline for Landscape Character and visual impact assessment 2020*.
	V2	Measures to reduce and manage lighting impacts during construction will be included in the CEMP. Measures will include (but not be limited to) ensuring lighting used during construction of the proposal is directed away from sensitive receivers, where practical.
	V3	Construction activities and design of the proposal will consider *Australian Standard AS/NZS 4282:2023 Control of the obtrusive effects of outdoor lighting* to minimise potential impacts of construction lighting on the surrounding environment.
Waste	M1	A Waste Management Plan (WMP) will be prepared and implemented as part of the CEMP. The WMP will be prepared following the Transport *Waste management guideline (*EMF-WM-GD-0055*)* and relevant Transport Fact Sheets. Measures outlined in the WMP will include, but not be limited to: • measures to avoid and minimise waste associated with the proposal • procedures for classification of wastes, in accordance with the NSW EPA *Waste Classification Guidelines* (NSW EPA, 2014) and applicable provisions under the POEO Act, and management options (re-use, recycle, stockpile, disposal) • statutory approvals required for managing both on and off-site waste, or application of any relevant resource recovery exemptions • procedures and requirements for further assessment and testing to characterise materials for on-site reuse and waste classification for off-site disposal

Factor	Safeguards	
		• procedures for storage, transport and disposal at an appropriately licenced facility including the identification of suitable temporary storage areas for material awaiting classification • monitoring, record keeping and reporting.
	M2	Resource management hierarchy principles will 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 and Resource Recovery Act 2001*).
	M3	If vegetation is to be mulched and transported off site for beneficial reuse, it will be assessed for the presence of weeds, pest, and other disease and a Mulch Management Plan prepared in accordance with the NSW EPA *Mulch Order and Exemption*.
	M4	Bulk waste (e.g. fill) sent to a site not owned by Transport (excluding EPA licensed landfills and resource recovery facilities) is to have prior formal written approval from the landowner, in accordance with Transports *Waste management guideline* (EMF-WM-GD-0055) and templates EMF-WM-TT-0098 and EMF-WM-TT-0127. This includes waste transported for reuse, recycling, disposal or stockpiling.
	M5	If coal tar asphalt is identified and is to be removed, it is to be disposed of to landfill in accordance with Transport *Coal Tar Asphalt Fact Sheet 2022* (EMF-WM-FS-0065).
	M6	There is to be no disposal or re-use of construction waste on to other land.
	M7	Waste is not to be burnt on site.
	M8	Waste material, other than vegetation and tree mulch, is not to be left on site once the works have been completed.
	M9	Working areas are to be maintained, kept free of rubbish and cleaned up at the end of each working day.
	M10	The management of established stockpile sites will be in accordance with the Transport *Stockpile Site Management Guideline* (EMS-TG-10) (2015).
Climate change and greenhouse gas emissions	GG1	Opportunities for the utilisation of renewable energy or low carbon energy will be further investigated during detailed design.
	GG2	Construction contractor staff and materials will be sourced from local suppliers and regions, where practicable.
Cumulative impacts	CU1	Where construction of the proposal overlaps with construction of other previously unidentified projects in the area, the owner of the project will be contacted to establish details of the construction method and timeframe. Following receival of further information, the CEMP and associated management plans (and if required, construction staging/method) will be updated to consider, minimise and manage potential cumulative impacts.

4.2 Licensing and approvals

No licenses or approvals are required for the proposed works.

5. Certification, review, and determination

5.1 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:

Signature 

Name: Bishal Ghimire

Position: Environmental Consultant

Company name: WSP Australia Pty Ltd (WSP)

Date: 28/03/2025

Minor works REF reviewed by:

Signature 

Name: Mark Maund

Position: Principal Environmental Consultant

Company name: WSP Australia Pty Ltd (WSP)

Date: 28/03/2025

5.2 Environment and sustainability 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 this minor works REF will have some environmental impacts which can be ameliorated satisfactorily. Having regard to the safeguards 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 would not affect areas of outstanding value. The activity described in the minor works REF would 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 of 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 Climate Change, Energy, the Environment and Water 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.

5.3 Environment and Sustainability staff recommendation

It is recommended that the proposal to upgrade the inrersection at Chain Valley Bay Road and Pacific Highway 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 in accordance with the EP&A Act, EP&A Regulation and the Guidelines approved under clause 170 of the EP&A Regulation. The minor works REF has 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.

If the proposal has not commenced within two years of the determination date the SMES must be consulted to identify any new or updated assessment or approval requirements.

Recommended by:

Signature 

Name: Mark Riddell

Position: A/ Environment & Sustainability Manager

Date: 01/04/2025

Noted by:

Signature 

Name: David Crowley

Position: Senior Project Manager

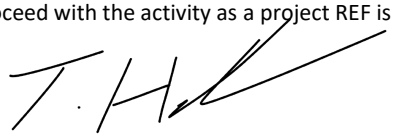
Date: 04/04/2025

5.4 Decision statement

In accordance with the above recommendation, I certify that I have reviewed and endorsed the contents of this minor works REF, and to the best of my knowledge, it is in accordance with the EP&A Act, the EP&A Regulation and the Guidelines approved under Section 170 of the EP&A Regulation, and the information is neither false nor misleading.

I determine that Transport for NSW may:

- [proceed with the activity] or
- [not proceed with the activity as the environmental impacts are not acceptable] or
- [not proceed with the activity as a project REF is required.]

Signature 

Name: Todd Hainsworth

Position: Senior Manager Project Services North

Date: 8/04/2025

5.5 EP&A Regulation publication requirement

Table 5-1: EP&A Regulation publication requirement

Requirement		
Does this minor works REF need to be published under section 171(4) of the EP&A Regulation?	Yes ☒	No ☐

6. Definitions

Table 6-1: Definitions

Term	Definition
Construction footprint	The construction footprint refers to the area that would be directly impacted by the proposal. This comprises the operational and construction areas of the proposal and any other areas that would be temporarily disturbed, including ancillary facilities. The construction footprint is shown in Figure 2-2.
Site compound and stockpiles	The site compound and stockpiles refer to the area of about 0.42 of Lot 100, DP 1044282 north of the construction footprint zoned C3 – Environmental Management, owned and managed by the Darkinjung Local Aboriginal Land Council. This area will be used for the site compound and stockpiles.
Study area	The construction footprint buffered (50 metres) to consider potential direct and indirect impacts associated with construction and/or operation of the proposal. The study area was used to inform the Aboriginal heritage, non- Aboriginal heritage, biodiversity and cumulative impact desktop investigations.
Survey Area (study area in the BAR)	The survey area refers to the portion of land that encompasses all biodiversity surveys undertaken. The survey area extends as far as is necessary to assess all important biodiversity values known and likely to occur within the impact area and includes the impact area and any additional areas which are likely to be affected by the proposal, either directly or indirectly. In this case, the survey area is defined as the impact area including a 20 metre buffer from construction footprint, and a 10 metre buffer from the site compound and stockpiles. This area is unique to the biodiversity assessment.

Appendix A: Consideration of State and Commonwealth environmental factors

Environmental Planning and Assessment Regulation 2021 section 171(2) factors

The following factors, listed in 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.

Table A1: Consideration of section 171 of the EP&A Regulation factors

Factor	Description of impact	Duration and extent
a) Environmental impact on the community.	There are potential short-term impacts associated with the proposal including noise, visual amenity, traffic and biodiversity. These impacts would be minimised with the implementation of appropriate control measures (as outlined in Section 4.1). Long-term impacts to the community due to the proposal would provide improved traffic conditions and increased safety for road users.	Short term minor negative. Long term positive.
b) The transformation of the locality.	The construction footprint, site compound and stockpiles would undergo some changes as a result of this proposal. There would be minor inconvenience during the construction phase. However, changes would be limited during operation, apart from small change to the visual appearance.	Short term negative. Long term positive.
c) Any environmental impact on the ecosystems of the locality.	Construction of the proposal has some potential to impact ecosystems within the locality, including the adjacent vegetation and fauna. Impacts may occur to these ecosystems that are within close proximity of the construction footprint, site compound and stockpiles. However, impacts are considered to be of minor consequence based upon the existing disturbed nature of the area and the mitigation measures that will be implemented (see Section 4.1).	Short term negative.
d) Any reduction of the aesthetic, recreational, scientific or other environmental quality or value of a locality.	The proposal would result in minor changes to the aesthetic, recreational, scientific or other environmental qualities of the locality. Short-term impacts would be limited to vegetation clearance and the presence of construction activities.	Short term negative.
e) Any effect on any 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 effect on any locality, place or building having aesthetic, anthropological, archaeological, architectural, cultural, historical, scientific or social significance or other special value for present or future generations as none were identified in the vicinity.	Nil.
f) Any impact on the habitat of protected fauna (within the meaning of the Biodiversity and Conservation Act 2016).	The proposal is not likely to have any significant impacts on protected fauna, however, the construction activities involve removal of vegetation which may have a minor impact. Safeguards in Section 3.7 will be implemented to ensure the impacts are mitigated.	Short term negative.

Factor	Description of impact	Duration and extent
g) Any endangering of a species of animal, plant or other form of life, whether living on land, in water or in the air.	The proposal is unlikely to endanger any species of animal, plant or other form of life, whether living on land, in water or in the air due to the limited scope of works and the implementation of the safeguards given in Section 3.7of this MWREF.	Nil.
h) Any long-term effects on the environment	The proposal would not have any long term effects on the environment.	Nil.
i) Any degradation of the quality of the environment.	There would be minor vegetation clearing during construction. However, there would be no long term degredation of the quality of the environment.	Short term negative. Nil in long term.
j) Any risk to the safety of the environment.	The proposal does not pose any risk to the safety of the environment.	Nil.
k) Any reduction in the range of beneficial uses of the environment.	The proposal would not result in reduction in benificial uses of the environment.	Nil.
l) Any pollution of the environment.	There may be some increase in noise, air and water pollution during construction. However, pollution would be temporary during construction. Mitigation measures proposed in Section 4.1 would address any potential pollution impacts.	Short term negative. Nil in long term.
m) Any environmental problems associated with the disposal of waste	No problems with disposal of waste identified for the proposal.	Nil.
n) Any increased demands on resources (natural or otherwise) that are, or are likely to become, in short supply.	The proposal would not result in any increased demands on resources that are likely to become in short supply.	Nil.
o) The cumulative environmental effect with other existing or likely future activities.	No other known projects are proposed to be carried out concurrently or in the future that may result in cumulative impacts when considered alongside this proposal.	Nil.
p) Any impact on coastal processes and coastal hazards, including those under projected climate change conditions.	The proposal would not impact on coastal processes and coastal hazards, including those under projected climate change conditions.	Nil.
q) Applicable local strategic planning statements, regional strategic plans or district strategic plans made under the Act, Division 3.1		Nil.
r) Other relevant environmental factors		Nil.

Matters of National Environmental Significance

Table A2: Matters of national environmental significance

Environmental factor	Impact
a) Any impact on a World Heritage property? The proposal would not impact on a World Heritage Property.	Nil
b) Any impact on a National Heritage place? The proposal would not impact on a National Heritage Place.	Nil

Environmental factor	Impact
c) Any impact on a wetland of international importance (often called 'Ramsar' wetlands)? The proposal would not impact on a wetland of international importance.	Nil
d) Any impact on nationally threatened species, ecological communities or migratory species? The proposal is not likely to impact nationally threatened species, ecological communities or migratory species.	Nil
e) Any impact on a Commonwealth marine area? The proposal would not impact on Commonwealth marine areas	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? The proposal would not have any direct or indirect impact on environment of Commonwealth land.	Nil

Appendix B: Biodiversity Assessment Report

Transport
for NSW

Pacific Highway and Chain Valley Bay Road Intersection Upgrade

Biodiversity assessment report for review of environmental factors (REF)

March 2025

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Executive summary

Transport for NSW (transport) propose an upgrade of the Chain Valley Bay Road (CVBR) intersection with the Pacific Highway, located near Chain Valley Bay and Lake Munmorah, within the Central Coast Council Local Government Area (LGA), NSW. Wedgetail Project Consulting (WPC) were engaged by WSP to undertake the biodiversity assessment for the associated Review of Environmental Factors (REF). The proposed activity consists of a construction footprint, and will require the establishment of two site compounds and stockpile areas.

The proposal would involve upgrading the existing intersection to traffic signals, providing a dual turning lane out of Chain Valley Bay Road, and providing active transport upgrades and connections. While the current intersection design is able to accommodate the current traffic demand of the area, the proposal is needed to satisfactorily accommodate future traffic demand from both current approved developments and future proposed development.

The study area occurs in the Wyong Interim Biogeographic Regionalisation for Australia (IBRA) Sub-region within the Sydney Basin IBRA Bioregion, and within the Gosford-Cooranbong Coastal Slopes Mitchell Landscape. The study area lies within an identified 'green corridor' connecting extensive vegetation in the Chain Valley Bay area to the north, with Munmorah State Conservation Area to the south (DPI 2012b), consisting of both native vegetation and more disturbed or degraded areas resulting from past land use, which combined, provide valuable connectivity. The study area consists predominantly of remnant native vegetation in moderate-good (moderate-good) condition, with some in disturbed or derived native grassland (DNG) condition resulting from prior clearing. Small areas of tree and shrub vegetation in the south of the site are planted exotic.

Native vegetation

The vegetation in the impact area is comprised of one Plant Community Type (PCT); PCT 3583: Hunter Lowland Scribbly Gum Forest. This PCT occurs in in three condition states within the study area, moderate-good, disturbed and grassland. Due to the limitations of the study area, one plot was conducted within the largest area of native vegetation within the condition zone of the PCT, which is in accordance with BAM requirements. No plots were conducted within the grassland zone due to size constraints and the close proximity of this vegetation zone to the road side.

The native vegetation within the study area is not consistent with any threatened ecological communities (TECs) listed under the NSW *Biodiversity Conservation Act 2016* (BC Act) or the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

Threatened species

A total of 106 threatened species were identified via database searches (including BioNet & Protected Matters Search Tool in the locality; 10 kilometre buffer, and candidate species associated with the PCT). These included 28 threatened flora species, 75 fauna species, and additionally, three migratory species and five threatened ecological communities were also modelled to occur.

Of these species, 6 flora species, 12 fauna species and 1 migratory species were assessed as having suitable habitat within the study area. Surveys undertaken for threatened flora species have detected one threatened species; *Tetratheca juncea* (Black-eyed Susan), listed as Vulnerable under the BC Act and the EPBC Act. A total of 16 individuals of *T. juncea* were identified within the study area, with none occurring within the Impact Area.

No suitable habitat for threatened marine or aquatic species is present in the study area.

Impact assessment

The direct, indirect, and cumulative ecological impacts of the proposal have been carefully considered in Section 5 of this report. Section 6 details measures to mitigate residual impacts, to address threatening processes and to create a more positive ecological outcome for biodiversity.

The proposal will directly impact 0.84 hectares of native vegetation and 0.27 hectares exotic pasture and lawn, which includes the following impacts:

- PCT 3583 Hunter Coast Lowland Scribbly Gum Forest – moderate-good condition zone: 0.19 hectares
- PCT 3583 Hunter Coast Lowland Scribbly Gum Forest – Disturbed condition zone: 0.18 hectares
- PCT 3583 Hunter Coast Lowland Scribbly Gum Forest – grassland condition zone: 0.47 hectares
- Exotic grassland: 0.27 hectares.

No threatened flora species surveyed to date have been identified within the proposed Impact Area and as such there will not be any direct impacts on threatened flora species.

Assessments of significance (5-part test) under Section 7.2 of the BC Act and assessments against the significant impact criteria under the EPBC Act concluded that the proposed Activity is unlikely to have a significant impact on any threatened species or migratory species. As such, no further assessment under the BC Act is required and no offsets are required for any Commonwealth Protected Matters listed under the EPBC Act.

Impact avoidance and minimisation

The following strategies and actions have been undertaken to either avoid or minimise impacts on biodiversity values:

- Impacts from clearing native vegetation and threatened species habitat has been minimised by locating the proposal to utilise:
    - existing road corridors
    - cleared areas
    - low-condition and grassland vegetation
    - locating ancillary facilities in areas where there are no biodiversity values.
- Locating construction compounds in areas where there are lower biodiversity values (e.g. utilising an existing cleared area in the north east of the study area).

Offsetting

No offset thresholds were triggered by the proposal for TECs, threatened fauna habitat or Key Fish Habitat in accordance with Transport Biodiversity assessment guidelines (2022) and Part 6 of the Biodiversity Conservation Regulation (2017). Further, there were no hollows identified requiring replacement.

Preliminary estimates for tree replacement are as follows:

- Impacts on 63 native trees will require the replacement with 136 native trees or a payment of $9,250 into Transport conservation fund.

1. Introduction

1.2 Proposal background

The Pacific Highway between Swansea and Bushells Ridge is an arterial route along the south-eastern side of Lake Macquarie within the Central Coast LGA. It connects to the Pacific Motorway in the south via Doyalson Link Road and follows the eastern side of Lake Macquarie to Newcastle. It provides connections to a range of centres and services within the Central Coast region.

Chain Valley Bay, a suburb within the Central Coast Council LGA, is expected to undergo significant uplift in residential housing over the coming decade. There are approved and proposed plans for low density and medium density residential dwellings as part of greenfield land releases in the area around Chain Valley Bay Road and Mulloway Road. While the current intersection design can accommodate the current traffic demand, it is unlikely that the intersection would be able to satisfactorily accommodate future traffic demand following completion of the greenfield residential developments in the area.

Transport proposes to upgrade the intersection of the Pacific Highway and Chain Valley Bay Road at Lake Munmorah, in the Central Coast local government area (LGA) (the proposal). The proposal would involve upgrading the existing intersection to traffic signals, providing a dual turning lane out of Chain Valley Bay Road, and providing active transport upgrades and connections. While the current intersection design is able to accommodate the current traffic demand of the area, the proposal is needed to satisfactorily accommodate future traffic demand from both current approved developments and future proposed development. The proposal site overview and study area are shown in Figure 1-1.

Objectives of the proposal include to:

- improve efficiency of the intersection of Pacific Highway and Chain Valley Bay Road, including to facilitate future predicted traffic demand
- reduce likelihood and severity of intersection crashes by separating traffic volumes and regulating turning movements in and out of Chain Valley Bay Road
- provide DDA compliant dedicated footpath and shared user path connections between the intersection and nearby bus stops support future residential growth in the Lake Munmorah area.

1.3 The proposal

The proposed CVBR intersection will provide for future predicted traffic volumes, support residential growth in the Chain Valley Bay and Lake Munmorah areas, and improve safety and accessibility for pedestrians and cyclists over an approximate 0.5 kilometres (km) stretch of road. Transport for NSW assessed two options for the proposed CVBR intersection upgrade, including a 'do nothing' option, or the 'Intersection upgrade' option. The 'do nothing' option was not considered feasible to accommodate future traffic volumes. The Intersection upgrade option was assessed as the preferred option. This option will involve upgrading the intersection to traffic signals on all approaches, providing an additional dual turning lane out of Chain Valley Bay Road, retaining existing U-turn facilities, installing dedicated footpath and shared user path connections between the intersection and nearby bus stops, and providing crossings for pedestrians and cyclists on the northern and eastern approaches.

Key features of the proposed CVBR intersection upgrade include:

- installing traffic signals at all approaches to the existing Pacific Highway and Chain Valley Bay Road intersection
- installing a dual turning lane out of Chain Valley Bay Road onto the Pacific Highway
- retaining the existing U-turn facilities
- lengthening the existing turning lane from the Pacific Highway southbound into Chain Valley Bay Road
- relocating the existing bus stop from the southbound lane of Chain Valley Bay Road to the northbound lane of the Pacific Highway
- installing a Disability Discrimination Act 1992 (DDA) compliant, dedicated footpath, connecting the intersection to the existing bus stop and footpath alongside the southbound lanes of the Pacific Highway
- installing a DDA compliant shared user path alongside the northbound lane of the Pacific Highway, connecting the relocated bus stop to the intersection and existing pedestrian facilities, while providing a connection for cyclists to enter and exit the northbound lane of the Pacific Highway as well as Chain Valley Bay Road, utilising the combination with on-road cycle lanes and designated off road cycle path

- installing signalised pedestrian crossings at the northern and eastern approaches of the intersection
- ancillary works (such as reinstating road furniture and road signs)
- relocating and adjusting utilities.

1.4 Assessment areas

The following terms are used in the BAR to define assessment areas and proposal boundaries:

- The proposal (Activity)– upgrading the intersection of the Pacific Highway and Chain Valley Bay Road at Lake Munmorah to traffic signals, providing a dual turning lane out of CVBR, and providing active transport upgrades and connections (see detailed description above).
- Impact area (Construction Footprint)– the area to be directly impacted by the proposal. This comprises the construction footprint of the proposed traffic signals, dual turning lane, including all roadside cut and fill, construction compound areas, and is equivalent to the combined Construction Footprint and Construction Compound areas shown on Figure 1-2. It forms part of, but is not equivalent to, the study area or assessment area.
- Operational footprint – the final area of the proposal including the area of land required for the use and maintenance of the proposed structures throughout their lifespan.
- Study area – is the portion of land that encompasses all surveys undertaken. The study area extends as far as is necessary to assess all important biodiversity values known and likely to occur within the impact area and includes the impact area and any additional areas which are likely to be affected by the proposal, either directly or indirectly. In this case, the study area is defined as the impact area including a 20 metre buffer from construction areas, and a 10 metre buffer from construction compounds.
- Landscape assessment area – the impact area and the area of land within a 500 metres buffer zone is identified as per Subsection 3.1.2 of the Biodiversity Assessment Method (BAM).

Please note, as part of the design process for the project Transport were able to reduce the impact area of the northern site compound and stockpile area. However, a conservative impact assessment has been undertaken for this Assessment, and the larger stockpile area has been assessed. Figure 1-2 depicts the proposed smaller impact area for the northern compound and stockpile area, while all other figures show the larger more conservative impact area.

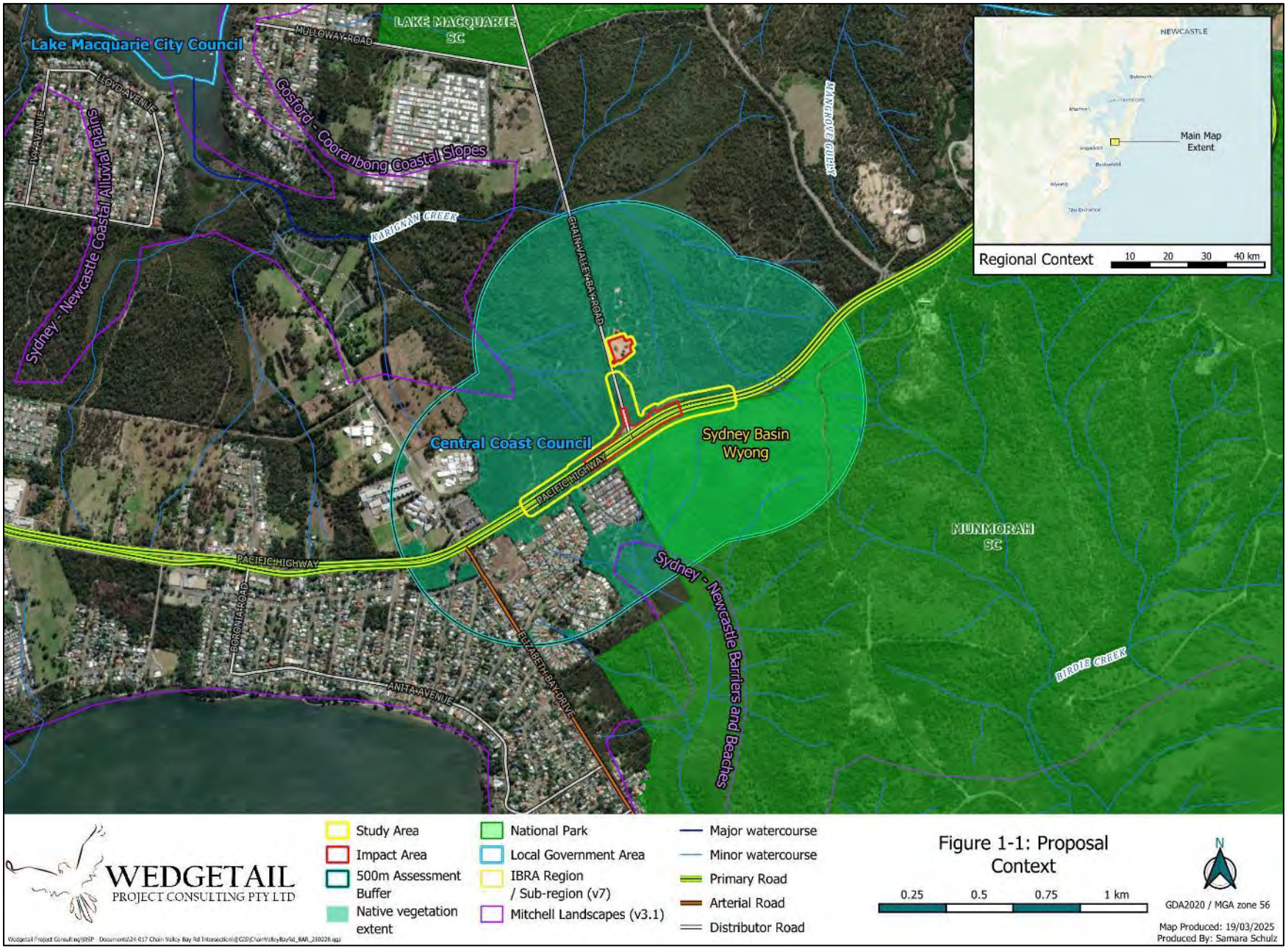

Figure 1-1: Proposal context

Figure 1-2: The proposal

1.5 Legislative context

A Review of Environmental Factors (REF) is prepared to satisfy Transport for NSW (Transport) duties under s.5.5 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) to *"examine and take into account to the fullest extent possible all matters affecting or likely to affect the environment by reason of that activity"* and s.5.5 in making decisions on the likely significance of any environmental impacts. This biodiversity impact assessment forms part of the REF being prepared for the Pacific Highway and CVBR intersection upgrade and assesses the biodiversity impacts of the proposal to meet the requirements of the EP&A Act.

The *Biodiversity Conservation Act 2016* (BC Act) requires that the significance of the impact on threatened species, populations and threatened ecological communities is assessed using the test listed in Section 7.3 of the BC Act. Where a significant impact is likely to occur, a species impact statement (SIS) must be prepared in accordance with the Environment Agency Head's requirements, or a biodiversity development assessment report (BDAR) must be prepared by an accredited assessor in accordance with the biodiversity assessment method (BAM) (DPIE 2020a).

Note, the proposed Activity does not require a permit under the *Fisheries Management Act 1994* (FM Act). As such, no significances assessments under Part 7A of the FM Act were as part of this BAR.

In September 2015, a 'strategic assessment' approval was granted by the Federal Minister in accordance with the *Environmental Protection and Biodiversity Conservation Act* (EPBC Act). The approval applies to Transport road activities being assessed under Division 5.1 (formerly Part 5) of the EP&A Act with respect to potential impacts on nationally listed threatened species, ecological communities and migratory species.

As a result, Transport road proposals assessed via an REF:

- Must address and consider potential impacts on EPBC Act listed threatened species, populations, ecological communities and migratory species, including application of the "avoid, minimise, mitigate and offset" hierarchy.
- Do not require referral to the Department of Climate Change, Energy, the Environment and Water (DCCEEW) for these matters, even if the activity is likely to have a significant impact.
- Must use the Biodiversity Assessment Method (BAM) to calculate credits that would offset significant impacts on EPBC Act listed threatened species, populations, ecological communities and migratory species.

Assessments of impact significance are required for all relevant biodiversity values in accordance with the *Matters of National Environmental Significance: Significant impact guidelines 1.1. Environment Protection and Biodiversity Conservation Act 1999* (DoE 2013).

2. Methods

2.1 Personnel

A list of personnel involved in the assessment and an overview of their qualifications and experience is provided Table 2-1.

Table 2-1: Personnel

Name	Role	Qualifications
Samara Schulz	Principal Ecologist - technical lead, flora survey, report review	BAM accredited assessor (BAAS17039) B.Env.Sc. & Mgt (Hons)
Debbie Plunkett	Ecologist (flora) – reporting, flora survey, data management	B.Nat.Res. (Hons)
Claire Larkin	Ecologist (fauna) – reporting, flora & fauna survey, data management	B.Env.Sc. & Mgt
Ashely Owen	Ecologist – reporting, flora survey	BAM Accredited Assessor (BAAS21020) DipSc. & B.Sc. (Ecology)
Shea Brunt	Ecologist – flora survey	B.Env.Sc.
Kane Blundell	GIS Analyst – mapping, GIS data management	Grad. Dip. Sp.Sci. (in progress)
Keryn Dowling	GIS Analyst – mapping, GIS data management	B.Env.Sci.(Hons) PhD

2.2 Background research

Background research was conducted prior to field inspection to inform the presence or likelihood of occurrence within the study area of:

- Threatened terrestrial and aquatic species and their habitat.
- Threatened ecological communities.
- Important habitat for migratory species.
- Areas of outstanding biodiversity value.

The following threatened species databases, previous ecological studies and vegetation mapping resources were reviewed:

- BioNet - the website for the Atlas of NSW Wildlife and Threatened Biodiversity Data Collection (TBDC) – 17/07/2024.
- BioNet Vegetation Classification database – reviewed 17/07/2024.
- BAM calculator (BAM-C).
- Department of Climate Change, Energy, the Environment and Water (DCCEEW) Protected Matters Search Tool – searched 17/07/2024.
- SEED Layer Intersection Tool – searched 02/08/2024.
- NSW DPI Fisheries Spatial Data Portal.
- Regional vegetation mapping: State Vegetation Type Map (release C1.1).
- Commonwealth Atlas of Groundwater Dependent Ecosystems (GDE): GDE Atlas Map: Water Information: Bureau of Meteorology (bom.gov.au).
- National Flying-fox monitoring viewer (environment.gov.au).

- Coastal management areas identified by the Resilience and Hazards SEPP 2022.
- Core Koala Habitat identified by the Biodiversity and Conservation SEPP 2022.
- The natural vegetation of the Wyong Local Government Area, Central Coast, New South Wales: Vegetation Community Profiles – Prepared by Steven Bell for Wyong Shire Council, December 2002.
- The preliminary and provisional determinations to list species and ecological communities as threatened under the BC Act were viewed on the NSW Threatened Species Scientific Committee website (accessed date 17/07/2024).
- The annual Final Priority Assessment List of nominated species and ecological communities that have been approved for assessment by the Minister responsible for the EPBC Act were viewed on the Commonwealth DCCEEW website (accessed date 17/07/2024).

2.3 Vegetation assessment

Vegetation survey and assessment was completed in accordance with Chapter 4 of the Biodiversity Assessment Method (BAM; DIPE 2020a).

2.3.1 Vegetation mapping

Vegetation mapping within the landscape assessment area followed the BAM and associated guidelines. Remnant native vegetation was allocated to the best fit PCT, as detailed in Section 3.1. Non-native vegetation was also mapped and assessed according to the BAM. Boundaries of woodland or forest vegetation were mapped to the dripline of trees using the most current aerial imagery (01/08/23). Near-infrared spectroscopy (NIRS) was also used to assist in mapping as this provides clearer distinction between different vegetation types. “Native vegetation” has been identified as defined in Section 1.6 of the Biodiversity Conservation Act 2016 (BC Act) and Part 5A 60B of the *Local Land Services Act 2013* (LLS Act) as follows:

(1) For the purposes of this Part, native vegetation means any of the following types of plants native to New South Wales—

a) trees (including any sapling or shrub or any scrub),

b) understorey plants,

c) groundcover (being any type of herbaceous vegetation),

d) plants occurring in a wetland.

(2) A plant is native to New South Wales if it was established in New South Wales before European settlement. The regulations may authorise conclusive presumptions to be made of the species of plants native to New South Wales by adopting any relevant classification in an official database of plants that is publicly accessible.

(3) For the purposes of this Part, native vegetation extends to a plant that is dead or that is not native to New South Wales if—

e) the plant is situated on land that is shown on the native vegetation regulatory map as category 2-vulnerable regulated land, and

f) it would be native vegetation for the purposes of this Part if it were native to New South Wales.

(4) For the purposes of this Part, native vegetation does not extend to marine vegetation (being mangroves, seagrasses or any other species of plant that at any time in its life cycle must inhabit water other than fresh water). A declaration under section 14.7 of the Biodiversity Conservation Act 2016 that specified vegetation is or is not marine vegetation also has effect for the purposes of this Part

Prior to surveys, an assessment of the NSW State Vegetation Type Map (SVTM), and available regional vegetation mapping including vegetation community profiles for the Wyong Local Government Area (Bell 2002) and Lake Macquarie Vegetation map (2022), was undertaken to inform likely vegetation types, locations for plot-based survey effort and inform the habitat assessment by identifying threatened species associated with mapped PCTs. The SVTM identified the following PCTs within the study area and nearby:

The SVTM identified the following PCTs within the study area and nearby:

- PCT 3583 Hunter Coast Lowland Scribbly Gum Forest.
- PCT 3794 Lower North Coast Headland Clay Heath.

- PCT 3998 Lower North Creekflat Mahogany Swamp Forest.

The field survey included a walk over the study area to identify vegetation and habitat types. The identification of vegetation types was based on dominant species present in the overstorey, midstorey, shrub and ground layers as recorded and did not include a comprehensive survey of all species potentially present. Surveys were undertaken by WPC over several days from the 1st to 11th July 2024.

The boundaries of each of the identified vegetation communities within the study area were mapped using a combination of on-site visual inspection and aerial photo interpretation (API). The species associations recorded in the study area were compared to descriptions of Plant Community Types (VIS Database), and vegetation mapping for the Wyong LGA (Bell 2002).

2.3.2 Vegetation survey and classification

Vegetation zones

Within the study area, PCTs have been delineated into vegetation zones based on broad condition states. Disturbance to growth form groups for tree, shrub and ground cover or extent of exotics (or combinations of these) have been used to identify areas of similar condition. The criteria in Table 2-2 were provided in the Transport *Template for Biodiversity Assessment Report (BAR) for REFs* and have been used to identify areas of low condition vegetation.

Table 2.2: Criteria for assessing vegetation in low condition without a vegetation integrity score

Cat	Vegetation formation	Criteria
A	Rainforest Wet-sclerophyll forest Dry-sclerophyll forest Grassy woodland Semi-arid woodland Forested wetland	Native tree cover <25 % of the tree cover benchmark for the PCT. **AND** Less than 50% of ground cover vegetation consists of either: • *species listed in the BioNet Vegetation Classification PCT profile for medium to high classification confidence PCTs;* ***or*** • *any native species for very low to low classification confidence PCTs.* **OR** Greater than 90% of ground cover vegetation is cleared.
B	Arid Shrubland Heathland Or any PCT from category A where the tree cover benchmark is <10 %	Native shrub cover <50 % of the shrub cover benchmark for the PCT. **AND** Less than 50% of ground cover vegetation consists of either: • *species listed in the BioNet Vegetation Classification PCT profile for medium to high classification confidence PCTs;* ***or*** • *any native species for very low to low classification confidence PCTs.* **OR** Greater than 90% of ground cover vegetation is cleared.
C	Freshwater Wetland Saline Wetland Grassland Alpine Complex Or any PCT from category B where the shrub cover benchmark is <10 %	Less than 50% of ground cover vegetation consists of either: • *species listed in the BioNet Vegetation Classification PCT profile for medium to high classification confidence PCTs;* ***or*** • *any native species for very low to low classification confidence PCTs.* **OR** Greater than 90% of ground cover vegetation is cleared.

Plot-based vegetation survey

Plot-based full floristic survey was completed, in part, in accordance with subsection 4.3.4 of the BAM. In addition to the plot data that must be collected (as described by the BAM), Transport also requires the number of trees in each stem size class to be counted in each plot. This data was used to provide a representative sample of tree counts in each vegetation zone and an estimate of tree replacement requirements where applicable in accordance with the Tree and Hollow Replacement Guidelines (EMF-BD-GD-0129) – refer to Section 7.2 of this BAR.

Table 2-3 lists the minimum number of plots required per hectare for each vegetation zone. Table 2-4 identifies the number of plots undertaken within each vegetation zone. Transport specifies plots should also be undertaken in areas of non-native and planted vegetation to provide evidence where no PCT determination can be made.

Due to the limitations of the study area, only one plot was undertaken within the largest area of native vegetation within the Impact Area (Zone 1: moderate-good). All native vegetation zones, and the exotic zone were not sampled via plots due to their proximity to the roadside (20 x 50 metre, or a 10 x 100 metre modified plot would not fit within study area). In these areas field surveys included walking transects through the study area to identify vegetation and habitat types.

The identification of vegetation types was based on dominant species present in the overstorey, midstory, shrub and ground layers as recorded and did not include a comprehensive survey of all species potentially present. Plot location surveyed is mapped on Figure 2-1.

Table 2-3: Minimum number of plots required per zone area

Vegetation zone area (ha)	Minimum number of plots/midlines
<2	1 plot/midlines
>2-5	2 plots/midlines
>5-20	3 plots/midlines
>20-50	4 plots/midlines
> 50–100	5 plots/midlines
> 100–250	6 plots/midlines
> 250–1000	7 plots/midlines; more plots may be needed if the condition of the vegetation is variable across the zone.
> 1000	8 plots/midlines; more plots may be needed if the condition of the vegetation is variable across the zone.

Table 2-4: Minimum number of plots required and completed per vegetation zone

Veg zone	PCT	Condition	Impact Area (ha)	No. plots required	No. plots completed (plot IDs)
Zone 1	PCT 3583: Hunter Coast Lowland Scribbly Gum Forest	Moderate-good	0.19	1	1 plot (Plot: Q01)
Zone 2	PCT 3583: Hunter Coast Lowland Scribbly Gum Forest	Disturbed	0.18	1	*0
Zone 3	PCT 3583: Hunter Coast Lowland Scribbly Gum Forest	Grassland	0.47	1	*0

*Completed plots are fewer than required due to size limitations of the study area as discussed above.

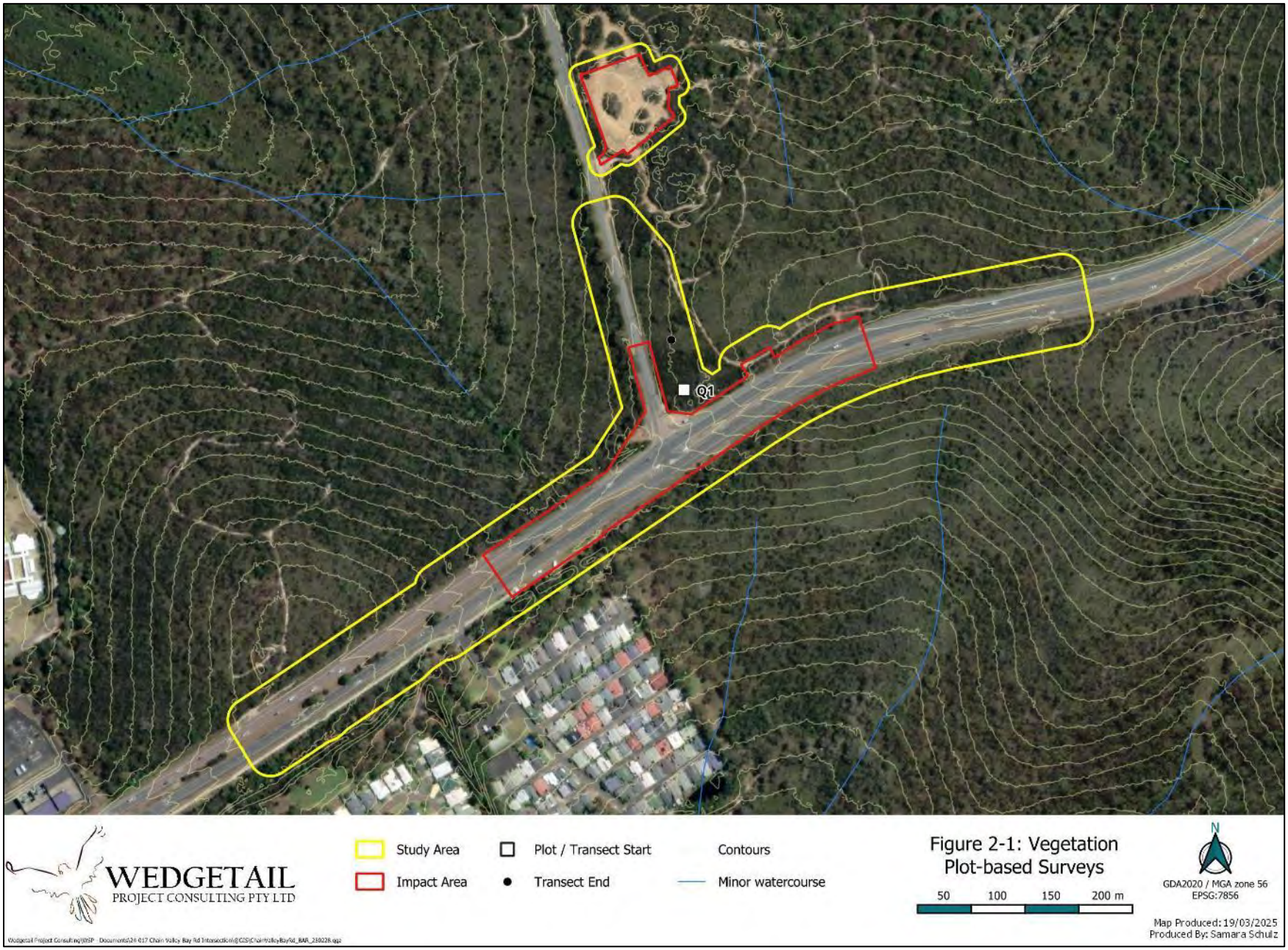

Figure 2-1: Vegetation plot-based survey locations

2.3.3 Patch size

Patch size was calculated for each vegetation zone containing remnant vegetation in accordance with Section 4.3.2 of the BAM. Patch size is calculated as the total area of native vegetation connected to the impact area according to one of the following classes:

- <5 hectares
- 5-<25 hectares
- 25-<100 hectares
- ≥100 hectares.

All vegetation zones are connected to large areas of remnant vegetation of >100ha. This places all vegetation zones within the >100ha patch size class. Results for patch size calculations are provided in Section 3.1.

2.3.4 Native vegetation cover

Native vegetation cover was calculated in accordance with Section 3.2 of the BAM. The SVTM mapping and aerial photo interpretation was used to measure native vegetation within the assessment area. A buffer of 500 metre from the impact area was used to define the assessment area, as the project is linear (Figure 1-1 and Table 2-5).

Table 2-5: Native vegetation cover in the assessment area

Assessment area (ha)	214
Total area of native vegetation cover (ha)	159
Percentage of native vegetation cover (%)	74
Class (0-10, >10-30, >30-70 or >70%)	>70%

Figure 2-1 provides a map of vegetation plot-based survey locations. Plot locations are displayed by a squire symbol showing the start of the plot and a point symbol representing the end of the 50 metre transect used to assess the function attributes.

2.4 Threatened species assessment

Threatened species assessment was conducted in alignment with Chapter 5 of the BAM. This requires that a list of species is produced as would be generated by the BAM-C in association with the PCTs within the impact area. For this BAR, the PCT associations within the BioNet Vegetation Classification power query database were used to effectively produce the same credit species associations as would be produced by the BAM-C. Threatened species are separated into two groups for assessment:

- 'Ecosystem-credit' species listed only under the BC Act – these species are assessed by habitat suitability assessment and do not strictly require targeted surveys.
- 'Species-credit' species listed under the BC Act and any species listed under the EPBC Act – any of these species that are associated with PCTs (as defined by the TBDC and BAM-C) being impacted and have a moderate to high likelihood of occurrence (an outcome of Appendix B) should be targeted by surveys in accordance with applicable guidelines. This is a slight variation to Chapter 5 of the BAM that requires targeted survey for all species-credit species identified by the BAM-C.

Targeted surveys for species-credit species followed relevant BAM guidelines and/or information provided in the TBDC for each species.

In accordance with the BAM, targeted survey is not required for ecosystem-credits species and is only required for dual-credit species where breeding habitat has been identified. For these, EPBC Act species that are being assessed as ecosystem-credit species (this includes dual-credit species where there is no breeding habitat), Commonwealth guidelines are considered noting that survey is unlikely to be required and presence may be assumed (noting that Transport offset thresholds only apply to species credit species). Commonwealth survey requirements are considered for species listed under the EPBC Act that are not listed under the BC Act.

2.4.1 Habitat suitability assessment

A list of threatened species and populations that have been reported or modelled to occur within a 10-kilometre radius of the study area was obtained from the following databases:

- NSW Department of Planning, Industry and Environment (DPIE) BioNet Atlas http://www.bionet.nsw.gov.au/.
- Department of Climate Change, Energy, the Environment and Water (DCCEEW) Protected Matters Search Tool (PMST) https://www.environment.gov.au/epbc/protected-matters-search-tool.

Predicted and candidate species associated with the recorded PCTs were also included in this list based on the PCT associations within the BioNet Vegetation Classification power query database. This provides the same credit species associations as would be produced by the BAM-C.

An assessment was made as to the likelihood of any of the reported matters occurring within the study area or using the habitat as an essential part of their foraging range based on information available concerning habitat requirements of threatened species, populations and ecological communities. Strictly pelagic and marine species were excluded from the analysis due to lack of habitat within the study area. The habitat suitability assessment is provided in Appendix B: Habitat suitability assessment.

2.4.2 Targeted flora surveys

Following habitat suitability assessment, targeted flora surveys were conducted for species with a potential to occur of moderate to high. Species with unlikely potential to occur do not require survey following the Transport threatened species assessment requirements.

Parallel field traverses were undertaken within areas of suitable habitat. Surveys were conducted in accordance with the following survey guides:

- DPIE (2020c), Surveying threatened plants and their habitats: NSW survey guide for the Biodiversity Assessment Method.
- Commonwealth of Australia (2013b) Draft survey guidelines for Australia's threatened orchids.

Details on the specific survey methods (regarding timing and transect width) for each target threatened flora species is detailed in Table 2-6. Field traverses thus far completed are shown on Figure 2-3 to Figure 2-8.

Table 2-6: Targeted threatened flora survey details

Species name	Common name	Required survey period	Associated PCTs in the impact area	Minimum survey requirements	Survey completed
Round 1: Orchid surveys					
Corybas dowlingii	Red Helmet Orchid	June-July	No associated PCT. Recorded within locality.	Parallel transects – maximum 5 metres apart (dense vegetation). Flowers are required for positive ID; vegetatively similar to Acianthus fornicatus, which also has cordate basal leaves. Flowering occurs from June to July, however, peak flowering at the main (largest) population at Soldiers Point occurs in the first two-three weeks of June. Use a local reference population to refine survey timing (i.e. when known local population is in flower). May require multiple surveys to detect (i.e. survey in June, if not found survey again in July).	Parallel field traverses 5 metres apart across study area. Surveys completed on 1 July 2024. Reference population at Bolton Point (closest population) was used to inform specific survey timing – confirmed to be in peak flower at time of surveys. **Surveys meet the minimum requirements.**
Round 2: Tree surveys					
Angophora inopina	Charmhaven Apple	All year	PCT 3583	Parallel transects – maximum 20 metres apart (dense vegetation)	Parallel field traverses 10 – 20 metres apart across study area. Surveys conducted on 4 & 11 July 2024 – complying with timing of all species. **Surveys meet the minimum requirements.**
Eucalyptus camfieldii	Camfield's Stringybark	All year	PCT 3583		
Eucalyptus parramattensis subsp. *decadens*	Earps Gum	All year	No associated PCT. Recorded within locality.		
Eucalyptus parramattensis subsp. *Parramattensis*	Endangered Population in the Wyong and Lake Macquarie LGAs	All year	PCT 3583		
Round 3: Orchid surveys					
Diuris praecox	Rough Doubletail	August	PCT 3583	Parallel transects – maximum 5 metres apart (dense vegetation). Survey season differs based on location. Survey Newcastle area and north of Newcastle early Aug. Survey remainder of distribution any time during Aug. Recommend checking a local	Parallel field traverses 5 metres apart across study area. Surveys completed on 27 August 2024.

Species name	Common name	Required survey period	Associated PCTs in the impact area	Minimum survey requirements	Survey completed
				reference population before surveying to identify flowering times.	Local reference population at the corner of Pacific Highway and Kanangra Drive was used to inform specific survey timing – confirmed to be in peak flower at time of surveys. **Surveys meet the minimum requirements.**
Round 4: Orchid, herbs and sub-shrub surveys					
Genoplesium insigne	Variable Midge Orchid	September-November	PCT 3583	Parallel transects – maximum 5 metres apart (dense vegetation). Requires flowering material to identify. Flowering time is variable depending on recent rainfall and is limited to about 2 weeks. Survey when a nearby reference population is in flower. Survey Sep to early Oct. If not located, survey again in mid-Oct to Nov.	Parallel field traverses 5 metres apart across study area. Surveys completed on 13 September 2024. Local reference population along Chain Valley Bay Road was used to inform specific survey timing – confirmed to be in peak flower at time of surveys. **Surveys meet the minimum requirements.**
Rhizanthella slateri	Eastern Australian Underground Orchid	September-November	PCT 3583	Parallel transects – maximum 5 metres apart (dense vegetation). Use buds, flowers and/or fruit to identify to species.	Parallel field traverses 5 metres apart across study area. Surveys completed on 13 September 2024. **Surveys meet the minimum requirements.**
Rutidosis heterogama	Heath Wrinklewort	All months	PCT 3583	Parallel transects – maximum 5 metres apart (dense vegetation). Species flowers opportunistically depending on temperature and rainfall. Use a reference population to identify likely flowering period. Use flowers to identify, as easily confused with *Coronidium scorpioides*.	
Tetratheca juncea	Black-eyed Susan	September-October	PCT 3583	Parallel transects – maximum 10 metres apart (dense vegetation). Peak flowering Sep - Oct, though will flower sporadically at other times throughout the year.	
Round 5: Orchid surveys					
Thelymitra adorata	Wyong Sun Orchid	September-October	PCT 3583	Parallel transects – maximum 5 metres apart (dense vegetation). Use flowers to identify. Flowering period and abundance varies each year and typically occurs for 2-4 weeks from Sep - Oct. Use a nearby reference population to determine most likely time for flowering. Species is more likely to be detectable on warm sunny days.	Parallel field traverses 5 metres apart across study area. Surveys completed on 1 October 2024. Peak flowering confirmed by Central Coast Council in week of 23 September. Surveys were conducted within 2-weeks of this date. **Surveys meet the minimum requirements.**

Species name	Common name	Required survey period	Associated PCTs in the impact area	Minimum survey requirements	Survey completed
Round 6: Shrubs surveys					
Acacia bynoeana	Bynoe's Wattle	All Year	PCT 3583	Parallel transects – maximum 10 metres apart (dense vegetation). Use reference population to identify vegetative state, which will assist in positive identification during survey.	Surveys conducted on 8th November 2024, during flowering period for the area.
Callistemon linearifolius	Netted Bottle Brush	October-January	PCT 3583	Parallel transects – maximum 10 metres apart (dense vegetation). Use flowers to identify. Survey Oct - Jan. If not observed in flower, return to site for re-survey later in the survey period. Check nearest possible reference site (within 20 km) at similar altitude.	Surveys conducted on 8th November 2024, during flowering period for the area.
Grevillea parviflora subsp. *parviflora*	Small-flower Grevillea	August-November	PCT 3583	Parallel transects – maximum 10 metres apart (dense vegetation). Use flowers to identify, as easily confused with *G. humilis*. Will also flower sporadically throughout the year.	Surveys conducted on 8th November 2024, during flowering period for the area.
Round 7: Orchid					
Corunastylis sp. Charmhaven (recently described as *Genoplesium branwhiteorum*)	-	November-April	PCT 3583	Parallel transects – maximum 5 metres apart (dense vegetation). Requires flowering material to identify. Flowering time is variable depending on rainfall and is limited to about 2 weeks. Survey when a nearby reference population is in flower, somewhere between Nov - Apr. Survey in Nov - Dec. If not found survey again in Jan - Feb and again in Mar - Apr, 2 weeks after a rainfall event.	Surveys conducted on 18th February 2025, during flowering period for the area. Email confirmation from Central Coast Council on 13th February 2025, that the species was in peak flower in dryer locations (relevant to the Study Area).
Round 8: Orchid					
Cryptostylis hunteriana	Leafless Tongue Orchid	November-January	PCT 3583	Parallel transects – maximum 5 metres apart (dense vegetation). Poor winter and spring rainfall may hamper flowering. Flowers between October and November in northern populations (north of Hunter Valley) and progressively later further south (November - December on the Central Coast to December to Late January on the South Coast). Species seems to flower well in periods when the understory is more open.	Parallel field traverses 5 metres apart across study area. Surveys completed on 8th November 2024. Local reference population within Munmorah State Conservation Area was used to inform specific survey timing – confirmed to be in peak flower at time of surveys. **Surveys meet the minimum requirements.**

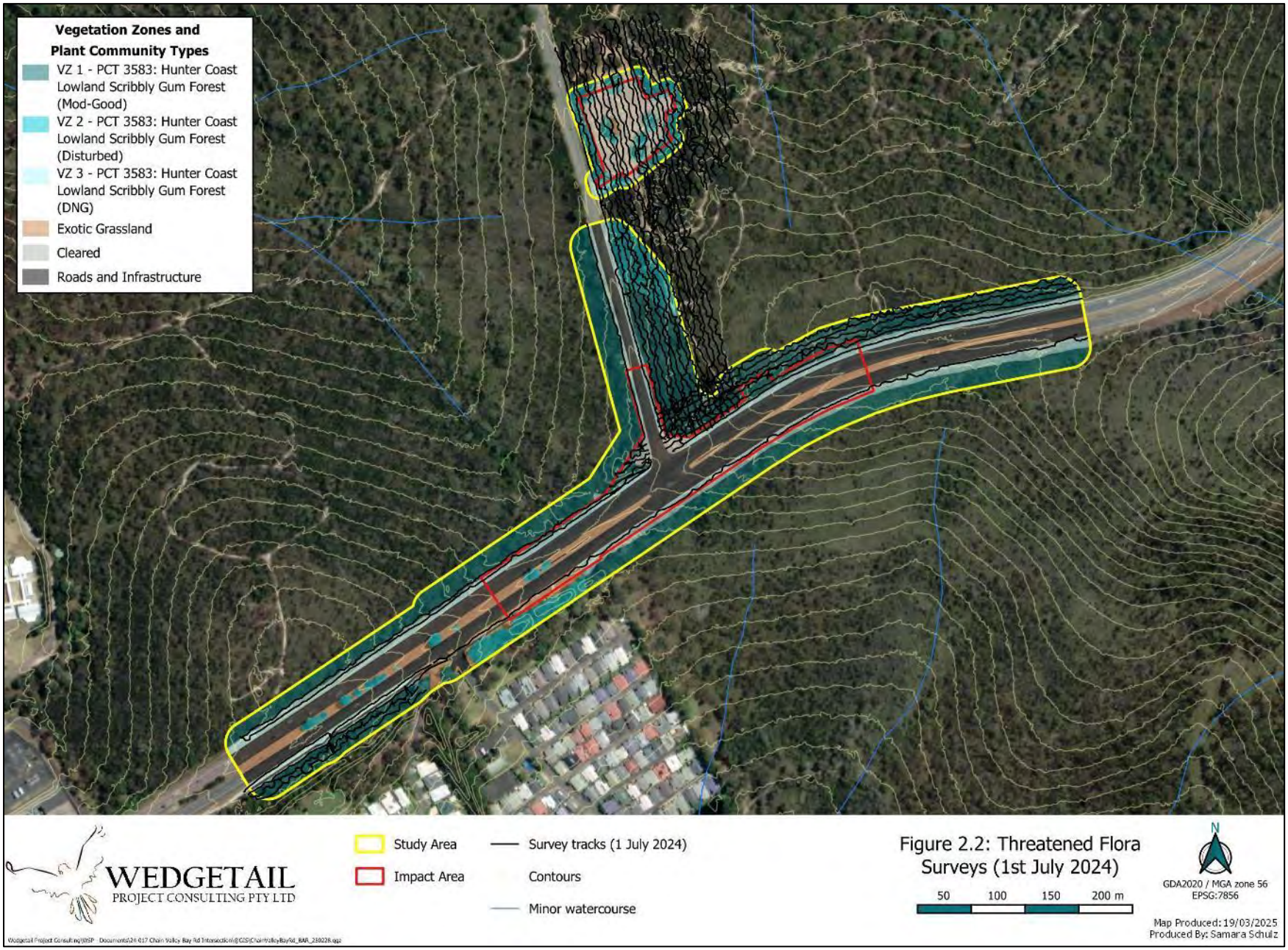

Figure 2-2: Threatened Flora Surveys (1 July 2024)

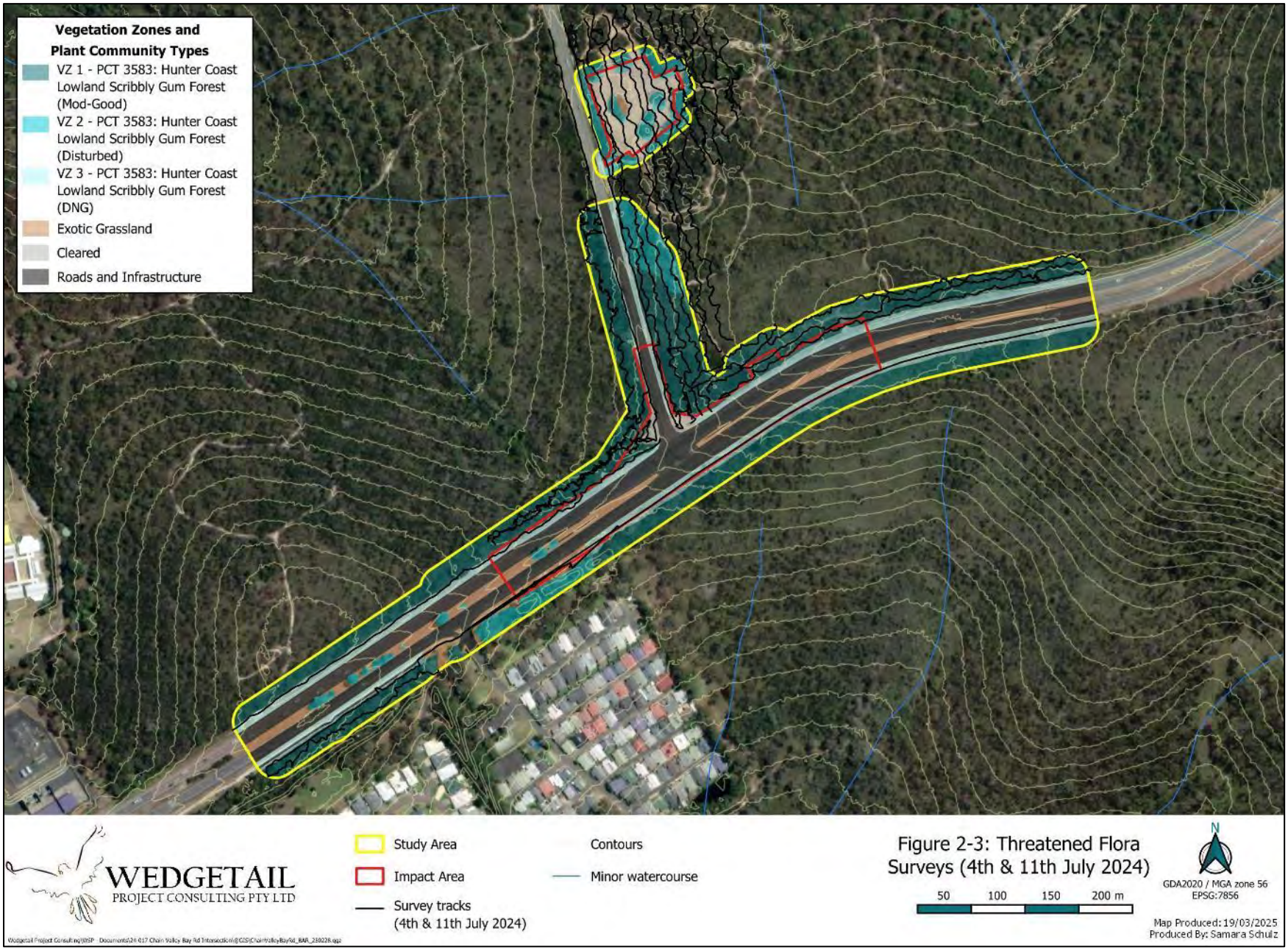

Figure 2-3: Threatened Flora Surveys (4 & 11 July 2024)

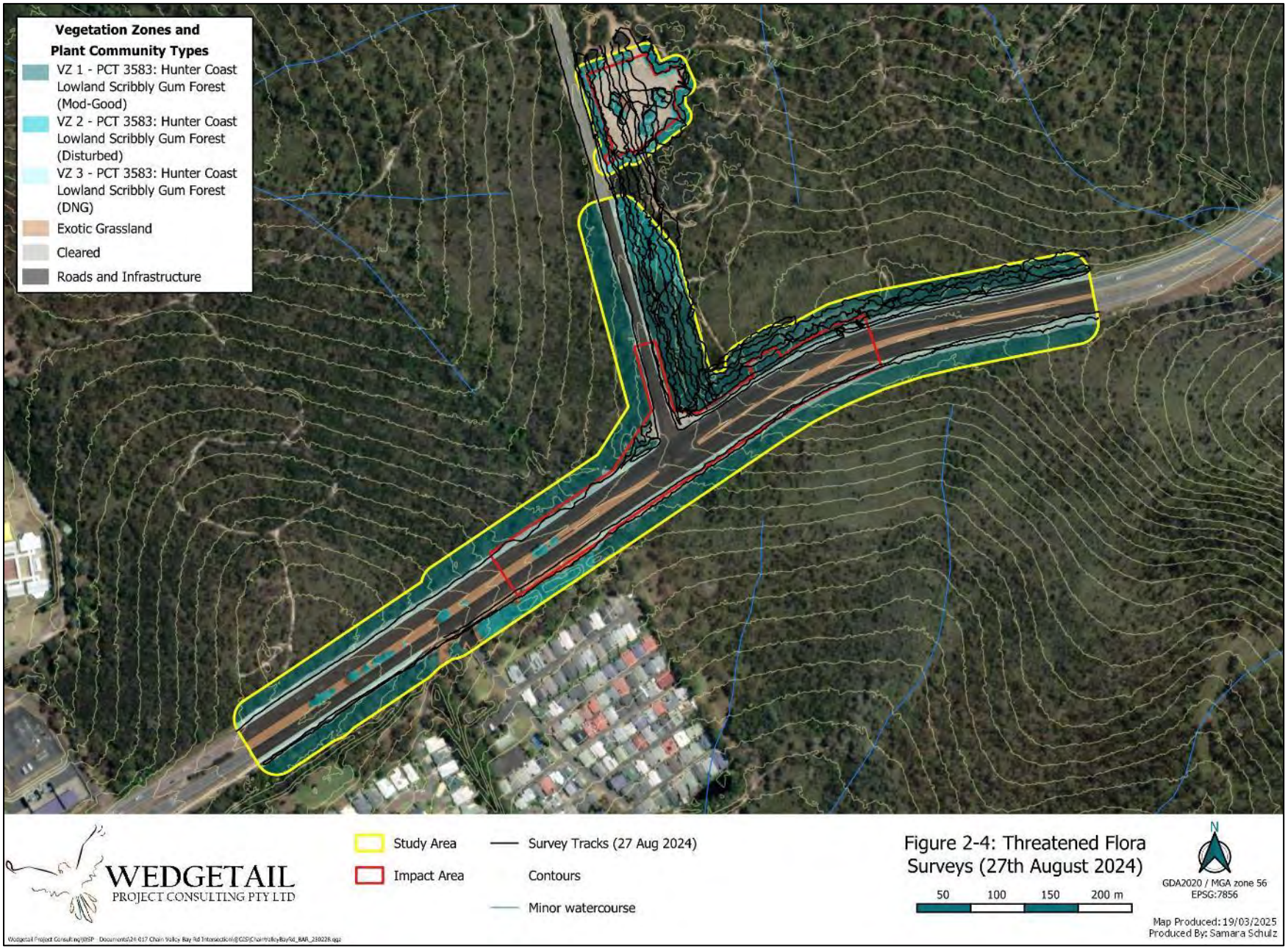

Figure 2-4: Threatened Flora Surveys (27 August 2024)

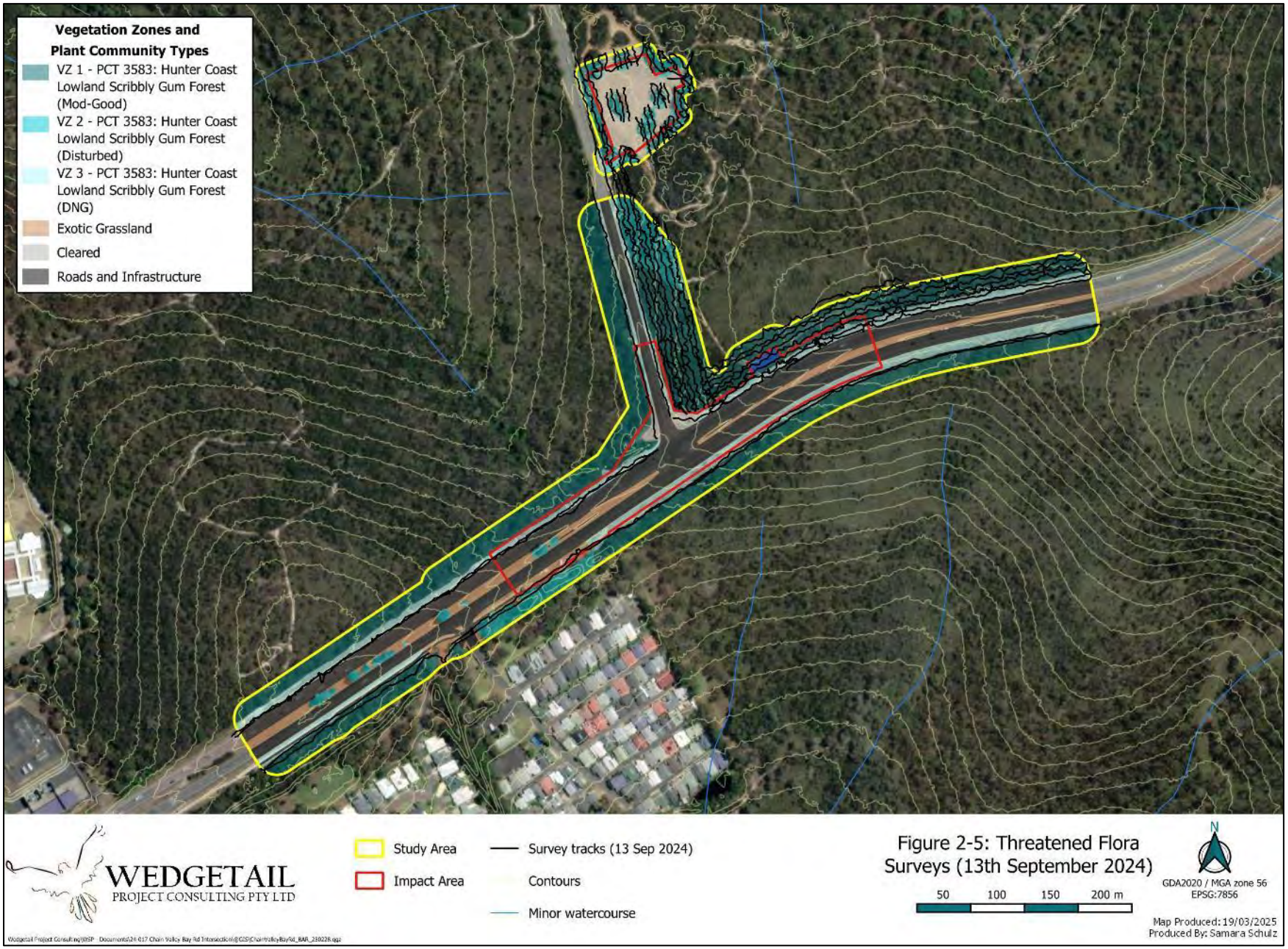

Figure 2-5: Threatened Flora Surveys (13 September 2024)

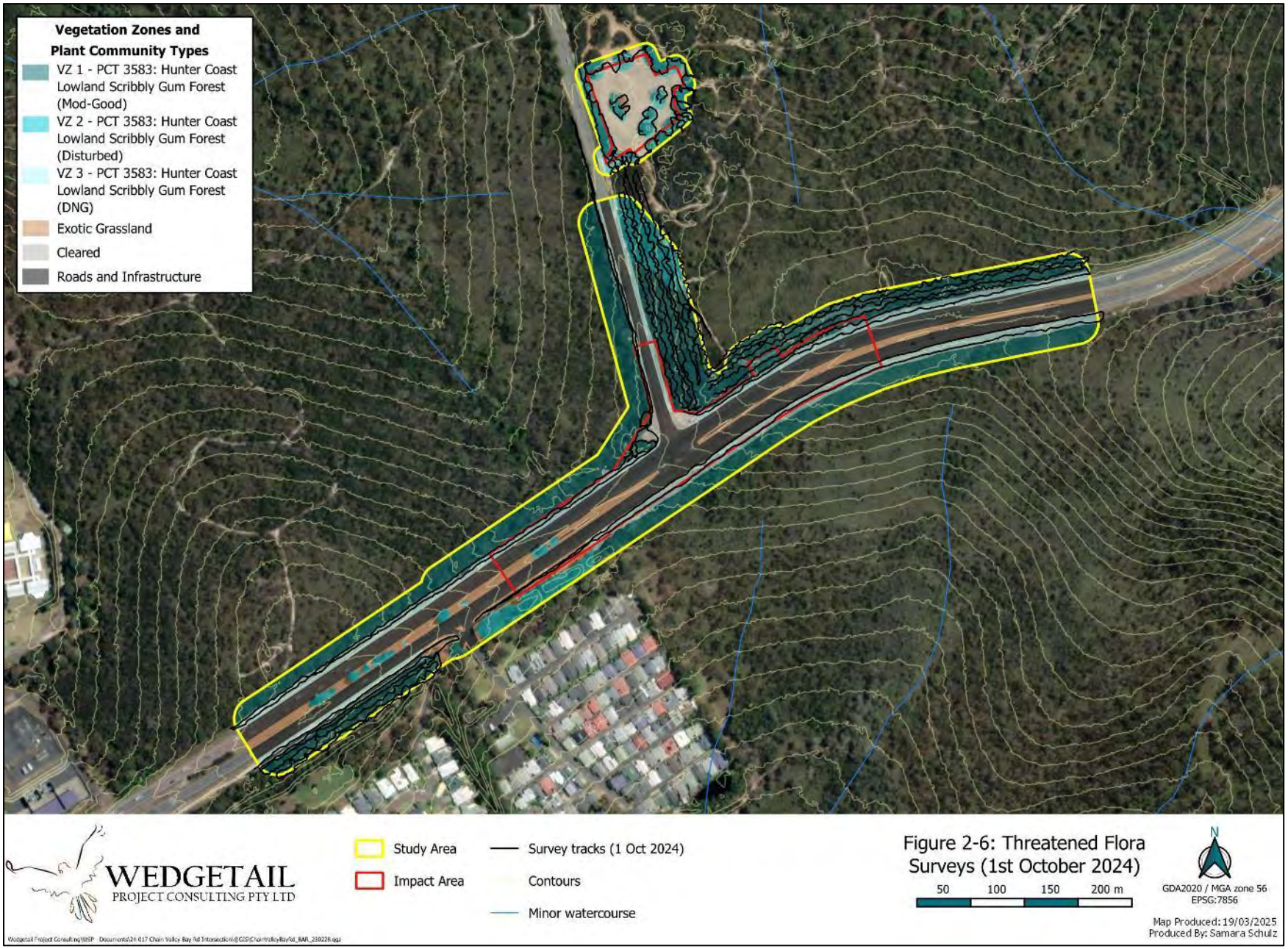

Figure 2-6: Threatened Flora Surveys (1 October 2024)

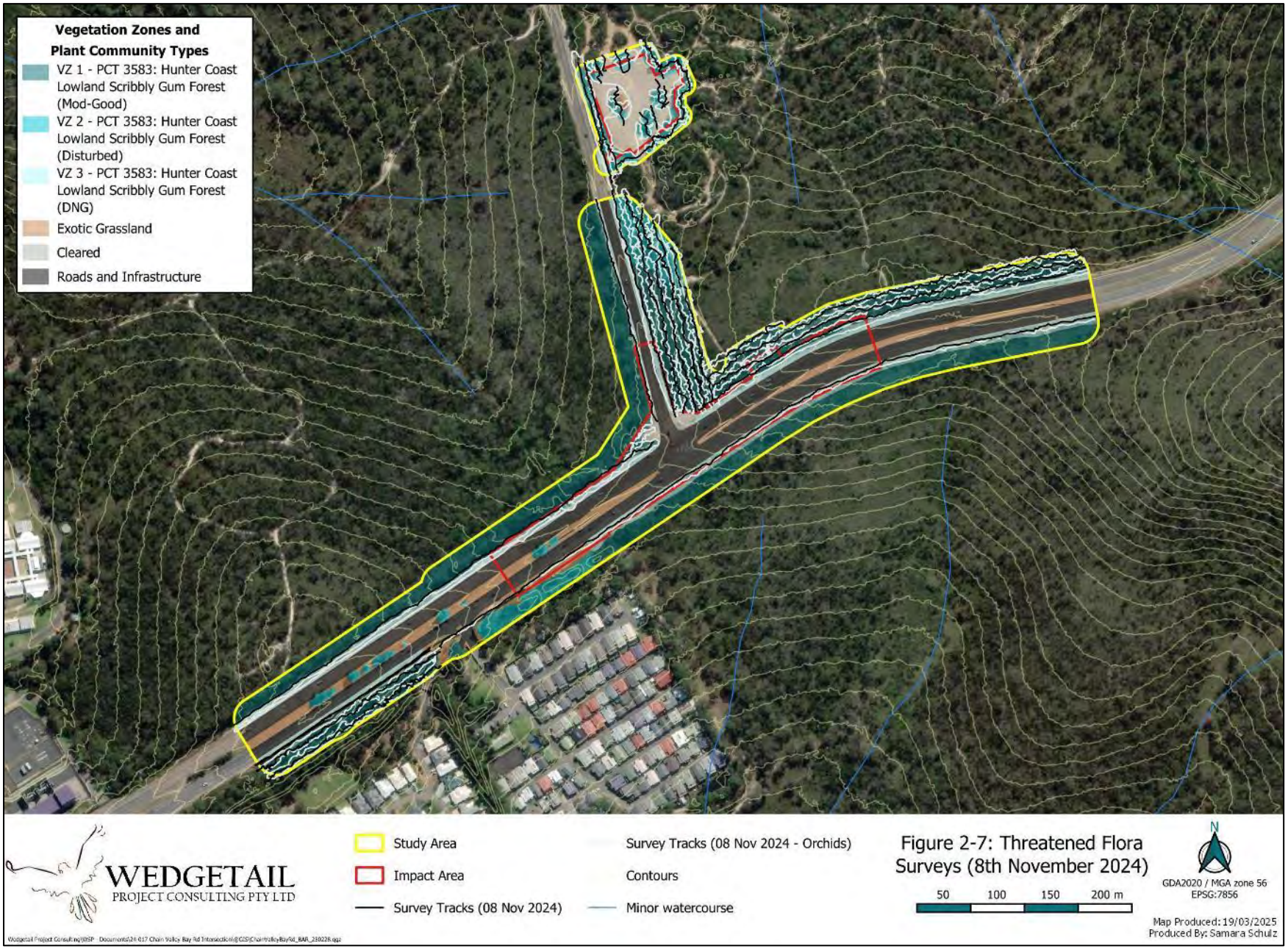

Figure 2-7: Threatened Flora Surveys (8 November 2024)

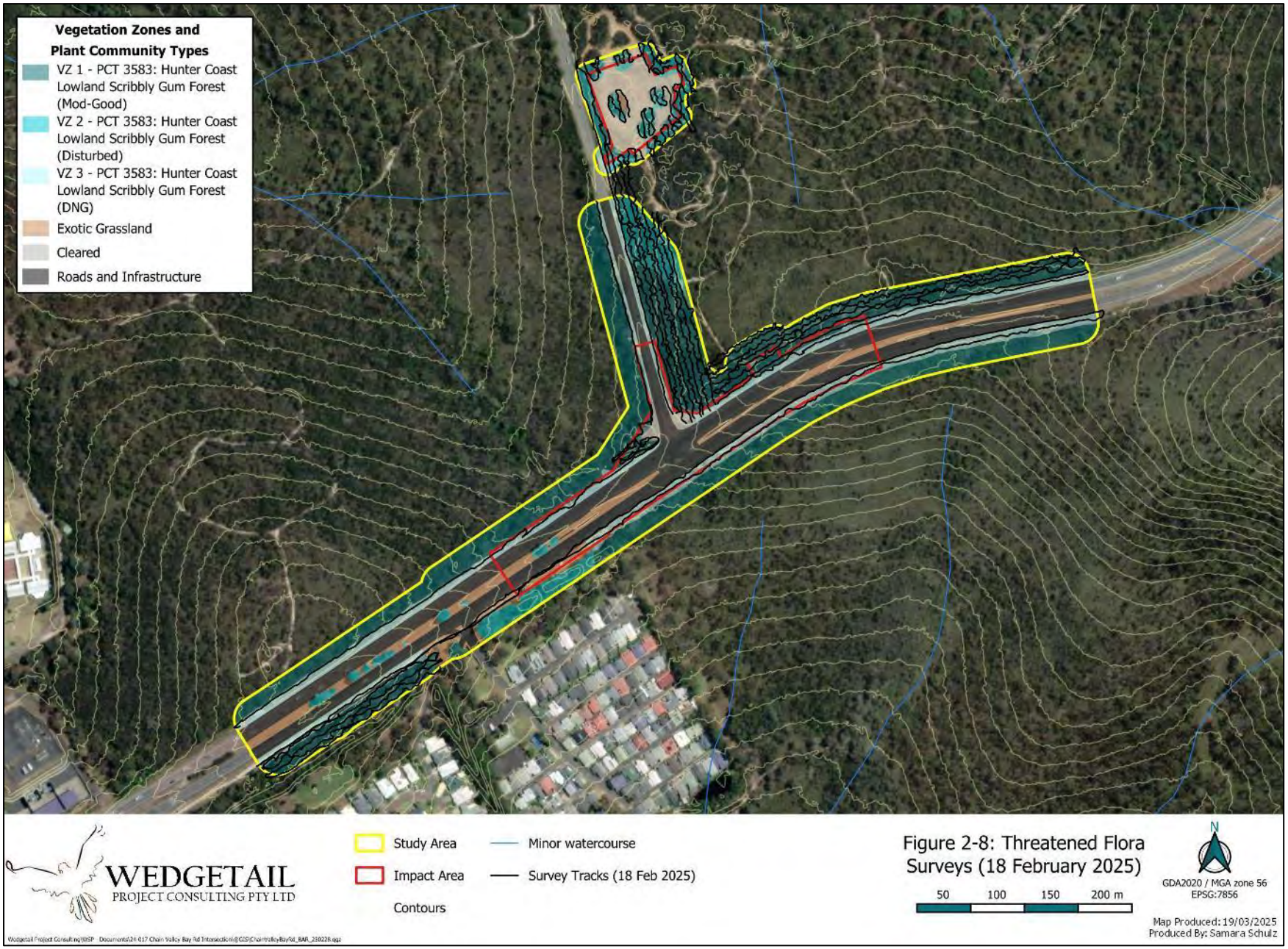

Figure 2-8: Threatened Flora Surveys (18 February 2025)

2.4.3 Targeted fauna surveys

No targeted threatened fauna surveys were undertaken. Fauna habitat assessments were undertaken across the study area including mapping any potential Hollow-bearing Trees, identifying water bodies, terrestrial refugia and a general assessment of vegetation condition and function, including; structural layers present, abundance of feed tree species, vegetation age and disturbances.

2.5 Limitations

It is important to note that field survey data collected during the survey period is representative of species occurring within the impact area at that time of survey. Due to effects of fire, breeding cycles, migratory patterns, camouflage, weather conditions, time of day, visibility, predatory and / or feeding patterns, increased species frequency or richness may be observed within the impact area outside the nominated survey period. Habitat assessments based on the identification of micro-habitat features for various species of interest, including regionally significant and threatened species, have been used to minimise the implications of this survey limitation.

Flora survey limitations

The species list does not include all household or exotic garden and landscaping species and those species which could not be identified at the time of the survey past genus level. Cryptic common species not flowering at the time of the survey may not be observed during survey outside of peak flowering periods.

Fauna survey limitations

Due to the small area of impact due to the proposal and already disturbed nature of the vegetation, no targeted fauna surveys were undertaken as part of the assessment. As such, assessments of significance (BC Act and/or EPBC Act) were undertaken for all fauna species assessed as having a moderate to high likelihood of occurrence within the study area.

3. Existing environment

Table 3-1 provides the environmental context of the study area, including the abiotic and biotic features of the landscape.

Table 3-1: Site features

IBRA Region & Sub-region	Sydney Basin IBRA Region Wyong IBRA sub-region
Mitchell Landscape	Gosford – Cooranbong Coastal Slopes
Elevation	20-30 metres ASL
Topography	Gently undulating rises with local relief to 30 metres and slope gradients <10%. Broad crests, ridges and gently inclined slopes, with rock outcrops typically absent.
Geology and soils	Geology: Munmorah Conglomerate, part of the Clifton Subgroup of the Narrabeen Group, consisting of conglomerate, pebbly sandstone, grey green and grey siltstone and claystone of Early Triassic-Late Permian age. Some small areas of Moon Island Beach subgroup, part of the Newcastle Coal Measures occur, dominated by polymictic conglomerate, sandstone and shales. Coarse quartz sandstone at the base of the Tuggerah Formation may have been included. Soil landscapes: Doyalson (moderately deep (50-100cm) Yellow Earths, Yellow Podzolic Soils and Sloths occur on sandstones and conglomerates; moderately deep Yellow Podzolic Soils, Soloths and some Red Podzolic Soils occur on fine-grained siltstones and claystone; moderately deep to deep (100–>150 cm) Yellow Leached Earths, Grey Earths, Soloths and Gleyed Podzolic Soils occur along drainage lines).
Catchment, drainage and stream order	The northwest and northeast portions of the study area drain into several adjacent unnamed first order creeks, which then flow into Karignan Creek. Karignan Creek then flows into Chain Valley Bay, in Lake Macquarie. The southern portion of the site similarly drains into several adjacent unnamed first order creeks, which then flow into Bears Creek. Bears Creek then flows into Elizabeth Bay, in Lake Munmorah.
Existing land use (within and adjoining study area)	Within the study area the existing land use is primarily the Pacific Highway Road Reserve, and the Chain Valley Bay Road Reserve containing existing roads and associated infrastructure. The northern side of the Pacific Highway contains native vegetation. With the north-east portion (Lot 100 DP 1044282) owned by Darkinjung Local Aboriginal Land Council, and the north-west portion is private property. The southern side of the Pacific Highway contains a mixture of native vegetation, with Munmorah Stage Conservation Area (SCA) in the east. In the south-west, managed vegetation borders the study area with private residential dwellings (within Lake Munmorah) and the Park Trees Village retirement community occurring adjacent to the study area.
Historic Land Use	The study area has been utilised as the Pacific Highway Road Easement from at least 1931, when the Pacific Highway between Newcastle and Gosford was completed. Historical imagery also shows that Chain Valley Bay Road has been present since at least 1965 (earliest aerial imagery). There is also evidence of other disturbances in the study area and adjacent land in the 1964 imagery, including a dwelling and cleared yard (possibly horse yard; approximately in the area of the proposed construction footprint), slashing and under scrubbing, and various tracks across the study area. Based on historical imagery the following other major disturbances have occurred in the study area: • In approximately 1975 there was clearing for a large easement (likely for the powerline easement within the study area) along the northern side of the Pacific Highway. • By 1983 the Pacific Highway has been duplicated, and there is also evidence of vegetation management and tracks in the study area. • In 1989, the clearing in the north of the study area was still bare, containing only patchy vegetation, and there were a number of tracks in the surrounding area. On the southern side of the Pacific Highway, there was a single residential dwelling. • In 1993, there was rural residential development and some smaller lot residential development occurring to the south of the Pacific Highway (western portion of the study area). The bare area in the north was still cleared of vegetation and there is evidence of other vegetation management within the study area. • In the early 2000s, the residential developments to the south of the study area became denser. There is some regeneration of vegetation within the bare area in the north of the study area.

3.1 Plant community types and vegetation zones

Table 3-2 details the PCT identified within both the impact area and broader study area being assessed for indirect impacts. A description of the PCT identified is provided in the following sections. Figure 3-1 shows the native vegetation extent within the impact area and broader study area.

Table 3-2: Plant community types and vegetation zones including patch size and vegetation integrity (VI) score

Veg. zone	Plant community type (PCT)	Threatened ecological community	Area (ha)		Patch size class	VI score
			Impact area	study area		
Zone 1	PCT 3583: Hunter Coast Lowland Scribbly Gum Forest (Moderate-good)	Not a TEC	0.19		>100 ha	47.7
Zone 2	PCT 3583: Hunter Coast Lowland Scribbly Gum Forest (Disturbed)	Not a TEC	0.18		>100 ha	-
Zone 3	PCT 3583: Hunter Coast Lowland Scribbly Gum Forest (Grassland)	Not a TEC	0.47		>100 ha	-
-	Exotic Grassland	-	0.27			

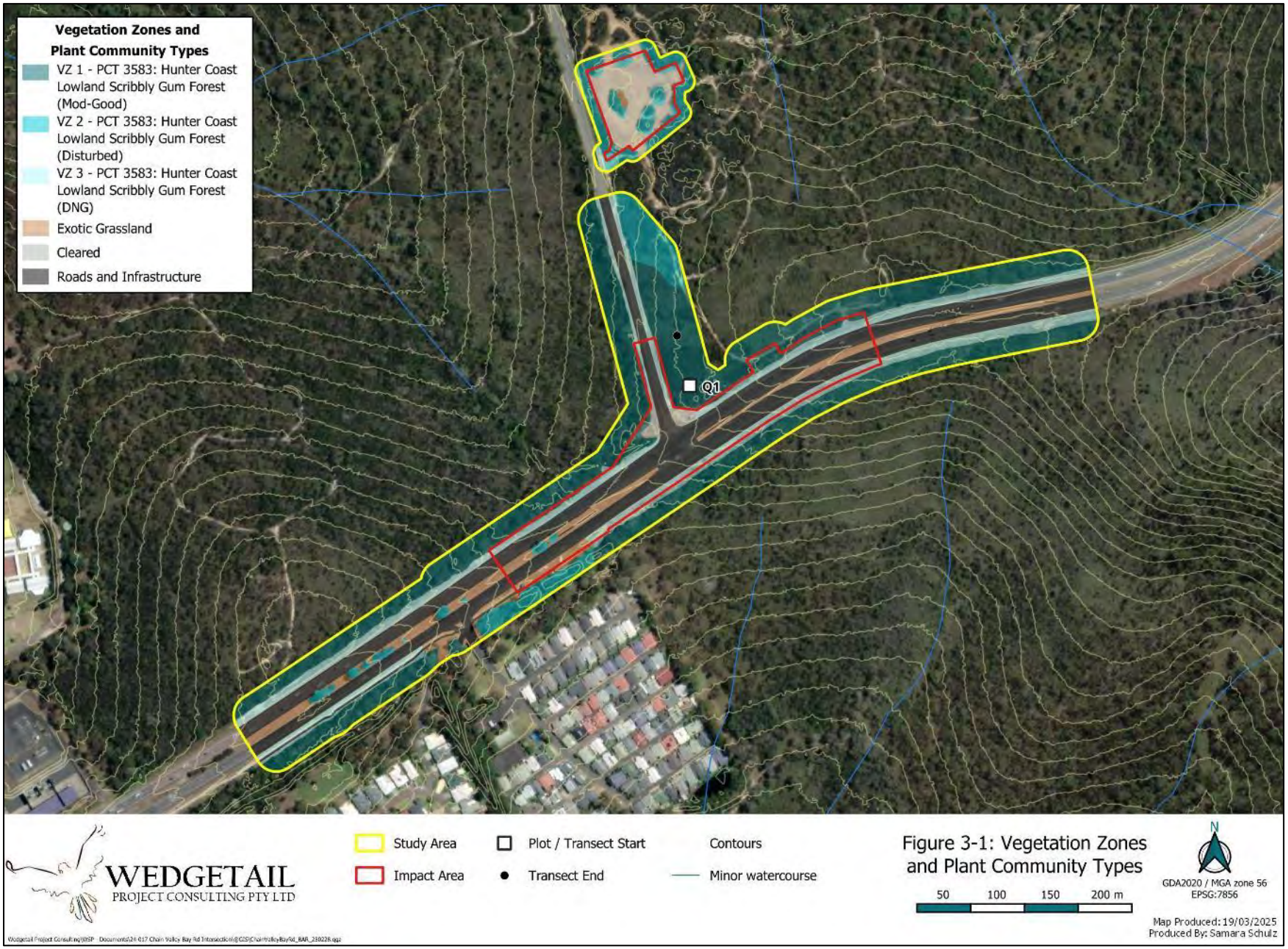

Figure 3-1: Vegetation zones & Plant Community Types

PCT 3583: Hunter Coast Lowland Scribbly Gum Forest

Description

This community occurs across both Northern and Southern portions of the study area, extending either side of Chain Valley Bay Rd and the Pacific Highway A43. The community is dominated by Corymbia gummifera (Red Bloodwood), with Eucalyptus haemastoma (Scribbly Gum) and Angophora costata (Smooth-barked Apple) also occurring. The understorey is dominated by a dense shrub layer including Allocasuarina littoralis, Banksia oblongifolia and Lambertia formosa, with dominant ground cover species including Entolasia stricta and Ptilothrix deusta. This community aligns with the Sydney Coastal Dry Sclerophyll Forests vegetation class.

Table 3-3: PCT 3583 (Zones 1-3) summary

PCT ID	Zone 1, 2 and 3
PCT name	3583
Vegetation class	Sydney Coastal Dry Sclerophyll Forests
Vegetation formation	Dry Sclerophyll Forests (Shrubby sub-formation)
Estimate of per cent cleared	64%
Area in impact area	0.84 ha
Conservation status	Not a TEC
Vegetation zones (condition) and plots	Zone 1 (Moderate-good) – Plots Q01 Zone 2 (Disturbed) Zone 3 (Grassland)

Justification for PCT selection:

Evidence used to identify the PCTs within the impact area: PCTs were filtered for dominant canopy trees, namely *Corymbia gummifera*, *Eucalyptus haemastoma*, *Allocasuarina littoralis* and *Angophora Costata*. PCTs were further filtered by IBRA sub-region of Wyong, and vegetation communities of Sydney Coastal Dry Sclerophyll Forests and Sydney Coastal Heaths. This produced a shortlist of 8 PCTS:

- PCT 3581 Hunter Coast Foothills Apple Forest
- PCT3582 Hunter Coast Lowland Apple-Bloodwood Forest
- PCT 3583 Hunter Coast Lowland Scribbly Gum Forest
- PCT 3586 Northern Sydney Scribbly Gum Woodland
- PCT 3592 Sydney Coastal Enriched Sandstone Forest
- PCT 3593 Sydney Coastal Sandstone Bloodwood Shrub Forest
- PCT 3595 Sydney Coastal Sandstone Gully Forest
- PCT 3807 Northern Sydney Heath-Mallee

PCT 3581 was excluded as occurs on hills and dominant groundcover species did not include *Ptilophrix deusta* which was prominent in the study area. Further PCTs and reasons excluded include: PCT 3586 as minimum elevation was greater than study area elevation; PCT 3592 as unlike the study area this community occurs on sheltered slopes and has *Dianella caerulea* almost always present; PCT 3593 rarely has *Angophora costata* present yet this species was frequently observed within the study area; PCT 3595 which occurs within Hawkesbury sandstone gullies and at higher elevations of 40-410 metres above sea level (ASL); and PCT 3807 which occurs on exposed skeletal sandstone on narrow ridges, rocky outcrops and pavements, and does not have *Allocasuarina littoralis*, whilst this species was frequently observed within the study area. PCT 3582 presented a strong floristic and structural match yet occurs at a greater elevation range of below 200 metres ASL, so was excluded in favour of PCT 3583 which provided an even more accurate match overall.

PCT 3583 represented a strong floristic and structural match with the study area, based on BAM plot and vegetation mapping comparisions. This PCT occurs at elevations between 10-80 metres ASL which matches elevation of site (20-30 metres ASL). The vegetation community on site was observed to be a mid-high heathy sclerophyll woodland, occurring on sandy-clay soils, which aligns with the PCT description. The site has tessellated patches of impeded wet heath where canopy trees are more sparse, which also matches the PCT description: "*E. haemastoma* may be absent from the tree canopy, however [the PCT] still retains the gramminoid clay heath understory that characterises the assemblage". The vegetation formation for PCT is Dry Sclerophyll Forests (Shrubby sub-formation), the Vegetation Class is Sydney Coastal Dry Sclerophyll Forests, occurring in the Wyong IBRA sub-region and Central Coast and Lake Macquarie LGAs. The understory species observed on site include *Ptilothrix deusta* and *Entolasia strica*, which match with the PCT description. Table 3-4 provides a floristic and structural summary of PCT 3583 within the study area.

Table 3-4: Floristic and structural summary of PCT 3583 within the study area

Growth form	Typical species
Trees	*Corymbia gummifera, Eucalyptus haemastoma, Allocasuarina littoralis, Angophora costata, Glochidion ferdinandi,* and *Melaleuca quinquenervia.*
Shrubs	Dense and varied shrubs observed including *Dodonaea triquetra, Banksia oblongifolia, Callistemon linearis, Hakea sericea, Hakea teretifolia, Leptospermum juniperinum, Leptospermum polygalifolium, Lambertia formosa, Isopogon anethifolius, Melaleuca nodosa,* and *Persoonia levis.*
Grass and grass-like	*Entolasia stricta* and *Ptilothrix deusta* dominant.
Forb	*Actinotus minor, Lobelia purpurascens, Patersonia glabrata* and *Dichondra repens.*
Fern	*Pteridium* spp.
Other	*Cassytha pubescens, Parsonsia straminea* and *Xanthorrhoea latifolia.*
Exotic	-
High Threat Exotic	*Andropogon virginicus* and *Hyparrhenia hirta*

Condition states

Three condition classes were identified within the impact area:

- Moderate-good (vegetation zone 1) – this condition class includes relatively intact areas containing a native vegetation and is located to the northwest, immediate northeast, and south of the Pacific Highway within the study area.
- Disturbed (vegetation zone 2) – this condition class includes vegetation of slightly different composition due to historical disturbance. There was also evidence of disturbance in ground, with visible soil mounds from previous earthworks evident. This condition zone is located in the upper northeast corner of the study area.
- Grassland (vegetation zone 3) – this condition class includes areas where vegetation has been cleared and/or has managed areas of native understorey, and is located along edges of road corridor immediately adjacent to Chain Valley Bay Road, and the Pacific Highway, right across the study area.

Photo 3-1: Plot Q01 showing vegetation zone 1 (PCT 3583 – moderate-good)

Photo 3-2: Photo showing vegetation zone 2 (PCT 3583 – disturbed)

Photo 3-3: Photo showing vegetation zone 3 (PCT 3583 – derived native grassland)

3.2 Threatened ecological communities

No threatened ecological communities (TECs) as listed under the BC Act were observed within the impact area following assessment of vegetation communities present.

3.3 Groundwater dependent ecosystems

Groundwater dependent ecosystems (GDEs) are communities of plants, animals and other organisms whose extent and life processes are dependent on groundwater. Some examples of ecosystems which depend on groundwater are:

- wetlands
- red gum forests, vegetation on coastal sand dunes and other terrestrial vegetation
- ecosystems in streams fed by groundwater
- limestone cave systems
- springs
- hanging valleys and swamps.

GDEs are therefore ecosystems which have their species composition and their natural ecological processes determined by groundwater (NSW State Groundwater Dependent Ecosystems Policy April 2002). The Groundwater Dependent Ecosystems Atlas predicts that there are moderate potential GDEs within and nearby the Impact area.

However, PCT 3583 Hunter Coast Lowland Scribbly Gum Forest, which is the PCT covering extant vegetation within the study area, does not fit the definition of a GDE as per the above. Thus, it is considered that there are no GDE within the study area.

3.4 Threatened species

Generally, threatened species habitat within the Impact Area is degraded due to historical clearing and disturbance. The vegetation consists of disturbed regenerating vegetation that lacks a mature canopy layer and grassland vegetation. Higher quality vegetation, with a more intact understorey and canopy layer occurs within the study area and in the vegetation surrounding the study area.

An assessment of fauna habitat identified that the Impact Area and study area contain areas of dense vegetation in the understorey, and some key foraging species (e.g. *Allocasuarina littoralis*). However, no large trees, hollow-bearing trees or ground logs were identified within the study area. Some small water bodies (constructed dams or drainage swales) occur within the study area, including one within the laydown area in the north, and another along the northern edge of Pacific Highway). These waterbodies are ephemeral and likely only provide opportunistic habitat.

One threatened flora species, *Tetratheca juncea* (Black-eyed Susan) listed as Vulnerable under the BC Act and the EPBC Act was identified within the study area (outside the Impact Area; Figure 3-3). The results of the targeted flora surveys conducted within the study area are outlined in Table 3-5.

No threatened fauna surveys were undertaken as part of the assessment. Those species assumed present due to moderate or high likelihood of occurrence are detailed in Table 3-5.

Table 3-5: Threatened species surveys results

Species name	EPBC Act	BC Act	Identification method (not recorded, assumed, recorded, expert report)	Survey effort compliant?[1]	Results
Flora Species					
Acacia bynoeana (Bynoe's Wattle)	V	E	Not recorded	Yes	Species Credit Species. Survey conducted and no individuals identified on-site. Surveys were compliant with guidelines. Species associated with the PCT & suitable habitat present within the study area. All records of this species within the locality > 10 years old. Habitat within the study area not
Callistemon linearifolius Netted Bottlebrush)	-	V	Not recorded	Yes	Species Credit species. Surveys completed, compliant with guidelines and no individuals were identified on-site. Species associated with the PCT & suitable habitat present within the study area. Some records in the locality < 10 years old.
Grevillea parviflora subsp. *parviflora* (Small-flowered Grevillea)	V	V	Not recorded	Yes	Species Credit species. Surveys completed and no individuals identified on-site. Species associated with the PCT & suitable habitat present within the study area. Recent (<10 years) records of the species occur within the locality.
Cryptostylis hunteriana (Leafless Tongue Orchid)	V	V	Not recorded	Yes	Species Credit species. Surveys completed and no individuals were identified on-site. Surveys were undertaken within the flowering period for the species and were compliant with guidelines. Species associated with the PCT & suitable habitat present within the study area. Recent (<10 years) records of the species in the locality.

Species name	EPBC Act	BC Act	Identification method (not recorded, assumed, recorded, expert report)	Survey effort compliant?[1]	Results
Corunastylis sp. Charmhaven (recently described as *Genoplesium branwhiteorum*)	CE	CE	Not recorded	Yes	Species Credit Species. Species associated with the PCT & suitable habitat present within the study area. Recent (<10 years) records of the species in the locality.
Tetratheca juncea (Black-eyed Susan)	V	V	Recorded	Yes	Species Credit Species. A total of 16 individuals were identified within the study area, outside the Impact Area (Figure 3-3). A total of 0.36 ha of suitable habitat is present for this species within the impact area. This includes linked PCT 3583 in mod-good and disturbed condition. As the species was not recorded within the Impact Area, a Species Polygon was not generated.
Fauna Species					
Crinia tinnula (Wallum Froglet)	-	V	Assumed present	No	Species Credit Species. Assumed present. Five small waterbodies present within the study area. Species polygon generated as per TBDC through applying a 50 metre buffer over all associated PCTs. PCT 3583 is associated within the species, and there is a total of 0.10 ha within the Species polygon (Figure 3-4).
Artamus cyanopterus cyanopterus (Dusky Woodswallow)	-	V	Assumed present	Yes	Ecosystem Credit Species. Assumed present. Foraging habitat is covered through Ecosystem Credits for PCT3583.
Calyptorhynchus lathami lathami (South-eastern Glossy Black-Cockatoo)	V	V	Assumed present (Foraging habitat only)	No	Species/Ecosystem Credit Species. No breeding habitat was identified on-site. Therefore, no species polygon generated. A total of 0.36 ha of potential foraging habitat is present for this species within the impact area. This includes linked PCT 3583 in mod-good and disturbed condition.
Daphoenositta chrysoptera (Varied Sittella)	-	V	Assumed present	Yes	Ecosystem Credit Species. Assumed present. Foraging habitat is covered through Ecosystem Credits for PCT3583.
Glossopsitta pusilla (Little Lorikeet)	-	V	Assumed present	Yes	Ecosystem Credit Species. Assumed present. Foraging habitat is covered through Ecosystem Credits for PCT3583.
Hirundapus caudacutus	V, M	V	Assumed present	Yes	Ecosystem Credit Species.

Species name	EPBC Act	BC Act	Identification method (not recorded, assumed, recorded, expert report)	Survey effort compliant?[1]	Results
(White-throated Needletail)					Assumed present. Foraging habitat is covered through Ecosystem Credits for PCT3583.
Lathamus discolor (Swift Parrot)	CE	E	Assumed present (Foraging habitat only)	Yes	Species/Ecosystem Credit Species. Assumed present. An area of important habitat mapping occurs within the study area. The species polygon covers important habitat mapping occurring, which equals 0.08 ha (Figure 3-5).
Lophoictinia isura (Square-tailed Kite)	-	V	Assumed present (Foraging habitat only)	No	Species/Ecosystem Credit Species No nest trees identified on-site. Therefore, no species polygon generated. 0.84 ha of potential foraging habitat present within the impact area including PCT 3583 in mod-good, disturbed and DNG condition.
Ninox connivens (Barking Owl)	-	V	Assumed present	No	Species Credit No hollows identified on-site. Therefore, no species polygon generated. 0.84 ha of potential foraging habitat present within the impact area. Linked PCT present on site (PCT 3583), and suitable habitat includes this PCT in all condition types.
Ninox strenua (Powerful Owl)	-	V	Assumed present	No	Species Credit No hollows identified on-site. Therefore, no species polygon generated. 0.36 ha of potential foraging habitat present within the impact area. Linked PCT present on site (PCT 3583), and suitable habitat includes this PCT in mod-good and disturbed condition.
Tyto novaehollandiae (Masked Owl)	-	V	Assumed present	Yes	Species Credit Species. No hollows identified on-site. Therefore, no species polygon generated. Suitable foraging habitat within the study area 0.84 ha. No suitable nest trees identified. Multiple recent BioNet records of the species in the locality. Linked PCT present on site (PCT 3583), and suitable habitat includes this PCT in all condition types.
Tyto tenebricosa (Sooty Owl)	-	v	Assumed present	No	Species Credit Species. Assumed present. No hollows identified within the study area. Species polygon of 0.36 ha due to suitable foraging habitat in linked PCT3583 (Figure 3-6).
Cercartetus nanus (Eastern Pygmy-possum)	-	V	Assumed present	Yes	Species Credit No caves or culverts present within the survey area, therefore no breeding habitat present, and no species polygon generated.

Species name	EPBC Act	BC Act	Identification method (not recorded, assumed, recorded, expert report)	Survey effort compliant?[1]	Results
					0.84 ha of suitable foraging habitat occurs on-site, including PCT 3583 in all conditions.
Chalinolobus dwyeri (Large-eared Pied Bat)	E	E	Assumed present	Yes	Ecosystem Credit. No breeding habitat is present on-site, therefore 0.36 ha of potential foraging habitat is present.
Dasyurus maculatus (Spotted-tailed Quoll)	E	V	Assumed present	Yes	Ecosystem Credit Species. Assumed present. Foraging habitat is covered through Ecosystem Credits for PCT3583
Falsistrellus tasmaniensis (Eastern False Pipistrelle)	-	V	Assumed present	Yes	Ecosystem Credit Species. Assumed present. Foraging habitat is covered through Ecosystem Credits for PCT3583
Micronomus norfolkensis (Eastern Coastal Free-tailed Bat)	-	V	Assumed present (Foraging habitat only)	Yes	Species/Ecosystem Credit Species. Species assumed present. However, no breeding habitat features present (caves, tunnel, mine, culvert with BioNet record) therefore no species polygon generated. Foraging habitat is covered through Ecosystem Credits for PCT3583.
Miniopterus australis (Little Bent-winged Bat)	-	V	Assumed present (Foraging habitat only)	Yes	Species/Ecosystem Credit Species. Species assumed present. However, no breeding habitat features present, therefore no species polygon generated. Foraging habitat is covered through Ecosystem Credits for PCT3583.
Miniopterus orianae oceanensis (Large Bent-winged Bat)	-	V	Assumed present	Yes	Species Credit Species. Species assumed present. However, no waterbodies > 3 metres present on-site therefore no species polygon generated. This habitat feature is required for both breeding and foraging.
Myotis macropus (Southern Myotis)	-	V	Assumed present	No	Species Credit Species. Assumed Present. Species Polygon 0.36 ha. Linked PCT present on site (PCT 3583) in mod-good and disturbed condition (Figure 3-7). No suitable hollows were recorded within the impact area.
Petaurus norfolcensis (Squirrel Glider)	V	-	Assumed present	Yes	Species Credit Species. Assumed present. PCT 3583 in all condition types. 0.84 ha of suitable foraging habitat occurs on-site, including PCT 3583 in all conditions.
Pseudomys novaehollandiae (New Holland Mouse)	-	V	Assumed present	Yes	Ecosystem Credit Species. Assumed present. Foraging habitat is covered through Ecosystem Credits for PCT3583.

Species name	EPBC Act	BC Act	Identification method (not recorded, assumed, recorded, expert report)	Survey effort compliant?[1]	Results
Saccolaimus flaviventris (Yellow-bellied Sheathtail-bat)	-	V	Assumed present	Yes	Ecosystem Credit Species. Assumed present. Foraging habitat is covered through Ecosystem Credits for PCT3583.
Scoteanax rueppellii (Greater Broad-nosed Bat)	-	V	Assumed present	Yes	Species Credit Species. Species assumed present. However, no breeding habitat features present, therefore no species polygon generated. Foraging habitat is covered through Ecosystem Credits for PCT3583.
Note: 1. As identified in Section 2.4 of this BAR.					

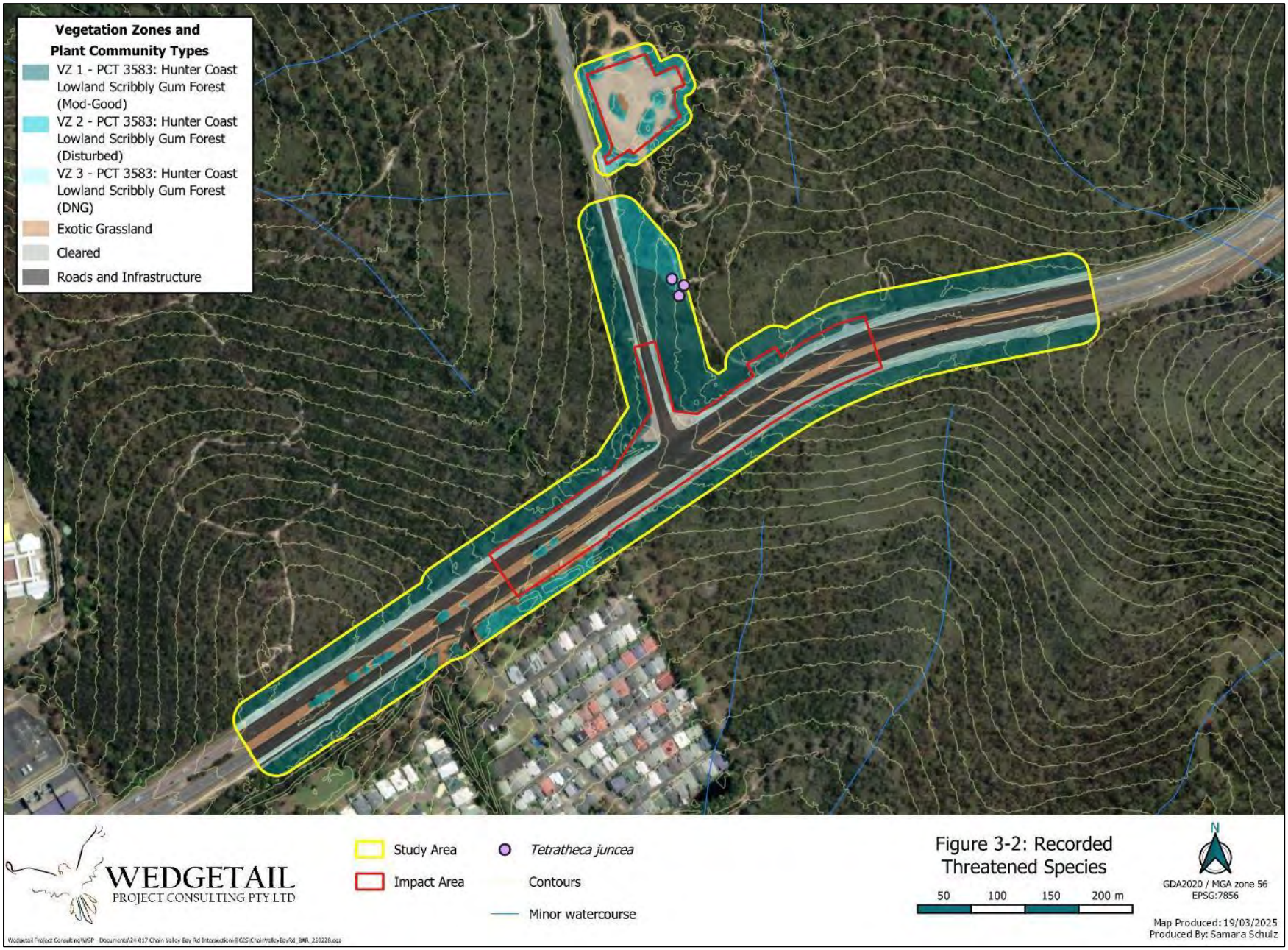

Figure 3-2: Recorded threatened species

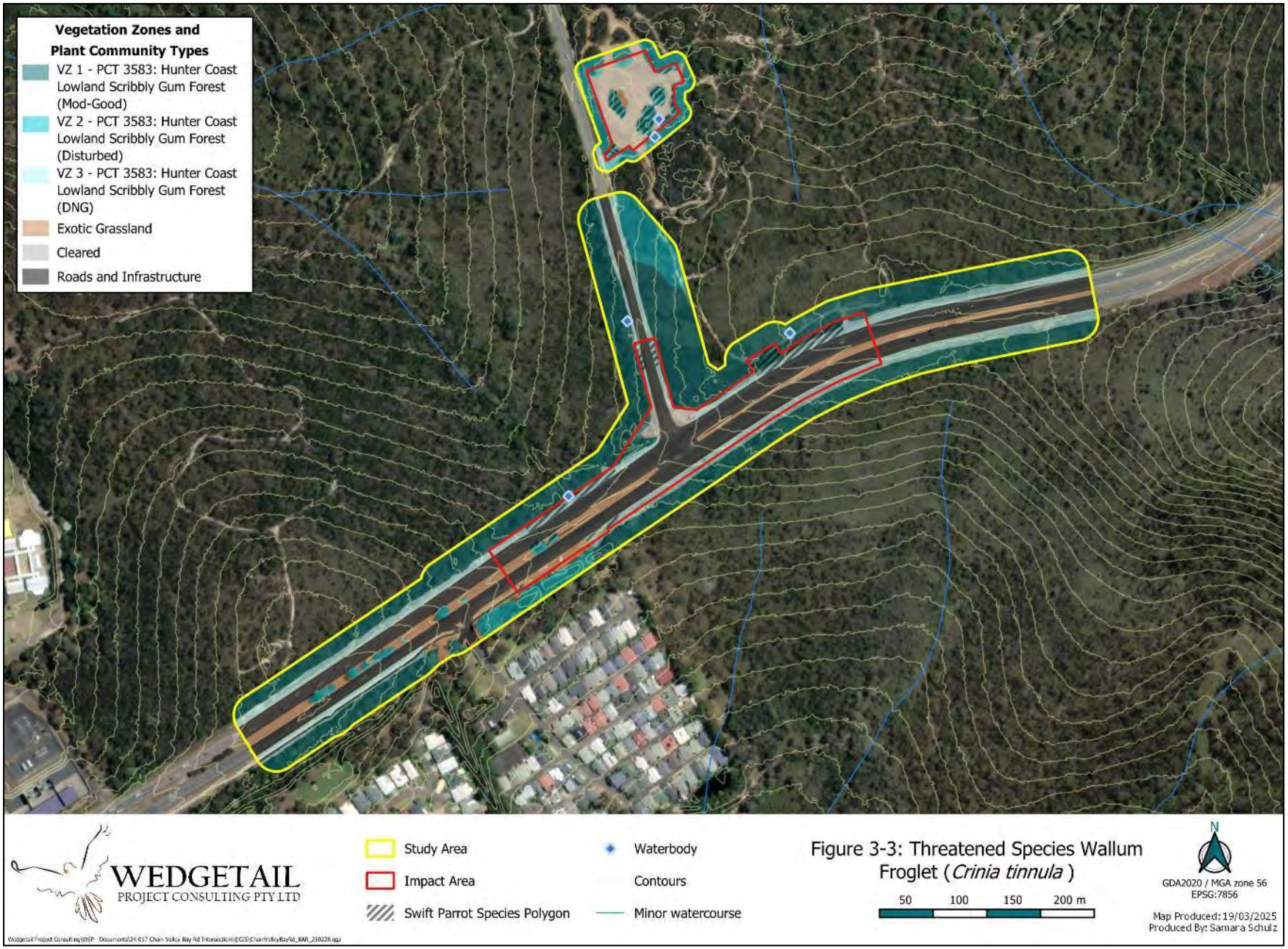

Figure 3-3: Species Polygon - Wallum Froglet

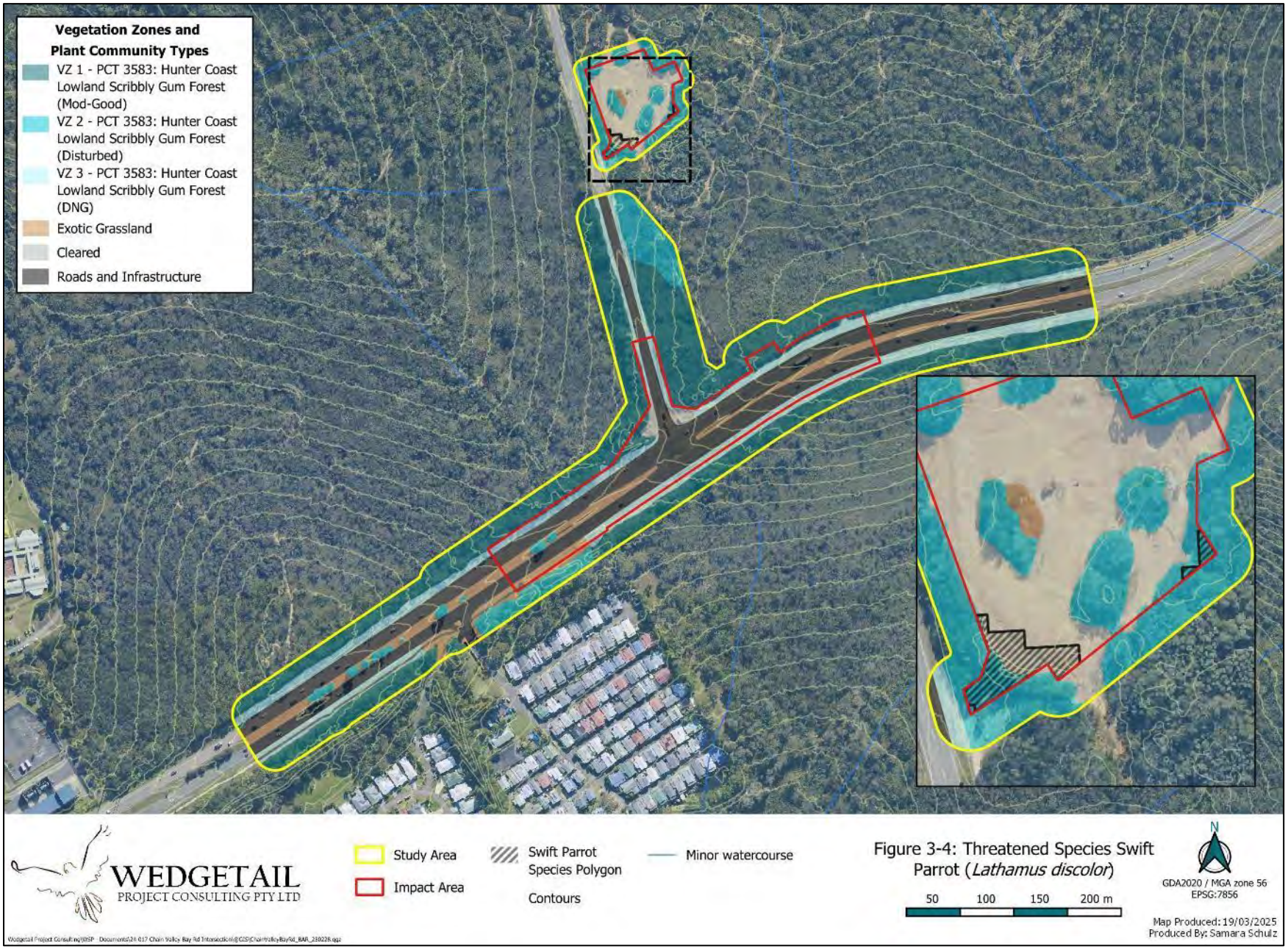

Figure 3-4: Species Polygon – Swift Parrot

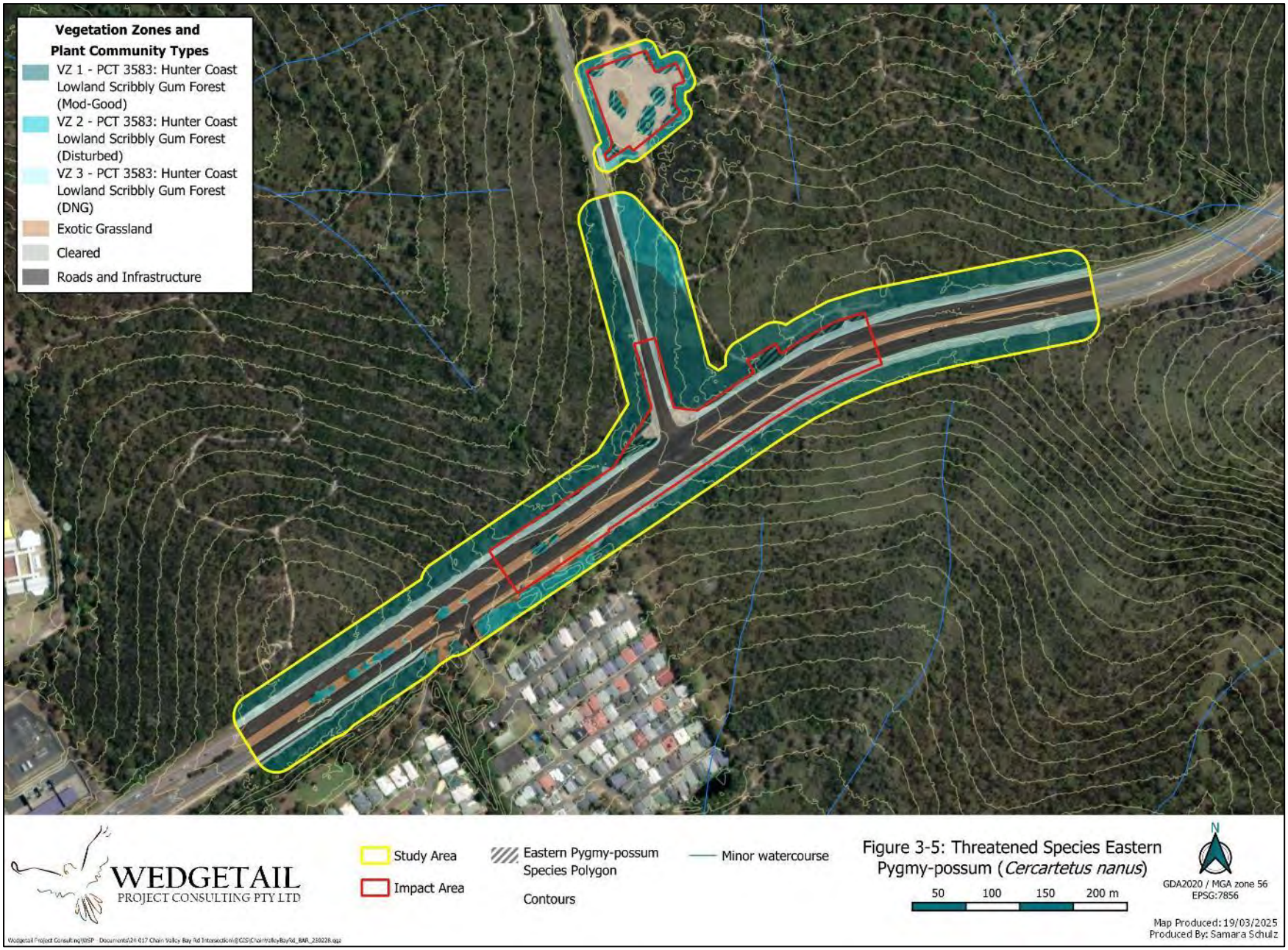

Figure 3-5: Species Polygon – Eastern Pygmy Possum

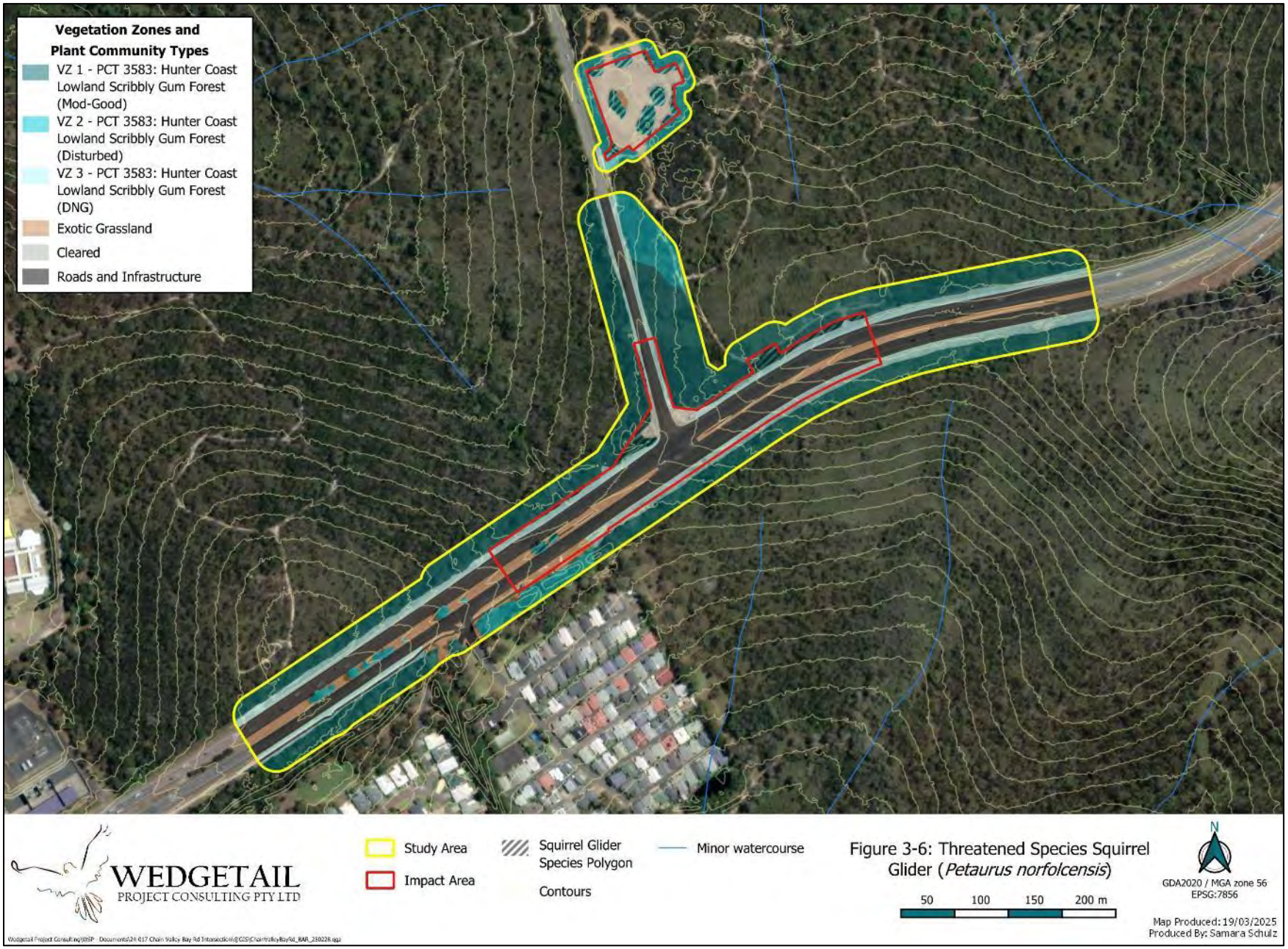

Figure 3-6: Species Polygon – Squirrel Glider

3.5 Areas of outstanding biodiversity value

No areas of outstanding biodiversity value occur within the study area.

3.6 Wildlife connectivity corridors

The North Wyong Shire Structure Plan (DPI 2012b) proposes a 'green corridor' running through the study area, connecting mountain areas in the west of the region to the ocean foreshore in the east, facilitating biodiversity connectivity and movement of wildlife. The moderate-good condition remnant native vegetation within the study area thus provides valuable links to the surrounding Lake Macquarie State Conservation Area in the north, and Munmorah State Conservation Area to the south. Connectivity is broken by roads including CVBR and the Pacific Highway. Given the small, proposed construction footprint, overall connectivity of the green corridor would not be significantly impacted by the proposal, with the majority of native vegetation occurring within the study area to be retained.

3.7 SEPPs (if applicable)

The study area does not constitute land mapped as Coastal Wetlands, Littoral Rainforest, or a Coastal Environment Area as defined by the State Environmental Planning Policy (Resilience and Hazards) 2022.

The State Environmental Planning Policy (Biodiversity and Conservation) 2021 – chapter 4 Koala Habitat Protection applies to land within LGAs listed under Schedule 2 of the Policy. The study area falls within the Central Coast LGA, which is listed under Schedule 2. It is considered that Chapter 4 of the SEPP 2021 may apply to the study area if the study area contains core koala habitat.

Under the SEPP, core koala habitat is defined as:

a) *an area of land which has been assessed by a suitably qualified and experienced person as being highly suitable koala habitat and where koalas are recorded as being present at the time of assessment of the land as highly suitable koala habitat, or*

b) *an area of land which has been assessed by a suitably qualified and experienced person as being highly suitable koala habitat and where koalas have been recorded as being present in the previous 18 years*

The study area was not assessed as core Koala habitat as there are no records of the species within 2.5 km within the past 18 years, and no evidence of Koala activity was recorded during the field surveys.

3.8 Matters of national environmental significance

A Protected Matters Search was undertaken with a 10 km buffer surrounding the Development Site. See Appendix G for the full report. Below is a summary of findings.

- No World Heritage Places were listed within the 10 km of the development.
- No National Heritage Places were listed within the 10 km of the development.
- No Ramsar Wetlands or Wetlands of international importance were listed within the 10 km of the development.
- One threatened flora species; *Tetratheca juncea* (Black-eyed Susan) listed as Vulnerable under the EPBC Act was identified within the study area (outside the Impact Area; Figure 3-8). Potential impacts on threatened and migratory species have been assessed in Appendix E of this document.
- Five TEC's had the potential to occur within the survey area. However, none of these TEC's were present within the site. PCT3583 was the only vegetation community identified on-site and this PCT is not linked to any TEC's.

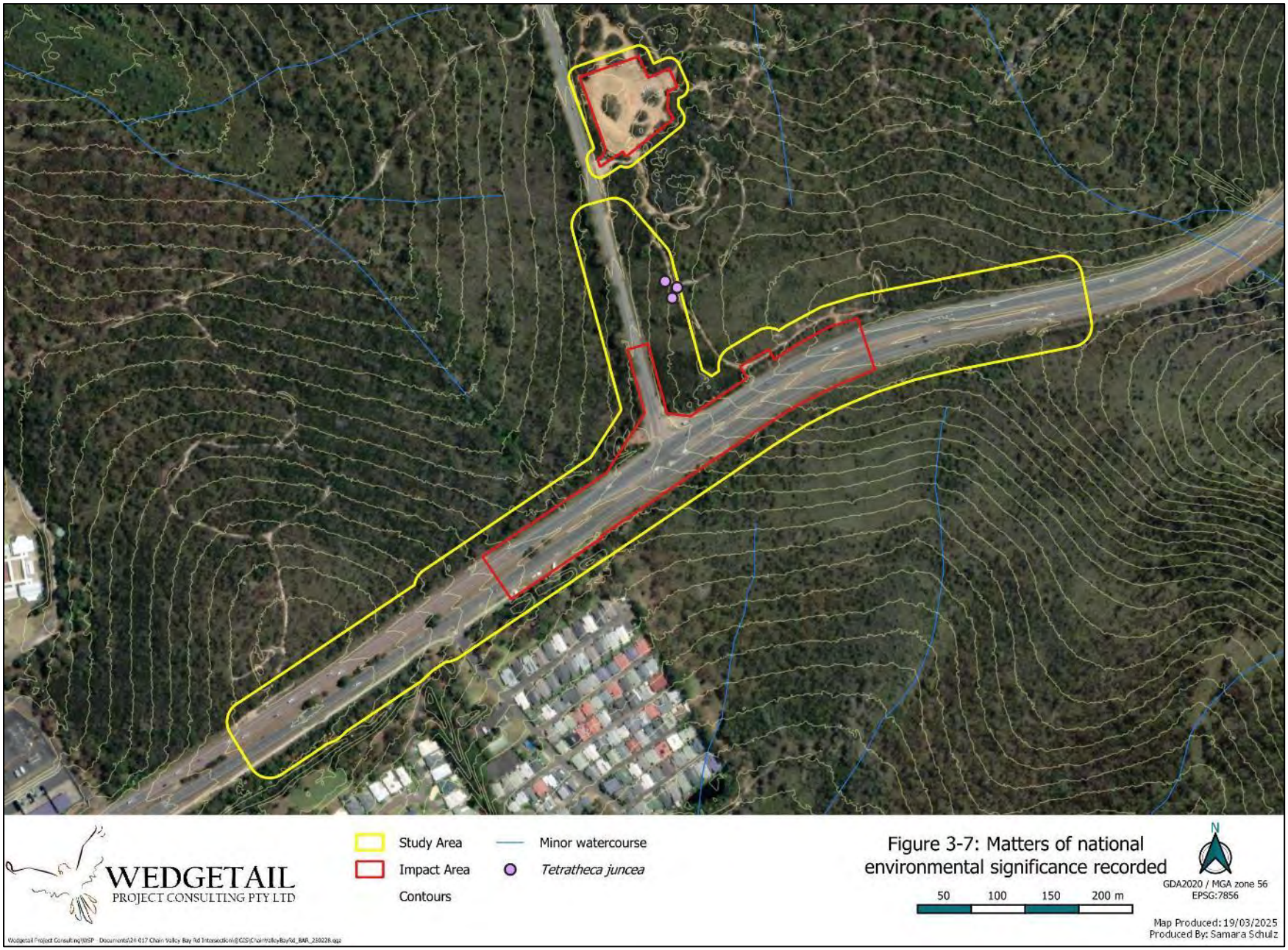

Figure 3-7: Matters of national environmental significance recorded

4. Avoidance and minimisation

This chapter outlines the steps that have been taken to avoid and minimise impacts to biodiversity and the measures recommended to manage residual impacts. In managing biodiversity, Transport for NSW aims to achieve a balanced outcome, taking account of environmental considerations together with economic and community objectives. This includes a balanced approach to examining the particular environmental consequences of an activity, recognising that achieving an optimal outcome often requires compromise and decisions regarding environmental values.

A key part of Transport's management of biodiversity for this proposal is the application of the 'avoid, minimise, mitigate and offset' hierarchy as follows:

1. Avoid and minimise impacts.
2. Mitigate impacts.
3. Offset impacts in accordance with Transport guidelines.

The following strategies and actions have been undertaken to either avoid or minimise impacts on biodiversity values:

- Impacts from clearing native vegetation and threatened species habitat has been minimised by locating the proposal to utilise:
    - existing road corridors
    - cleared areas
    - low-condition and exotic vegetation
- The proposed impact area has been re-designed to avoid:
    - Areas of potential habitat such as hollow-bearing trees and ephemeral ponds
    - Impact on a number of mature trees
- Offset measures have been outlines in section 7 for tree replacement

5. Impact assessment

The proposal's likely direct and indirect impacts on biodiversity are summarised in this chapter. Direct impacts for the BAR have been calculated within the impact area using the construction and operational footprints of the REF as the extent of impact. The potential for indirect impacts on biodiversity values is considered low given that much of the REF area is subject to existing edge effects and are bounded by existing roads.

5.1 Construction direct impacts

5.1.1 Removal of native vegetation

The total impact area of the proposal is 2.76 ha, this includes 0.84 ha of native vegetation, 0.27 ha of exotic vegetation, 0.43 ha of cleared areas, and 1.23 ha of roads and existing infrastructure. Impacts of the proposal on native vegetation are identified in Table 5-1. The impact assessment is based on the construction footprint of the proposal.

These impacts on native vegetation constitute one key threatening process, Clearing Native Vegetation.

Table 5-1: Summary of direct impacts on native vegetation

Veg. zone	Plant community type (PCT)	Broad condition class	TEC	Area to be impacted (ha)[1]
Zone 1	PCT 3583: Hunter Coast Lowland Scribbly Gum Forest	Moderate-good	Not a TEC	0.19
Zone 2	PCT 3583: Hunter Coast Lowland Scribbly Gum Forest	Disturbed	Not a TEC	0.18
Zone 3	PCT 3583: Hunter Coast Lowland Scribbly Gum Forest	Derived Native Grassland (DNG)	Not a TEC	0.47

5.1.2 Removal of threatened fauna habitat

The proposal will impact on 0.84 ha of native vegetation representing marginal or opportunistic habitat for threatened fauna species. No hollow-bearing trees were identified within the study area. There are two ephemeral water bodies which represent marginal habitat for amphibian species.

Table 5-2: Summary of direct impacts on threatened fauna and habitat

Species name	EPBC Act	BC Act	Credit type[1]	Potential occurrence (Moderate, High, Recorded)	Associated habitat in impact area	Impact (ha)
Crinia tinnula (Wallum Froglet)	-	V	Species	High	PCT 3583 (all zones).	0.10 ha
Artamus cyanopterus cyanopterus (Dusky Woodswallow)	-	V	Ecosystem	Moderate	PCT 3583 (Zone 1 & 2 only).	0.36 ha

Species name	EPBC Act	BC Act	Credit type[1]	Potential occurrence (Moderate, High, Recorded)	Associated habitat in impact area	Impact (ha)
Calyptorhynchus lathami lathami (South-eastern Glossy Black-Cockatoo)	V	V	Ecosystem (Habitat constraint for breeding habitat not present – no hollows).	Moderate – High	PCT 3583 (Zone 1 & 2 only).	0.36 ha
Daphoenositta chrysoptera (Varied Sittella)	-	V	Ecosystem	Moderate	PCT 3583 (Zone 1 & 2 only).	0.36 ha
Glossopsitta pusilla (Little Lorikeet)	-	V	Ecosystem	Low – Moderate	PCT 3583 (Zone 1 & 2 only).	0.36 ha
Hirundapus caudacutus (White-throated Needletail)	M	V	Ecosystem	High	PCT 3583 (Zone 1 & 2 only).	0.36 ha
Lathamus discolor (Swift Parrot)	CE	E	Species	Moderate	PCT 3583 (Zone 1 & 2 only).	0.08 ha
Lophoictinia isura (Square-tailed Kite)	-	V	Ecosystem	Moderate	PCT 3583 (all zones).	0.84 ha
Ninox connivens (Barking Owl)	-	V	Species	Moderate	PCT 3583 (Zone 1 & 2 only). No large hollows present within the Impact Area (no species polygon generated).	0.36 ha
Ninox strenua (Powerful Owl)	-	V	Species	Moderate	PCT 3583 (Zone 1 & 2 only). No large hollows present within the Impact Area (no species polygon generated).	0.36 ha
Tyto novaehollandiae (Masked Owl)	-	V	Species	Moderate	PCT 3583 (Zone 1 & 2 only). No large hollows present within the Impact Area (no species polygon generated).	0.36 ha
Tyto tenebricosa (Sooty Owl)	-	V	Species	Moderate	PCT 3583 (Zone 1 & 2 only). No large hollows present within the Impact Area (no species polygon generated).	0.36 ha

Species name	EPBC Act	BC Act	Credit type[1]	Potential occurrence (Moderate, High, Recorded)	Associated habitat in impact area	Impact (ha)
Cercartetus nanus (Eastern Pygmy-possum)	-	V	Species	Moderate - Low	PCT 3583 (Zone 1 & 2 only).	0.36 ha
Chalinolobus dwyeri (Large-eared Pied Bat)	E	E	Species	Moderate	PCT 3583 (all zones). Habitat constraint not present (Caves, etc within 2 km, as such no species polygon generated).	
Dasyurus maculatus (Spotted-tailed Quoll)	E	V	Ecosystem	Moderate	PCT 3583 (all zones).	0.84 ha
Falsistrellus tasmaniensis (Eastern False Pipistrelle)	-	V	Ecosystem	Moderate	PCT 3583 (all zones).	0.84 ha
Micronomus norfolkensis (Eastern Coastal Free-tailed Bat)	-	V	Ecosystem	Moderate - High	PCT 3583 (all zones).	0.84 ha
Miniopterus australis (Little Bent-winged Bat)	-	V	Ecosystem (Habitat constraint for breeding habitat not present – no caves).	Moderate	PCT 3583 (all zones).	0.84 ha
Miniopterus orianae oceanensis (Large Bent-winged Bat)	-	V	Ecosystem Ecosystem (Habitat constraint for breeding habitat not present – no caves).	Moderate	PCT 3583 (all zones).	0.84 ha
Myotis macropus (Southern Myotis)	-	V	Species	Moderate	PCT 3583 (Zone 1 & 2 only). Habitat constraint not present (Suitable water bodies within 200 metres, as such no species polygon generated).	0.36 ha
Petaurus norfolcensis (Squirrel Glider)	-	V	Species	Moderate	PCT 3583 (Zone 1 & 2 only).	0.36 ha
Pseudomys novaehollandiae (New Holland Mouse)	V	-	Ecosystem	Moderate	PCT 3583 (Zone 1 & 2 only).	0.36 ha

Species name	EPBC Act	BC Act	Credit type[1]	Potential occurrence (Moderate, High, Recorded)	Associated habitat in impact area	Impact (ha)
Saccolaimus flaviventris (Yellow-bellied Sheathtail-bat)	-	V	Ecosystem	Moderate	PCT 3583 (all zones).	0.84 ha
Scoteanax rueppellii (Greater Broad-nosed Bat)	-	V	Ecosystem	Moderate	PCT 3583 (all zones).	0.84 ha
Vespadelus troughtoni (Eastern Cave Bat)	-	V	Species	Moderate	PCT 3583 (all zones).	0.84 ha
Note: 1. For dual-credit species, identify the credit type being assessed (i.e. where there is no breeding habitat present the credit type would be 'ecosystem').						

5.1.3 Removal of threatened flora

One threatened plant species was identified within the study area; *Tetratheca juncea* (Black-eyed Susan), listed as Vulnerable under the BC Act and the EPBC Act.

Table 5-3: Summary of direct impacts on threatened flora

Species name	EPBC Act	BC Act	Potential occurrence (Moderate, High, Recorded)	Associated habitat in impact area	Impact (ha or individuals)
Tetratheca juncea (Black-eyed Susan)	V	V	Recorded within study area (outside Impact Area)	PCT3583 (Zone 1 & 2) – 0.36 ha	0 individuals 0.36 ha

5.1.4 Aquatic impacts

The proposal has limited potential to impact aquatic ecosystems during construction and operation due absence of aquatic ecosystems within the study area, and lack of proximity of the proposal to surrounding creeks and waterways.

5.1.5 Injury and mortality

Injury and mortality of fauna as detailed in Table 5-4 could occur during construction activities and can typically be managed through the development of specific and targeted measures as detailed in Section 6, including pre-clearing surveys undertaken in accordance with *Guide 1: Pre-clearing process* of the *Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects* (RTA 2011). All of these impacts are relevant to the proposal.

Table 5-4: Potential fauna injury or death

Action or scenario	Potential outcome for fauna	Species potentially impacted	Likelihood of impact & notes
Removal of vegetation and habitat	Fauna injury or death from crushing/smothering during clearance	• Non-threatened ground dwelling species • Non-threatened nocturnal species nesting/roosting in trees during the day (e.g. arboreal mammals and microbat species) • Microbats roosting in tree crevices or under bark	Low. Less mobile species (ground dwelling reptiles), or those that are nocturnal and nest or roost in trees during the day (arboreal mammals and microbat species), may find it difficult to rapidly move away from the clearing activities when disturbed. The study area is only likely to contain a limited number of arboreal species (possums) and nesting birds that may be injured or killed during vegetation removal. Non-threatened reptiles, frogs,

Action or scenario	Potential outcome for fauna	Species potentially impacted	Likelihood of impact & notes
			aquatic species and invertebrates may also be injured or killed during construction as habitat is cleared.
Machinery and plant operation	Fauna injury or death from being crushed or struck by machinery, entrapment in parked / stored machinery	• Non-threatened ground dwelling species • Microbats	Low. Wildlife may also become trapped in or may choose to shelter in machinery that is stored in the study area overnight. If these animals were to remain inside the machinery, or under the wheels or tracks, they may be injured or may die once the machinery is in use.
Construction traffic	Fauna injury or death from vehicle strike.	• Non-threatened ground dwelling species (no local records of native roadkill are recorded on BioNet, however macropods, possums and low flying are possible) • Microbats • Birds including woodland birds, raptors and owls.	Low – not expected to increase level of traffic strikes significantly above current levels. Impact to threatened species expected to be minimal.

5.1.6 Groundwater dependent ecosystems

The Bureau of Meteorology Groundwater Dependent Ecosystems (GDE) Altas indicates the study area to consist of mostly Unclassified potential GDE based on regional study, although this unclassified area adjoins areas of Moderate potential GDE. PCT 3583 Hunter Coast Lowland Scribbly Gum Forest, however, is not considered to constitute a GDE (refer Section 3.3). Effects of clearing on terrestrial GDEs and groundwater drawdown is thus considered limited.

5.2 Indirect and operational impacts

Indirect impacts occur when the proposal or activities relating to the construction, operation and general change in land-use patterns of the proposal affect native vegetation, threatened ecological communities, threatened species and their habitats beyond the impact area (direct impact area). Table 5-5 identifies indirect and operational impacts relevant to the proposal, that are additional to the direct impacts described above.

Table 5-5: Summary of indirect impacts on native vegetation

Indirect impact	Impacted entities	Project phase/ timing of impact	Likelihood and consequences
Edge effects	All retained vegetation within approximately 10 metres of development area	Clearing, construction and ongoing	Likelihood: moderate. Consequences: • Increased soil nutrients from changes to runoff that may provide further opportunities for weeds. • Spill-over from noise, activity, scent and lighting effects • Inappropriate use of remaining native vegetation areas such as additional clearing, dumping of materials and waste Edge effects are already prevalent within the impact area due to being immediately adjacent to road corridors. Whilst the proposal will increase edge effects slightly, it is not expected to substantially impact local biodiversity.

Indirect impact	Impacted entities	Project phase/ timing of impact	Likelihood and consequences
Habitat fragmentation	Arboreal and terrestrial mammals, small woodland birds, amphibians, flora species and vegetation.	Clearing	Likelihood: very low Consequence: • Slight increase in road crossing distances. • Impacts to overall landscape connectivity are considered minor.
Injury and mortality	Native fauna species	Operation	Likelihood of ongoing vehicle strikes is high, but it is not expected to increase level of traffic strikes significantly above current levels. Impact to threatened species expected to be minimal.
Invasion and spread of weeds	Native vegetation.	Following clearing and construction	Although it is expected that weed species will establish following clearance and earthworks associated with the proposal, it is not likely that this will substantially increase the prevalence of weeds in the study area or locality. Weeds should be managed during and post-construction to minimise weed spread.
Invasion and spread of pests	Native vegetation.	Clearing & construction	Likelihood: Low. Proposal activities have the low potential to disperse pest species out of the impact area across the surrounding landscape, and the magnitude of any impact will be low. Mitigation measures are not deemed necessary.
Invasion and spread of pathogens and disease	Native vegetation. Non-threatened frogs.	All phases	Several pathogens known from NSW have potential to impact on biodiversity as a result of their movement and infection during clearance and construction. Of these, three are listed as a key threatening process under either the EPBC Act and/or BC Act including: • Dieback caused by *Phytophthora* (Root Rot; EPBC Act and BC Act) • Infection of frogs by amphibian chytrid fungus causing the disease chytridiomycosis (EPBC Act and BC Act) • Introduction and establishment of exotic Rust Fungi of the order Pucciniales on plants of the family Myrtaceae (BC Act). While these pathogens were not observed or tested for in the study area the potential for pathogens to occur should be treated as a risk during construction. The most likely causes of pathogen dispersal and importation associated with the proposal include earthworks, movement of soil, and attachment of plant matter to vehicles and machinery during all proposal phases (construction and operation). Pathogens will be managed within the impact area according to the *Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects (NSW Roads and Traffic Authority, 2011).*
Changes to surface hydrology	GDEs and wetland vegetation	All phases	There are no GDEs or wetlands located within the impact or study areas. The section of road subject to the upgrade proposal will incorporate drainage structures to control road runoff to downstream receiving watercourses. Any potential change to water quality, resulting from the increased hard surfaces associated with the intersection upgrade, is not likely to have a demonstrable impact on the aquatic ecology within the wider area beyond the study area.

Indirect impact	Impacted entities	Project phase/ timing of impact	Likelihood and consequences
Noise, light, dust and vibration	Roadside vegetation All local fauna, particularly nocturnal species.	All phases	Likelihood: low. A substantial increase in noise and vibration during operation of the road that will result in any increased impacts to biodiversity is unlikely. There is potential for minor impacts to locally non-threatened fauna from noise and vibration during construction, which may result in fauna temporarily avoiding habitats adjacent to the construction area. Traffic noise is already significant in the area and is likely to be a deterrent to most fauna groups already. The magnitude of this impact will be low and mitigation measures are not deemed necessary. Temporary and permanent lighting may be used at night to enable some work to be completed at the intersection, and as part of traffic operation, that may result in impacts to nocturnal fauna. Nocturnal species such as possums and microbats may avoid the habitat in the impact area where temporary lighting systems are used or permanent streetlights installed. This impact is considered minor given the existence of similar light sources in the impact area. The magnitude of this impact will be low and mitigation measures are not deemed necessary.

5.3 Cumulative impacts

This section of the report provides an analysis of the contribution of the proposal to ecological impacts in a local and regional context due to development. The impacts of other Transport proposals, major proposals and other large-scale proposals have been considered to an extent that is practical.

Cumulative impacts should be considered in terms of vegetation and habitat removal, impacts on threatened species and ecological communities and water quality impacts as a minimum. Cumulative impacts will have a temporal and spatial scale. A cumulative impact assessment should consider impacts of both concurrent and future proposals (where these are known or can be anticipated).

The accumulating impacts of historic vegetation clearing for urban development, and development and maintenance of infrastructure will likely include continued loss of biodiversity within the Chain Valley Bay and Lake Munmorah areas. Within the Gosford-Cooranbong Coastal Slopes Mitchell Landscape included in the development area, 38 per cent of native vegetation has been cleared. Due to the likely expansion of urban areas and creation of housing and associated services and infrastructure, further impacts to biodiversity are likely to result in this region.

While data from all recent projects in the locality is not freely available, some information on the likely biodiversity impacts from recent projects is available. There were no other TfNSW projects currently proposed or being assessed within the locality. Central Coast Council have several minor works proposed, including the scheduled upgrade of Kanangra Water Reservoir, Pacific Highway, Crangan Bay, and a Road Renewal on Rosemount Avenue from Azalea Close to Terence Avenue within Lake Munmorah area, both in July 2024. Both upgrades are scheduled to occur in areas already cleared, thus resulting in minimal biodiversity values impacted.

5.4 Assessments of significance

An Assessment of Significance has been conducted for threatened species that have been positively identified within the study area or that are considered to have a moderate or high likelihood of occurring in the study area due to the presence of suitable habitat and nearby recent records.

Section 7.3 of the BC Act outlines the 'test of significance' that is to be undertaken to assess the likelihood of significant impact upon threatened species, populations or ecological communities listed under the BC Act. These tests of significance have been undertaken in accordance with the guidelines provided in the *Threatened Species Test of Significance Guidelines* (Office of Environment and Heritage, 2018), which outlines a set of guidelines to help applicants/proponents of a development or activity with interpreting and applying the factors of the assessment process. The guidance provided by the Office of Environment and Heritage (2018) has been used here in preparing these tests of significance and in determining whether there is likely to be a significant effect on a threatened species, population or ecological community listed under the BC Act.

Full details of assessment of significance under the BC Act are presented in Appendix D. Species with similar broad habitat requirements have been grouped together for assessment. The conclusions of the impact area assessments are provided in Table 5-6, which indicates that a significant impact is considered unlikely on any threatened species or threatened ecological communities listed under the BC Act.

For threatened biodiversity listed under the EPBC Act, significance assessments have been completed in accordance with the *EPBC Act Policy Statement 1.1 Significant Impact Guidelines* (Department of Environment, 2013). As per the Matters of *National Environmental Significance, Significant Impact Guidelines 1.1 Environment Protection and Biodiversity Conservation Act 1999* (Department of Environment, 2013). The conclusions of the impact area assessments under the EPBC Act are provided in Table 5-7

The results of both significance tests under the BC Act and the EPBC Act concluded that the current proposed development is unlikely to significantly impact threatened fauna species identified to have known or potential habitat within the study area.

Table 5-6: Summary of BC Act significance assessments findings

Significance assessment question *(per Section 7.2 of the BC Act and Threatened Species Test of Significance Guidelines (OEH 2018))*						
Threatened species, or communities	a	b	c	d	e	Likely significant impact?
Tetratheca juncea (Black-eyed Susan)	N	X	N	N	Y	Unlikely
Crinia tinnula (Wallum Froglet)	N	X	N	N	Y	Unlikely
Artamus cyanopterus cyanopterus (Dusky Woodswallow)	N	X	N	N	Y	Unlikely
Calyptorhynchus lathami lathami (South-eastern Glossy Black-Cockatoo)	N	X	N	N	Y	Unlikely
Daphoenositta chrysoptera (Varied Sittella)	N	X	N	N	Y	Unlikely
Glossopsitta pusilla (Little Lorikeet)	N	X	N	N	Y	Unlikely
Hirundapus caudacutus (White-throated Needletail)	N	X	N	N	Y	Unlikely
Lathamus discolor (Swift Parrot)	N	X	N	N	Y	Unlikely
Lophoictinia isura (Square-tailed Kite)	N	X	N	N	Y	Unlikely
Ninox connivens (Barking Owl)	N	X	N	N	Y	Unlikely
Ninox strenua (Powerful Owl)	N	X	N	N	Y	Unlikely
Tyto novaehollandiae (Masked Owl)	N	X	N	N	Y	Unlikely
Tyto tenebricosa (Sooty Owl)	N	X	N	N	Y	Unlikely
Cercartetus nanus (Eastern Pygmy-possum)	N	X	N	N	Y	Unlikely
Chalinolobus dwyeri (Large-eared Pied Bat)	N	X	N	N	Y	Unlikely
Dasyurus maculatus (Spotted-tailed Quoll)	N	X	N	N	Y	Unlikely
Falsistrellus tasmaniensis (Eastern False Pipistrelle)	N	X	N	N	Y	Unlikely
Micronomus norfolkensis (Eastern Coastal Free-tailed Bat)	N	X	N	N	Y	Unlikely
Miniopterus australis (Little Bent-winged Bat)	N	X	N	N	Y	Unlikely

Significance assessment question *(per Section 7.2 of the BC Act and Threatened Species Test of Significance Guidelines (OEH 2018))*						
Threatened species, or communities	a	b	c	d	e	Likely significant impact?
Miniopterus orianae oceanensis (Large Bent-winged Bat)	N	X	N	N	Y	Unlikely
Myotis macropus (Southern Myotis)	N	X	N	N	Y	Unlikely
Petaurus norfolcensis (Squirrel Glider)	N	X	N	N	Y	Unlikely
Pseudomys novaehollandiae (New Holland Mouse)	N	X	N	N	Y	Unlikely
Saccolaimus flaviventris (Yellow-bellied Sheathtail-bat)	N	X	N	N	Y	Unlikely
Scoteanax rueppellii (Greater Broad-nosed Bat)	N	X	N	N	Y	Unlikely
***Y** = Yes (negative impact), **N** = No (no or positive impact), **X** = Yes/No answer not applicable, **?** = unknown impact.*						

Table 5-7: Summary of EPBC Act significance assessments findings

Threatened species, or communities	Important population *(per Significant Impact Guidelines 1.1 (DoE 2013))*	Likely significant impact?
Tetratheca juncea (Black-eyed Susan)	Yes	Unlikely
Calyptorhynchus lathami lathami (South-eastern Glossy Black-Cockatoo)	Yes (no targeted species surveys undertaken, but any potentially occurring local population could form part of an important population)	Unlikely
Hirundapus caudacutus (White-throated Needletail)	Yes (no targeted species surveys undertaken, but any potentially occurring local population could form part of an important population)	Unlikely
Lathamus discolor (Swift Parrot)	Yes (no targeted species surveys undertaken, but any potentially occurring local population could form part of an important population)	Unlikely
Chalinolobus dwyeri (Large-eared Pied Bat)	Yes (no targeted species surveys undertaken, but any potentially occurring local population could form part of an important population)	Unlikely
Dasyurus maculatus (Spotted-tailed Quoll)	Yes (no targeted species surveys undertaken, but any potentially occurring local population could form part of an important population)	Unlikely
Pseudomys novaehollandiae (New Holland Mouse)	Yes (no targeted species surveys undertaken, but any potentially occurring local population could form part of an important population)	Unlikely
***Y** = Yes (negative impact), **N** = No (no or positive impact), **X** = Yes/No answer not applicable, **?** = unknown impact.*		

6. Mitigation

Measures to mitigate and minimise impacts on biodiversity within the study area are outlined in Table 6-1. These measures have been considered in consultation with the *Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects* (2011), and *Wildlife Connectivity Guidelines for Road Projects* (RTA 2011).

Table 6-1: Mitigation measures

ID	Impact	Mitigation measure	Timing and duration	Likely efficacy of mitigation	Residual impacts anticipated?	Responsibility
B01	Removal of native vegetation	Native vegetation removal will be minimised through detailed design.	Detailed design	Effective	Total impact on 0.84 ha of native vegetation.	Transport
B02		Native vegetation will 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).	Post construction	Effective	-	Transport
B03		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 proposal site.	During construction	Proven	-	Contractor & Transport
B04	Removal of threatened fauna habitat	Threatened fauna habitat removal will be minimised through detailed design.	Detailed design	Effective	Total impact on 0.84 ha of native vegetation & fauna habitat.	Transport
B05		Prior to the commencement of works, an inspection of the ephemeral water bodies present within the study area will be conducted. 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). If these water bodies contain standing water appropriate measures will be taken to capture and relocate potentially occupying fauna in accordance with *Guide 9: Fauna handling of the Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects (RTA 2011).*	During construction	Proven	-	Contractor & Transport
B06		Fauna will be managed in accordance with *Guide 9: Fauna handling* of the *Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects* (RTA 2011).	During construction	Effective	-	Contractor & Transport
B07		The unexpected species find procedure is to be followed under *Guide 1: Pre-clearing process* of the *Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects* (RTA 2011) if threatened fauna, not assessed in the biodiversity assessment, are identified in the proposal site.	During construction	Proven	-	Contractor & Transport
B08	Removal of threatened flora	The unexpected species find procedure is to be followed under *Guide 1: Pre-clearing process* of the *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 proposal site.	During construction	Proven	-	Contractor & Transport

ID	Impact	Mitigation measure	Timing and duration	Likely efficacy of mitigation	Residual impacts anticipated?	Responsibility
B09	Changes to hydrology	Changes to existing surface water flows will be minimised through detailed design.	Detailed design	Effective	-	Transport
B10	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	-	Contractor & Transport
B11	Injury and mortality of fauna	Fauna will be managed in accordance with *Guide 9: Fauna* handling of the *Biodiversity Guidelines: Protecting and managing biodiversity on RTA projects* (RTA 2011).	During construction	Effective	-	Contractor & Transport
B12	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	-	Contractor & Transport
B13	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	-	Contractor & Transport
B14	Noise, light, dust and vibration	Shading and artificial light impacts will be minimised through detailed design.	Detailed design	Effective	-	Contractor & Transport

7. Offsets and other measures

Impacts that require the provision of biodiversity offsets, conservation measures or tree and hollow replacement are assessed below in accordance with:

- No Net Loss Guidelines and supporting resources (Transport 2022).
- Tree and Hollow Replacement Guidelines and supporting resources (Transport 2022).

7.1 Thresholds

This section must detail the process of identifying the biodiversity impacts in this BAR that trigger thresholds set out by No Net Loss Guidelines (Transport 2022). Residual impacts that do not exceed offset thresholds must then consider the requirements of the Tree and Hollow Replacement Guidelines (Transport 2022). The Transport thresholds for offsetting are outlined in Table 7-1, and assessment of the impacts of the proposal against these thresholds is outlined in Table 7-2.

Table 7-1: Offset thresholds (Transport No Net Loss Guidelines)

Impact	Threshold
Works involving clearing of a CEEC	Where there is any clearing of an CEEC in 'moderate to good' condition
Works involving clearing of an EEC	Where clearing of a EEC ≥ 2 ha in 'moderate to good' condition
Works involving clearing of VEC	Where clearing of VEC ≥ 5 ha in 'moderate to good' condition
Works involving clearing of any habitat for a known species credit fauna species or clearing of breeding habitat (as defined by the TBDC) for dual-credit fauna species (excluding exotic and planted vegetation that cannot be assigned to a plant community type)	Where clearing ≥ 1 ha in 'moderate to good' condition
Works involving removal of known threatened flora species and their habitat	Where loss of individuals is ≥10 or where clearing of habitat is ≥ 1 ha
Type 1 or Type 2 key fish habitats	Where there is a net loss of habitat
Any residual biodiversity impact that doesn't require offsets in accordance with the No Net Loss Guideline is to be assessed against the requirements of the Tree and Hollow Replacement Guideline.	**Any clearing of hollows and/or trees ≥5cm DBH**

Table 7-2: Assessment of vegetation impacts against thresholds

Veg. zone	Plant community type (PCT)	Condition	TEC	Impact area (ha or m²)[1]	Threshold triggered?
Zone 1	PCT 3583: Hunter Coast Lowland Scribbly Gum Forest	Moderate-good	Not a TEC	0.19	No offsets required: <2 ha impact and not TEC. Tree replacement is required.
Zone 2	PCT 3583: Hunter Coast Lowland Scribbly Gum Forest	Disturbed	Not a TEC	0.18	No offsets required: <2 ha impact and not TEC. Tree replacement is required.
Zone 3	PCT 3583: Hunter Coast Lowland Scribbly Gum Forest	DNG	Not a TEC	0.47	No offsets required: <2 ha impact and not TEC. No clearing of trees, as such tree replacement not required.

7.2 Preliminary offset and tree/hollow replacement calculations

7.2.1 Preliminary offset calculations

Offsets for terrestrial impacts are not required for the proposal (as per Table 7-1 and Table 7-2). As such, tree replacement is required and is outlined in Section 7.2.2.

7.2.2 Preliminary tree and hollow replacement estimates

As the threshold for offsetting was not triggered, the requirement of the proposal to replace trees that are to be removed has been assessed against the requirements of the Tree and Hollow Replacement Guidelines (Transport 2022b).

Surveys across the impact area and immediate surrounds were conducted to identify and map all tree species occurring within the Impact Area. A summary of the trees identified is provided in Table 7-3 and a preliminary assessment of replacement requirements is outlined in Table 7-4.

Table 7-3: Counts of trees and hollows occurring within the Impact Area

Veg. zone	Impact (ha)	Plots	Number of trees in stem size classes (cm) and hollows per ha[1]					Average count of tree and hollows in impact area[2]				
			5-19	20-49	50-99	>100	Hollows	5-19	20-49	50-99	>100	Hollows
Zone 1 and Zone 2	0.36	Full count	58	5	0	0	0	0	0	0	0	0

NOTE 1: Calculated by measuring all individual tree diameter at breast height (DBH) in cm within the impact area
NOTE 2: Calculated by surveying the number of hollows within the impact area, with only one basal hollow identified.

Table 7-4: Preliminary estimates of trees and hollow replacement requirements

Category	Estimated No. impacted		Replacement requirement per tree/hollow removed[1]		Estimates number to be replaced[2]		Estimated equivalent payment to Transport conservation fund[2]
	Native trees	Amenity trees	Planting required	Contribution required	Native trees	Amenity trees	
Very large tree (DBH ≥100cm)	0	0	Plant minimum 16 trees	$2,500	0	0	$0
Large tree (DBH ≥50 to <100cm)	0	0	Plant minimum 8 trees	$1,000	0	0	$0
Medium tree (DBH ≥20 to <50 cm)	5	0	Plant minimum 4 trees	$500	20	0	$2, 000
Small tree (DBH ≥ 5cm to <20 cm)	58	0	Plant minimum 2 trees	$125	116	0	$7, 250
Hollow	0		Provide 3 artificial hollows for every occupied hollow removed*	$500	0		$0
Totals					136		$9,250

NOTE 1: As per the Transport Tree and Hollow Replacement Guidelines

NOTE 2: An equivalent payment to the Transport Conservation Fund can be used where replanting is not feasible or fully achievable within the project boundary or adjacent land.

7.3 Biodiversity offset strategy/tree and hollow replacement plan

As tree replacement is required under the Tree and Hollow Replacement Guidelines then an environmental safeguard will be included to prepare a Tree and Hollow Replacement Plan in accordance with the Tree and Hollow Replacement Guidelines.

8. Conclusion

The finds of the Biodiversity survey and assessment undertaken for the Chain Valley Bay Road Intersection is summarised below:

- The vegetation in the impact area is comprised of one Plant Community Type (PCT); PCT 3583: Hunter Lowland Scribbly Gum Forest. This PCT occurs in in three condition states within the study area, moderate-good (0.19 ha), disturbed (0.18 ha) and grassland (0.47 ha). The native vegetation within the study area is not consistent with any threatened ecological communities (TECs) listed under the NSW *Biodiversity Conservation Act 2016* (BC Act) or the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).
- A total of 106 threatened species were identified via database searches (including BioNet & Protected Matters Search Tool in the locality; 10 km, and candidate species associated with the PCT). These included 28 threatened flora species, 75 fauna species, and additionally, three migratory species and five threatened ecological communities were also modelled to occur. Of these species, 6 flora species, 12 fauna species and 1 migratory species were assessed as having suitable habitat within the study area.
- Surveys undertaken to date for threatened flora species have detected one threatened species; *Tetratheca juncea* (Black-eyed Susan), listed as Vulnerable under the BC Act and the EPBC Act. A total of 16 individuals of *T. juncea* were identified within the study area, with none occurring within the Impact Area.
- Due to the small nature of impacts and limited fauna habitat on site, no threatened fauna surveys were undertaken.
- No hollow-bearing trees were identified within the study area. Two ephemeral water bodies occur within the Impact Area, which have the potential to provide opportunistic habitat for amphibian species.
- The direct, indirect, and cumulative ecological impacts of the proposal have been carefully considered in Section 5 of this report. Section 6 details measures to mitigate residual impacts.
- Assessments of significance (5-part test) under Section 7.2 of the BC Act and assessments against the significant impact criteria under the EPBC Act concluded that the proposed Activity is unlikely to have a significant impact on any threatened species or migratory species. As such, no further assessment under the BC Act is required and no offsets are required for any Commonwealth Protected Matters listed under the EPBC Act.
- No offset thresholds were triggered by the proposal for TECs, threatened fauna habitat or Key Fish Habitat in accordance with Transport Biodiversity assessment guidelines (2022) and Part 6 of the Biodiversity Conservation Regulation (2017). Further, there were no hollows identified requiring replacement.
- Preliminary estimates for tree replacement for impacts on 63 native trees includes replacement with 163 native trees or payment of $9,250 into Transport conservation fund.

9. Glossary

Term	Definition
Accredited person or assessor	Means as person accredited under section 6.10 (of the BC Act) to prepare reports in accordance with the BAM.
Biodiversity Assessment Method	The Biodiversity Assessment Method is established under section 6.7 of the BC Act. The BAM is established for the purpose of assessing certain impacts on threatened species and threatened ecological communities (TECs), and their habitats, and the impact on biodiversity values.
Biodiversity Assessment Method Calculator	Biodiversity Assessment Method Calculator (BAM-C) – the online computer program that provides decision support to assessors and proponents by applying the BAM and referred to as the BAM-C. The BAM-C contains biodiversity data from the BioNet Vegetation Classification and the Threatened Biodiversity Data Collection that the assessor is required to use in a BAM assessment. The BAM-C applies the equations used in the BAM, including those to determine the number and class of biodiversity credits required to offset the impacts of a development, or created at a biodiversity stewardship site. It is published by the Department (DPIE 2020a).
Biodiversity credit report	The report produced by the BAM-C that sets out the number and class of biodiversity credits required to offset the remaining adverse impacts on biodiversity values at a development site, or on land to be biodiversity certified, or that sets out the number and class of biodiversity credits that are created at a biodiversity stewardship site (DPIE 2020a).
Biodiversity offsets	The gain in biodiversity values achieved from the implementation of management actions on areas of land, to compensate for losses to biodiversity values from the impacts of development (DPIE 2020a).
Biodiversity Offsets and Agreement Management System	The online system used to administer the Biodiversity Offsets Scheme. The BOAMS is used by accredited assessors (to carry out specific BAM-related tasks involving access to the BAM-C to perform assessments, submit data, generate credits and calculate a credit price), by landholders (to apply for a Biodiversity Stewardship Agreement and manage ongoing reporting obligations for their agreement) and by proponents of developments (to view their credit obligation or the payment required to the Biodiversity Conservation Fund).
Biodiversity risk weighting	A factor of the formulas used by the BAM to calculate credits. The biodiversity risk weighting (BRW) is a score given to each vegetation zone and species based on the 'sensitivity to loss' versus the 'sensitivity to gain'. The value is set for threatened species and listed in the TBDC. The BRW for vegetation is calculated for each vegetation zone by the BAM-C using a factor of the 'sensitivity to loss' of the PCT or TEC (located in the BioNet vegetation classification) and the 'sensitivity to gain' of the ecosystem credit species (in the TBDC) that are predicted to occur.
Biodiversity Stewardship site	Refers to land which is the subject to a Biodiversity Stewardship Agreement under the BC Act.
BioNet Atlas	The DPIE database of flora and fauna records (formerly known as the NSW Wildlife Atlas). The Atlas contains records of plants, mammals, birds, reptiles, amphibians, some fungi, some invertebrates (such as insects and snails listed under the BC Act) and some fish (DPIE 2020a).
BioNet Vegetation classification	Refers to the vegetation community-level classification for use in vegetation mapping programs and regulatory biodiversity impact assessment frameworks in NSW. Refer About BioNet Vegetation Classification | NSW Environment and Heritage (DPE 2020a).
Construction footprint	The area to be directly impacted by the proposal during construction activities. See also definition for impact area.

Term	Definition
Cumulative impact	The impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time. Refer to Clause 228(2) of the EP&A Regulation 2000 for cumulative impact assessment requirements.
Direct impact	Direct impacts on biodiversity values include those related to clearing native vegetation and threatened species habitat and impacts on biodiversity values prescribed by the Biodiversity Conservation Regulation 2017 (the BC Regulation) (DPIE 2020a).
Ecosystem credit species	Threatened species or components of species habitat that are identified in the Threatened Species Data Collection as requiring assessment for ecosystem credits. This is analogous with the definition of 'predicted species'.
Ecosystem credits	A measurement of the value of threatened ecological communities, threatened species habitat for species that can be reliably predicted to occur with a PCT, and PCTs generally. Ecosystem credits measure the loss in biodiversity values at a development, activity, clearing or biodiversity certification site and the gain in biodiversity values at a biodiversity stewardship site (DPIE 2020a).
Habitat	An area or areas occupied, or periodically or occasionally occupied, by a species, population or ecological community, including any biotic or abiotic component (DPIE 2020a).
Indirect impact	Impacts that occur when the proposal affects native vegetation and threatened species habitat beyond the development footprint or within retained areas (e.g. transporting weeds or pathogens, dumping rubbish). This includes impacts from activities related to the construction or operational phase of the proposal and prescribed impacts (DPIE 2020a).
Landscape assessment area	The area which includes the impact area and a 1500 metre buffer surrounding the outside edge of the boundary of the impact area or 500 metres along each side of the centre line of a linear-shaped proposal
Local population	The population that occurs in the study area. The assessment of the local population may be extended to include individuals beyond the study area if it can be clearly demonstrated that contiguous or interconnecting parts of the population continue beyond the study area, according to the following definitions: • *The local population of a threatened plant species comprises those individuals occurring in the study area or the cluster of individuals that extend into habitat adjoining and contiguous with the study area that could reasonably be expected to be cross-pollinating with those in the study area.* • *The local population of resident fauna species comprises those individuals known or likely to occur in the study area, as well as any individuals occurring in adjoining areas (contiguous or otherwise) that are known or likely to utilise habitats in the study area.* • *The local population of migratory or nomadic fauna species comprises those individuals that are likely to occur in the study area from time to time or return year to year (OEH 2018).*
Matter of national environmental significance	A matter of national environmental significance (MNES) is any of the nine defined components protected by a provision of Part 3 of the EPBC Act (Commonwealth).
Mitigation	Action to reduce the severity of an impact.
Native vegetation	Has the same meaning as in section 1.6 of the BC Act and section 60B of the LLS Act. In summary, a) trees (including any sapling or shrub or any scrub) b) understorey plants

Term	Definition
	c) groundcover (being any type of herbaceous vegetation) d) plants occurring in a wetland. A plant is native to New South Wales if it was established in New South Wales before European settlement (BC Act). Native vegetation does not extend to marine vegetation (being mangroves, seagrasses or any other species of plant that at any time in its life cycle must inhabit water other than fresh water). Marine vegetation is covered by the provisions of the FM Act.
NSW (Mitchell) landscape	Landscapes with relatively homogeneous geomorphology, soils and broad vegetation types, mapped at a scale of 1:250,000 (DPIE 2020a).
Operational footprint	The area that will be subject to ongoing operational impacts from the proposal. This includes the road, surrounding safety verges and infrastructure, fauna connectivity structures and maintenance access tracks and compounds.
Patch size	An area of native vegetation that: • *occurs on the development site or biodiversity stewardship site* • *includes native vegetation that has a gap of less than 100 metres from the next area of native vegetation (or ≤30 metres for non-woody ecosystems).* Patch size may extend onto adjoining land that is not part of the development site or biodiversity stewardship site (DPIE 2020a).
PlantNET	An online database of the flora of New South Wales which contains currently accepted taxonomy for plants found in the State, both native and exotic.
Population	A group of organisms, all of the same species, occupying a particular area (DPIE 2020a).
Spatial datasets	Spatial databases required to prepare a BAR • *BioNet NSW (Mitchell) Landscapes – Version 3.1* • *NSW Interim Biogeographic Regions of Australia (IBRA region and sub-regions) – Version 7* • *NSW soil profiles* • *hydrogeological landscapes* • *acid sulfate soils risk* • *digital cadastral database* • *Vegetation Information Systems maps* • *Geological sites of NSW.*
Species credit species	Threatened species or components of species habitat that are identified in the Threatened Species Data Collection as requiring assessment for species credits (DPIE 2020a). This is analogous with the definition of 'candidate species'.
Species credits	The class of biodiversity credits created or required for the impact on threatened species that cannot be reliably predicted to use an area of land based on habitat surrogates. Species that require species credits are listed in the Threatened Biodiversity Data Collection (DPIE 2020a).
Species polygon	An area of land identified in Chapter 5 (of the BAM) that contains habitat or is occupied by a threatened species (DPIE 2020a).
study area	The area directly affected by the proposal (impact area or construction footprint) and any additional areas likely to be affected by the proposal, either directly or indirectly.
Impact area	Land subject to a development, activity, clearing, biodiversity certification or a biodiversity stewardship proposal. It excludes the landscape assessment area which surrounds the impact area (i.e., the area of land in the 1500 metre buffer zone around the impact area or 500 metre

Term	Definition
	buffer zone for linear proposals). In the case of a biodiversity certification proposal, impact area includes the biodiversity certification assessment area (DPIE 2020a). See also definition for construction footprint.
Threatened Biodiversity Data Collection	A publicly assessable online database (registration required) which contains information for listed threatened species, populations and ecological communities (DPIE 2020a). Part of the BioNet database, published by the EHG and accessible from the BioNet website at www.bionet.nsw.gov.au.
Vegetation integrity (score)	The condition of native vegetation assessed for each vegetation zone against the benchmark for the PCT. The vegetation integrity score is the quantitative measure of vegetation condition calculated by the BAM-C (DPIE 2020a).
Vegetation zone	A relatively homogeneous area of native vegetation on a development site, clearing site, land to be biodiversity certified or biodiversity stewardship site that is the same PCT and has the same broad condition state (DPIE 2020a).

10. Abbreviations

Term	Definition
AOBV	Area of Outstanding Biodiversity Value
BAM	Biodiversity Assessment Method
BAM-C	Biodiversity Assessment Method calculator
BC Act	Biodiversity Conservation Act 2016 (NSW)
BC Regulation	Biodiversity Conservation Regulation 2017 (NSW)
BDAR	Biodiversity Development Assessment Report
BOAMS	Biodiversity Offsets and Agreement Management System
BOS	Biodiversity Offset Scheme
BRW	Biodiversity risk weighting
CEEC	Critically Endangered Ecological Community
CEMP	Construction Environmental Management Plan
CVBR	Chain Valley Bay Road
DCCEEW	Department of Climate Change, Energy, the Environment and Water
DIWA	Directory of Important Wetlands in Australia
DPE	Department of Planning and Environment
DPI	Department of Primary Industries
EEC	Endangered ecological community
EHG	NSW Environment and Heritage Group within the Department of Planning and Environment
EIS	Environmental Impact Statement
EP&A Act	*Environment Planning and Assessment Act 1979* (NSW)
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Commonwealth)
Fisheries NSW Policy and guidelines	Fisheries NSW Policy and guidelines for fish habitat conservation and management (Update 2013)
FM Act	Fisheries Management Act 1994 (NSW)
GDE	Groundwater dependent ecosystems
IBRA	Interim Biogeographically Regionalisation of Australia
LGA	Local Government Area
MNES	Matters of national environmental significance
PCT	Plant community type
PMST	Protected Matters Search Tool
REF	Review of Environmental Factors
SAII	Serious and Irreversible Impacts
SEARs	Secretary's Environmental Assessment Requirements
SEPP	State Environmental Planning Policy
SSD	State Significant Development
SSI	State Significant Infrastructure
TBDC	Threatened Biodiversity Data Collection
TECs	Threatened ecological communities (VECs, EECs and CEECs)

Transport	Transport for NSW
VEC	Vulnerable Ecological Community
WPC	Wedgetail Project Consulting

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Appendix A: Species recorded

Recorded flora

Family	Scientific name	Common name	Status		Cover (%) plot*	Incidental observation
			BC Act	EPBC Act	Q01	
Apiaceae	*Actinotus minor*	Lesser Flannel Flower	-	-	-	Meander
Apocynaceae	*Parsonsia straminea*	Common Silkpod	-	-	-	Meander
Asteraceae	*Ageratina adenophora*	Crofton Weed (High Threat Weed)	-	-	-	Meander
Campanulaceae	*Lobelia purpurascens*	Whiteroot	-	-	-	Meander
Casuarinaceae	*Allocasuarina littoralis*	Black She-Oak	-	-	60	
Convolvulaceae	*Dichondra repens*	Kidney Weed	-	-	-	Meander
Cyperaceae	*Cyathochaeta diandra*	-	-	-	0.1	
Cyperaceae	*Gahnia clarkei*	Tall Saw-sedge	-	-	0.2	
Cyperaceae	*Gahnia sieberiana*	Red-fruit Saw-sedge	-	-	0.2	
Cyperaceae	*Lepidosperma laterale*	Variable Sword-sedge	-	-	-	Meander
Cyperaceae	*Ptilothrix deusta*	-	-	-	40	
Dennstaedtiaceae	*Pteridium esculentum*	Bracken	-	-	-	Meander
Elaeocarpaceae	*Tetratheca juncea*	Black-eyed Susan	V	V	-	Targeted flora surveys
Elaeocarpaceae	*Tetratheca juncea*	Black-eyed Susan	-	-	-	Meander
Ericaceae	*Epacris microphylla*	Coral Heath	-	-	0.1	
Ericaceae	*Sprengelia sprengelioides*	-	-	-	-	Meander
Fabaceae (Faboideae)	*Dillwynia retorta*	-	-	-	0.2	

Family	Scientific name	Common name	Status		Cover (%) plot*	Incidental observation
			BC Act	EPBC Act	Q01	
Fabaceae (Mimosoideae)	*Acacia binervia*	Coast Myall	-	-	0.1	
Fabaceae (Mimosoideae)	*Acacia elongata*	Swamp Wattle	-	-	-	Meander
Fabaceae (Mimosoideae)	*Acacia longifolia* subsp. *Longifolia*	Sydney Golden Wattle	-	-	-	Meander
Iridaceae	*Patersonia glabrata*	Leafy Purple-flag	-	-	-	Meander
Lauraceae	*Cassytha pubescens*	Downy Dodder-laurel	-	-	0.1	
Lomandraceae	*Lomandra longifolia*	Spiny-headed Mat-rush	-	-	-	Meander
Lomandraceae	*Lomandra obliqua*	-	-	-	0.2	
Loranthaceae	*Amyema miquelii*	Box Mistletoe	-	-	-	Meander
Myrtaceae	*Angophora costata*	Sydney Red Gum	-	-	-	Meander
Myrtaceae	*Callistemon linearis*	Narrow-leaved Bottlebrush	-	-	0.1	
Myrtaceae	*Callistemon rigidus*	Stiff Bottlebrush	-	-	-	Targeted flora surveys
Myrtaceae	*Corymbia gummifera*	Red Bloodwood	-	-	1	
Myrtaceae	*Eucalyptus haemastoma*	Broad-leaved Scribbly Gum	-	-	-	Meander
Myrtaceae	*Leptospermum juniperinum*	Prickly Tea-tree	-	-	2	
Myrtaceae	*Leptospermum polygalifolium*	Tantoon	-	-	1	
Myrtaceae	*Melaleuca nodosa*	-	-	-	2	
Myrtaceae	*Melaleuca quinquenervia*	Broad-leaved Paperbark	-	-	0.2	
Orchidaceae	*Cryptostylis erecta*	Bonnet Orchid	-	-	-	Targeted flora surveys
Orchidaceae	*Cryptostylis subulata*	Large Tongue Orchid	-	-	-	Targeted flora surveys
Orchidaceae	*Diuris alba*	-	-	-	-	Targeted flora surveys

Family	Scientific name	Common name	Status		Cover (%) plot*	Incidental observation
			BC Act	EPBC Act	Q01	
Orchidaceae	*Diuris aurea*	-	-	-	-	Targeted flora surveys
Orchidaceae	*Microtis parviflora*	Slender Onion Orchid	-	-	-	Meander
Orchidaceae	*Thelymitra pauciflora*	Slender Sun Orchid	-	-	-	Targeted flora surveys
Phyllanthaceae	*Glochidion ferdinandi*	Cheese Tree	-	-	-	Meander
Poaceae	*Andropogon virginicus*	Whisky Grass (High Treat Weed)	-	-	-	Meander
Poaceae	*Cymbopogon refractus*	Barbed Wire Grass	-	-	-	Meander
Poaceae	*Entolasia stricta*	Wiry Panic	-	-	2	
Poaceae	*Hyparrhenia hirta*	Coolatai Grass (High Treat Weed)	-	-	-	Meander
Poaceae	*Imperata cylindrica*	Blady Grass	-	-	-	Meander
Proteaceae	*Banksia oblongifolia*	Fern-leaved Banksia	-	-	1	
Proteaceae	*Grevillea speciosa*	Red Spider Flower	-	-	-	Targeted flora surveys
Proteaceae	*Hakea sericea*	Needlebush	-	-	-	Meander
Proteaceae	*Hakea teretifolia*	Needlebush	-	-	0.2	
Proteaceae	*Isopogon anethifolius*	Narrow-leaf Drumsticks	-	-	-	Meander
Proteaceae	*Lambertia formosa*	Mountain Devil	-	-	0.1	
Proteaceae	*Persoonia levis*	Broad-leaved Geebung	-	-	0.2	
Pteridaceae	*Adiantum formosum*	Giant Maidenhair	-	-	-	Meander
Restionaceae	*Lepyrodia muelleri*	-	-	-	-	Meander
Sapindaceae	*Dodonaea triquetra*	Large-leaf Hop-bush	-	-	2	

Family	Scientific name	Common name	Status		Cover (%) plot*	Incidental observation
			BC Act	EPBC Act	Q01	
Xanthorrhoeaceae	*Xanthorrhoea latifolia*	-	-	-	5	

*Note: *Cover determined in accordance with the BAM.*

Appendix B: Habitat suitability assessment

Use the below criteria to determine the likelihood that a threatened species could occur in the study area. The criteria are designed for use in a BAR only and is not applicable for use in a BDAR (i.e., where the BAM-C is being used). Only recorded sightings from BioNet are valid for these criteria.

Likelihood	Criteria
Recorded	The species was observed in the study area during the current survey or has been recorded within the past five years (known from a reputable source).
High	A species is considered highly likely to occur in the study area if: • *There are previous credible records on BioNet within the study area from the last 10 years and suitable habitat is present.* **OR** • *The species is highly mobile, is dependent on identified suitable habitat within the study area (i.e., for breeding or important life cycle periods such as winter flowering resources) and has been recorded recently (within five years) on BioNet in the locality. This also includes species known or likely to visit the study area during regular seasonal movements or migration.*
Moderate	A species is considered moderately likely to occur in the study area if: • *Any suitable habitat (e.g., foraging) is present in the study area, the species is highly mobile and has been recorded in the locality in the last 10 years on BioNet. The species may be 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** • *The species is not highly mobile, is dependent on identified suitable habitat features (e.g., hollows, rocky outcrops) within the study area and has been recorded in the locality in the last 10 years on BioNet.* **OR** • *For flora species that are associated with PCTs in the study area (see TBDC) or have been recorded in the locality in the last 10 years on BioNet – the associated PCT/habitat present in the study area is not degraded and the species was not targeted by surveys in accordance with the BAM and relevant survey guidelines. In addition, for flora species known to occur in disturbed areas (e.g., orchids), records from any time within the locality may warrant inclusion in this category.*
Low	A species is considered to have a low likelihood of occurring in the study area if: • *For highly mobile species, the species may be an occasional visitor, but habitat similar to the study area is widely distributed in the locality, meaning that the species is not dependent (i.e., for breeding or important life cycle periods such as winter flowering resources) on habitats in the study area and the species has not been recorded in the locality in the last 10 years on BioNet.* **OR** • *The species is not highly mobile, is dependent on identified suitable habitat features (e.g., hollows, rocky outcrops) within the study area and has not been recorded in the locality in the last 10 years on BioNet.* **OR** • *For flora species that are associated with PCTs in the study area (see TBDC) and the species was not identified following targeted surveys in accordance with the BAM and relevant survey guidelines. Flora species that have been recorded in the locality on BioNet at any time, associated suitable habitat (see the TBDC) is not present in the study area, though similar habitats of the same vegetation formation is present in the study area.*
Unlikely	Suitable habitat for the species is absent from the study area.

Habitat suitability assessment table

Scientific name	Status		BAM credit type	Habitat constraints and/or geographic limitations	Distribution and habitat	Number of records (source)	Likelihood of occurrence
	BC Act	EPBC Act					
Plants							
Acacia bynoeana Bynoe's Wattle	E	V	Species	-	The species is endemic to central eastern NSW, currently known from only 30 locations, many of only 1-5 plants. Grows mainly in heath/ dry sclerophyll forest on sandy soils, prefers open, sometimes slightly disturbed sites such as trail margins, road edges, and in recently burnt open patches.	49 - BioNet, PCT, PMST	Low All records in the locality > 10 years old. Species associated with the PCT & suitable habitat present within the study area. Surveys conducted in accordance with the BAM did not identify the species within the study area.
Angophora inopina Charmhaven Apple	V	V	Species	-	This species is endemic to the central coast region of NSW and is known to occur in four main vegetation communities: Eucalyptus haemastoma / Corymbia gummifera / Angophora inopina woodland / forest; Hakea teretifolia / Banksia oblongifolia wet heath; Eucalyptus resinifera / Melaleuca sieberi / Angophora inopina sedge / woodland; and Eucalyptus capitellata / Corymbia gummifera / Angophora inopina woodland / forest elegans. Flowering generally poor and sporadic.	2,927 - BioNet, PCT, PMST	Low Suitable habitat and records of the species in the locality (within the last 10 years). Surveys conducted in accordance with the BAM did not identify the species within the study area.
Caladenia tessellata Thick Lip Spider Orchid	E	V	Species	-	Occurs from Central Coast NSW to southern VIC. Mostly coastal but extends inland to Braidwood in southern NSW. In NSW grows in grassy dry sclerophyll woodland on clay loam or sandy soils, and less commonly in heathland on sandy loam soils.	5 - BioNet, PMST	Low One recent (<10 years) record in the locality. Species not associated with the PCT. Vegetation structure and composition not suitable habitat for the species.

Scientific name	Status		BAM credit type	Habitat constraints and/or geographic limitations	Distribution and habitat	Number of records (source)	Likelihood of occurrence
	BC Act	EPBC Act					
Callistemon linearifolius Netted Bottle Brush	V	-	Species	-	This shrub grows up to 3-4 metres tall, with red flowers that are clustered into the typical "bottlebrushes". The species grows in dry sclerophyll forest on the coast and adjacent ranges.	17 - BioNet, PCT	Low Some records in the locality < 10 years old. Species associated with the PCT & suitable habitat present within the study area. Surveys conducted in accordance with the BAM did not identify the species within the study area.
Chamaesyce psammogeton Sand Spurge	E	-	Species	-	Sparse populations along the coast from south of Jervis Bay to Queensland. Grows on fore-dunes and exposed headlands, often with Spinifex sericeus.	1 - BioNet	Low One historical record (1987) of the species in the locality. Species not associated with the PCT. Vegetation structure and composition not suitable habitat for the species.
Corunastylis sp. Charmhaven (recently described as *Genoplesium branwhiteorum*)	CE	CE	Species	-	Terrestrial orchid currently only known from the Wyong Shire of NSW in the Gorokan/Charmhaven area. It occurs within low woodland to heathland with a shrubby understorey and ground layer. Dominants include Allocasuarina littoralis, Leptospermum juniperinum, Melaleuca nodosa, Callistemon linearis and Schoenus brevifolius. Flowers likely in Feb-Mar.	75 - BioNet, PCT, PMST	Low Recent (<10 years) records of the species in the locality. Species associated with the PCT & suitable habitat present within the study area. Surveys conducted in accordance with the BAM did not identify the species within the study area.

Scientific name	Status		BAM credit type	Habitat constraints and/or geographic limitations	Distribution and habitat	Number of records (source)	Likelihood of occurrence
	BC Act	EPBC Act					
Corybas dowlingii Red Helmet Orchid	E	-	Species	-	Tuberous orchid species which grows in clonal colonies. The orchid has a solitary dark green heart-shaped to circular leaf 15-35 millimetres long and 15-35 millimetres wide ending in a sharp point. The solitary, erect flower grows close to the ground and is dark purplish red with whitish areas in the labellum. Sheltered areas such as gullies and southerly slopes in tall open forest on well-drained gravelly soil at elevations of 10-200 metres; though the species has been recorded from sandy soils in swamp forest areas (e.g., Medowie, Anna Bay, Wauchope and Port Macquarie). The species is also associated with closely related PCTs to the vegetation on site (3582 & 3581).	3 - BioNet	Low Recent records of the species in the locality. Suitable habitat present within the study area. Surveys conducted in accordance with the BAM did not identify the species within the study area.
Cryptostylis hunteriana Leafless Tongue Orchid	V	V	Species	-	The species occurs in coastal areas from East Gippsland to southern Queensland. Habitat preferences for this species are not well defined, however it is known to grow in coastal heathlands, margins of coastal swamps and sedgelands, coastal forest, dry woodland, and lowland forest. Prefers open areas in the understorey and is often found in association with Cryptostylis subulata and Cryptostylis erecta.	53 - BioNet, PCT, PMST	Low Recent (<10 years) records of the species in the locality. Species associated with the PCT & suitable habitat present within the study area. Surveys conducted in accordance with the BAM did not identify the species within the study area.
Cynanchum elegans Whie-flowered Wax Plant	E	E	Species		The species occurs north of Sydney, in the Baulkham Hills, Hawkesbury and Hornsby LGAs, may also occur in the western part of Gosford LGA. Habitat for the species includes Hawkesbury sandstone, commonly amongst rocky outcrops and boulders in sheltered forests on mid- to lower slopes and valleys.	PMST	Unlikely No records of the species in the locality. Species not associated with the PCT. No suitable habitat within the study area.
Diuris praecox Rough Doubletail	V	V	Species	Within the Parish boundaries of Newcastle, Kahibah, Wallarah, Tuggerah and Kincumber	Occurs between Ourimbah and Nelson Bay on the New South Wales (NSW) north coast. This species has also been identified on the Wallarah Peninsula, near Lake Macquarie in NSW. Grows on hills and slopes of near-coastal districts, in open heathy forests which have a grassy to fairly dense understorey.	223 - BioNet, PCT, PMST	Low Recent (<10 years) records of the species in the locality. Surveys conducted in accordance with the BAM did not identify the species within the study area.

Scientific name	Status		BAM credit type	Habitat constraints and/or geographic limitations	Distribution and habitat	Number of records (source)	Likelihood of occurrence
	BC Act	EPBC Act					
Eucalyptus camfieldii Camfield's Stringybark	V	V	Species	-	Occurs from Raymond Terrace to Waterfall, with populations known from Norah Head (Tuggerah Lakes), Peats Ridge, Mt Colah, Elvina Bay Trail (West Head), Terrey Hills, Killara, North Head, Menai and the Royal NP. Occurs in exposed situations on sandstone plateaus, ridges and slopes near the coast, often on the boundary of tall coastal heaths or low open woodland. It grows in shallow sandy soils overlying Hawkesbury sandstone.	5 - BioNet, PCT, PMST	Low One recent record (<10 years) of the species in the locality. Surveys conducted in accordance with the BAM did not identify the species within the study area.
Eucalyptus parramattensis subsp. *Decadens* Earp's Gum	V	V	Species	-	A woodland tree, up to 15 metres in height. Bark sheds in large plates to leave a smooth, granular and mottled white or grey surface. It occurs in dry sclerophyll woodland with dry heath understorey requiring deep, low-nutrient sands.	4 - BioNet, PMST	Low Recent records of the species in the locality. Marginal habitat within the study area. Surveys conducted in accordance with the BAM did not identify the species within the study area.
Eucalyptus parramattensis subsp. *Parramattensis* Endangered Population in the Wyong & Lake Macquarie Local Government Areas	EP	-	Species	Wyong and Lake Macquarie LGAs	This species is a small to medium-sized woodland tree. The species bark sheds in large plates to reveal a smooth or matt mottled grey-white surface The adult leaves of the species are dull green, lance-shaped and 7 - 20 cm long and 1 - 3.5 cm wide. The white flowers appear in clustered groups of seven and the fruit is ball-shaped. This species grows in low moist areas alongside drainage lines and adjacent to wetlands. It is often found in woodland on sandy soils.	14 – BioNet, PCT	Low Suitable habitat and records of the species in the locality (within the last 10 years). Surveys conducted in accordance with the BAM did not identify the species within the study area.
Euphrasia arguta -	CE	CE	Species	-	Known from Nundle State Forest and adjacent private land, in New South Wales. The species is known from three locations in two areas approximately 14 km apart. Occur in eucalypt forest with a mixed grass and shrub understorey within Nundle State Forest.	PMST	Unlikely No records of the species in the locality. Species not associated with the PCT. No suitable habitat within the study area.

Scientific name	Status		BAM credit type	Habitat constraints and/or geographic limitations	Distribution and habitat	Number of records (source)	Likelihood of occurrence
	BC Act	EPBC Act					
Genoplesium insigne Variable Midge Orchid	CE	CE	Species	-	Terrestrial orchid with a solitary cylindrical leaf that encloses the flowering stem. The leaf is 6 to 15 cm long, 0.15 cm wide and dark green with a reddish base. The flowering stem is 9 to 18 cm tall, bearing 5 to 12 flowers in a moderately dense spike, 15-25 millimetres long. Flowers are dark purple and approximately 5 millimetres in diameter. Grows in patches of Themeda australis (Kangaroo Grass) amongst shrubs and sedges in heathland and forest.	161 - BioNet, PCT, PMST	Low Multiple recent (<10 years) records of the species in the locality. Surveys conducted in accordance with the BAM did not identify the species within the study area.
Grevillea parviflora subsp. *parviflora* Small-flowered Grevillea	V	V	Species	-	The species distribution is between Moss Vale/Bargo and the lower Hunter Valley, with most occurrences in Appin, Wedderburn, Picton and Bargo. The habitat for the species is broad including heath, shrubby woodland and open forest on light clay or sandy soils, and often in disturbed areas such as on the fringes of tracks.	2 - BioNet, PCT, PMST	Low Recent (<10 years) records of the species in the locality. Species associated with the PCT & suitable habitat present within the study area. Surveys conducted in accordance with the BAM did not identify the species within the study area.
Macadamia integrifolia Macadamia Nut	-	V	Species	-	This species is not known to occur naturally in NSW. Grows in remnant rainforest preferring partially open areas such as rainforest edge.	4 - BioNet	Low No suitable habitat within the study area. Species not naturally occurring in NSW.
Melaleuca biconvexa Biconvex Paperbark	V	V	Species	-	Scattered, disjunct populations in coastal areas from Jervis Bay to Port Macquarie, with most populations in the Gosford-Wyong areas. Grows in damp places, often near streams or low-lying areas on alluvial soils of low slopes or sheltered aspects.	8 - BioNet, PMST	Low One recent (<10 years) record of the species in the locality. No suitable habitat for the species in the study area. Species not associated with the PCT within the study area.

Scientific name	Status		BAM credit type	Habitat constraints and/or geographic limitations	Distribution and habitat	Number of records (source)	Likelihood of occurrence
	BC Act	EPBC Act					
Persicaria elatior Tall Knotweed	V	V	Species	Semi-permanent/ephemeral wet areas; or within 50 metres. Swamps; or within 50 metres. Waterbodies; including Wetlands, or within 50 metres.	Grows in damp places, especially beside streams and lakes. Occasionally in swamp forest or associated with disturbance.	PMST	Unlikely No records of the species in the locality. Species not associated with the PCT. No suitable habitat within the study area.
Pultenaea maritima Coastal Headland Pea	V	-	Species	-	Prostrate, mat forming shrub with hairy stems. Its leaves are 3.5-5 millimetres long, 1.8-2.8 millimetres wide, with incurved margins. The stipules (at the leaf bases) are 1.1-2 millimetres long. Inflorescences are leafy and appear at or towards the ends of branches. The pea-flowers are 6.5-10 millimetres long on stalks about 0.5 millimetres long. The species occurs in grasslands, shrublands and heath on exposed coastal headlands and adjoining low coastal heath.	7 - BioNet	Low Recent (<10 years) records of the species in the locality. No suitable habitat for the species in the study area. Species not associated with the PCT within the study area.
Rhizanthella slateri Eastern Underground Orchid	E	E	Species	-	The species grows in eucalypt forest but no informative assessment of the likely preferred habitat for the species is available. Currently known only from 10 locations, including near Bulahdelah, the Watagan Mountains, the Blue Mountains, Wiseman's Ferry area, Agnes Banks and near Nowra.	PCT, PMST	Low No records of the species in the locality. Species associated with the PCT. Habitat within the study area not degraded to allow for exclusion. Surveys conducted in accordance with the BAM did not identify the species within the study area.
Rhodamnia rubescens Scrub Terpentine	E	CE	Species	-	Small shrub to tree up to 25 metres tall occurring in coastal districts north from Batemans Bay in NSW to areas of inland Bundaberg, QLD. Found in littoral, warm temperate and subtropical rainforest and wet sclerophyll forest usually on volcanic and sedimentary soils.	240 - BioNet, PMST	Low Recent (<10 years) records of the species in the locality. No suitable habitat for the species in the study area. Species not associated with the PCT within the study area.

Scientific name	Status		BAM credit type	Habitat constraints and/or geographic limitations	Distribution and habitat	Number of records (source)	Likelihood of occurrence
	BC Act	EPBC Act					
Rhodomyrtus psidioides Native Guava	CE	CE	Species	-	Pioneer species found in littoral, warm temperate and subtropical rainforest and wet sclerophyll forest often near creeks and drainage lines. Populations are typically restricted to coastal and sub-coastal areas of low elevation. However, the species does occur up to approximately 120 km inland in the Hunter and Clarence River catchments and along the Border Ranges in NSW. Distribution N – Maryborough Qld, S – Broken Bay NSW.	3 - BioNet, PMST	Low One recent (<10 years) record of the species in the locality. No suitable habitat for the species in the study area. Species not associated with the PCT within the study area.
Rutidosis heterogama Heath Wrinklewort	V	V	Species	-	Small perennial herb of the daisy family to 30 cm. Grows in heath on sandy soils and moist areas in open forest, and has been recorded along disturbed roadsides. The species has a scattered distribution in coastal locations between Wyong and Evans Head and on the New England Tablelands from Torrington and Ashford south to Wandsworth south-west of Glen Innes.	231 - BioNet, PMST	Low Multiple recent (<10 years) records of the species in the locality. Potential habitat present within the study area. Surveys conducted in accordance with the BAM did not identify the species within the study area.
Syzygium paniculatum Magenta Lily Pilly	E	V	Species	-	The species occurs in a narrow coastal strip from Bulahdelah to Conjola State Forest. Rainforest on sandy soils or stabilised Quaternary sand dunes at low altitudes in coastal areas, often in remnant littoral or gallery rainforests. Plants produce white flower-clusters at the end of each branch is the preferred habitat for this species. The petals are small accompanied by prominent long stamens.	22 - BioNet, PMST	Low Recent (<10 years) records of the species in the locality. No suitable habitat for the species in the study area. Species not associated with the PCT within the study area.
Tetratheca juncea	V	V	Species	-	Regarded as extinct within the Sydney area, current range from Wyong north to Bulahdelah and inland 50km to edge of Sugarloaf Range. Occurs predominately in areas of over 1000 millimetres annual rainfall, within dry sclerophyll forest, and sometimes heath and moist forest, with a preference for Coastal Plains Smooth-barked Apple Woodland and Coastal Plains Scribbly Gum Woodland.	1,011 - BioNet, PCT, PMST	**Known** Recent (<10 years) records of the species in the locality, including one 'credible' record (description notes match location, and location accuracy = 10 m). A total of 16 individuals identified within the study area (outside the Impact Area).

Scientific name	Status		BAM credit type	Habitat constraints and/or geographic limitations	Distribution and habitat	Number of records (source)	Likelihood of occurrence
	BC Act	EPBC Act					
Thelymitra adorata	CE	CE	Species	-	Currently known from a few localised occurrences in the area bounded by the towns of Wyong, Warnervale and Wyongah on the New South Wales Central Coast, Occurs from 10-40 metres ASL in grassy woodland or occasionally derived grassland in well-drained clay loam or shale derived soils. The vegetation type in which the majority of populations occur (including the largest colony) is a Spotted Gum - Ironbark Forest with a diverse grassy understorey and occasional scattered shrubs.	3 - BioNet, PCT, PMST	Low Recent (<10 years) records of the species in the locality. Species associated with the PCT & potential habitat present within the study area. Surveys conducted in accordance with the BAM did not identify the species within the study area.
Thesium australe	V	V	Species	-	The species occurs in very small populations scattered across eastern NSW, along the coast, and from the Northern to Southern Tablelands. Habitat for this species includes grassland on coastal headlands or grassland and grassy woodland away from the coast.	PMST	Unlikely No records of the species in the locality. Species not associated with the PCT. No suitable habitat within the study area.
Amphibians							
Crinia tinnula Wallum Froglet	V	-	Species	Non-breeding habitat is any area of suitable PCT located on the impact area.	Found in a wide range of habitats, usually associated with acidic swamps on coastal sand plains. They typically occur in sedgelands and wet heathlands under leaf litter, vegetation and other debris. In NSW the species extends from north of the Queensland border south to Kurnell. Breeding occurs in colder months.	144 -BioNet, PCT	High Suitable habitat within the study area
Heleioporus australiacus Giant Burrowing Frog	V	V	Species	Non-breeding habitat is any area of PCT on the impact area that is located within 300 metres of suitable breeding habitat as individuals can be expected to migrate up to 300 metres from breeding habitat to establish territories of essential non-breeding habitat.	The species occurs along the coast and eastern slopes of the Great Dividing Range south from Wollemi National Park, appearing to exist as 2 populations between Jervis Bay and Eden. Habitat for the species includes sandy soils supporting heath, woodland or open forest. The species breeds in ephemeral to intermittent streams with persistent pools. Only infrequently moves to breeding sites, most commonly found on ridges away from creeks, several hundred metres from water.	PCT	Low

Scientific name	Status		BAM credit type	Habitat constraints and/or geographic limitations	Distribution and habitat	Number of records (source)	Likelihood of occurrence
	BC Act	EPBC Act					
Litoria aurea Green and Golden Bell Frog	E	V	Species	Semi-permanent/ephemeral wet areas; Within 1km of wet areas/Swamps; Within 1km of swamp/Waterbodies; Within 1km of waterbody	Prefers the edges of permanent water, streams, swamps, creeks, lagoons, farm dams and ornamental ponds. Often found under debris. Distribution limit: N-Byron Bay S-South of Eden.	6 – BioNet, PCT, PMST	Low
Mixophyes balbus Stuttering Frog	E	V	Species	Nonbreeding habitat is native vegetation located within 500 metres of a breeding site; the species is known to move long distances from breeding sites.	The species occurs along the east coast of Australia. Habitat for the species includes rainforest and wet, tall, open forest, sheltering in deep leaf litter and thick understorey vegetation on the forest floor. Within Sydney Basin the species is now confined to populations in the Watagan Mountains, the southern Blue Mountains and Macquarie Pass. The species does not occur in areas where the riparian vegetation has been disturbed or where there have been significant upstream human impacts.	PCT, PMST	Low
Mixophyes iteratus Giant Barred Frog	E	E	Species	Other; Land within 50 metres of semi-permanent and permanent drainages	Occurs on the coast and ranges from south-eastern QLD to the Hawkesbury River in NSW, particularly in Coffs Harbour - Dorrigo area. Forage and live amongst deep, damp leaf litter in rainforest, moist eucalypt forest and nearby dry eucalypt forest. Breed in shallow, flowing rocky streams. Within Sydney Basin, confined to small populations in tall, wet forest in the Watagan Mountains north of the Hawkesbury and the lower Blue Mountains.	PCT, PMST	Low
Uperoleia mahonyi Mahony's Toadlet	E	E	Species	Suitable breeding habitat consists of ephemeral and semi-permanent swamps and swales that occur within areas of native vegetation. Non-breeding habitat is similar swampy native vegetation located within 400 metres of suitable breeding habitat (Webster & Clulow 2019).	Inhabits ephemeral and semi-permanent swamps and swales on the coastal fringe of its range. Known records occur in heath or wallum habitats almost exclusively associated with leached (highly nutrient impoverished) white sand. Commonly associated with acid paperbark swamps, also is known to occur in wallum heath, swamp mahogany-paperbark swamp forest, heath shrubland and Sydney red gum woodland. Distribution limit: N-Seal Rocks S-Kangy Angy (to date)	PCT, PMST	Low
Birds							

Scientific name	Status		BAM credit type	Habitat constraints and/or geographic limitations	Distribution and habitat	Number of records (source)	Likelihood of occurrence
	BC Act	EPBC Act					
Anthochaera phrygia Regent Honeyeater	E	CE	Species/ Ecosystem	Other; As per Important Habitat Map	In NSW the species is confined to two known breeding areas: the Capertee Valley and Bundarra-Barraba region. Non-breeding flocks are seen occasionally in coastal areas foraging in flowering Spotted Gum and Swamp Mahogany forests. Habitat for the species includes dry open forest and woodlands, particularly Box-Ironbark woodland and riparian forests of River Sheoak, with an abundance of mature trees, high canopy cover and abundance of mistletoes.	24 – BioNet, PMST	Low Not mapped as important habitat. Lack of preferred feed trees within study area. Areas of suitable habitat occurs outside study area in surrounding vegetation.
Artamus cyanopterus cyanopterus Dusky Woodswallow	V	-	Ecosystem	-	Found in woodlands and dry open sclerophyll forests, usually dominated by eucalypts, including mallee associations. It has also been recorded in shrublands and heathlands and various modified habitats, including regenerating forests, very occasionally in moist forests or rainforests. Prefers habitat with an open understorey. Often observed in farmland tree patches or roadside remnants.	46 – BioNet,	Moderate Suitable habitat within the study area.
Botaurus poiciloptilus Australasian Bittern	E	E	Ecosystem	Brackish or freshwater wetlands	Found in or over water of shallow freshwater or brackish wetlands with tall reedbeds, sedges, rushes, cumbungi, lignum and also in rice fields, drains in tussocky paddocks, occasionally saltmarsh, brackish wetlands.	PMST	Unlikely Habitat constrains not met. No records of the species in the locality.
Burhinus grallarius Bush Stone-curlew	E	-	Species	Fallen/standing dead timber including logs	Scattered distribution across NSW. Inhabits lowland grassy woodland and open forest and, in coastal areas, Casuarina and Melaleuca woodlands, saltmarsh and mangroves. Requires a low, sparse groundcover, some fallen timber and leaf litter, and a general lack of a shrubby understory.	PCT	Unlikely Habitat constraints not met. No records of the species in the locality.
Callocephalon fimbriatum Gang-gang Cockatoo	V	E	Species	Hollow bearing trees; Eucalypt tree species with hollows at least 3 metres above the ground and with hollow diameter of 7 cm or larger	In spring and summer, generally found in tall mountain forests and woodlands, particularly in heavily timbered and mature wet sclerophyll forests. In autumn and winter, the species often moves to lower altitudes in drier more open eucalypt forests and woodlands, particularly box-gum and box-ironbark assemblages, or in dry forest in coastal areas and often found in urban areas. May also occur in sub-alpine Snow Gum (Eucalyptus pauciflora) woodland and occasionally in temperate rainforests.	2 – BioNet, PMST	Unlikely Habitat constrains not met (no suitable hollows). Marginal foraging habitat for the species. Only one record within the past 10 years (2014) in the locality.

Scientific name	Status		BAM credit type	Habitat constraints and/or geographic limitations	Distribution and habitat	Number of records (source)	Likelihood of occurrence
	BC Act	EPBC Act					
Calyptorhynchus lathami lathami South-eastern Glossy Black-Cockatoo	V	V	Species/ Ecosystem	Other; Presence of Allocasuarina and casuarina species Hollow bearing trees; Living or dead tree with hollows greater than 15cm diameter and higher than 8 metres above ground.	A small brown – black cockatoo with a large bill, short crest, and a colored tail panel. Males typically have red tail panels and females have yellow to orange. Feeds almost exclusively on the seeds of several species of she-oak (Casuarina and Allocasuarina species) therefore inhabiting open forests and woodlands. 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.	61 – BioNet, PMST	Moderate – High Species has been recorded in the locality in recent years (2023 most recent record). Suitable foraging habitat present within the woodland and degraded zones due to presence and dominance of *A. littoralis*. No suitable hollows were identified within the study area.
Chthonicola sagittata Speckled Warbler	V	-	Ecosystem	-	Within NSW most frequently reported from the hills and tablelands of the Great Dividing Range, rarely from the coast. The species inhabits a wide range of Eucalypt-dominated communities with a grassy understorey, a sparse shrub layer, often on rocky ridges or in gullies. Sedentary and requires large, relatively undisturbed remnants to persist in an area. Forages on the ground for seeds and insects, and nests in a slight hollow in the ground or at the base of low dense plants.	1 - BioNet	Unlikely Vegetation within the study area does not provide suitable foraging habitat for the species.
Circus assimilis Spotted Harrier	V	-	Species/ Ecosystem	-	Occurs in grassy open woodland including Acacia and mallee remnants, inland riparian woodland, grassland and shrub steppe. It is found most commonly in native grassland, but also occurs in agricultural land, foraging over open habitats including edges of inland wetlands. Builds a stick nest in a tree and lays eggs in spring (or sometimes autumn).	2 - BioNet	Low Marginal foraging habitat for the species in the study area.
Climacteris picumnus victoriae Brown Treecreeper (eastern subspecies)	V	-	Ecosystem	-	Small grey-brown bird with black streaking on the lower breast/belly and black bars on the undertail. Inhabits Box-Gum woodlands and dry open forest of inland slopes and plains. Preferred woodlands dominant by stringybarks or other rough-barked eucalypts. Forages in trees and on the ground. Endemic to eastern Australia, occurring from the coast to inland plains and western slopes of the Great Dividing Range. Nests in tree or stump hollows greater than 6cm.	3 – BioNet, PMST	Unlikely Vegetation within the study area does not provide suitable foraging habitat for the species.

Scientific name	Status		BAM credit type	Habitat constraints and/or geographic limitations	Distribution and habitat	Number of records (source)	Likelihood of occurrence
	BC Act	EPBC Act					
Daphoenositta chrysoptera Varied Sittella	V	-	Ecosystem	-	Sedentary, occurs across NSW from the coast to the far west. Inhabits eucalypt forests and woodlands, especially rough-barked species and mature smooth-barked gums with dead branches, mallee and Acacia woodland. Sensitive to habitat isolation and loss of structural complexity, and adversely affected by dominance of Noisy Miners. Cleared agricultural land is potentially a barrier to movement. Builds a cup-shaped nest of plant fibres and cobwebs in an upright tree fork high in the living tree canopy, and often re-uses the same fork or tree in successive years.	55 - BioNet	Moderate
Ephippiorhynchus asiaticus Black-necked Stork	E	-	Ecosystem	Shallow, open freshwater or saline wetlands or shallow edges of deeper wetlands within 300 metres of these swamps. Shallow lakes, lake margins and estuaries within 300 metres of these waterbodies	Primarily inhabits permanent freshwater wetlands and surrounding vegetation including swamps, floodplains, watercourses and billabongs, freshwater meadows, wet heathland, farm dams and shallow floodwaters. Will also forage in inter-tidal shorelines, mangrove margins and estuaries. Feeds in shallow, still water. This species breeds during summer, nesting in or near a freshwater swamp.	7 - BioNet	Unlikely Habitat constrains not met
Epthianura albifrons White-fronted Chat	V	-	Ecosystem	-	Small passerine bird 12cm in length, with a short slender bill, square tipped tail, and rounded wings. Found mostly in temperate to arid climates and very rarely sub-tropical areas, it occupies foothills and lowlands up to 1000 metres 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. Two isolated sub-populations of are currently known from the Sydney Metropolitan Catchment Management Authority (CMA) area; one at Newington Nature Reserve and one at Towra Point Nature Reserve.	2 - BioNet	Unlikely Vegetation within the study area does not provide suitable foraging habitat for the species.
Erythrotriorchis radiatus Red Goshawk	E	V	Species	-	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.	PMST	Unlikely Marginal habitat within the study area. Species not known from the locality.

Scientific name	Status		BAM credit type	Habitat constraints and/or geographic limitations	Distribution and habitat	Number of records (source)	Likelihood of occurrence
	BC Act	EPBC Act					
Falco hypoleucos Grey Falcon	V	V	Species/ Ecosystem	-	Medium-sized, compact, pale falcon with a heavy, thick-set, deep-chested appearance. The species is sparsely distributed in NSW, chiefly throughout the Murray-Darling Basin, with the occasional vagrant east of the Great Dividing Range. Usually restricted to shrubland, grassland and wooded watercourses of arid and semi-arid regions, although it is occasionally found in open woodlands near the coast.	PMST	Unlikely Marginal habitat within the study area. Species not known from the locality.
Falco subniger Black Falcon	V	-	Species/ Ecosystem	-	Widely, but sparsely, distributed in New South Wales, mostly occurring in inland regions. 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 over hundreds of kilometres. The Black Falcon inhabits woodland, shrubland and grassland in the arid and semi-arid zones, especially wooded watercourses and agricultural land with scattered remnant trees.	1 - BioNet	Unlikely Marginal habitat within the study area. No recent (<10 years) records of the species in the locality.
Gallinago hardwickii Latham's Snipe	-	V, M	Ecosystem		In Australia, Latham's Snipe occurs in permanent and ephemeral wetlands up to 2000 metres above sea-level.	PMST	Unlikely No suitable habitat within the study area. Species not known from the Locality.
Grantiella picta Painted Honeyeater	V	V	Ecosystem	Mistletoes present at a density of greater than five mistletoes per hectare	The species is nomadic, occurring in low densities across most of NSW. Highest concentrations and almost all breeding occur on inland slopes of the Great Dividing Range. Habitat for the species includes Boree, Brigalow and Box Gum woodlands and Box-Ironbark forests.	PMST	Unlikely No suitable habitat within the study area due to the lack of Mistletoe. No records of the species in the locality.

Scientific name	Status		BAM credit type	Habitat constraints and/or geographic limitations	Distribution and habitat	Number of records (source)	Likelihood of occurrence
	BC Act	EPBC Act					
Glossopsitta pusilla Little Lorikeet	V	-	Ecosystem	-	The species occurs from the coast to western slopes of the Great Dividing Range and inhabits dry, open eucalypt forests and woodlands. Occurrence is positively associated with patch size, and with components of habitat complexity including canopy cover, shrub cover, ground cover, logs, fallen branches and litter. Feed primarily on profusely-flowering eucalypts and a variety of other species including melaleucas and mistletoes. On the western slopes and tablelands Eucalyptus albens and E. melliodora are particularly important food sources for pollen and nectar respectively. Mostly nests in small (opening approx. 3cm) hollows in living, smooth-barked eucalypts, especially Eucalyptus viminalis, E. blakelyi and E. dealbata. Most breeding records are from the western slopes.	80 - BioNet	Low – Moderate Very low availability of suitable foraging habitat within the study area due to lack of dominant mature Eucalypt canopy (scattered). No suitable hollows present. Higher quality habitat for the species in the surrounding area. Species may forage in the study area.
Haliaeetus leucogaster White-bellied Sea-Eagle	V	-	Species/ Ecosystem	Waterbodies; Within 1km of rivers, lakes, large dams or creeks, wetlands and coastlines Other; Living or dead mature trees within suitable vegetation within 1km of rivers, lakes, large dams or creeks, wetlands and coastlines	The White-bellied Sea-Eagle is found in coastal habitats (especially those close to the seashore) and around terrestrial wetlands in tropical and temperate regions of mainland Australia and its offshore islands. Feed mainly on fish and freshwater turtles, but also waterbirds, reptiles, mammals and carrion. Breeding habitat consists of mature tall open forest, open forest, tall woodland, and swamp sclerophyll forest close to foraging habitat. Nest trees are typically large emergent eucalypts and often have emergent dead branches or large dead trees nearby which are used as 'guard roosts'. Nests are large structures built from sticks and lined with leaves or grass.	392 - BioNet	Unlikely Habitat constrains not met – no suitable foraging of nesting habitat.
Hirundapus caudacutus White-throated Needletail	V	V, M	Ecosystem	-	Widespread in eastern and south-eastern Australia. In Australia, the White-throated Needletail is almost exclusively aerial, from heights of less than 1 metre up to more than 1000 metres above the ground.	115 – BioNet, PMST	High Suitable aerial foraging habitat. Recent (<10 years) records of the species in the locality.
Hieraaetus morphnoides Little Eagle	V	-	Species/ Ecosystem	Other; Nest trees - live (occasionally dead) large old trees within vegetation.	Occurs throughout NSW except most densely forested parts of the Dividing Range escarpment. Occupies habitats rich in prey within open eucalypt forest, woodland or open woodland. Sheoak or acacia woodlands and riparian woodlands of interior NSW are also used. For nest sites it requires a tall living tree within a remnant patch, where pairs build a large stick nest in winter and lay in early spring.	6 -BioNet,	Low Marginal foraging habitat within the study area. No nest trees present. One recent record of the species in the locality.

Scientific name	Status		BAM credit type	Habitat constraints and/or geographic limitations	Distribution and habitat	Number of records (source)	Likelihood of occurrence
	BC Act	EPBC Act					
Ixobrychus flavicollis Black Bittern	V	-	Ecosystem	Land within 40 metres of freshwater and estuarine wetlands, in areas of permanent water and dense vegetation	This species is a heron, black in colour with distinct yellow streaks down the head and neck. Distribution: southern NSW to Cape York. Inhabits both terrestrial and estuarine wetlands, generally in areas of permanent water and dense vegetation. Where permanent water is present, the species may occur in flooded grassland, forest, woodland, rainforest and mangroves. In NSW, records of the species are scattered along the east coast, with individuals rarely being recorded south of Sydney or inland.	3 - BioNet	Unlikely Habitat constrains not met
Lathamus discolor Swift Parrot	E	CE	Species/ Ecosystem	Other; As per Important Habitat Map	A migratory species that travels to the mainland from March to October, the species breeds in Tasmania from September to January. Principal over-winter habitat is box-ironbark communities on the inland slopes and plains. Eucalyptus robusta, Corymbia maculata and C. gummifera dominated coastal forests are also important habitat.	185 – BioNet, PMST	Moderate Species known from the locality and in the surrounding area. The study area contains some suitable foraging habitat, however, there is a lack of mature canopy trees. Important habitat mapping for the species occurs within the northern portion of the study area.
Lophoictinia isura Square-tailed Kite	V	-	Species/ Ecosystem	Other; Nest trees	Found in a variety of timbered habitats including dry woodlands and open forests. Shows a particular preference for timbered water courses. In arid north-western NSW, has been observed in stony country with a ground cover of chenopods and grasses, open acacia scrub and patches of low open eucalypt woodland. Breeding is from July to February.	24 – BioNet	Low - moderate Marginal foraging habitat within the study area. No suitable nesting habitat. Recent records of the species in the locality.
Melanodryas cucullata cucullata Hooded Robin (south-eastern form)	V	-	Ecosystem	-	Widespread, found across Australia, except for the driest deserts and the wetter coastal areas - northern and eastern coastal Queensland and Tasmania. The south-eastern form (subspecies cucullata) is found from Brisbane to Adelaide and throughout much of inland NSW. Prefers lightly wooded country, usually open eucalypt woodland, acacia scrub and mallee, often in or near clearings or open areas. Requires structurally diverse habitats featuring mature eucalypts, saplings, some small shrubs and a ground layer of moderately tall native grasses.	PMST	Unlikely Marginal habitat. No record of the species in the locality.

Scientific name	Status		BAM credit type	Habitat constraints and/or geographic limitations	Distribution and habitat	Number of records (source)	Likelihood of occurrence
	BC Act	EPBC Act					
melithreptus gularis gularis Black-chinned Honeyeater (eastern subspecies)	V	-	Ecosystem	-	Occupies mostly upper levels of drier open forests or woodlands dominated by box and ironbark eucalypts. Also inhabits open forests of smooth-barked gums, stringybarks, ironbarks, river sheoaks (nesting habitat) and tea-trees. Breeds solitarily or co-operatively, with up to five or six adults, from June to December.	PCT	Unlikely No suitable habitat. No record of the species in the locality.
Neophema pulchella Turquoise Parrot	V	-	Species	-	Inhabits fringes of eucalypt woodlands, often adjacent to clearings, ridges and farmland creeks. Typically forages on the ground under trees. Distributed from southern Queensland to northern Victoria, extending from the coast to the western slopes of the Great Dividing Range. Nesting occurs from December to August in tree hollows.	2 - BioNet	Low Marginal habitat within the study area. One recent record of the species in the locality.
Nettapus coromandelianus Cotton Pygmy-Goose	E	-	Species	Waterbodies; Deep permanent fresh waters on floodplains with floating and submergent vegetation.	Small surface-feeding duck with a goose-like bill. Although once found from north Queensland to the Hunter River in NSW, the Cotton Pygmy-Goose is now only a rare visitor to NSW. Uncommon in Queensland. The species inhabits freshwater lakes, lagoons, swamps and dams, particularly those vegetated with waterlilies and other floating and submerged aquatic vegetation.	PCT	Unlikely Habitat constrains not met.
Ninox connivens Barking Owl	V	-	Species	Hollow bearing trees; a living or dead tree with a hollow >20 cm diameter that occurs >4 metres above the ground	Occurs from coast to inland slopes and plains, though is rare in dense, wet forests east of the Great Dividing Range and sparse in higher parts of the tablelands and in the arid zone. Inhabits eucalypt woodlands, open forest, swamp woodlands, and, especially in inland areas, timber along watercourses. Roosts along creek lines in dense, tall understorey foliage (e.g. in Acacia and Casuarina), or dense eucalypt canopy. Nests in hollows of large, old eucalypts including Eucalyptus camaldulensis, Eucalyptus albens, Eucalyptus polyanthemos and Eucalyptus blakelyi. Birds and mammals' important prey during breeding. Territories range from 30 to 200 hectares.	3 – BioNet, PCT	Low – moderate Suitable foraging habitat within the study area. No suitable nest trees identified. One recent record of the species in the locality.
Ninox strenua Powerful Owl	V	-	Species	Hollow bearing trees: a living or dead tree with a hollow >20 cm diameter that occurs >4 metres above the ground	Forests containing mature trees for shelter or breeding and densely vegetated gullies for roosting. Breeding requires large tree hollows >20 cm diameter. Distribution limits: N-Border Ranges National Park. S-Eden	83 - BioNet, PCT	Moderate Suitable foraging habitat within the study area. No suitable nest trees identified. Multiple recent record of the species in the locality.

Scientific name	Status		BAM credit type	Habitat constraints and/or geographic limitations	Distribution and habitat	Number of records (source)	Likelihood of occurrence
	BC Act	EPBC Act					
Pandion cristatus Eastern Osprey	V	-	Species/ Ecosystem	Other; Presence of stick-nests in living and dead trees (>15 metres) or artificial structures within 100 metres of a floodplain for nesting	Favor coastal areas, especially the mouths of large rivers, lagoons and lakes. Feed on fish over clear, open water. Breed from July to September in NSW. Nests are made high up in dead trees or in dead crowns of live trees, usually within one kilometres of the sea.	48 – BioNet,	Unlikely Habitat constrains not met.
Petroica boodang Scarlet Robin	V	-	Ecosystem	-	Lives in dry eucalypt forests and woodlands. The understorey is usually open and grassy with few scattered shrubs. It occasionally occurs in mallee or wet forest communities, or in wetlands and tea-tree swamps. Habitat usually contains abundant logs and fallen timber: these are important components of its habitat. Mainly breed between the months of July and January.	2 - BioNet	Unlikely Vegetation does not provide suitable habitat for the species. No recent records of the species in the locality.
Petroica phoenicea Flame Robin	V	-	Ecosystem	N/A	Prefers clearings or areas with open understories. Occasionally occurs in temperate rainforest, and in herb fields, heathlands, shrublands and sedgelands at high altitudes. In winter lives in dry forests, open woodlands and in pastures and native grasslands, with or without scattered trees.	PCT	Unlikely Vegetation does not provide suitable habitat for the species. No records of the species in the locality.
Pomatostomus temporalis temporalis Grey-crowned Babbler (eastern subspecies)	V	-	Ecosystem	-	Fairly large brown babbler with distinctive white/grey crown and brow. Live in family groups of up to 15 birds. Inhabits Box-Gum woodlands on slopes, and Box-Cypress pine and Open-Box woodlands when on Alluvial plains. Distribution along most of the eastern side of Australia, particularly the western slopes of the Great Dividing Range. Breeding occurs between July and February. Several conspicuous dome-shaped nests are built and maintained in shrubs, sapling eucalypts or lower branches of larger eucalypts. Territories are usually around 10ha but can be up to 50ha.	2- BioNet	Lowy Marginal habitat for the species in the study area. No recent records of the species in the locality.
Ptilinopus magnificus Wompoo Fruit-Dove	V	-	Ecosystem	-	Occurs from Hunter River to Cape York, but rare south of Coffs Harbour. No recent records from Illawarra where it once occurred. Inhabits rainforest, low elevation moist eucalypt forest and brush box forests, mostly in mature forest but also remnant and regenerating rainforest. Feeds on fruit and is locally nomadic following food availability. Builds nest platform on thin branch or palm frond, often over water, usually 3-10 metres above ground.	1 - BioNet	Unlikely Vegetation does not provide suitable habitat for the species.

Scientific name	Status		BAM credit type	Habitat constraints and/or geographic limitations	Distribution and habitat	Number of records (source)	Likelihood of occurrence
	BC Act	EPBC Act					
Ptilinopus regina Rose-crowned Fruit-Dove	V	-	Ecosystem	-	Occur mainly in sub-tropical and dry rainforest and occasionally in moist eucalypt forest and swamp forest. Some populations are migratory in response to food availability.	3 - BioNet	Unlikely Vegetation does not provide suitable habitat for the species.
Ptilinopus superbus Superb Fruit-Dove	V	-	Ecosystem	-	Occurs mainly north from NE NSW, much less common further south and largely confined to pockets of habitat south to Moruya. Vagrants occur south to VIC and TAS. Inhabits rainforest and closed forests, may also forage in eucalypt or acacia woodland with fruit-bearing trees. Nests 5-30 m above ground in rainforest/rainforest edge tree and shrub species. Part of the population migratory/nomadic.	2 - BioNet	Unlikely Vegetation does not provide suitable habitat for the species.
Pycnoptilus floccosus Pilotbird	-	V	--	-	Pilotbirds are small terrestrial ground-dwelling birds, living on the ground in dense forests with heavy undergrowth. Critical habitat includes wet sclerophyll forests in temperate zones in moist gullies with dense undergrowth, and dry sclerophyll forests and woodlands occupying dry slopes and ridges. Lowland Pilotbirds occur in forests from the Blue Mountains west of Newcastle, around the wetter forests of eastern Australia, to Dandenong near Melbourne.	PMST	Unlikely Vegetation does not provide suitable habitat for the species. No records of the species in the locality.
Stagonopleura guttata Diamond Firetail	V	-	Ecosystem	-	Found in grassy eucalypt woodlands, including Box-Gum Woodlands and Snow Gum (Eucalyptus pauciflora) Woodlands. Also occurs in open forest, mallee, Natural Temperate Grassland, and in secondary grassland derived from other communities. Often found in riparian areas (rivers and creeks), and sometimes in lightly wooded farmland. Groups separate into small colonies to breed, between August and January.	2 – BioNet, PMST	Low Marginal habitat for the species in the study area. No recent records of the species in the locality.
Turnix maculosus Red-backed Button-quail	V	-	Species		A small, cryptic ground-dwelling bird, inhabiting grasslands, open and savannah woodlands with grassy ground layer, pastures and crops of warm temperate areas. The species extends discontinuously from along northern and eastern Australia in mainly coastal and subcoastal regions, preferring sites near water.	1 - BioNet	Low Marginal habitat for the species in the study area. No recent records of the species in the locality.

Scientific name	Status		BAM credit type	Habitat constraints and/or geographic limitations	Distribution and habitat	Number of records (source)	Likelihood of occurrence
	BC Act	EPBC Act					
Neophema chrysostoma Blue-winged Parrot	V	V, M			Occurs in south-eastern Australia, breeding in Tasmania, and only occurs sporadically across NSW. Throughout their range they favor grasslands and grassy woodlands. They are often found near wetlands and can also be seen in altered environments such as airfields, golf courses and paddocks. Diet includes Wallaby grass *Austrodanthonia*.	PMST	Unlikely Marginal habitat for the species in the study area. No records of the species in the locality.
Tyto novaehollandiae Masked Owl	V	-	Species	Hollow bearing trees; a living or dead tree with a hollow >20 cm diameter that occurs >4 metres above the ground	Occurs across NSW except NW corner. Most common on the coast. Inhabits dry eucalypt woodlands from sea level to 1100 metres. Roosts and breeds in large (>40cm) hollows and sometime caves in moist eucalypt forested gullies. Hunts along the edges of forests and roadsides. Home range between 500 ha and 1000 ha. Prey mostly terrestrial mammals but arboreal species may also be taken.	24 – BioNet, PCT,	Moderate Suitable foraging habitat within the study area. No suitable nest trees identified. Multiple recent record of the species in the locality.
Tyto tenebricosa Sooty Owl	V	-	Species	a living or dead tree with a hollow >20 cm diameter that occurs >4 metres above the ground	Occurs in the coastal, escarpment and tablelands regions of NSW. More common in the north and absent from the western tablelands and further west. Inhabits tall, moist eucalypt forests and rainforests, and are strongly associated with sheltered gullies, particularly those with tall rainforest understorey. Roosts in tree hollows, amongst dense foliage in gullies or in caves, recesses or ledges of cliffs or banks. Nest in large (>40cm wide, 100cm deep) tree hollows in unlogged/unburnt gullies within 100 metres of streams or in caves.	2 - BioNet	Low study area does not provide foraging habitat for the species and no suitable nest trees identified. One recent record of the species in the locality.
Mammals							
Cercartetus nanus Eastern Pygmy-possum	V	-	Species	-	In NSW, has been found in mallee shrubland dominated by either spinifex (Triodia spp.) or with an understorey of tea-tree (Leptospermum spp.) and in Belah (Casuarina pauper) in a mixed woodland with well-developed understorey of saltbush. In other states is also frequently found in woodlands with dense heath understorey (particularly Proteaceae species such as Banksia and Hakea species).	8- BioNet, PCT	Moderate - low Suitable foraging habitat. No small hollows identified within the study area. Recent records of the species in the locality.

Scientific name	Status		BAM credit type	Habitat constraints and/or geographic limitations	Distribution and habitat	Number of records (source)	Likelihood of occurrence
	BC Act	EPBC Act					
Chalinolobus dwyeri Large-eared Pied Bat	E	E	Species	Caves; Cave, tunnel, mine, culvert or other structure known or suspected to be used for breeding including species records in BioNet with microhabitat code 'IC – in cave'; observation type code 'E nest-roost'; with numbers of individuals >500; or from the scientific literature.	The species occurs from the coast to the western slopes of the divide. The largest numbers of records are from sandstone escarpment country in the Sydney Basin and Hunter Valley. The species roosts in caves and mines and most commonly recorded from dry sclerophyll forests and woodlands. In southern Sydney appears to be largely restricted to the interface between sandstone escarpments and fertile valleys.	8 – BioNet, PCT, PMST	Moderate Suitable foraging habitat within the study area. No Suitable roosting habitat.
Dasyurus maculatus Spotted-tailed Quoll	V	E	Ecosystem	-	Found in eastern NSW, eastern Victoria, south-east and north-eastern Queensland, and Tasmania the species has been recorded across a range of habitat types, including rainforest, open forest, woodland, coastal heath and inland riparian forest, from the sub-alpine zone to the coastline	10 - BioNet	Moderate Suitable foraging habitat within the study area. No Suitable denning habitat.
Falsistrellus tasmaniensis Eastern False Pipistrelle	V	-	Ecosystem	-	The species occurs on southeast coast and ranges. Prefers tall (>20 metres) and wet forest with dense understorey. Absent from small remnants, preferring continuous forest but can move through cleared landscapes and may forage in open areas. Roosts include hollow trunks of Eucalypts, underneath bark or in buildings. Forages in gaps and spaces within forest, with large foraging range (12km foraging movements recorded).	14 - BioNet	Moderate Suitable foraging habitat within the study area. No Suitable roosting habitat.
Micronomus norfolkensis Eastern Coastal Free-tailed Bat	V	-	Ecosystem	-	Inhabits open forests and woodlands foraging above the canopy and along the edge of forests. Roosts in tree hollows, under bark and buildings. Distribution limit: N-Woodenbong. S-Pambula.	59 - BioNet	Moderate – high Suitable foraging habitat within the study area. No Suitable roosting habitat.

Scientific name	Status		BAM credit type	Habitat constraints and/or geographic limitations	Distribution and habitat	Number of records (source)	Likelihood of occurrence
	BC Act	EPBC Act					
Miniopterus australis Little Bent-winged Bat	V	-	Species/ Ecosystem	Caves: Cave, tunnel, mine, culvert or other structure known or suspected to be used for breeding including species records in BioNet with microhabitat code 'IC – in cave'; observation type code 'E nest-roost'; with numbers of individuals >500; or from the scientific literature.	Roosts in caves, old buildings and structures in the higher rainfall forests along the south coast of Australia. Distribution limit: N-Border Ranges National Park. S-Sydney.	101 - BioNet	Moderate Suitable foraging habitat within the study area. No Suitable roosting habitat.
Miniopterus orianae oceanensis Large Bent-winged Bat	V	-	Species/ Ecosystem	Caves: Cave, tunnel, mine, culvert or other structure known or suspected to be used for breeding including species records with microhabitat code "IC - in cave;" observation type code "E nest-roost;" with numbers of individuals >500	Prefers areas where there are caves, old mines, old buildings, stormwater drains and well-timbered areas. Distribution limit: N-Border Ranges National Park. S-South of Eden.	50 - BioNet	Moderate Suitable foraging habitat within the study area. No Suitable roosting habitat.
Myotis macropus Southern Myotis	V	-	Species	Waterbodies: Waterbodies with permanent pools/stretches 3 metres or wider, including rivers, large creeks, billabongs, lagoons, estuaries, dams and other waterbodies, on or within 200 metres of the site.	Roosts in caves, mines, tunnels, buildings, tree hollows and under bridges. Forages over open water. Distribution limit: N-Border Ranges National Park. S-South of Eden.	44 - BioNet	Moderate Suitable foraging habitat within the study area. No Suitable roosting habitat.
Notamacropus parma Parma Wallaby	V	V	Species	-	Inhabits rainforests and wet and dry sclerophyll forests with a dense understorey and associated grassy patches. Distribution limit: N-Border Ranges National Park. S-Morton National Park.	PMST	Unlikely Marginal habitat within the study area. Species not known from the locality.

Scientific name	Status		BAM credit type	Habitat constraints and/or geographic limitations	Distribution and habitat	Number of records (source)	Likelihood of occurrence
	BC Act	EPBC Act					
Petauroides volans Southern Greater Glider	E	E	Species	-	The species occurs in eucalypt forests and woodlands along the east coast of Australia from northeast Queensland to the Central Highlands of Victoria. Feeds exclusively on eucalypt leaves, buds, flowers and mistletoe. Occupy a relatively small home range with an average size of 1 to 3 ha.	PMST	Unlikely study area does not provide suitable habitat for the species. Species not known from the locality.
Petaurus australis Yellow-bellied Glider	V	V	Ecosystem	-	Found along the eastern coast to the western slopes of the Great Dividing Range, from southern Queensland to Victoria. Occur in tall mature eucalypt forest generally in areas with high rainfall and nutrient rich soils. Very mobile species known to occupy large home ranges between 20 to 85 ha.	PMST	Unlikely study area does not provide suitable habitat for the species. Species not known from the locality.
Petaurus norfolcensis Squirrel Glider	V	-	Species	-	The species is widely though sparsely distributed in eastern Australia, from northern Queensland to western Victoria. Inhabits mature or old growth Box, Box-Ironbark woodlands and River Red Gum Forest west of the Great Dividing Range and Blackbutt-Bloodwood forest with heath understorey in coastal areas. Prefers mixed species stands with a shrub or Acacia midstorey.	124 – BioNet, PCT	Moderate Suitable foraging habitat within the study area. No suitable nesting trees. Multiple recent records in the locality.
Petrogale penicillata Brush-tailed Rock-wallaby	E	V	Species	Other; Land within 1 km of rocky escarpments, gorges, steep slopes, boulder piles, rock outcrops or cliff lines	Occurring from Shoalhaven to the Queensland border the species is now mostly extinct west of the Great Dividing Range, except in the Warrumbungles and Mt Kaputar. The species inhabits rocky escarpments, outcrops and cliffs with a preference for complex structures with fissures, caves and ledges facing north.	PCT	Unlikely No rocky escarpments within 1 km.
Phascogale tapoatafa Brush-tailed Phascogale	V	-	Species	-	Prefer dry sclerophyll open forest with sparse groundcover of herbs, grasses, shrubs or leaf litter. Also inhabit heath, swamps, rainforest and wet sclerophyll forest. Mating occurs May – July.	PCT	Low Marginal habitat within the study area. No records of the species in the locality.
Phascolarctos cinereus Koala	E	E	Species	Other; Presence of koala use trees - refer to Survey Comments field in TBDC	Fragmented distribution throughout eastern Australia from north-east Queensland to the Eyre Peninsula in South Australia. 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 feeding on the foliage of more than 70 eucalypt species and 30 non-eucalypt species, but in any one area will select preferred browse species.	18 – BioNet, PCT, PMST	Low Low density of preferred feed trees and majority of *Eucalypt* trees within the Impact Area are less than 10 cm DBH (i.e. lack of mature trees).

Scientific name	Status		BAM credit type	Habitat constraints and/or geographic limitations	Distribution and habitat	Number of records (source)	Likelihood of occurrence
	BC Act	EPBC Act					
Phoniscus papuensis Golden-tipped Bat	V	-	Ecosystem	N/A	Found in rainforest and adjacent wet and dry sclerophyll forest up to 1000 metres. Also recorded in tall open forest, Casuarina-dominated riparian forest and coastal Melaleuca forests. Roost mainly in rainforest gullies on small first- and second-order streams in usually abandoned hanging Yellow-throated Scrubwren and Brown Gerygone nests modified with an access hole on the underside.	PCT	Unlikely No suitable habitat within the study area. Species not known from the locality;
Planigale maculata Common Planigale	V	-	Species	-	Occupies coastal north-eastern NSW, coastal east Queensland and Arnhem Land. The species reaches its confirmed southern distribution limit on the NSW lower north coast. Common Planigales inhabit rainforest, eucalypt forest, heathland, marshland, grassland and rocky areas where there is surface cover, and usually close to water.	PCT	Low Marginal habitat within the study area. No records of the species in the locality.
Potorous tridactylus Long-nosed Potoroo	V	V	Species	Other; Dense shrub layer or alternatively high canopy cover exceeding 70% (i.e. to capture populations inhabiting wet sclerophyll and rainforest)	Restricted to east of the Great Dividing Range, with annual rainfall >760 millimetres. Inhabits coastal heath and dry and wet sclerophyll forests. Requires relatively thick ground cover and appears restricted to areas of light and sandy soil. Feeds on fungi, roots, tubers, insects and their larvae, and other soft-bodied animals in the soil.	PCT, PMST	Low Marginal habitat within the study area. No records of the species in the locality.
Pseudomys gracilicaudatus Eastern Chestnut Mouse	V	-	Ecosystem	-	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. Mostly found, in low numbers, in heathland and is most common in dense, wet heath and swamps. Optimal habitat appears to be in vigorously regenerating heathland burnt from 18 months to four years previously.	1 - BioNet	Low Marginal habitat within the study area. No recent records of the species in the locality.
Pseudomys novaehollandiae New Holland Mouse	-	V	Ecosystem	-	The species occurs in disjunct, coastal populations from Tasmania to Queensland. In NSW it inhabits a variety of coastal habitats including heathland, woodland, dry sclerophyll forest with a dense shrub layer and vegetated sand dunes. Species presence is strongly correlated with understorey vegetation density, and high floristic diversity in regenerating heath.	259 – BioNet, PMST	Low - moderate Suitable habitat for the species in the study area. No recent records of the species in the locality. All records form 2009 or earlier.

Scientific name	Status		BAM credit type	Habitat constraints and/or geographic limitations	Distribution and habitat	Number of records (source)	Likelihood of occurrence
	BC Act	EPBC Act					
Pteropus poliocephalus Grey-headed Flying-fox	V	V	Species/ Ecosystem	Other; Breeding camps	Generally, this species is found within 200 km of the eastern coast of Australia, from Rockhampton in Queensland to Adelaide in South Australia. Inhabit 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.	155 – BioNet, PMST	Low Marginal habitat due to low density of mature Eucalypt trees. Higher quality habitat in the surrounding area.
Saccolaimus flaviventris Yellow-bellied Sheathtail-bat	V	-	Ecosystem	-	Migrates from tropics to SE Aus in summer. Forages across a range of habitats including those with and without trees, from wet and dry sclerophyll forest, open woodland, Acacia shrubland, mallee, grasslands and desert. Seasonal movements are unknown.	7 - BioNet	Moderate Suitable foraging habitat within the study area. No Suitable roosting habitat.
Scoteanax rueppellii Greater Broad-nosed Bat	V	-	Ecosystem	-	The species 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 metres. Inhabits a variety of habitats from woodland to wet and dry sclerophyll forests and rainforest, also remnant paddock trees and timber-lined creeks.	34 - BioNet	Moderate Suitable foraging habitat within the study area. No Suitable roosting habitat.
Vespadelus troughtoni Eastern Cave Bat	V	-	Species	Caves; Within two kilometres of rocky areas containing caves, overhangs, escarpments, outcrops, crevices or boulder piles, or within two kilometers of old mines, tunnels, old buildings or sheds."	Very little is known about the biology of this uncommon species. A cave-roosting species that is usually found in dry open forest and woodland, near cliffs or rocky overhangs; has been recorded roosting in disused mine workings, occasionally in colonies of up to 500 individuals. Occasionally found along cliff-lines in wet eucalypt forest and rainforest.	5 – BioNet, PCT	Moderate Suitable foraging habitat within the study area. No Suitable roosting habitat.
Reptiles							

Scientific name	Status		BAM credit type	Habitat constraints and/or geographic limitations	Distribution and habitat	Number of records (source)	Likelihood of occurrence
	BC Act	EPBC Act					
Hoplocephalus stephensii Stephens' Banded Snake	V	-	Species	Hollow bearing trees; Or within 500 metres of this habitat/Other ;Within 500 metres of arboreal vine tangle/Fallen/standing dead timber including logs; Or within 500 metres of this habitat	Rainforest and eucalypt forests and rocky areas up to 950 metres in altitude. nocturnal, and shelters between loose bark and tree trunks, amongst vines, or in hollow trunks limbs, rock crevices or under slabs during the day.	PCT	Low
Invertebrates							
Petalura gigantea Giant Dragonfly	E	-	Species	Within 500 metres of swamps	Inhabits large relatively deep permanent swamps and bogs with high water quality and moss or other soft vegetation along the edge for egg laying. It occurs in the far NE NSW, south to Kempsey, & in a patch between Gosford & Nowra.	1 – BioNet	Low
Migratory species							
Neophema chrysostoma Blue-winged Parrot	V	V, M		-	Occurs in south-eastern Australia, breeding in Tasmania, and only occurs sporadically across NSW. Throughout their range they favor grasslands and grassy woodlands. They are often found near wetlands and can also be seen in altered environments such as airfields, golf courses and paddocks. Diet includes Wallaby grass Austrodanthonia.	PMST	Unlikely
Gallinago hardwickii Latham's Snipe	-	V, M	-	-	In Australia, Latham's Snipe occurs in permanent and ephemeral wetlands up to 2000 metres above sea-level.	PMST	Unlikely
Hirundapus caudacutus White-throated Needletail	V	M	Ecosystem	-	Widespread in eastern and south-eastern Australia. In Australia, the White-throated Needletail is almost exclusively aerial, from heights of less than 1 metres up to more than 1000 metres above the ground.	115 – BioNet, PMST	High

Shorebirds and pelagic species are not included in this list due to lack of habitat.

Appendix C: Plot-based field data sheets

Provide copies of all plot data sheets. This can be PDFs of electronic sheets or scanned handwritten sheets (please ensure handwriting in legible).

Quadrat Number: Q1 **Date:** 11/7/2024 **Recorder:** A. Owen

Vegetation Type: C gummifera shrubby **Property Name or Project Name:** Chain Valley Bay

Overstorey Species	F	Ab	Midstorey Species	F	Ab	Ground Cover (Shrubs)	F	Ab	Ground Cover (Grasses)	F	Ab	Ground Cover (Other)	F	Ab	Exotic	F	Ab
			Lepto juip	2	20	Epac mic	0.1	5	Xanth lat	5	100	Casytha pub	0.1	20			
Corymbia gummifera	1	10	Lepto poly	1	5	Callist lin	0.1	2	~~Gahnia~~			*Ptilothrix deusta	40	10000			
Allocas litt	60	200				Lamb form	0.1	10	~~Gahnia~~			* Ento stric	2	100			
			Mel nodosa	2	20												
Mel quin	0.2	1				Hakea tered	0.2	10	Lom obliq	0.1	10	* Twisty sedge C. diandra	0.1	10			
			Pers levis	0.2	1												
Ac binerv	0.1	1				Dilw retorl	0.2	20	Gahnia clarkei	0.2	5						
			Dod tri	2	50												
Bank ~~spin~~ oblong.	1	20							Gahn sieb	0.2	2						

F Foliage Projective Cover: within the boundaries of the plot including all attached plant material, alive or dead, rooted in or overhanging the plot. Cover should be recorded in decimals if less than 1% (0.1, 0.2, 0.3), in whole numbers up to 5% (1, 2, 3), to the nearest 5% if >5% (5, 10, 15, 20, 25, ...100%).
64 cm x 64 cm = 0.1%; 1 m x 1 m = 0.25%; 10 m^2 = 2.5%; 20 m^2 = 5%.

Ab Abundance Rating (no. of individuals or shoots rooted within the plot): 1-10, 20, 50, 100, 500, 1000, 1500, 2000 etc
(numbers > 20 are estimates only, and the recorded abundance is the upper end of each class, e.g. 50 represents an estimated abundance of between 20 and 50)

General Comments:

041282 0293

1,000 m² PLOT

Tree Stem Size Class*		Trees^
Count of Large Trees Record DBH of each tree at 1.3 m from ground.	80+ cm	
	50+ cm	
All other Trees: Only record ***presence or absence*** of trees in these stem size classes. Record DBH of each tree at 1.3 m from ground.	30-49 cm	
	20-29 cm	✓
	10-19 cm	✓
	5-9 cm	✓
Presence or absence of **Regeneration#** Maximum stem diameter of <5 cm regardless of height.	<5 cm	✓

Count of HBTs†

*Living trees only; for **multi-stemmed trees**, only largest stem is counted or recorded as present;

#Record presence of regeneration for any tree with a maximum stem diameter of <5 cm, regardless of height (i.e., record presence of regeneration if sapling or seedings that are <1.3 m heigh and have DBH <5 cm).

^Includes species classified as Trees under the BAM Growth Form Table.

†Count of **hollow-bearing *trees*** and ***shrubs***; includes living and dead; record by stem size class.

10000 m²

Length of logs (m) Fallen logs = >10 cm diameter, that is dead and entirely or partly on the ground within the 1,000 m² plot. Only the length of log within the plot is recorded.	Tally	TOTAL LENGTH (m)
	𝍸 𝍸 𝍸 𝍸 I	

1 m² sub PLOT

L R L R L
3 15 25 35 45

	Litter cover (%)				
Subplot	95	100	100	85	90
Average	95				

- Log habitat.
- Large mature Allo.
- Wombat poo.

Litter includes leaves, seeds, twigs, branchlets and branches **less than 10 cm diameter.** Include all plant material that is detached from a plant and forms part of the litter layer on the ground surface. Litter cover is the two-dimensional litter layer in contact with the ground surface, including litter under the canopies of erect plants. Plant material that is not detached should be assessed as foliage cover, regardless of whether it appears alive or dead.

Quadrat Number: Q1 **Date:** 11 **Recorder:** CL/AO

Property Name or Project Name: Chain Valley Bay

☑ Both Start and End points collected on GPS

☑ Start and End locations are approximately 50 m apart on GPS

Appendix D: Tests of Significance (BC Act)

Threatened Flora

Tetratheca juncea

Factor	*Assessment*
Effect on life cycle of threatened species	The proposal will clear approximately (0.84 ha) of suitable habitat for Tetratheca juncea (Tj). A total of 16 individuals were recorded during targeted surveys, however these are outside the development footprint, therefore there will be no direct impact to these individuals.
(i)Effect on the extent of EEC or CEEC	Not Applicable
(ii)Effect in composition of EEC or CEEC	Not Applicable
(i)Extent of habitat removal or modification for threatened species	The proposed development will require the clearing of 0.84 ha of vegetation. Larger areas of more suitable habitat will be retained to the North and East of the development area including Lake Macquarie SCA and Munmorah SCA. Given that the area to be cleared occurs adjacent a roadside, and is already highly disturbed, the removal of this habitat is unlikely to significantly impact the continued survival of the species.
(ii)The important of habitat to threatened species, populations or ecological community	The impact area exists in a developed landscape along roadsides and development, as such, there is existing levels of fragmentation within the locality. The greater connectivity is to the North and East and these areas will not be impacted. There are higher numbers of individuals of this species in the surrounding area therefore the development is unlikely to increase existing fragmentation of vegetation and is unlikely to significantly impact the continued survival of local populations of these species.
(iii)The importance of habitat to threatened species, populations or ecological community.	The proposed impact area is only an indirect to 16 individuals, and a direct impact to 0.84 ha of habitat including 0.47 ha of roadside disturbed grassland, which is not of high quality. Due to the small size of the impact to habitat, and low quality of the majority of potential habitat, it is unlikely to considered important habitat for this species.
Area of outstanding Biodiversity value	Not applicable
Key threatening process	Key Threatening processes relevant to the proposed development - Clearing of native vegetation - Given the small scale of proposed clearing within the impact area, the proposed development is likely to facilitate the above listed KTPs to a minor extent. Impacts likely to be negligible.

Threatened wood land birds

Suitable foraging and breeding habitat resides within the impact area for the following species and recent records exists within the surrounding locality. The impact area has been mapped as important habitat for the Swift Parrot therefore foraging habitat is present for that species.

Not hollow-dependent

- *Artamus cyanopterus* (Dusky Woodswallow) - Vulnerable
- *Daphoenositta chrysoptera* (Varied Sittella) – Vulnerable
- *Hirundapus caudacutus* (White-throated Needletail) – Vulnerable
- *Lophoictinia isura* (Square-tailed Kite) - Vulnerable
- *Lathamus discolor* (Swift Parrot) – Endangered

Table Test of significance for non-hollow dependant woodland birds

Factor	*Assessment*
(a) Effect on life cycle of	The proposal will directly impact approximately (0.84 ha) of habitat that may be suitable for foraging by non-hollow dependant threatened woodland birds. Suitable habitat exists within the impact area and nearby records indicate this. These species prefer Eucalypt-dominated open

threatened species	woodlands, where they may forage on pollen, insects, and nest in forks of trees. Swift parrots, however, prefer high nectar producing trees such as Swamp Mahogany, this species will not nest within the subject site as breeding habitat is located in Tasmania. No nests were observed during surveys, however no targeted surveys were undertaken. There are larger, more suitable areas of habitat in the neighbouring Lake Munmorah State Conservation Area, Lake Macquarie State Conservation Area, and in the retained vegetation to the North and east of the proposed road upgrades. These species are highly mobile and are able to move between areas of habitat where required. The small amount of area being cleared is therefore unlikely to significantly impact the long-term survival of these species
(i)Effect on the extent of EEC or CEEC	Not Applicable
(ii)Effect in composition of EEC or CEEC	Not Applicable
(i)Extent of habitat removal or modification for threatened species	The proposal will remove approximately (0.84 ha) of suitable foraging habitat for the threatened woodland bird species. Swift parrot habitat occurs within the impact area. The area to be removed is 0.3 ha. The threatened species habitat is generally present in low condition and occurs in a fragmented landscape where introduced cover Is significant. The proposed development area already occurs in a disturbed, patchy and edge-effected state, and the proposal will not substantially increase these negative pressures. The vegetation to be directly removed does not comprise any ecological components critical to the survival of threatened birds in the locality. Large areas of more suitable habitat occur in the neighbouring state conservation areas and connected vegetation.
(ii)The important of habitat to threatened species, populations or ecological community	The impact area exists in a developed landscape where it is fringed by urban development and roads. As such there is existing fragmentation within the locality. The greatened connectivity is the North and East and will not be impacted. Impacts elsewhere will reduce size fragments but not lead to any additional isolation of fragments already isolated. The proposal is therefore unlikely to fragment important habitat such that the continued survival of these species will be impacted.
(iii)The importance of habitat to threatened species, populations or ecological community.	In respect to threatened woodland birds species with potential to occur the proposed area of impact is not likely of high quality, of any breeding importance or central to the home range requirements of any species such that behaviours or ecology of these species will be significantly altered. These species are highly mobile and can utilise areas of better-quality habitat where required.
Area of outstanding Biodiversity value	There are no areas of outstanding biodiversity value present on-site.
Key threatening process	Key threatening processes relevant to the proposed development - Clearing of native vegetation - Given small scale proposed clearing within the impact area, the proposed development is likely to facilitate the above listed KTPs to a minor extent. Impacts are likely to be negligible

Suitable foraging habitat resides within the impact area for the following species and recent records exists within the surrounding locality. A habitat survey determined that no hollows were present within the impact area.

Hollow dependent

- *Calyptorhynchus lathami lathami* (South-eastern Glossy Black-Cockatoo) - Vulnerable
- *Glossopsitta pusillal* (Little Lorikeet) – Vulnerable
- *Lophoictinia isura* (Square-tailed Kite) – Vulnerable
- *Ninox connivens* (Barking Owl) – Vulnerable
- *Ninox strenua* (Powerful Owl) – Vulnerable
- *Tyto novaehollandiae* (Masked Owl) – Vulnerable

Table Test of significance for hollow dependant woodland birds

Factor	*Assessment*
(b) Effect on life cycle of threatened species	The proposal will directly impact approximately (0.84) of habitat that may be suitable for foraging by hollow dependant threatened woodland birds. Suitable habitat exists within the impact area and nearby records indicate this. Owls species have large home ranges and some (Masked Owl)

	will hunt along forest edges and along roadsides, feeding on tree dwelling mammals especially rats. Little Lorikeet and Square-tailed Kite are highly mobile and may use this area for foraging. No hollows were observed during habitat surveys; therefore this is not considered breeding habitat for these species. There are larger, more suitable areas of habitat in the neighbouring Lake Munmorah State Conservation Area, Lake Macquarie State Conservation Area, and in the retained vegetation to the North and east of the proposed road upgrades. These species are highly mobile and are able to move between areas of habitat where required. The small amount of area being cleared is therefore unlikely to significantly impact the long-term survival of these species.
(i)Effect on the extent of EEC or CEEC	Not Applicable
(ii)Effect in composition of EEC or CEEC	Not Applicable
(i)Extent of habitat removal or modification for threatened species	The proposal will remove approximately (0.84 ha) of suitable foraging habitat for the threatened woodland bird species. The threatened species habitat is generally present in low condition and occurs in a fragmented landscape where introduced cover Is significant. The proposed development area already occurs in a disturbed, patchy and edge-effected state, and the proposal will not substantially increase these negative pressures. The vegetation to be directly removed does not comprise any ecological components critical to the survival of threatened birds in the locality. Large areas of more suitable habitat occur in the neighbouring state conservation areas and connected vegetation.
(ii)The important of habitat to threatened species, populations or ecological community	The impact area exists in a developed landscape where it is fringed by urban development and roads. As such there is existing fragmentation within the locality. The greatened connectivity is the North and East and will not be impacted. Impacts elsewhere will reduce size fragments but not lead to any additional isolation of fragments already isolated. The proposal is therefore unlikely to fragment important habitat such that the continued survival of these species will be impacted.
(iii)The importance of habitat to threatened species, populations or ecological community.	In respect to threatened woodland birds species with potential to occur the proposed area of impact is not likely of high quality, of any breeding importance or central to the home range requirements of any species such that behaviours or ecology of these species will be significantly altered. These species are highly mobile and can utilise areas of better-quality habitat where required.
Area of outstanding Biodiversity value	
Key threatening process	Key threatening processes relevant to the proposed development - Clearing of native vegetation - Given small scale proposed clearing within the impact area, the proposed development is likely to facilitate the above listed KTPs to a minor extent. Impacts are likely to be negligible

<u>Microbats</u>

The impact area provides suitable foraging habitat and roosting habitat for threatened micro bats. Habitat surveys found that there is no suitable breeding habitat for threatened microbats, however no targeted surveys were conducted for these species.

The following species have moderate potential to occur within the impact area:

- *Chalinolobus dwyeri* (Large-eared Pied Bat)
- *Falsistrellus tasmaniensis* (Eastern False Pipistrelle)
- *Miniopterus australis* (Little Bent-winged Bat)
- *Miniopterus orianae oceanensis* (Large Bent-winged Bat)
- *Myotis macropus* (Southern Myotis)
- *Saccolaimus flaviventris* (Yellow-bellied Sheathtail-bat)
- *Scoteanax rueppellii* (Greater Broad-nosed Bat)
- *Vespadelus troughtoni* (Eastern Cave Bat).

The species below has moderate to high potential to occur within the impact area:

- *Micronomus norfolkensis* (Eastern Coastal Free-tailed Bat)

Factor	*Assessment*
Effect on life cycle of threatened species	These Microbats may roost and breed in hollows, under bark or within man-made structures, though no evidence of this habitat was located on site. These species are likely to utilise several roosting and breeding locations throughout the surrounding landscape.
(i)Effect on the extent of EEC or CEEC	Not Applicable
(ii)Effect in composition of EEC or CEEC	Not Applicable
(i)Extent of habitat removal or modification for threatened species	The proposed development will require the clearing of up to (0.84 ha) of vegetation that likely represents suitable foraging habitat. These species may utilise the impact area as part of a broader area of foraging habitat, although given the limited area if vegetation being cleared, the proposal is unlikely to significantly impact the continued survival of the species.
(ii)The important of habitat to threatened species, populations or ecological community	The impact area exists in a developed landscape where it is fringed by urban development, and roads, as such, there is existing levels of fragmentation within the locality. The greater connectivity is to the North and East and will not be impacted. Impacts elsewhere will reduce size of fragments but not lead to any additional isolation of fragments that are not already isolated. The proposal is therefore unlikely to increase existing fragmentation of vegetation and is unlikely to significantly impact the continued survival of local populations of these species
(iii)The importance of habitat to threatened species, populations or ecological community.	The proposal will clear approximately (0.84 ha) of native vegetation providing foraging habitat. No Hollows or caves were present to provide breeding habitat. Larger areas of more suitable native vegetation in the neighbouring state conservation areas and in retained vegetation and human-made structures surrounding the impact area. The proposal is unlikely to significantly impact habitat important for the continued survival of local populations.
Area of outstanding biodiversity value	Not applicable
Key threatening process	Key Threatening processes relevant to the proposed development - Clearing of native vegetation - Given the small scale of proposed clearing within the impact area, the proposed development is likely to facilitate the above listed KTPs to a minor extent. Impacts likely to be negligible.

Petaurus norfolcensis (Squirrel Glider)

The Squirrel Glider inhabits mixed aged stands of eucalypt forests and woodlands including gum barked and high nectar producing species in southeastern Australia, away from the denser forests of the coastal ranges. Potential habitat is present within the impact area, although the species was not observed during targeted surveys. This assessment considers that the study area is at most of seasonal value to Squirrel Gliders as a foraging resource due to lack of breeding hollows present.

Factor	*Assessment*
Effect on life cycle of threatened species	The proposal will clear approximately (0.36 ha) of native vegetation providing potential foraging habitat. No hollow bearing trees were found within the development area, so is not suitable for breeding as Squirrel gliders nest exclusively in Hollows, therefore, is not likely to effect the life cycle of the local population.
(i)Effect on the extent of EEC or CEEC	Not Applicable
(ii)Effect in composition of EEC or CEEC	Not Applicable
(i)Extent of habitat removal or modification for threatened species	The proposed development will require the clearing of up to (0.36 ha) of vegetation that likely represents suitable foraging habitat. Larger areas of more suitable vegetation will be retained to the North and East of the development area. Given the Spotted Harriers extensive home range, the proposed removal of low-quality foraging habitat is unlikely to significantly impact the continued survival of the species.
(ii)The important of habitat to threatened species, populations or ecological community	The impact area exists in a developed landscape where it is fringed by urban development, and roads. As such, there is existing levels of fragmentation within the locality. The greatened connectivity is to the North and East and will not be impacted. Impacts elsewhere will reduce size of fragments but not lead to any additional isolation of fragments that are not already isolated. This species is highly mobile with large home ranges therefore, the proposal is therefore unlikely to increase existing fragmentation of vegetation and is unlikely to significantly impact the continued survival of local populations of these species.

(iii)The importance of habitat to threatened species, populations or ecological community.	The proposed impact area is not of high quality, of any breeding importance or central to the home range requirements of the species such that behaviour or ecology of this species will be significantly altered.
Area of outstanding Biodiversity value	Not applicable
Key threatening process	Key Threatening processes relevant to the proposed development - Clearing of native vegetation - Given the small scale of proposed clearing within the impact area, the proposed development is likely to facilitate the above listed KTPs to a minor extent. Impacts likely to be negligible.

Cercartetus nanus – Eastern Pygmy-possum

Factor	*Assessment*
Effect on life cycle of threatened species	The proposal will clear approximately (0.36 ha) of native vegetation providing potential foraging and breeding habitat.
(i)Effect on the extent of EEC or CEEC	Not Applicable
(ii)Effect in composition of EEC or CEEC	Not Applicable
(i)Extent of habitat removal or modification for threatened species	The proposed development will require the clearing of up to (0.36 ha) of vegetation that likely represents suitable foraging habitat. Larger areas of more suitable vegetation will be retained to the North and East of the development area. Given the Eastern Pygmy possum selective nature for pristine vegetation, the proposed removal of low-quality foraging habitat is unlikely to significantly impact the continued survival of the species.
(ii)The important of habitat to threatened species, populations or ecological community	The impact area exists in a developed landscape where it is fringed by urban development, and roads, As such, there is existing levels of fragmentation within the locality. The greatened connectivity is to the North and East and will not be impacted. Impacts elsewhere will reduce size of fragments but not lead to any additional isolation of fragments that are not already isolated. The proposal is therefore unlikely to increase existing fragmentation of vegetation and is unlikely to significantly impact the continued survival of local populations of these species.
(iii)The importance of habitat to threatened species, populations or ecological community.	The proposed impact area is not of high quality, of any breeding importance or central to the home range requirements of the species such that behaviour or ecology of this species will be significantly altered.
Area of outstanding Biodiversity value	Not applicable
Key threatening process	Key Threatening processes relevant to the proposed development - Clearing of native vegetation - Given the small scale of proposed clearing within the impact area, the proposed development is likely to facilitate the above listed KTPs to a minor extent. Impacts likely to be negligible.

Dasyurus maculatus– Spotted-tailed Quoll

Factor	*Assessment*
Effect on life cycle of threatened species	The proposal will clear approximately (0.36 ha) of native vegetation providing potential foraging habitat.
(i)Effect on the extent of EEC or CEEC	Not Applicable
(ii)Effect in composition of EEC or CEEC	Not Applicable
(i)Extent of habitat removal or modification for threatened species	The proposed development will require the clearing of up to (0.36 ha) of vegetation that likely represents suitable foraging habitat. Larger areas of more suitable vegetation will be retained to the North and East of the development area. Given the small area of native vegetation to be removed, the proposal is unlikely to significantly impact the continued survival of the species.
(ii)The important of habitat to threatened	The impact area exists in a developed landscape where it is fringed by urban development, and roads, as such, there is existing levels of fragmentation within the locality. The greatened

species, populations or ecological community	connectivity is to the North and East and will not be impacted. Impacts elsewhere will reduce size of fragments but not lead to any additional isolation of fragments that are not already isolated. The proposal is therefore unlikely to increase existing fragmentation of vegetation and is unlikely to significantly impact the continued survival of local populations of these species.
(iii)The importance of habitat to threatened species, populations or ecological community.	The proposed impact area is not of high quality, of any breeding importance or central to the home range requirements of the species such that behaviour or ecology of this species will be significantly altered.
Area of outstanding Biodiversity value	Not applicable
Key threatening process	Key Threatening processes relevant to the proposed development - Clearing of native vegetation - Given the small scale of proposed clearing within the impact area, the proposed development is likely to facilitate the above listed KTPs to a minor extent. Impacts likely to be negligible.

Crinia tinnula -Wallum Froglet

Factor	*Assessment*
Effect on life cycle of threatened species	The proposal will clear approximately (0.84 ha) of native vegetation providing potential foraging habitat. The Wallum Froglet has a potential to occur on this site although it was not recorded
(i)Effect on the extent of EEC or CEEC	Not Applicable
(ii)Effect in composition of EEC or CEEC	Not Applicable
(i)Extent of habitat removal or modification for threatened species	The proposed development will require the clearing of up to (0.84 ha) of vegetation, and outside the development footprint there are several ephemeral ponds with potential for breeding. Larger areas of more suitable wetland vegetation will be retained to the North and East of the development area. Given that the Wallum froglet is mobile and will travel large distances to find suitable breeding habitat the proposed removal of low quality and disturbed breeding habitats unlikely to significantly impact the continued survival of the species. Pre-clearance surveys are required in accordance with *Guide 1: Pre-clearing process of the biodiversity guidelines (RTA 2024) to mitigate impacts to this species (Guide 1: Pre-clearing process)*
(ii)The important of habitat to threatened species, populations or ecological community	The impact area exists in a developed landscape where it is fringed by urban development, and roads. As such, there is existing levels of fragmentation within the locality. The greatened connectivity is to the North and East and will not be impacted. Impacts elsewhere will reduce size of fragments but not lead to any additional isolation of fragments that are not already isolated. This species is highly mobile with large home ranges therefore, the proposal is therefore unlikely to increase existing fragmentation of vegetation and is unlikely to significantly impact the continued survival of local populations of these species.
(iii)The importance of habitat to threatened species, populations or ecological community.	The proposed impact area is not of high quality, of any breeding importance or central to the home range as these observed ponds are ephemeral (temporary sources of habitat) requirements of the species such that behaviour or ecology of this species will be significantly altered.
Area of outstanding Biodiversity value	Not applicable
Key threatening process	Key Threatening processes relevant to the proposed development - Clearing of native vegetation - Clearing of ephemeral ponds - Given the small scale of proposed clearing within the impact area, the proposed development is likely to facilitate the above listed KTPs to a minor extent. Impacts likely to be negligible.

Appendix E: Assessments of significance (EPBC Act)

Species Assessed under the EPBC Act Significant Impact Guidelines

The following pertains to Assessments of Significance for direct or indirect impacts to EBPC Act listed threatened species, populations, and communities.

The following species have been assessed under the EPBC Act *Matters of National Environmental Significance*

Significant impact guidelines 1.1 (Department of the Environment [DotE], 2013) (Significant Impact Guidelines):

Critically Endangered Species

- *Lathamus discolor* (Swift Parrot)

Endangered Species

- *Dasyurus maculatus* (Spotted-tailed Quoll)

Vulnerable Species

- *Chalinolobus dwyeri* (Large-eared Pied Bat)
- *Calyptorhynchus lathami lathami* (South-eastern Glossy Black-Cockatoo)
- *Hirundapus caudacutus* (White-throated Needletail)
- *Pseudomys novaehollandiae* (New Holland Mouse)
- *Tetratheca juncea* (Black-eyed Susan)

Critically Endangered and Endangered Species – EPBC Act Assessment of Significance

The EPBC Act Significant Impact Guidelines (DOE 2013) state:

- *An action is likely to have a significant impact on a critically endangered or endangered species if there is a real chance or possibility that it will:*
    - *lead to a long-term decrease in the size of a population*
    - *reduce the area of occupancy of the species*
    - *fragment an existing population into two or more populations*
    - *adversely affect habitat critical to the survival of a species*
    - *disrupt the breeding cycle of a population*
    - *modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline*
    - *result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat*
    - *introduce disease that may cause the species to decline, or*
    - *interfere with the recovery of the species.*
- *A 'population of a species' is defined under the EPBC Act as an occurrence of the species in a particular area. In relation to critically endangered, endangered or vulnerable threatened species, occurrences include but are not limited to:*
    - *a geographically distinct regional population, or collection of local populations, or*
    - *a population, or collection of local populations, that occurs within a particular bioregion.*

- *An 'invasive species' is an introduced species, including an introduced (translocated) native species, which out-competes native species for space and resources, or which is a predator of native species. Introducing an invasive species into an area may result in that species becoming established. An invasive species may harm listed threatened species or ecological communities by direct competition, modification of habitat or predation.*
    - *Habitat critical to the survival of a species or ecological community' refers to areas that are necessary:*
    - *for activities such as foraging, breeding, roosting, or dispersal*
    - *for the long-term maintenance of the species or ecological community (including the maintenance of species essential to the survival of the species or ecological community, such as pollinators)*
    - *to maintain genetic diversity and long-term evolutionary development, or*
    - *for the reintroduction of populations or recovery of the species or ecological community.*
- *Such habitat may be but is not limited to: habitat identified in a recovery plan for the species or ecological community as habitat critical for that species or ecological community; and/or habitat listed on the Register of Critical Habitat maintained by the minister under the EPBC Act.*

Environment Protection and Biodiversity Conservation Act 1999

Critically Endangered species

- *Lathamus discolor (Swift Parrot)*

Lead to the long-term decrease in the size of a population.

The Swift Parrot does not breed in the study area and the extent of habitat remaining in the locality area likely provides sufficient resources to sustain future visitation, such that the action itself is unlikely to lead to a long-term decrease in the size of the Australian population.

The Swift Parrot is known to breed in Tasmania during spring and summer, migrating along the east coast of Australia during winter. As such, the vegetation within the impact area does not constitute important habitat for breeding.

Swift Parrot 'important area' mapping does occur within the impact area, with multiple records of the species made within the locality. This species may feed on winter-flowering E. haemastoma and lerps within host trees. Whilst the impact area is unlikely to constitute key dispersal habitat, it is likely to be represent part of a broader area of foraging habitat for the species within the region.

Impacts to potential foraging habitat is minimal. The proposal will require the clearing of approximately 0.84 ha total of potential foraging habitat, including 0.08 hectares of mapped important habitat. The species may utilise the impact area as part of a broader area of foraging habitat, however larger areas of suitable habitat occur in the surrounding landscape, particularly in nearby reserves and National Parks. Within the Wyong Subregion, the potential habitat removal represents a small proportion of currently available habitat for this species.

Records of this species occur within the surrounding locality although this species was not observed during surveys.

As such, the proposal will only impact potential marginal foraging habitat for the species. The proposed activity is therefore considered unlikely to lead to a long-term decrease in the size of an important population of the Swift Parrot.

Reduce the area of occupancy of the species.

Swift Parrots are vulnerable to the loss of quantity and quality of key forage tree species. As a large-scale migrant, it can cover vast areas of its winter range, seeking suitable flowering eucalypt habitat. The species is an occasional visitor to the region and may utilise trees in the study area for foraging intermittently when no other suitable resources are available. The proposal will contribute to the loss of potential foraging habitat which will reduce the area of habitat available. However, the action, removing approximately 0.84 ha total of potential foraging habitat, including 0.05 ha of mapped important habitat, will not reduce the area of occupancy of this species which is estimated at 4,000 square kilometres.

Fragment an existing population into two or more populations.

The impact area borders an existing roadway in a development landscape where it is fringed by urban developments. This species is highly mobile and, as a regular behaviour, flies long distances over open areas to move between suitable foraging

habitats. The action will not affect the movement of the Swift Parrot between habitat patches or fragment the population. The action is considered unlikely to fragment existing populations as movement corridors within the locality will remain intact.

The proposal is therefore unlikely to increase existing fragmentation of vegetation and is unlikely to significantly impact the continued survival of the population.

Adversely affect habitat critical to the survival of a species.

No breeding habitat for the Swift Parrot occurs within the impact area (species breeds in Tasmania), as such it is unlikely that the proposal will significantly impact the breeding cycle of the species. The impact area supports winter foraging resources and is also mapped as Important Habitat; therefore, we consider that important habitat for this species is present. The impact on 0.08 ha of important habitat for this species is not likely to critically impact the species such that its immediate survival is put a risk.

Disrupt the breeding cycle of a population.

The Swift Parrot is a non-breeding visitor to the Australian mainland, breeding exclusively in Tasmania, as such the proposal will not impact on winter breeding habitat.

Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.

The proposed development will impact on approximately 0.84 hectares total of potential foraging habitat, including 0.08 hectares of mapped important habitat. As a large-scale migrant, it has the ability to cover vast areas of its winter range, seeking suitable flowering eucalypt habitat. The species is an occasional visitor to the region and may utilise trees in the study area for foraging intermittently when no other suitable resources are available. The proposal is unlikely to modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.

Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the critically endangered or endangered species' habitat.

The impact area is highly disturbed and already contains a high abundance of invasive species. The proposal is not expected to increase the prevalence of these species such that they impact on Swift Parrot.

Introduce disease that may cause the species to decline.

There are no known disease issues affecting this species in relation to the action. The action is unlikely to increase the potential for significant disease vectors to affect local populations.

Interfere substantially with the recovery of the species.

The proposed development will not interfere with the recovery of the species due to low level of impact and proposed offsets (see Section 7). Replacement plantings in accordance with the Tree and Hollow Replacement Guidelines (TfNSW Transport, 2022b) should use winter-flowering species such as E. haemastoma where possible to provide a positive increase in potential foraging habitat for this species.

Endangered species

- *Dasyurus maculatus (Spotted-tailed Quoll)*

Lead to the long-term decrease in the size of an important population of the species.

Although the impact area contains potential foraging habitat, no breeding habitat was identified for this species as there are no caves or hollow-bearing trees present. As there is no breeding habitat for the species, a low number of records of the species in the locality, and the impact area occurs adjacent a highly utilised roadside, it is not considered to be habitat for an important population of Spotted-tailed Quoll. Therefore, the proposed development is not expected to impact the size of the population.

Reduce the area of occupancy of an important population.

There is not considered to be an important population of Spotted-tailed Quoll present within the impact area, as above, therefore the proposal will not reduce the area of occupancy of an important population.

Fragment an existing population into two or more populations.

The proposed development is clearing road side vegetation, and therefore is not adding further fragmentation to the surrounding habitat. Spotted-tailed Quoll is relatively mobile species, and no individuals are likely to be impacted by the development. The proposed development is not likely to fragment a population, due to the highly mobile nature of the species, and the nature of the proposed development that is occurring along roadside, and not fragmenting habitat.

Adversely affect habitat critical to the survival of a species.

No breeding habitat for the Spotted-tailed Quoll occurs in the impact area, as such is it unlikely that the proposal will significantly impact breeding cycle of the species. The impacts on 0.84 hectares of native vegetation that is potential foraging habitat is not likely to critically impact the species such that its immediate survival is put a risk.

Disrupt the breeding cycle of an important population.

The proposed development will only impact foraging habitat for the Spotted-tailed Quoll and not breeding habitat. In addition, the proposal is not fragmenting fauna movement corridors, as such the proposal does not have the potential to impact on the breeding cycle of a population.

Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.

The impact area is already disturbed and occurs along a roadside. The proposal is not expected to isolate or fragment habitat further. In addition, the area of native vegetation to be removed is relatively small, covering 0.84 ha, which is not expected to impact the species to the extent that it would lead to decline, particularly as there is higher quality foraging habitat in the areas to the north and east oof the proposed development.

Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the critically endangered or endangered species' habitat.

The impact area is highly disturbed and already contains a high abundance of invasive species. The proposal is not expected to increase the prevalence of these species such that they impact on Spotted-tailed Quoll

Introduce disease that may cause the species to decline.

There are no known disease issues affecting this species in relation to the action. The action is unlikely to increase the potential for significant disease vectors to affect local populations.

Interfere substantially with the recovery of the species.

The proposed development will not interfere with the recovery of the species due to low level impact and proposed offsets.

Vulnerable species

- *Artamus cyanopterus* (Dusky Woodswallow)

Lead to the long-term decrease in the size of a population.

In the case of a vulnerable species, an important population is a population that is necessary for a species' long-term survival and recovery. This may include populations that are:

• Key source populations either for breeding or dispersal; or

• Populations that are necessary for maintaining genetic diversity; and/or

• Populations that are near the limit of the species range.

The Dusky Woodswallow is not likely to utilise this area for breeding as most breeding for the species occurs west of the Great Dividing Range, therefore impact is likely to be limited to foraging habitat for the species. There are records of this species within the surrounding locality. The clearing of 0.84 ha of native vegetation considered foraging habitat is not likely to impact on any individuals of Dusky Woodswallow, as they are highly mobile species. The location of the proposed development is not suitable to meet any of the conditions listed above, therefore, the proposed development is unlikely to lead to decrease in the size of the population or impact the population over time.

Reduce the area of occupancy of the species.

The Dusky Woodswallow may utilise this area for foraging. The action, removing approximately 0.84 ha of potential foraging habitat, will not reduce the area of occupancy of this species as there is no important population occupying the area.

Fragment an existing population into two or more populations

The impact area boarders an existing roadway in a development landscape where it is fringed by urban developments. This species is highly mobile and, flies long distances over open areas to move between suitable foraging habitats. The action will not affect the movement of Dusky Woodswallow between habitat patches or fragment the population. The action is considered unlikely to fragment existing populations as movement corridor within the locality will remain intact.

The proposal is therefore unlikely to increase existing fragmentation of vegetation and is unlikely to significantly impact the continued survival of the population.

Adversely affect habitat critical to the survival of the species.

No breeding habitat for the Dusky Woodswallow occurs in the impact area, as such is it unlikely that the proposal will significantly impact breeding cycle of the species. The impacts on 0.84 hectares of native vegetation that is potential foraging habitat is not likely to critically impact the species such that its immediate survival is put a risk.

Disrupt the breeding cycle of the population.

The proposed development will only impact foraging habitat for the Dusky Woodswallow and not breeding habitat, as such the proposal will not impact on the breeding cycle of a population.

Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.

The impact area is already disturbed and occurs along a roadside. The proposal is not expected to isolate or fragment habitat further. In addition, the area of native vegetation to be removed is relatively small, covering 0.84 ha, which is not expected to impact the species to the extent that it would lead to decline, particularly as there is higher quality foraging habitat in the areas to the north and east oof the proposed development.

Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the critically endangered or endangered species' habitat.

The impact area is highly disturbed and already contains a high abundance of invasive species. The proposal is not expected to increase the prevalence of these species such that they impact on Dusky Woodswallow.

Introduce disease that may cause the species to decline.

There are no known disease issues affecting this species in relation to the action. The action is unlikely to increase the potential for significant disease vectors to affect local populations.

Interfere substantially with the recovery of the species.

The proposed development will not interfere with the recovery of the species due to low level impact and proposed offsets.

- *Calyptorhynchus lathami lathami* (South-eastern Glossy Black-Cockatoo)

Lead to the long-term decrease in the size of a population.

The Glossy Black-Cockatoo does not have breeding habitat in the impact area as there are no hollows. Impact is limited to clearing of 0.84 ha of native vegetation that may provide foraging resources for the species. As the proposed action is not impacting breeding habitat for the species, or high numbers of Sheoks able to provide large amount of foraging resources, it is not likely to impact the species, or lead to any impact on the size of the population.

Reduce the area of occupancy of the species.

As this area is not considered important habitat for the species, it is not likely to reduce the area of occupancy of the species.

Fragment an existing population into two or more populations

The impact area boarders an existing roadway in a development landscape where it is fringed by urban developments. This species is highly mobile and flies long distances over open areas to move between suitable foraging habitats. The action will

not affect the movement of Glossy Black-Cockatoo between habitat patches or fragment the population. The action is considered unlikely to fragment existing populations as the movement corridor within the locality will remain intact.

The proposal is therefore unlikely to increase existing fragmentation of vegetation and is unlikely to significantly impact the continued survival of the population.

Adversely affect habitat critical to the survival of the species.

No breeding habitat for the Glossy Black-Cockatoo occurs in the impact area, as such is it unlikely that the proposal will significantly impact breeding cycle of the species. The impacts on 0.84 hectares of potential foraging habitat is not likely to critically impact the species such that it's immediate survival is put a risk.

Disrupt the breeding cycle of the population.

Glossy Black-Cockatoo has no suitable breeding habitat within the impact area, and the proposal is not impacting on the movement of the species, therefore will not impact on the breeding cycle of the species.

Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.

The impact area occurs along roadsides, and the proposed development will not add further fragmentation to this area of vegetation. There are areas of higher quality habitat in the surrounding area, to the north and east of the development. The proposal is unlikely to impact the species to the extent that it is likely to decline as the area to be removed is small and does not contain breeding habitat or high quality foraging resources, and better quality habitat occurs in the surrounding area.

Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the critically endangered or endangered species' habitat.

The impact area is already disturbed and contains a high abundance of invasive species. The proposal is not expected to increase the prevalence of these species such that they impact the Glossy Black-Cockatoo. Mitigation measures are in place for weed control during works (Section 6).

Introduce disease that may cause the species to decline.

There are no known disease issues affecting this species in relation to the action. The action is unlikely to increase the potential for significant disease vectors to affect local populations.

Interfere substantially with the recovery of the species.

The proposed development will not interfere with the recovery of the species due to low level impact and proposed offsets.

- *Chalinolobus dwyeri (Large-eared Pied Bat)*

Lead to the long-term decrease in the size of an important population of the species.

In the case of a vulnerable species, an important population is a population that is necessary for a species' long-term survival and recovery. This may include populations that are:

• Key source populations either for breeding or dispersal; or

• Populations that are necessary for maintaining genetic diversity; and/or

• Populations that are near the limit of the species range.

The identification of potential foraging habitat for this vulnerable species does not constitute the presence of an 'important population' as defined by the criteria listed above, as any potentially occurring individuals within the study area do not represent a key source population either for breeding or dispersal; the study area is not important for the maintenance of genetic diversity of the species; and the species is not at the limits of its range in the study area. Therefore, the study area is not likely to contain an important population of the large-eared pied bat. Further, the National Recovery Plan for the large-eared pied bat (DERM 2011) states that habitat critical for the survival of the species requires the presence of diurnal roosts and shelter habitat, usually in the form of sandstone cliffs and adjacent fertile woodland valley foraging habitat. The majority of records of the species occur within several km of cliff lines or caves. Due to the absence of suitable cliff lines or cave roosting habitat within the study area, it is not considered to contain important habitat for the species. This species was not detected during surveys but has moderate potential to use the proposal area for foraging use only. Large-eared Pied-bat requires a

combination of sandstone cliff/escarpment to provide roosting habitat; while breeding and nursery roosts have very specific requirements, i.e. arch caves with dome roofs (that need to be deep enough to allow juvenile bats to learn to fly safely inside) and with indentations in the roof (presumably to allow the capture of heat). These physical characteristics are not very common in the landscape and therefore a limiting factor in the distribution of the species. No such features are present within the proposal area or nearby.

The proposed development will impact on approximately 0.84 hectares of native vegetation, representing potential foraging habitat for this species. The action will not affect any known permanent roosting, breeding / maternity sites. Therefore, it is likely that the impacts of the action will be confined to minor loss of foraging habitat caused by direct clearing or damage to native vegetation during the construction phase. Due to the relatively small impact on potential foraging habitat for these species, it is unlikely that the proposal will lead to the long-term decline of any potentially occurring important populations.

Given the relative widespread nature of similar native vegetation in the locality and abundance of higher quality foraging habitat within the feeding range of local individuals, the proposal is not expected to significantly affect important habitat or lead to a long-term decrease in the size of an important population.

Reduce the area of occupancy of an important population.

As the area is not considered to be occupied by an important population, the proposal will not have an impact on the area of occupancy of an important population.

Fragment an existing population into two or more populations.

Highly mobile species such as bats are expected to be less impacted by fragmentation. The Large-eared Pied-bat is known to forage several kilometres from roost sites and may travel up to 100 kilometres between maternity and winter roosts (SPRAT profile). The proposal will not fragment an important population of this species as individuals will still be able to disperse between roosts and foraging areas within its range. Genetic exchange within the population and dispersal will not be disrupted by the proposal.

The proposal is therefore unlikely to increase existing fragmentation of vegetation and is unlikely to significantly impact the continued survival of the population.

Adversely affect habitat critical to the survival of a species.

The species is dependent on the presence of diurnal roosts such as caves, overhangs, or other landscape features for shelter. Large-eared Pied-bat roosting habitat includes areas with cliffs, escarpments or rocky outcrops, typically sandstone but also rhyolite in central-eastern NSW and south-eastern and central Qld. The structure of maternity roosts appears to be particularly specific (arched caves with domed roofs), which mean appropriate caves are uncommon in the landscape. Any known roost site, or caves that could be roost sites, are considered habitat critical to the survival of the species. No suitable features likely to provide such habitat are present within the proposal area or nearby.

The proposal will not adversely affect habitat critical to the survival of this species in this region.

Disrupt the breeding cycle of an important population.

No breeding habitat for these species was identified within the proposal area nor is it expected to occur. The breeding requirements for this species are very specific, as discussed above, and the proposal will not disrupt the breeding cycle of this species or significantly impact the continued survival of the species.

Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.

The impacts to foraging habitat are minimal and no potential breeding or roosting habitat occurs within the study area. This impact is not expected to lead to a decline in the species in the region given the availability of high-quality foraging habitat available to local animals in surrounding the study area.

Result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat.

The proposal area is highly disturbed and already contains a high abundance of invasive species. The proposal is not expected to increase the prevalence of these species. The action is unlikely to result in an invasive species harmful to the Large-eared Pied-bat becoming established in the habitat.

Introduce disease that may cause the species to decline.

There are no known disease issues affecting this species in relation to the action. The action is unlikely to increase the potential for significant disease vectors to affect local populations.

Interfere substantially with the recovery of the species.

Actions identified in the species recovery plan (DERM 2011) are not pertinent to the proposal as they are primarily concerned with known and potential roost / breeding sites. The proposed development will not interfere with the recovery of the species due to low level of impact and proposed offsets (see Section 7). Replacement plantings in accordance with the Tree and Hollow Replacement Guidelines (Transport, 2023d) will provide a positive increase in potential foraging habitat for this species.

- *Hirundapus caudacutus(White-throated Needletail)*

Lead to the long-term decrease in the size of a population.

The White-throated needletail does not breed in the study area and the extent of habitat remaining in the locality area likely provides sufficient resources to sustain future visitation, such that the action itself is unlikely to lead to a long-term decrease in the size of the Australian population.

White-throated Needletail is known to breed in Asia, migrating to mainly Australia, occasionally in New Guinea and New Zealand. As such, the vegetation within the impact area does not constitute important habitat for breeding.

Impact of potential foraging habitat is minimal, in Australia the White-throated Needletail almost always forages aerially at heights up to 'Cloud Level'. The species may utilise the impact area as part of a broader area of foraging habitat, however larger areas of suitable habitat occur in the surrounding landscape, particularly in nearby reserves and national park. Within the Wyong subregion, the potential habitat removal represents a small proportion of currently available foraging habitat for this species.

Records of this species occur within the surrounding locality although this species was not observed during surveys.

As such, the proposal will only impact potential marginal foraging habitat for the species. The proposed activity is therefore considered unlikely to lead to a long-term decrease in the size of an important population of the White throated-needletail.

Reduce the area of occupancy of the species.

White-throated Needletails is an occasional visitor to the region and may utilise the aerial space above the site for foraging intermittently when there is a high availability of flying insects. The action, removing appro ---Hectares total of potential foraging habitat, will not reduce the area of occupancy of this species which is aerial.

Fragment an existing population into two or more populations

The impact area boarders an existing roadway in a development landscape where it is fringed by urban developments. This species is highly mobile and, ad a regular behaviour, flies long distances over open areas to move between suitable foraging habitats. The action will not affect the movement of White-throated Needletail between habitat patches or fragment the population. The action is considered unlikely to fragment existing populations as movement corridor within the locality will remain intact.

The proposal is therefore unlikely to increase existing fragmentation of vegetation and is unlikely to significantly impact the continued survival of the population.

Adversely affect habitat critical to the survival of the species.

No breeding habitat for the White-throated Needletail occurs in the impact area, as such is it unlikely that the proposal will significantly impact breeding cycle of the species. The impacts on 0.84 hectares of is not likely to critically impact the species such that its immediate survival is put a risk.

Disrupt the breeding cycle of the population.

White-throated Needletail is a non-breeding visitor to the Australian mainland, breeding exclusively in Asia, as such the proposal will not impact on breeding habitat.

Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.

The impact area is already disturbed and contains a high abundance of invasive species. The proposal is not expected to increase the prevalence of these species such that they impact the White-throated Needletail.

Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the critically endangered or endangered species' habitat.

The impact area is highly disturbed and already contains a high abundance of invasive species. The proposal is not expected to increase the prevalence of these species such that they impact on White-throated Needletail.

Introduce disease that may cause the species to decline.

There are no known disease issues affecting this species in relation to the action. The action is unlikely to increase the potential for significant disease vectors to affect local populations.

Interfere substantially with the recovery of the species.

The proposed development will not interfere with the recovery of the species due to low level impact and proposed offsets.

- *Pseudomys novahollandiae (New holland mouse)*

Lead to the long-term decrease in the size of a population.

The New Holland Mouse was not recorded within the study area. An 'important population' is defined as a population that is necessary for a species' long-term survival and recovery. This may include populations identified as such in recovery plans, and/or that are:

- Key source populations either for breeding or dispersal
- Populations that are necessary for maintaining genetic diversity, and/or
- Populations that are near the limit of the species range.

The Action area is not near the limit of the species range. The action Area could contain a population for the purpose of breeding, dispersal and possibly for maintaining genetic diversity. Both the Development site and the retained land adjoining the Development site represent suitable habitat for the New Holland Mouse. As such, the proposed Action could have a direct impact on the species, it is likely that individuals found within the Development site can be translocated to suitable and available habitat in the surrounding landscape. As such, it is unlikely that the proposed action will lead to long-term decline of the size of an important population.

Reduce the area of occupancy of the species.

As the proposed action will not impact on a large portion of New Holland Mouse habitat and due to the availability of suitable habitat in the surrounding area, it is unlikely that the proposed action will reduce the area of occupancy of an important population.

Fragment an existing population into two or more populations

Due to the location of the development, the loss of habitat within the development site would not isolate remaining areas of the population or its habitat.

Adversely affect habitat critical to the survival of the species.

Critical habitat for the species is not defined, as such, conservatively it is assumed the habitat-on site is critical to the survival of the species.

Both the development site and the retained land adjoining the development area represent suitable habitat for the New Holland Mouse. This species habitat is generic (self-constructed burrows) and would not be restricted to the action area. Expanse of similar habitat, including softer substrates preferred for burrowing (DCCEEW 2024), is available within areas to be retained within the study area. As such the removal of a total of 0.84 ha of native vegetation is unlikely to adversely affect habitat critical to the survival of the species.

Disrupt the breeding cycle of the population.

Breeding takes place late winter to early summer, followed by gestation period of 32-39 days.

Due to the nature of the clearing and relatively small area of habitat removal, in the context of the available habitat in the area, it is unlikely that any potential distribution to the species breeding will be significant.

Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.

Both the Development site and the retained land adjoining the development site represent suitable habitat for the New Holland Mouse. As such the removal of –ha of native vegetation is unlikely to cause the species in decline. Additionally, the proposed action will not isolate any habitat or population.

Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the critically endangered or endangered species' habitat.

Weed invasion is a recognised threat to the New Holland Mouse (Seebeck, et al., 1996). Predation by introduced predators, including the Red Fox (*Vulpes vulpes*), Cat (*Felis catus*) and Dog (*Canis familiaris*) is a recognised threat to the New Holland Mouse. Competition from introduced rodents, such as the house mouse is a potential threat. The existing feral animal threat levels are unlikely to change significantly due to the Action.

Introduce disease that may cause the species to decline.

Vegetations dieback caused by Phytophthora cinnamomic is a recognised threat to the New Holland Mouse (Seebeck et al., 1996). The Action is unlikely to introduce any disease, fungus or virus to the local population of this species.

Interfere substantially with the recovery of the species.

There is no adopted or made recovery plan for this species, The approved conservation advice for New Holland Mouse lists a number of priority actions for this species. The action would be inconsistent with the following priority action listed in this plan, given three individuals recorded within the Action Area:

- Ensure there is no disturbance in areas where the New Holland Mouse occurs, excluding necessary actions to manage the conservation of the species.

The activities which comprise the action are otherwise not inconsistent with the priority actions listed in this plan, and the action would not interfere substantially with the recovery of this species.

DCCEEW (2024). Species profile and Threats Database. Available https://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=96 Accessed: August 2024

Seebeck, J., Menkhorst, P., Wi, B.A., and Lowe, K.M. (1996). Flora and Fauna Guarantee Action Statement No. 74, New Holland Mouse Pseudomys novaehollandiae. Department of Natural Resources and Environment, Victoria.

Seebeck, J., Menkhorst, P., Wilson, B.A., and Lowe, K.M. (1996). Flora and Fauna Guarantee Action

- *Tetratheca juncea* (Black-eyed Susan)

Lead to the long-term decrease in the size of a population.

A total of 16 individual *Tetratheca juncea* plants were recorded within the study area, however they were outside the impact area, and therefore will not be directly impacted on by the proposal. There is a large number of records of this species within the locality. The proposed development is not likely to impact the size of the local population in the long term.

Reduce the area of occupancy of the species.

The proposal will impact a total of 0.84 ha of vegetation that is suitable habitat for the species, however as Tj was not present within this area, the proposed action will not reduce the area of occupancy of the species.

Fragment an existing population into two or more populations

The proposed development will not impact fragmentation of this species, as the impact is occurring on an existing roadside, and the species present occur outside of the impact area.

Adversely affect habitat critical to the survival of the species.

There is 0.84 ha of potential habitat present within the impact area, however this is not habitat that is critical for the survival of the species, as it is not present within the development footprint.

Disrupt the breeding cycle of the population.

There is a larger population of this species in the surrounding area to the north and east of the proposed development. The proposed development is not likely to impact the potential for the local population to continue producing new individuals, as it is not fragmenting the landscape, and isolating patches of individuals.

Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.

As the impact area of the proposed development is very minor, clearing only 1.01 ha of native and exotic vegetation, there main impact will be on potential habitat for the species. However, the area is not high condition habitat, and better condition vegetation occurs in the surrounding area to the north and east. As such the removal of 0.84 ha of native vegetation is unlikely to cause the species in decline. Additionally, the proposed action will not isolate any habitat or population.

Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the critically endangered or endangered species' habitat.

There is already a high density of weeds in the area, and as the development occurs in a highly disturbed roadside location, there is a high risk of invasion by weeds. However, weed management controls have been outlined in mitigation measures (Table 6.1 Section B23), and these controls should prevent lantana and bitou bush becoming established in the area throughout the construction process (these weeds are listed as threats to Tj as they change the microclimate and soil composition over time). Therefore, the proposed development will not add to the risk of weed invasion in the surrounding area.

Introduce disease that may cause the species to decline.

The Proposed Development is unlikely to introduce any disease, fungus or virus to the local population of this species due to the mitigation measures outlined in Section 6.

Interfere substantially with the recovery of the species.

The proposed development is unlikely to isolate patches, add additional fire risk, increase risk of weed or disease, limit distribution of the species and therefore is not expected to have an impact on the recovery of this species.

Appendix F: Biodiversity credit reports

Provide copies of the following BAM-C credit reports:

- Credits summary report
- Biodiversity credit report (Like-for-like)
- Candidate threatened species report
- Predicted species report.

BAM Credit Summary Report

Proposal Details

Assessment Id
00052297/BAAS21020/24/00052298

Proposal Name
Chain Valley Bay Road Intersection

BAM data last updated *
28/10/2024

Assessor Name
Ashley Owen

Report Created
27/03/2025

BAM Data version *
Current classification (live - default) (80)

Assessor Number
BAAS21020

BAM Case Status
Open

Date Finalised
To be finalised

Assessment Revision
0

Assessment Type
Part 5 Activities

* Disclaimer: BAM data last updated may indicate either complete or partial update of the BAM calculator database. BAM calculator database may not be completely aligned with Bionet.

Ecosystem credits for plant communities types (PCT), ecological communities & threatened species habitat

Zone	Vegetation zone name	TEC name	Current Vegetation integrity score	Change in Vegetation integrity (loss / gain)	Area (ha)	Sensitivity to loss (Justification)	Species sensitivity to gain class	BC Act Listing status	EPBC Act listing status	Biodiversity risk weighting	Potential SAII	Ecosystem credits

Hunter Coast Lowland Scribbly Gum Forest											
1	3583_mod-good	Not a TEC	47.7	47.7	0.19	PCT Cleared - 64%	High Sensitivity to Gain			1.75	4
										Subtotal	**4**
										Total	**4**

Species credits for threatened species

Vegetation zone name	Habitat condition (Vegetation Integrity)	Change in habitat condition	Area (ha)/Count (no. individuals)	Sensitivity to loss (Justification)	Sensitivity to gain (Justification)	BC Act Listing status	EPBC Act listing status	Potential SAII	Species credits
Cercartetus nanus / Eastern Pygmy-possum (Fauna)									
3583_mod-good	47.7	47.7	0.19	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Not Listed	False	5
								Subtotal	**5**
Crinia tinnula / Wallum Froglet (Fauna)									
3583_mod-good	47.7	47.7	0.1	Biodiversity Conservation Act listing status	Effectiveness of management in controlling threats	Vulnerable	Not Listed	False	2
								Subtotal	**2**

Lathamus discolor / Swift Parrot (Fauna)									
3583_mod-good	47.7	47.7	0.08	Environment Protection and Conservation Act listing status	Effectiveness of management in controlling threats	Endangered	Critically Endangered	True	3
								Subtotal	**3**
Petaurus norfolcensis / Squirrel Glider (Fauna)									
3583_mod-good	47.7	47.7	0.19	Biodiversity Conservation Act listing status	Species dependent on habitat attributes	Vulnerable	Not Listed	False	5
								Subtotal	**5**

BAM Biodiversity Credit Report (Like for like)

Proposal Details

Assessment Id
00052297/BAAS21020/24/00052298

Proposal Name
Chain Valley Bay Road Intersection

BAM data last updated *
28/10/2024

Assessor Name
Ashley Owen

Assessor Number
BAAS21020

BAM Data version *
Current classification (live - default) (80)

Proponent Names

Report Created
27/03/2025

BAM Case Status
Open

Assessment Revision
0

Assessment Type
Part 5 Activities

Date Finalised
To be finalised

* Disclaimer: BAM data last updated may indicate either complete or partial update of the BAM calculator database. BAM calculator database may not be completely aligned with Bionet.

Potential Serious and Irreversible Impacts

Name of threatened ecological community	Listing status	Name of Plant Community Type/ID
Nil		

Species
Lathamus discolor / Swift Parrot

Additional Information for Approval

BAM Biodiversity Credit Report (Like for like)

PCT Outside Ibra Added

None added

PCTs With Customized Benchmarks

PCT
No Changes

Predicted Threatened Species Not On Site

Name
No Changes

Ecosystem Credit Summary (Number and class of biodiversity credits to be retired)

Name of Plant Community Type/ID	Name of threatened ecological community	Area of impact	HBT Cr	No HBT Cr	Total credits to be retired
3583-Hunter Coast Lowland Scribbly Gum Forest	Not a TEC	0.2	0	4	4

BAM Biodiversity Credit Report (Like for like)

3583-Hunter Coast Lowland Scribbly Gum Forest

Like-for-like credit retirement options

Class	Trading group	Zone	HBT	Credits	IBRA region
Sydney Coastal Dry Sclerophyll Forests This includes PCT's: 3583, 3592, 3594	Sydney Coastal Dry Sclerophyll Forests >=50% and <70%	3583_mod-good	No	4	Wyong, Hunter, Pittwater and Yengo. or Any IBRA subregion that is within 100 kilometers of the outer edge of the impacted site.

Species Credit Summary

Species	Vegetation Zone/s	Area / Count	Credits
Cercartetus nanus / Eastern Pygmy-possum	**3583_mod-good**	0.2	5.00
Crinia tinnula / Wallum Froglet	**3583_mod-good**	0.1	2.00
Lathamus discolor / Swift Parrot	**3583_mod-good**	0.1	3.00
Petaurus norfolcensis / Squirrel Glider	**3583_mod-good**	0.2	5.00

Credit Retirement Options

Like-for-like credit retirement options

Cercartetus nanus / Eastern Pygmy-possum

Spp	IBRA subregion
Cercartetus nanus / Eastern Pygmy-possum	Any in NSW

Crinia tinnula / Wallum Froglet	Spp	IBRA subregion
	Crinia tinnula / Wallum Froglet	Any in NSW
Lathamus discolor / Swift Parrot	Spp	IBRA subregion
	Lathamus discolor / Swift Parrot	Any in NSW
Petaurus norfolcensis / Squirrel Glider	Spp	IBRA subregion
	Petaurus norfolcensis / Squirrel Glider	Any in NSW

BAM Candidate Species Report

Proposal Details

Assessment Id 00052297/BAAS21020/24/00052298	Proposal Name Chain Valley Bay Road Intersection	BAM data last updated * 28/10/2024
Assessor Name Ashley Owen	Report Created 27/03/2025	BAM Data version * Current classification (live - default) (80)
Assessor Number BAAS21020	Assessment Type Part 5 Activities	BAM Case Status Open
Assessment Revision 0		Date Finalised To be finalised

* Disclaimer: BAM data last updated may indicate either complete or partial update of the BAM calculator database. BAM calculator database may not be completely aligned with Bionet.

List of Species Requiring Survey

Name	Presence	Survey Months
Acacia bynoeana Bynoe's Wattle	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☑ Nov ☐ Dec ☐ Survey month outside the specified months?
Angophora inopina Charmhaven Apple	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☑ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Callistemon linearifolius Netted Bottle Brush	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☑ Nov ☐ Dec ☐ Survey month outside the specified months?

Cercartetus nanus Eastern Pygmy-possum	Yes (assumed present)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Corunastylis sp. Charmhaven (NSW896673) Corunastylis sp. Charmhaven (NSW896673)	No (surveyed)	☐ Jan ☑ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Crinia tinnula Wallum Froglet	Yes (assumed present)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Cryptostylis hunteriana Leafless Tongue Orchid	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☑ Dec ☐ Survey month outside the specified months?
Diuris praecox Rough Doubletail	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☑ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Eucalyptus camfieldii Camfield's Stringybark	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☑ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?

Eucalyptus parramattensis subsp. parramattensis - endangered population Eucalyptus parramattensis C. Hall. subsp. parramattensis in Wyong and Lake Macquarie local government areas	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☑ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Genoplesium insigne Variable Midge Orchid	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Grevillea parviflora subsp. parviflora Small-flower Grevillea	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☑ Nov ☐ Dec ☐ Survey month outside the specified months?
Lathamus discolor Swift Parrot	Yes (assumed present)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Petaurus norfolcensis Squirrel Glider	Yes (assumed present)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Rhizanthella slateri Eastern Australian Underground Orchid	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?

Rutidosis heterogama Heath Wrinklewort	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Tetratheca juncea Black-eyed Susan	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☑ Sep ☐ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?
Thelymitra adorata Wyong Sun Orchid	No (surveyed)	☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☑ Oct ☐ Nov ☐ Dec ☐ Survey month outside the specified months?

Threatened species Manually Added

None added

Threatened species assessed as not on site

Refer to BAR for detailed justification

Common name	Scientific name	Justification in the BAM-C
Barking Owl	Ninox connivens	Habitat constraints
Brush-tailed Phascogale	Phascogale tapoatafa	Habitat degraded
Brush-tailed Rock-wallaby	Petrogale penicillata	Habitat constraints
Bush Stone-curlew	Burhinus grallarius	Habitat constraints
Common Planigale	Planigale maculata	Habitat degraded
Cotton Pygmy-Goose	Nettapus coromandelianus	Habitat constraints
Eastern Cave Bat	Vespadelus troughtoni	Habitat constraints
Eastern Osprey	Pandion cristatus	Habitat constraints
Gang-gang Cockatoo	Callocephalon fimbriatum	Habitat constraints

Giant Barred Frog	Mixophyes iteratus	Habitat constraints
Giant Burrowing Frog	Heleioporus australiacus	Habitat degraded
Green and Golden Bell Frog	Litoria aurea	Habitat constraints
Grey-headed Flying-fox	Pteropus poliocephalus	Habitat constraints
Koala	Phascolarctos cinereus	Habitat constraints
Large Bent-winged Bat	Miniopterus orianae oceanensis	Habitat constraints
Large-eared Pied Bat	Chalinolobus dwyeri	Habitat constraints
Little Bent-winged Bat	Miniopterus australis	Habitat constraints
Little Eagle	Hieraaetus morphnoides	Habitat constraints
Long-nosed Potoroo	Potorous tridactylus	Habitat degraded
Mahony's Toadlet	Uperoleia mahonyi	Habitat degraded
Masked Owl	Tyto novaehollandiae	Habitat constraints
Powerful Owl	Ninox strenua	Habitat constraints
Regent Honeyeater	Anthochaera phrygia	Habitat constraints
South-eastern Glossy Black-Cockatoo	Calyptorhynchus lathami lathami	Habitat constraints
Southern Myotis	Myotis macropus	Habitat constraints
Square-tailed Kite	Lophoictinia isura	Habitat constraints
Stephens' Banded Snake	Hoplocephalus stephensii	Habitat constraints
Stuttering Frog	Mixophyes balbus	Habitat degraded
White-bellied Sea-Eagle	Haliaeetus leucogaster	Habitat constraints

BAM Predicted Species Report

Proposal Details

Assessment Id	Proposal Name	BAM data last updated *
00052297/BAAS21020/24/00052298	Chain Valley Bay Road Intersection	28/10/2024
Assessor Name	**Report Created**	**BAM Data version ***
Ashley Owen	27/03/2025	Current classification (live - default) (80)
Assessor Number	**Assessment Type**	**BAM Case Status**
BAAS21020	Part 5 Activities	Open
Assessment Revision		**Date Finalised**
0		To be finalised

* Disclaimer: BAM data last updated may indicate either complete or partial update of the BAM calculator database. BAM calculator database may not be completely aligned with Bionet.

Threatened species reliably predicted to utilise the site. No surveys are required for these species. Ecosystem credits apply to these species.

Common Name	Scientific Name	Vegetation Types(s)
Black Bittern	Ixobrychus flavicollis	3583-Hunter Coast Lowland Scribbly Gum Forest
Black-chinned Honeyeater (eastern subspecies)	Melithreptus gularis gularis	3583-Hunter Coast Lowland Scribbly Gum Forest
Black-necked Stork	Ephippiorhynchus asiaticus	3583-Hunter Coast Lowland Scribbly Gum Forest
Brown Treecreeper (eastern subspecies)	Climacteris picumnus victoriae	3583-Hunter Coast Lowland Scribbly Gum Forest
Dusky Woodswallow	Artamus cyanopterus cyanopterus	3583-Hunter Coast Lowland Scribbly Gum Forest
Eastern Coastal Free-tailed Bat	Micronomus norfolkensis	3583-Hunter Coast Lowland Scribbly Gum Forest
Eastern False Pipistrelle	Falsistrellus tasmaniensis	3583-Hunter Coast Lowland Scribbly Gum Forest
Eastern Osprey	Pandion cristatus	3583-Hunter Coast Lowland Scribbly Gum Forest
Flame Robin	Petroica phoenicea	3583-Hunter Coast Lowland Scribbly Gum Forest
Gang-gang Cockatoo	Callocephalon fimbriatum	3583-Hunter Coast Lowland Scribbly Gum Forest

Golden-tipped Bat	Phoniscus papuensis	3583-Hunter Coast Lowland Scribbly Gum Forest
Greater Broad-nosed Bat	Scoteanax rueppellii	3583-Hunter Coast Lowland Scribbly Gum Forest
Grey-headed Flying-fox	Pteropus poliocephalus	3583-Hunter Coast Lowland Scribbly Gum Forest
Large Bent-winged Bat	Miniopterus orianae oceanensis	3583-Hunter Coast Lowland Scribbly Gum Forest
Little Bent-winged Bat	Miniopterus australis	3583-Hunter Coast Lowland Scribbly Gum Forest
Little Eagle	Hieraaetus morphnoides	3583-Hunter Coast Lowland Scribbly Gum Forest
Little Lorikeet	Glossopsitta pusilla	3583-Hunter Coast Lowland Scribbly Gum Forest
New Holland Mouse	Pseudomys novaehollandiae	3583-Hunter Coast Lowland Scribbly Gum Forest
Regent Honeyeater	Anthochaera phrygia	3583-Hunter Coast Lowland Scribbly Gum Forest
Rose-crowned Fruit-Dove	Ptilinopus regina	3583-Hunter Coast Lowland Scribbly Gum Forest
Scarlet Robin	Petroica boodang	3583-Hunter Coast Lowland Scribbly Gum Forest
South-eastern Glossy Black-Cockatoo	Calyptorhynchus lathami lathami	3583-Hunter Coast Lowland Scribbly Gum Forest
Speckled Warbler	Chthonicola sagittata	3583-Hunter Coast Lowland Scribbly Gum Forest
Spotted-tailed Quoll	Dasyurus maculatus	3583-Hunter Coast Lowland Scribbly Gum Forest
Square-tailed Kite	Lophoictinia isura	3583-Hunter Coast Lowland Scribbly Gum Forest
Swift Parrot	Lathamus discolor	3583-Hunter Coast Lowland Scribbly Gum Forest
Turquoise Parrot	Neophema pulchella	3583-Hunter Coast Lowland Scribbly Gum Forest
Varied Sittella	Daphoenositta chrysoptera	3583-Hunter Coast Lowland Scribbly Gum Forest
White-bellied Sea-Eagle	Haliaeetus leucogaster	3583-Hunter Coast Lowland Scribbly Gum Forest
White-throated Needletail	Hirundapus caudacutus	3583-Hunter Coast Lowland Scribbly Gum Forest
Yellow-bellied Sheathtail-bat	Saccolaimus flaviventris	3583-Hunter Coast Lowland Scribbly Gum Forest

Threatened species Manually Added

None added

BAM Predicted Species Report

Threatened species assessed as not within the vegetation zone(s) for the PCT(s)

Refer to BAR for detailed justification

Common Name	Scientific Name	Justification in the BAM-C

Appendix G: Protected Matters Search

Department of Climate Change, Energy, the Environment and Water

Protected Matters Search Tool

Report Generated - 1:59PM - 17 July 2024

Matters of National Environment Significance	Count
World Heritage Properties	0
National Heritage Places	0
Wetlands of International Importance (Ramsar Wetlands)	0
Great Barrier Reef Marine Park	0
Commonwealth Marine Area	1
Listed Threatened Ecological Communities	5
Listed Threatened Species	104
Listed Migratory Species	82

Other Matters Protected by the EPBC Act	Count
Commonwealth Lands	14
Commonwealth Heritage Places	0
Listed Marine Species	107
Whales and Other Cetaceans	15
Critical Habitats	0
Commonwealth Reserves Terrestrial	0
Australian Marine Parks	0
Habitat Critical to the Survival of Marine Turtles	0

Extra Information	Count
State and Territory Reserves	7
Regional Forest Agreements	1
Nationally Important Wetlands	4
EPBC Act Referrals	22
Key Ecological Features	0
Biologically Important Areas	9
Bioregional Assessments	1
Geological and Bioregional Assessments	0

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 and is accurate at the time of generation.
Please see the caveat for interpretation of information provided here.
Consider carefully the age of information for decision making.

Report Metadata	Caveat

World Heritage Places [Resource Information]

Place ID	Place Name	State	Legal Status	Natural Values	Cultural Values	Website

National Heritage Places [Resource Information]

Place ID	Place Name	State	Heritage Class	Legal Status	Website

Wetlands of International Importance (Ramsar Wetlands)

[Resource Information]

Ramsar Site No.	Ramsar Site Name	Proximity	Website

Great Barrier Reef Marine Park [Resource Information]

Zone ID	Zone Type	State	Permit Description	IUCN

Commonwealth Marine Area

[Resource Information]

Feature Name	Buffer Status
Commonwealth Marine Areas (EPBC Act)	In buffer area only

Listed Threatened Ecological Communities

[Resource Information]

				Presence		
Community ID	**Community Name**	**Threatened Category**	**Website**	**Rank**	**Text**	**Buffer Status**
127	Posidonia australis seagrass meadows of the Manning-Hawkesbury	Endangered	Species Profile and	Likely	Community likely to	In buffer area only
154	River-flat eucalypt forest on coastal floodplains of southern New South	Critically Endangered	Species Profile and	Likely	Community likely to	In feature area
171	Coastal Swamp Sclerophyll Forest of New South Wales and South East	Endangered	Species Profile and	Likely	Community likely to	In feature area
118	Subtropical and Temperate Coastal Saltmarsh	Vulnerable	Species Profile and	Likely	Community likely to	In buffer area only
142	Coastal Swamp Oak (Casuarina glauca) Forest of New South Wales	Endangered	Species Profile and	Likely	Community likely to	In feature area

Listed Threatened Species [Resource Information]

Species ID	Scientific Name	Common Name	Class	Simple Presence	Presence Text	Threatened	Migratory	Migratory	Marine	Cetacean	Buffer Status
82338	*Anthochaera phrygia*	Regent Honeyeater	Bird	Known	Species or species habitat known to occur within area	Critically Endangered					In feature area
82651	*Ardenna grisea*	Sooty Shearwater	Bird	Known	Breeding known to occur within area	Vulnerable	Migratory	Migratory Marine Birds	Listed (as Puffinus griseus)		In feature area
872	*Arenaria interpres*	Ruddy Turnstone	Bird	Known	Roosting known to occur within area	Vulnerable	Migratory	Migratory Wetlands Species	Listed		In feature area
1001	*Botaurus poiciloptilus*	Australasian Bittern	Bird	Known	Species or species habitat known to occur within area	Endangered					In feature area
874	*Calidris acuminata*	Sharp-tailed Sandpiper	Bird	Known	Roosting known to occur within area	Vulnerable	Migratory	Migratory Wetlands Species	Listed		In feature area
855	*Calidris canutus*	Red Knot, Knot	Bird	Known	Species or species habitat known to occur within area	Vulnerable	Migratory	Migratory Wetlands Species	Listed - overfly marine area		In feature area
856	*Calidris ferruginea*	Curlew Sandpiper	Bird	Known	Species or species habitat known to occur within area	Critically Endangered	Migratory	Migratory Wetlands Species	Listed - overfly marine area		In feature area
862	*Calidris tenuirostris*	Great Knot	Bird	Known	Roosting known to occur within area	Vulnerable	Migratory	Migratory Wetlands Species	Listed - overfly marine area		In feature area
768	*Callocephalon fimbriatum*	Gang-gang Cockatoo	Bird	Known	Species or species habitat known to occur within area	Endangered					In feature area
67036	*Calyptorhynchus lathami lathami*	South-eastern Glossy Black-Cockatoo	Bird	Known	Species or species habitat known to occur within area	Vulnerable					In feature area
877	*Charadrius leschenaultii*	Greater Sand Plover, Large Sand Plover	Bird	Likely	Species or species habitat likely to occur within area	Vulnerable	Migratory	Migratory Wetlands Species	Listed		In feature area
879	*Charadrius mongolus*	Lesser Sand Plover, Mongolian Plover	Bird	Known	Roosting known to occur within area	Endangered	Migratory	Migratory Wetlands Species	Listed		In feature area
67062	*Climacteris picumnus victoriae*	Brown Treecreeper (south-eastern)	Bird	Known	Species or species habitat known to occur within area	Vulnerable					In feature area
64458	*Diomedea antipodensis*	Antipodean Albatross	Bird	Likely	Foraging, feeding or related behaviour likely to occur within area	Vulnerable	Migratory	Migratory Marine Birds	Listed		In feature area
82270	*Diomedea antipodensis gibsoni*	Gibson's Albatross	Bird	Likely	Foraging, feeding or related behaviour likely to occur within area	Vulnerable			Listed (as Diomedea gibsoni)		In feature area
89221	*Diomedea epomophora*	Southern Royal Albatross	Bird	Likely	Foraging, feeding or related behaviour likely to occur within area	Vulnerable	Migratory	Migratory Marine Birds	Listed		In feature area
89223	*Diomedea exulans*	Wandering Albatross	Bird	Likely	Foraging, feeding or related behaviour likely to occur within area	Vulnerable	Migratory	Migratory Marine Birds	Listed		In feature area
64456	*Diomedea sanfordi*	Northern Royal Albatross	Bird	May	Species or species habitat may occur within area	Endangered	Migratory	Migratory Marine Birds	Listed		In feature area

Listed Threatened Species [Resource Information]

Species ID	Scientific Name	Common Name	Class	Simple Presence	Presence Text	Threatened	Migratory	Migratory	Marine	Cetacean	Buffer Status
942	*Erythrotriorchis radiatus*	Red Goshawk	Bird	May	Species or species habitat may occur within area	Endangered					In feature area
929	*Falco hypoleucos*	Grey Falcon	Bird	May	Species or species habitat may occur within area	Vulnerable					In feature area
64438	*Fregetta grallaria grallaria*	White-bellied Storm-Petrel (Tasman Sea), White-bellied Storm-Petrel (Australasian)	Bird	Likely	Species or species habitat likely to occur within area	Vulnerable					In buffer area only
863	*Gallinago hardwickii*	Latham's Snipe, Japanese Snipe	Bird	Known	Species or species habitat known to occur within area	Vulnerable	Migratory	Migratory Wetlands Species	Listed - overfly marine area		In feature area
470	*Grantiella picta*	Painted Honeyeater	Bird	Known	Species or species habitat known to occur within area	Vulnerable					In feature area
682	*Hirundapus caudacutus*	White-throated Needletail	Bird	Known	Species or species habitat known to occur within area	Vulnerable	Migratory	Migratory Terrestrial Species	Listed - overfly marine area		In feature area
744	*Lathamus discolor*	Swift Parrot	Bird	Known	Species or species habitat known to occur within area	Critically Endangered			Listed - overfly marine area		In feature area
86380	*Limosa lapponica baueri*	Nunivak Bar-tailed Godwit, Western Alaskan Bar-tailed Godwit	Bird	Known	Species or species habitat known to occur within area	Endangered					In feature area
845	*Limosa limosa*	Black-tailed Godwit	Bird	Known	Roosting known to occur within area	Endangered	Migratory	Migratory Wetlands Species	Listed - overfly marine area		In feature area
1060	*Macronectes giganteus*	Southern Giant-Petrel, Southern Giant Petrel	Bird	May	Species or species habitat may occur within area	Endangered	Migratory	Migratory Marine Birds	Listed		In feature area
1061	*Macronectes halli*	Northern Giant Petrel	Bird	Likely	Foraging, feeding or related behaviour likely to occur within area	Vulnerable	Migratory	Migratory Marine Birds	Listed		In feature area
67093	*Melanodryas cucullata cucullata*	South-eastern Hooded Robin, Hooded Robin (south-eastern)	Bird	Likely	Species or species habitat likely to occur within area	Endangered					In feature area
726	*Neophema chrysostoma*	Blue-winged Parrot	Bird	May	Species or species habitat may occur within area	Vulnerable			Listed - overfly marine area		In feature area
847	*Numenius madagascariensis*	Eastern Curlew, Far Eastern Curlew	Bird	Known	Species or species habitat known to occur within area	Critically Endangered	Migratory	Migratory Wetlands Species	Listed		In feature area
64445	*Pachyptila turtur subantarctica*	Fairy Prion (southern)	Bird	Known	Species or species habitat known to occur within area	Vulnerable					In feature area
1075	*Phoebetria fusca*	Sooty Albatross	Bird	May	Species or species habitat may occur within area	Vulnerable	Migratory	Migratory Marine Birds	Listed		In buffer area only

Listed Threatened Species [Resource Information]

Species ID	Scientific Name	Common Name	Class	Simple Presence	Presence Text	Threatened	Migratory	Migratory	Marine	Cetacean	Buffer Status
865	*Pluvialis squatarola*	Grey Plover	Bird	Known	Roosting known to occur within area	Vulnerable	Migratory	Migratory Wetlands Species	Listed - overfly marine area		In feature area
26033	*Pterodroma leucoptera leucoptera*	Gould's Petrel, Australian Gould's Petrel	Bird	May	Species or species habitat may occur within area	Endangered					In buffer area only
64450	*Pterodroma neglecta neglecta*	Kermadec Petrel (western)	Bird	May	Foraging, feeding or related behaviour may occur within area	Vulnerable					In buffer area only
525	*Pycnoptilus floccosus*	Pilotbird	Bird	Known	Species or species habitat known to occur within area	Vulnerable					In feature area
77037	*Rostratula australis*	Australian Painted Snipe	Bird	Likely	Species or species habitat likely to occur within area	Endangered			Listed - overfly marine area (as Rostratula benghalensis (sensu lato))		In feature area
59398	*Stagonopleura guttata*	Diamond Firetail	Bird	Known	Species or species habitat known to occur within area	Vulnerable					In feature area
82950	*Sternula nereis nereis*	Australian Fairy Tern	Bird	Likely	Foraging, feeding or related behaviour likely to occur within area	Vulnerable					In feature area
64460	*Thalassarche bulleri*	Buller's Albatross, Pacific Albatross	Bird	May	Species or species habitat may occur within area	Vulnerable	Migratory	Migratory Marine Birds	Listed		In feature area
82273	*Thalassarche bulleri platei*	Northern Buller's Albatross, Pacific Albatross	Bird	May	Species or species habitat may occur within area	Vulnerable			Listed (as Thalassarche sp. nov.)		In feature area
64464	*Thalassarche carteri*	Indian Yellow-nosed Albatross	Bird	Likely	Species or species habitat likely to occur within area	Vulnerable	Migratory	Migratory Marine Birds	Listed		In buffer area only
89224	*Thalassarche cauta*	Shy Albatross	Bird	Likely	Foraging, feeding or related behaviour likely to occur within area	Endangered	Migratory	Migratory Marine Birds	Listed		In feature area
64457	*Thalassarche eremita*	Chatham Albatross	Bird	May	Foraging, feeding or related behaviour may occur within area	Endangered	Migratory	Migratory Marine Birds	Listed		In feature area
64459	*Thalassarche impavida*	Campbell Albatross, Campbell Black-browed Albatross	Bird	May	Species or species habitat may occur within area	Vulnerable	Migratory	Migratory Marine Birds	Listed		In feature area
66472	*Thalassarche melanophris*	Black-browed Albatross	Bird	Likely	Foraging, feeding or related behaviour likely to occur within area	Vulnerable	Migratory	Migratory Marine Birds	Listed		In feature area
64463	*Thalassarche salvini*	Salvin's Albatross	Bird	Likely	Foraging, feeding or related behaviour likely to occur within area	Vulnerable	Migratory	Migratory Marine Birds	Listed		In feature area
64462	*Thalassarche steadi*	White-capped Albatross	Bird	Known	Foraging, feeding or related behaviour known to occur within area	Vulnerable	Migratory	Migratory Marine Birds	Listed		In feature area

Listed Threatened Species [Resource Information]

Species ID	Scientific Name	Common Name	Class	Simple Presence	Presence Text	Threatened	Migratory	Migratory	Marine	Cetacean	Buffer Status
832	*Tringa nebularia*	Common Greenshank, Greenshank	Bird	Known	Species or species habitat known to occur within area	Endangered	Migratory	Migratory Wetlands Species	Listed - overfly marine area		In feature area
59300	*Xenus cinereus*	Terek Sandpiper	Bird	Known	Roosting known to occur within area	Vulnerable	Migratory	Migratory Wetlands Species	Listed - overfly marine area		In feature area
68449	*Epinephelus daemelii*	Black Rockcod, Black Cod, Saddled Rockcod	Fish	Likely	Species or species habitat likely to occur within area	Vulnerable					In feature area
66240	*Hippocampus whitei*	White's Seahorse, Crowned Seahorse, Sydney Seahorse	Fish	Likely	Species or species habitat likely to occur within area	Endangered			Listed		In buffer area only
26179	*Prototroctes maraena*	Australian Grayling	Fish	May	Species or species habitat may occur within area	Vulnerable					In buffer area only
69374	*Seriolella brama*	Blue Warehou	Fish	Known	Species or species habitat known to occur within area	Conservation Dependent					In buffer area only
1870	*Litoria aurea*	Green and Golden Bell Frog	Frog	Known	Species or species habitat known to occur within area	Vulnerable					In feature area
1942	*Mixophyes balbus*	Stuttering Frog, Southern Barred Frog (in Victoria)	Frog	Likely	Species or species habitat likely to occur within area	Vulnerable					In feature area
89189	*Uperoleia mahonyi*	Mahony's Toadlet	Frog	Known	Species or species habitat known to occur within area	Endangered					In feature area
34	*Balaenoptera borealis*	Sei Whale	Mammal	Likely	Foraging, feeding or related behaviour likely to occur within area	Vulnerable	Migratory	Migratory Marine Species		Cetacean	In buffer area only
36	*Balaenoptera musculus*	Blue Whale	Mammal	May	Species or species habitat may occur within area	Endangered	Migratory	Migratory Marine Species		Cetacean	In buffer area only
37	*Balaenoptera physalus*	Fin Whale	Mammal	Likely	Foraging, feeding or related behaviour likely to occur within area	Vulnerable	Migratory	Migratory Marine Species		Cetacean	In buffer area only
183	*Chalinolobus dwyeri*	Large-eared Pied Bat, Large Pied Bat	Mammal	Known	Species or species habitat known to occur within area	Endangered					In feature area
75184	*Dasyurus maculatus maculatus (SE mainland population)*	Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population)	Mammal	Known	Species or species habitat known to occur within area	Endangered					In feature area
40	*Eubalaena australis*	Southern Right Whale	Mammal	Likely	Species or species habitat likely to occur within area	Endangered	Migratory (as Balaena glacialis australis)	Migratory Marine Species		Cetacean	In buffer area only
89289	*Notamacropus parma*	Parma Wallaby	Mammal	Likely	Species or species habitat likely to occur within area	Vulnerable					In feature area
254	*Petauroides volans*	Greater Glider (southern and central)	Mammal	Likely	Species or species habitat likely to occur within area	Endangered					In feature area

Listed Threatened Species [Resource Information]

Species ID	Scientific Name	Common Name	Class	Simple Presence	Presence Text	Threatened	Migratory	Migratory	Marine	Cetacean	Buffer Status
87600	*Petaurus australis australis*	Yellow-bellied Glider (south-eastern)	Mammal	Likely	Species or species habitat likely to occur within area	Vulnerable					In feature area
85104	*Phascolarctos cinereus (combined populations of Qld, NSW and the ACT)*	Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory)	Mammal	Known	Species or species habitat known to occur within area	Endangered					In feature area
66645	*Potorous tridactylus tridactylus*	Long-nosed Potoroo (northern)	Mammal	Likely	Species or species habitat likely to occur within area	Vulnerable					In feature area
96	*Pseudomys novaehollandiae*	New Holland Mouse, Pookila	Mammal	Known	Species or species habitat known to occur within area	Vulnerable					In feature area
186	*Pteropus poliocephalus*	Grey-headed Flying-fox	Mammal	Known	Foraging, feeding or related behaviour known to occur within area	Vulnerable					In feature area
8575	*Acacia bynoeana*	Bynoe's Wattle, Tiny Wattle	Plant	Known	Species or species habitat known to occur within area	Vulnerable					In feature area
64832	*Angophora inopina*	Charmhaven Apple	Plant	Known	Species or species habitat known to occur within area	Vulnerable					In feature area
2119	*Caladenia tessellata*	Thick-lipped Spider-orchid, Daddy Long-legs	Plant	Known	Species or species habitat known to occur within area	Vulnerable					In feature area
84692	*Corunastylis insignis*	Wyong Midge Orchid 1, Variable Midge Orchid 1	Plant	Known	Species or species habitat known to occur within area	Critically Endangered					In feature area
19533	*Cryptostylis hunteriana*	Leafless Tongue-orchid	Plant	Known	Species or species habitat known to occur within area	Vulnerable					In feature area
12533	*Cynanchum elegans*	White-flowered Wax Plant	Plant	Likely	Species or species habitat likely to occur within area	Endangered					In buffer area only
55086	*Diuris praecox*	Newcastle Doubletail	Plant	Known	Species or species habitat known to occur within area	Vulnerable					In feature area
15460	*Eucalyptus camfieldii*	Camfield's Stringybark	Plant	Known	Species or species habitat known to occur within area	Vulnerable					In feature area
56148	*Eucalyptus parramattensis subsp. decadens*	Earp's Gum, Earp's Dirty Gum	Plant	Known	Species or species habitat known to occur within area	Vulnerable					In feature area
4325	*Euphrasia arguta*	null	Plant	May	Species or species habitat may occur within area	Critically Endangered					In feature area
93200	*Genoplesium branwhiteorum*	null	Plant	Known	Species or species habitat known to occur within area	Critically Endangered (listed as Corunastylis sp. Charmhaven (NSW 896673))					In feature area
64910	*Grevillea parviflora subsp. parviflora*	Small-flower Grevillea	Plant	Known	Species or species habitat known to occur within area	Vulnerable					In buffer area only

Listed Threatened Species [Resource Information]

Species ID	Scientific Name	Common Name	Class	Simple Presence	Presence Text	Threatened	Migratory	Migratory	Marine	Cetacean	Buffer Status
5583	*Melaleuca biconvexa*	Biconvex Paperbark	Plant	Known	Species or species habitat known to occur within area	Vulnerable					In feature area
5831	*Persicaria elatior*	Knotweed, Tall Knotweed	Plant	Likely	Species or species habitat likely to occur within area	Vulnerable					In feature area
11768	*Rhizanthella slateri*	Eastern Underground Orchid	Plant	May	Species or species habitat may occur within area	Endangered					In feature area
15763	*Rhodamnia rubescens*	Scrub Turpentine, Brown Malletwood	Plant	Known	Species or species habitat known to occur within area	Critically Endangered					In feature area
19162	*Rhodomyrtus psidioides*	Native Guava	Plant	Known	Species or species habitat known to occur within area	Critically Endangered					In feature area
13132	*Rutidosis heterogama*	Heath Wrinklewort	Plant	Known	Species or species habitat known to occur within area	Vulnerable					In feature area
20307	*Syzygium paniculatum*	Magenta Lilly Pilly, Magenta Cherry, Daguba, Scrub Cherry, Creek Lilly Pilly, Brush Cherry	Plant	Known	Species or species habitat known to occur within area	Vulnerable					In feature area
21407	*Tetratheca juncea*	Black-eyed Susan	Plant	Known	Species or species habitat known to occur within area	Vulnerable					In feature area
84724	*Thelymitra adorata*	Wyong Sun Orchid	Plant	Known	Species or species habitat known to occur within area	Critically Endangered					In feature area
15202	*Thesium australe*	Austral Toadflax, Toadflax	Plant	Likely	Species or species habitat likely to occur within area	Vulnerable					In feature area
1763	*Caretta caretta*	Loggerhead Turtle	Reptile	Known	Foraging, feeding or related behaviour known to occur within area	Endangered	Migratory	Migratory Marine Species	Listed		In feature area
1765	*Chelonia mydas*	Green Turtle	Reptile	Known	Foraging, feeding or related behaviour known to occur within area	Vulnerable	Migratory	Migratory Marine Species	Listed		In feature area
1768	*Dermochelys coriacea*	Leatherback Turtle, Leathery Turtle, Luth	Reptile	Known	Foraging, feeding or related behaviour known to occur within area	Endangered	Migratory	Migratory Marine Species	Listed		In feature area
1766	*Eretmochelys imbricata*	Hawksbill Turtle	Reptile	Known	Foraging, feeding or related behaviour known to occur within area	Vulnerable	Migratory	Migratory Marine Species	Listed		In feature area
59257	*Natator depressus*	Flatback Turtle	Reptile	Known	Foraging, feeding or related behaviour known to occur within area	Vulnerable	Migratory	Migratory Marine Species	Listed		In feature area
68751	*Carcharias taurus (east coast population)*	Grey Nurse Shark (east coast population)	Shark	Likely	Foraging, feeding or related behaviour likely to occur within area	Critically Endangered					In buffer area only
64470	*Carcharodon carcharias*	White Shark, Great White Shark	Shark	Known	Species or species habitat known to occur within area	Vulnerable	Migratory	Migratory Marine Species			In buffer area only
68453	*Galeorhinus galeus*	School Shark, Eastern School Shark, Snapper Shark, Tope, Soupfin Shark	Shark	May	Species or species habitat may occur within area	Conservation Dependent					In buffer area only

Listed Threatened Species [Resource Information]

Species ID	Scientific Name	Common Name	Class	Simple Presence	Presence Text	Threatened	Migratory	Migratory	Marine	Cetacean	Buffer Status
66680	*Rhincodon typus*	Whale Shark	Shark	May	Species or species habitat may occur within area	Vulnerable	Migratory	Migratory Marine Species			In buffer area only
85267	*Sphyrna lewini*	Scalloped Hammerhead	Shark	Likely	Species or species habitat likely to occur within area	Conservation Dependent					In feature area

Listed Migratory Species [Resource Information]

Species ID	Scientific Name	Common Name	Class	Presence		Threatened Category	Migratory Status	Migratory Category	Marine Status	Cetacean Status	Buffer Status
				Rank	Text						
860	*Calidris ruficollis*	Red-necked Stint	Bird	Known	Roosting known to occur within area		Migratory	Migratory Wetlands Species	Listed - overfly marine area		In feature area
825	*Anous stolidus*	Common Noddy	Bird	Likely	Species or species habitat likely to occur within area		Migratory	Migratory Marine Birds	Listed		In feature area
43	*Lagenorhynchus obscurus*	Dusky Dolphin	Mammal	May	Species or species habitat may occur within area		Migratory	Migratory Marine Species		Cetacean	In buffer area only
66472	*Thalassarche melanophris*	Black-browed Albatross	Bird	Likely	Foraging, feeding or related behaviour likely to occur within area	Vulnerable	Migratory	Migratory Marine Birds	Listed		In feature area
872	*Arenaria interpres*	Ruddy Turnstone	Bird	Known	Roosting known to occur within area	Vulnerable	Migratory	Migratory Wetlands Species	Listed		In feature area
1768	*Dermochelys coriacea*	Leatherback Turtle, Leathery Turtle, Luth	Reptile	Known	Foraging, feeding or related behaviour known to occur within area	Endangered	Migratory	Migratory Marine Species	Listed		In feature area
875	*Calidris alba*	Sanderling	Bird	Known	Roosting known to occur within area		Migratory	Migratory Wetlands Species	Listed		In feature area
877	*Charadrius leschenaultii*	Greater Sand Plover, Large Sand Plover	Bird	Likely	Species or species habitat likely to occur within area	Vulnerable	Migratory	Migratory Wetlands Species	Listed		In feature area
874	*Calidris acuminata*	Sharp-tailed Sandpiper	Bird	Known	Roosting known to occur within area	Vulnerable	Migratory	Migratory Wetlands Species	Listed		In feature area
879	*Charadrius mongolus*	Lesser Sand Plover, Mongolian Plover	Bird	Known	Roosting known to occur within area	Endangered	Migratory	Migratory Wetlands Species	Listed		In feature area
46	*Orcinus orca*	Killer Whale, Orca	Mammal	May	Species or species habitat may occur within area		Migratory	Migratory Marine Species		Cetacean	In buffer area only
592	*Rhipidura rufifrons*	Rufous Fantail	Bird	Known	Species or species habitat known to occur within area		Migratory	Migratory Terrestrial Species	Listed - overfly marine area		In feature area
90033	*Mobula alfredi*	Reef Manta Ray, Coastal Manta Ray	Shark	May	Species or species habitat may occur within area		Migratory (as Manta alfredi)	Migratory Marine Species			In feature area
83288	*Lamna nasus*	Porbeagle, Mackerel Shark	Shark	Likely	Species or species habitat likely to occur within area		Migratory	Migratory Marine Species			In feature area
83946	*Symposiachrus trivirgatus*	Spectacled Monarch	Bird	Likely	Species or species habitat likely to occur within area		Migratory (as Monarcha trivirgatus)	Migratory Terrestrial Species	Listed - overfly marine area (as Monarcha trivirgatus)		In feature area
64463	*Thalassarche salvini*	Salvin's Albatross	Bird	Likely	Foraging, feeding or related behaviour likely to occur within area	Vulnerable	Migratory	Migratory Marine Birds	Listed		In feature area
25545	*Pluvialis fulva*	Pacific Golden Plover	Bird	Known	Roosting known to occur within area		Migratory	Migratory Wetlands Species	Listed		In feature area
64460	*Thalassarche bulleri*	Buller's Albatross, Pacific Albatross	Bird	May	Species or species habitat may occur within area	Vulnerable	Migratory	Migratory Marine Birds	Listed		In feature area
1061	*Macronectes halli*	Northern Giant Petrel	Bird	Likely	Foraging, feeding or related behaviour likely to occur within area	Vulnerable	Migratory	Migratory Marine Birds	Listed		In feature area

Listed Migratory Species [Resource Information]

Species ID	Scientific Name	Common Name	Class	Presence		Threatened Category	Migratory Status	Migratory Category	Marine Status	Cetacean Status	Buffer Status
				Rank	Text						
64462	*Thalassarche steadi*	White-capped Albatross	Bird	Known	Foraging, feeding or related behaviour known to occur within area	Vulnerable	Migratory	Migratory Marine Birds	Listed		In feature area
64470	*Carcharodon carcharias*	White Shark, Great White Shark	Shark	Known	Species or species habitat known to occur within area	Vulnerable	Migratory	Migratory Marine Species			In buffer area only
1765	*Chelonia mydas*	Green Turtle	Reptile	Known	Foraging, feeding or related behaviour known to occur within area	Vulnerable	Migratory	Migratory Marine Species	Listed		In feature area
952	*Pandion haliaetus*	Osprey	Bird	Known	Breeding known to occur within area		Migratory	Migratory Wetlands Species	Listed		In feature area
895	*Charadrius bicinctus*	Double-banded Plover	Bird	Known	Roosting known to occur within area		Migratory	Migratory Wetlands Species	Listed - overfly marine area		In feature area
612	*Myiagra cyanoleuca*	Satin Flycatcher	Bird	Known	Species or species habitat known to occur within area		Migratory	Migratory Terrestrial Species	Listed - overfly marine area		In feature area
1060	*Macronectes giganteus*	Southern Giant-Petrel, Southern Giant Petrel	Bird	May	Species or species habitat may occur within area	Endangered	Migratory	Migratory Marine Birds	Listed		In feature area
82849	*Sternula albifrons*	Little Tern	Bird	Likely	Breeding likely to occur within area		Migratory	Migratory Marine Birds	Listed (as Sterna albifrons)		In buffer area only
28	*Dugong dugon*	Dugong	Mammal	May	Species or species habitat may occur within area		Migratory	Migratory Marine Species	Listed		In buffer area only
1077	*Calonectris leucomelas*	Streaked Shearwater	Bird	Known	Species or species habitat known to occur within area		Migratory	Migratory Marine Birds	Listed		In feature area
678	*Apus pacificus*	Fork-tailed Swift	Bird	Likely	Species or species habitat likely to occur within area		Migratory	Migratory Marine Birds	Listed - overfly marine area		In feature area
84108	*Carcharhinus longimanus*	Oceanic Whitetip Shark	Shark	May	Species or species habitat may occur within area		Migratory	Migratory Marine Species			In buffer area only
34	*Balaenoptera borealis*	Sei Whale	Mammal	Likely	Foraging, feeding or related behaviour likely to occur within area	Vulnerable	Migratory	Migratory Marine Species		Cetacean	In buffer area only
1763	*Caretta caretta*	Loggerhead Turtle	Reptile	Known	Foraging, feeding or related behaviour known to occur within area	Endangered	Migratory	Migratory Marine Species	Listed		In feature area
682	*Hirundapus caudacutus*	White-throated Needletail	Bird	Known	Species or species habitat known to occur within area	Vulnerable	Migratory	Migratory Terrestrial Species	Listed - overfly marine area		In feature area
1766	*Eretmochelys imbricata*	Hawksbill Turtle	Reptile	Known	Foraging, feeding or related behaviour known to occur within area	Vulnerable	Migratory	Migratory Marine Species	Listed		In feature area
845	*Limosa limosa*	Black-tailed Godwit	Bird	Known	Roosting known to occur within area	Endangered	Migratory	Migratory Wetlands Species	Listed - overfly marine area		In feature area
849	*Numenius phaeopus*	Whimbrel	Bird	Known	Roosting known to occur within area		Migratory	Migratory Wetlands Species	Listed		In feature area
36	*Balaenoptera musculus*	Blue Whale	Mammal	May	Species or species habitat may occur within area	Endangered	Migratory	Migratory Marine Species		Cetacean	In buffer area only

Listed Migratory Species [Resource Information]

				Presence							
Species ID	**Scientific Name**	**Common Name**	**Class**	**Rank**	**Text**	**Threatened Category**	**Migratory Status**	**Migratory Category**	**Marine Status**	**Cetacean Status**	**Buffer Status**
37	*Balaenoptera physalus*	Fin Whale	Mammal	Likely	Foraging, feeding or related behaviour likely to occur within area	Vulnerable	Migratory	Migratory Marine Species		Cetacean	In buffer area only
66680	*Rhincodon typus*	Whale Shark	Shark	May	Species or species habitat may occur within area	Vulnerable	Migratory	Migratory Marine Species			In buffer area only
38	*Megaptera novaeangliae*	Humpback Whale	Mammal	Known	Species or species habitat known to occur within area		Migratory	Migratory Marine Species		Cetacean	In buffer area only
644	*Motacilla flava*	Yellow Wagtail	Bird	Likely	Species or species habitat likely to occur within area		Migratory	Migratory Terrestrial Species	Listed - overfly marine area		In feature area
64456	*Diomedea sanfordi*	Northern Royal Albatross	Bird	May	Species or species habitat may occur within area	Endangered	Migratory	Migratory Marine Birds	Listed		In feature area
848	*Numenius minutus*	Little Curlew, Little Whimbrel	Bird	Likely	Roosting likely to occur within area		Migratory	Migratory Wetlands Species	Listed - overfly marine area		In buffer area only
64459	*Thalassarche impavida*	Campbell Albatross, Campbell Black-browed Albatross	Bird	May	Species or species habitat may occur within area	Vulnerable	Migratory	Migratory Marine Birds	Listed		In feature area
64457	*Thalassarche eremita*	Chatham Albatross	Bird	May	Foraging, feeding or related behaviour may occur within area	Endangered	Migratory	Migratory Marine Birds	Listed		In feature area
64458	*Diomedea antipodensis*	Antipodean Albatross	Bird	Likely	Foraging, feeding or related behaviour likely to occur within area	Vulnerable	Migratory	Migratory Marine Birds	Listed		In feature area
84292	*Ardenna pacifica*	Wedge-tailed Shearwater	Bird	Known	Breeding known to occur within area		Migratory	Migratory Marine Birds	Listed (as Puffinus pacificus)		In buffer area only
89224	*Thalassarche cauta*	Shy Albatross	Bird	Likely	Foraging, feeding or related behaviour likely to occur within area	Endangered	Migratory	Migratory Marine Birds	Listed		In feature area
82651	*Ardenna grisea*	Sooty Shearwater	Bird	Known	Breeding known to occur within area	Vulnerable	Migratory	Migratory Marine Birds	Listed (as Puffinus griseus)		In feature area
89223	*Diomedea exulans*	Wandering Albatross	Bird	Likely	Foraging, feeding or related behaviour likely to occur within area	Vulnerable	Migratory	Migratory Marine Birds	Listed		In feature area
89221	*Diomedea epomophora*	Southern Royal Albatross	Bird	Likely	Foraging, feeding or related behaviour likely to occur within area	Vulnerable	Migratory	Migratory Marine Birds	Listed		In feature area
40	*Eubalaena australis*	Southern Right Whale	Mammal	Likely	Species or species habitat likely to occur within area	Endangered	Migratory (as Balaena glacialis australis)	Migratory Marine Species		Cetacean	In buffer area only
82652	*Ardenna tenuirostris*	Short-tailed Shearwater	Bird	Known	Breeding known to occur within area		Migratory	Migratory Marine Birds	Listed (as Puffinus tenuirostris)		In buffer area only
847	*Numenius madagascariensis*	Eastern Curlew, Far Eastern Curlew	Bird	Known	Species or species habitat known to occur within area	Critically Endangered	Migratory	Migratory Wetlands Species	Listed		In feature area
39	*Caperea marginata*	Pygmy Right Whale	Mammal	May	Foraging, feeding or related behaviour may occur within area		Migratory	Migratory Marine Species		Cetacean	In buffer area only
844	*Limosa lapponica*	Bar-tailed Godwit	Bird	Known	Species or species habitat known to occur within area		Migratory	Migratory Wetlands Species	Listed		In feature area

Listed Migratory Species [Resource Information]

Species ID	Scientific Name	Common Name	Class	Presence		Threatened Category	Migratory Status	Migratory Category	Marine Status	Cetacean Status	Buffer Status
				Rank	Text						
842	*Limicola falcinellus*	Broad-billed Sandpiper	Bird	Known	Species or species habitat known to occur within area		Migratory	Migratory Wetlands Species	Listed - overfly marine area		In buffer area only
865	*Pluvialis squatarola*	Grey Plover	Bird	Known	Roosting known to occur within area	Vulnerable	Migratory	Migratory Wetlands Species	Listed - overfly marine area		In feature area
1014	*Phaethon lepturus*	White-tailed Tropicbird	Bird	May	Species or species habitat may occur within area		Migratory	Migratory Marine Birds	Listed		In feature area
864	*Gallinago megala*	Swinhoe's Snipe	Bird	Likely	Roosting likely to occur within area		Migratory	Migratory Wetlands Species	Listed - overfly marine area		In buffer area only
841	*Gallinago stenura*	Pin-tailed Snipe	Bird	Likely	Roosting likely to occur within area		Migratory	Migratory Wetlands Species	Listed - overfly marine area		In buffer area only
1075	*Phoebetria fusca*	Sooty Albatross	Bird	May	Species or species habitat may occur within area	Vulnerable	Migratory	Migratory Marine Birds	Listed		In buffer area only
64464	*Thalassarche carteri*	Indian Yellow-nosed Albatross	Bird	Likely	Species or species habitat likely to occur within area	Vulnerable	Migratory	Migratory Marine Birds	Listed		In buffer area only
1012	*Fregata ariel*	Lesser Frigatebird, Least Frigatebird	Bird	Known	Species or species habitat known to occur within area		Migratory	Migratory Marine Birds	Listed		In feature area
1013	*Fregata minor*	Great Frigatebird, Greater Frigatebird	Bird	Likely	Species or species habitat likely to occur within area		Migratory	Migratory Marine Birds	Listed		In feature area
862	*Calidris tenuirostris*	Great Knot	Bird	Known	Roosting known to occur within area	Vulnerable	Migratory	Migratory Wetlands Species	Listed - overfly marine area		In feature area
863	*Gallinago hardwickii*	Latham's Snipe, Japanese Snipe	Bird	Known	Species or species habitat known to occur within area	Vulnerable	Migratory	Migratory Wetlands Species	Listed - overfly marine area		In feature area
59309	*Actitis hypoleucos*	Common Sandpiper	Bird	Known	Species or species habitat known to occur within area		Migratory	Migratory Wetlands Species	Listed		In feature area
90034	*Mobula birostris*	Giant Manta Ray	Shark	May	Species or species habitat may occur within area		Migratory (as Manta birostris)	Migratory Marine Species			In feature area
833	*Tringa stagnatilis*	Marsh Sandpiper, Little Greenshank	Bird	Known	Roosting known to occur within area		Migratory	Migratory Wetlands Species	Listed - overfly marine area		In feature area
609	*Monarcha melanopsis*	Black-faced Monarch	Bird	Known	Species or species habitat known to occur within area		Migratory	Migratory Terrestrial Species	Listed - overfly marine area		In feature area
35	*Balaenoptera edeni*	Bryde's Whale	Mammal	May	Species or species habitat may occur within area		Migratory	Migratory Marine Species		Cetacean	In buffer area only
59257	*Natator depressus*	Flatback Turtle	Reptile	Known	Foraging, feeding or related behaviour known to occur within area	Vulnerable	Migratory	Migratory Marine Species	Listed		In feature area
832	*Tringa nebularia*	Common Greenshank, Greenshank	Bird	Known	Species or species habitat known to occur within area	Endangered	Migratory	Migratory Wetlands Species	Listed - overfly marine area		In feature area
86651	*Cuculus optatus*	Oriental Cuckoo, Horsfield's Cuckoo	Bird	May	Species or species habitat may occur within area		Migratory	Migratory Terrestrial Species			In feature area
59300	*Xenus cinereus*	Terek Sandpiper	Bird	Known	Roosting known to occur within area	Vulnerable	Migratory	Migratory Wetlands Species	Listed - overfly marine area		In feature area

Listed Migratory Species [Resource Information]

				Presence							
Species ID	**Scientific Name**	**Common Name**	**Class**	**Rank**	**Text**	**Threatened Category**	**Migratory Status**	**Migratory Category**	**Marine Status**	**Cetacean Status**	**Buffer Status**
858	*Calidris melanotos*	Pectoral Sandpiper	Bird	Known	Species or species habitat known to occur within area		Migratory	Migratory Wetlands Species	Listed - overfly marine area		In feature area
82404	*Ardenna carneipes*	Flesh-footed Shearwater, Fleshy-footed Shearwater	Bird	Likely	Foraging, feeding or related behaviour likely to occur within area		Migratory	Migratory Marine Birds	Listed (as Puffinus carneipes)		In buffer area only
851	*Tringa brevipes*	Grey-tailed Tattler	Bird	Known	Roosting known to occur within area		Migratory	Migratory Wetlands Species	Listed (as Heteroscelus brevipes)		In feature area
856	*Calidris ferruginea*	Curlew Sandpiper	Bird	Known	Species or species habitat known to occur within area	Critically Endangered	Migratory	Migratory Wetlands Species	Listed - overfly marine area		In feature area
855	*Calidris canutus*	Red Knot, Knot	Bird	Known	Species or species habitat known to occur within area	Vulnerable	Migratory	Migratory Wetlands Species	Listed - overfly marine area		In feature area

Commonwealth Land	Commonwealth Land Name	Agency	State	Buffer Status
11757	Commonwealth Land - Australian Telecommunications Commission	Communications,	NSW	In buffer area only
11719	Commonwealth Land - Australian Telecommunications Commission	Communications,	NSW	In buffer area only
11718	Commonwealth Land - Australian Telecommunications Commission	Communications,	NSW	In buffer area only
11716	Commonwealth Land - Australian Telecommunications Commission	Communications,	NSW	In buffer area only
11725	Commonwealth Land - Director of War Service Homes	Defence - Defence	NSW	In buffer area only
11713	Commonwealth Land - Australian Telecommunications Commission	Communications,	NSW	In buffer area only
16105	Commonwealth Land - Australian Postal Commission	Communications,	NSW	In buffer area only
11717	Commonwealth Land - Australian Telecommunications Commission	Communications,	NSW	In buffer area only
11714	Commonwealth Land - Australian Telecommunications Commission	Communications,	NSW	In buffer area only
11722	Commonwealth Land - Australian Telecommunications Commission	Communications,	NSW	In buffer area only
11712	Commonwealth Land - Director of War Service Homes	Defence - Defence	NSW	In buffer area only
11715	Commonwealth Land - Australian Telecommunications Commission	Communications,	NSW	In buffer area only
11731	Commonwealth Land - Australian Telecommunications Commission	Communications,	NSW	In buffer area only
12246	Commonwealth Land - Australian Telecommunications Commission	Communications,	NSW	In buffer area only

NSW GOVERNMENT

Appendix C: Transport and Infrastructure SEPP Consultation Letters

Transport for NSW

Subsidence Advisory NSW
PO Box 488G, Newcastle NSW, 2300

Re: Consultation regarding proposed Chain Valley Bay Road and Pacific Highway Intersection Upgrade. 18 December 2024

To whom it may concern,

Transport for NSW is proposing to upgrade the intersection of the Pacific Highway and Chain Valley Bay Road at Lake Munmorah, in the Central Coast local government area (LGA). The proposal would involve upgrading the existing intersection to traffic signals, providing a dual turning lane out of Chain Valley Bay Road, modifying existing turning lane configurations, relocating bus stop facilities, and providing active transport (pedestrian and cyclist) upgrades and connections. Key features of the proposal are described and shown in Attachment A.

While the current intersection design is able to accommodate the current traffic demand of the area, the proposal is needed to satisfactorily accommodate future traffic demand from both current approved developments and future proposed development.

The objectives of the proposal are:

- improve efficiency of the intersection of Pacific Highway and Chain Valley Bay Road, including to facilitate future predicted traffic demand
- improve safety of the Pacific Highway and Chain Valley Bay Road intersection by separating traffic flow and regulating turning movements in and out of Chain Valley Bay Road to reduce the likelihood and severity of intersection crashes
- provide *Disability Discrimination Act 1992* (DDA) compliant dedicated footpath and shared user path connections between the intersection and nearby bus stops and Parktrees Village
- support future residential growth in the Lake Munmorah area.

The proposal area is located on land mapped within the Swansea North Entrance mine subsidence district, as shown in Attachment B. Construction of the proposal would require earthworks and excavation activities within the existing road corridor. However, the proposal is not expected to require deep excavation activities, and the proposal is for the upgrade of an existing road infrastructure, therefore would not constitute new road infrastructure.

Minor Works Review of Environmental Factors

A minor works review of environmental factors (MWREF) is currently being prepared to assess the likely impacts of the proposal under Division 5.1 of the *Environmental Planning and Assessment Act 1979*.

Under section 2.15 of SEPP (Transport and Infrastructure), Transport for NSW is required to undertake consultation with Subsidence Advisory NSW in relation to the proposed work location on land mapped within the Swansea North Entrance mine subsidence district.

It would be appreciated if Central Coast Council could provide comments on the proposal by 5pm on 24 January 2025.

Feedback received will assist Transport for NSW in its decision to determine whether the proposal should proceed.

Transport for NSW would be pleased to provide further information if required. In this regard, Mackenzie Pierpoint may be contacted on 0477 451 758 or by email **mackenzie.pierpoint@transport.nsw.gov.au**

Yours sincerely,

Mackenzie Pierpont

Project Manager

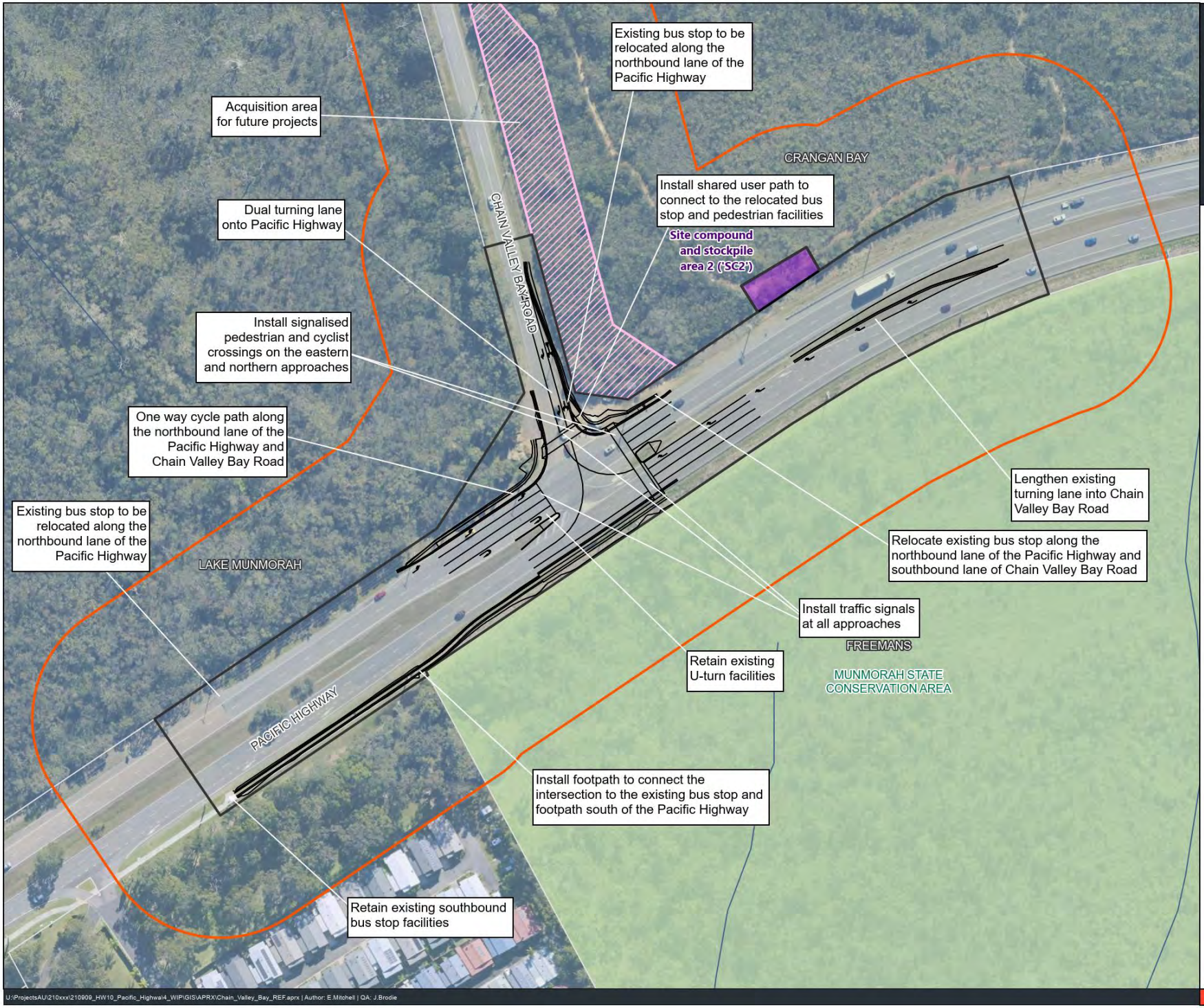
0447 451 785 | Mackenzie.Pierpoint@transport.nsw.gov.au

Attachment A

Key features of the proposal include:

- installing traffic signals at all approaches to the existing Pacific Highway and Chain Valley Bay Road intersection
- installing a dual turning lane out of Chain Valley Bay Road onto the Pacific Highway
- retaining the existing U-turn facilities
- lengthening the existing turning lane from the Pacific Highway southbound into Chain Valley Bay Road
- relocating the existing bus stop along the northbound lane of the Pacific Highway and southbound lane of Chain Valley Bay Road
- installing a *Disability Discrimination Act 1992* (DDA) compliant, dedicated footpath, connecting the intersection to the existing bus stop and footpath alongside the southbound lanes of the Pacific Highway
- installing a DDA compliant shared user path alongside the northbound lane of the Pacific Highway, connecting the relocated bus stop to the intersection and existing pedestrian facilities, while providing a connection for cyclists to enter and exit the northbound lane of the Pacific Highway as well as Chain Valley Bay Road, utilising the combination with on-road cycle lanes and designated off road cycle path
- installing signalised pedestrian crossings at the northern and eastern approaches of the intersection
- ancillary works (such as reinstating road furniture and road signs)
- relocating and adjusting utilities.

Key features of the proposal are shown in the following figures.

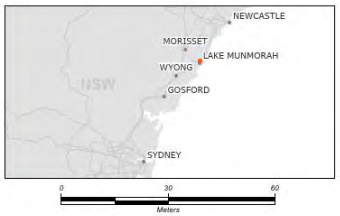


HW10 Pacific Highway and Chain Valley Bay Road Intersection Upgrade

Key features of the proposal

Legend

- Study area (construction footprint with 50 metre buffer)
- Construction footprint
- Site compound and stockpile areas
- Future acquisition area (out of scope of this proposal)
- Cadastre (surveyed)
- Watercourse
- Waterbody
- National Parks and Wildlife Service managed land



Coordinate system: GDA2020 MGA Zone 56
Scale ratio correct when printed at A3

1:1,500 Date: 28/11/2024

GDA 2020

Data sources: TfNSW, NSWSS, Geoscience Australia
Australia latest: Metromap 2024

wsp

HW10 Pacific Highway and Chain Valley Bay Road Intersection Upgrade

Figure 2-2
Proposal area overview

Legend

- Study area (construction footprint with 50 metre buffer)
- Construction footprint
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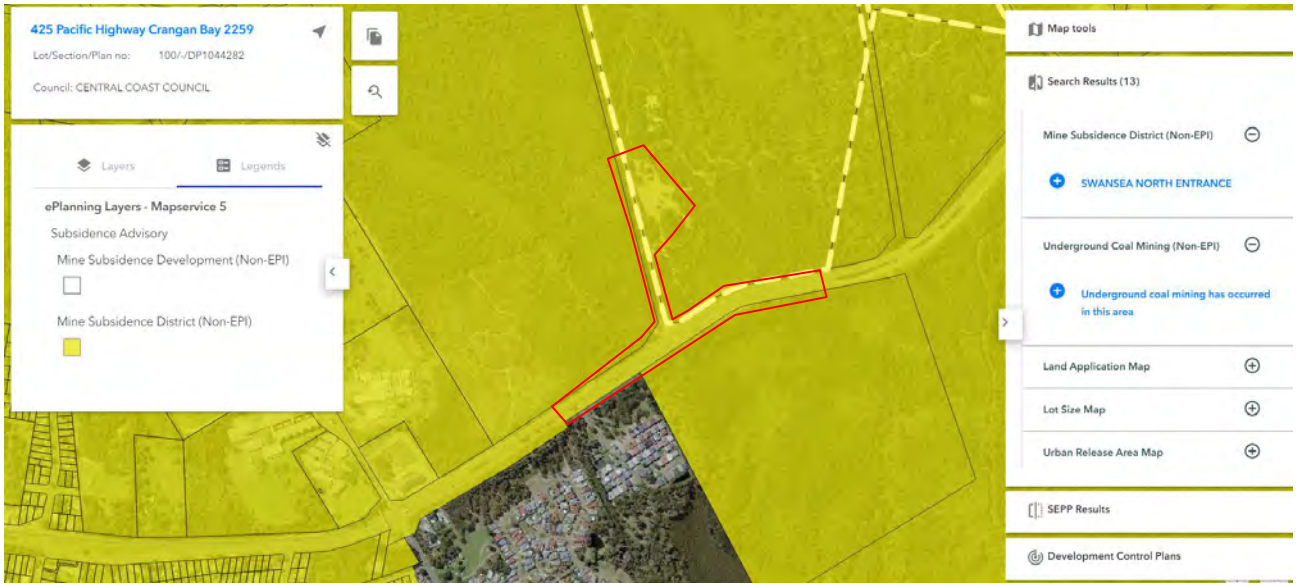
- Cadastre (surveyed)
- Watercourse
- Waterbody
- National Parks and Wildlife Service managed land

Coordinate system: GDA2020 MGA Zone 56
Scale ratio correct when printed at A3

1:2,500 Date: 2/12/2024

GDA 2020

Attachment B



Red polygon indicating approximate proposal area

Transport for NSW

Department of Climate Change, Energy, the Environment and Water (DCCEEW) (State)
4 Parramatta Square
12 Darcy Street
Parramatta, NSW, 2150

Re: Consultation regarding proposed Chain Valley Bay Road and Pacific Highway intersection upgrade. 17 December 2024

To whom it may concern,

Transport for NSW is proposing to upgrade the intersection of the Pacific Highway and Chain Valley Bay Road at Lake Munmorah, in the Central Coast local government area (LGA). The proposal would involve upgrading the existing intersection to traffic signals, providing a dual turning lane out of Chain Valley Bay Road, modifying existing turning lane configurations, relocating bus stop facilities, and providing active transport (pedestrian and cyclist) upgrades and connections. Key features of the proposal are described and shown in Attachment A.

While the current intersection design is able to accommodate the current traffic demand of the area, the proposal is needed to satisfactorily accommodate future traffic demand from both current approved developments and future proposed development.

The objectives of the proposal are:

- improve efficiency of the intersection of Pacific Highway and Chain Valley Bay Road, including to facilitate future predicted traffic demand
- improve safety of the Pacific Highway and Chain Valley Bay Road intersection by separating traffic flow and regulating turning movements in and out of Chain Valley Bay Road to reduce the likelihood and severity of intersection crashes
- provide *Disability Discrimination Act 1992* (DDA) compliant dedicated footpath and shared user path connections between the intersection and nearby bus stops and Parktrees Village
- support future residential growth in the Lake Munmorah area.

The proposal area is located directly adjacent to the Munmorah State Conservation Area (Munmorah SCA), zoned C1: National Parks and Nature Reserves under the Central Coast Local Environmental Plan 2022, being land reserved under the *National Parks and Wildlife Act 1974*.

No work for the proposal would be carried out within the Munmorah SCA. The proposal would not directly impact the conservation, environmental or other values of the Munmorah SCA.

Potential indirect impacts to Munmorah SCA (such as erosion and sediment, noise and vibration, air quality, flooding and hydrology, and water quality impacts) are expected to be minor, and limited to the construction phase. Mitigation measures would be implemented to minimise potential off-site impacts. Existing drainage infrastructure for the Pacific Highway near the Munmorah SCA would be upgraded as part of the proposal.

Minor Works Review of Environmental Factors

A minor works review of environmental factors (MWREF) is currently being prepared to assess the likely impacts of the proposal under Division 5.1 of the *Environmental Planning and Assessment Act 1979*.

Transport for NSW will publish the MWREF on the project website once completed and determined, which is expected to be early 2025.

Under section 2.15 of SEPP (Transport and Infrastructure), Transport for NSW is required to undertake consultation with National Parks and Wildlife Services (through DCCEEW) in relation to the proposal area being located on land adjacent to the Munmorah SCA.

It would be appreciated if National Parks and Wildlife Services (through DCCEEW) could provide comments on the proposal by 5pm on 24 January 2025.

Feedback received will assist Transport for NSW in its decision to determine whether the proposal should proceed.

Transport for NSW would be pleased to provide further information if required. In this regard, Mackenzie Pierpoint may be contacted on 0477 451 758 or by email **mackenzie.pierpoint@transport.nsw.gov.au**

Yours sincerely,

Mackenzie Pierpont

Project Manager

0447 451 785 | Mackenzie.Pierpoint@transport.nsw.gov.au

Attachment A

Key features of the proposal include:

- installing traffic signals at all approaches to the existing Pacific Highway and Chain Valley Bay Road intersection
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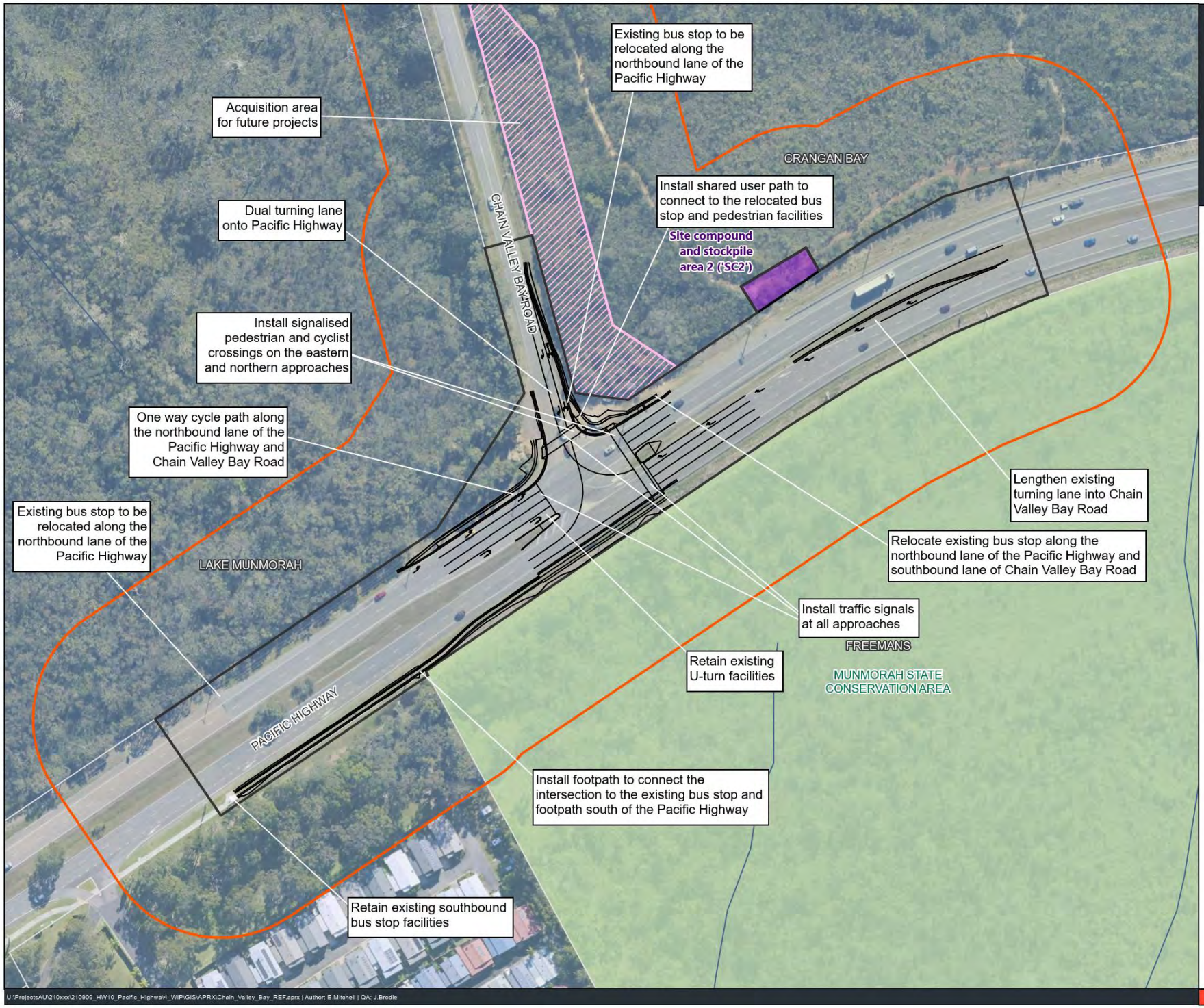
- installing signalised pedestrian crossings at the northern and eastern approaches of the intersection
- ancillary works (such as reinstating road furniture and road signs)
- relocating and adjusting utilities.

Key features of the proposal are shown in the following figures.



HW10 Pacific Highway and Chain Valley Bay Road Intersection Upgrade

Key features of the proposal

Legend

- Study area (construction footprint with 50 metre buffer)
- Construction footprint
- Site compound and stockpile areas
- Future acquisition area (out of scope of this proposal)
- Cadastre (surveyed)
- Watercourse
- Waterbody
- National Parks and Wildlife Service managed land

Coordinate system: GDA2020 MGA Zone 56
Scale ratio correct when printed at A3

1:1,500 Date: 28/11/2024

GDA 2020

Data sources: TfNSW, NSWSS, Geoscience Australia Australia latest: Metromap 2024

wsp

HW10 Pacific Highway and Chain Valley Bay Road Intersection Upgrade

Figure 2-2
Proposal area overview

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Coordinate system: GDA2020 MGA Zone 56
Scale ratio correct when printed at A3

1:2,500 Date: 2/12/2024

GDA 2020

Transport for NSW

Central Coast Council
91-99 Mann Street
Gosford NSW 2250, Australia
P. 02 4306 7900

Re: Consultation regarding proposed Chain Valley Bay Road and Pacific Highway intersection upgrade.

18 December 2024

To whom it may concern,

Transport for NSW is proposing to upgrade the intersection of the Pacific Highway and Chain Valley Bay Road at Lake Munmorah, in the Central Coast local government area (LGA). The proposal would involve upgrading the existing intersection to traffic signals, providing a dual turning lane out of Chain Valley Bay Road, modifying existing turning lane configurations, relocating bus stop facilities, and providing active transport (pedestrian and cyclist) upgrades and connections. Key features of the proposal are described and shown in Attachment A.

While the current intersection design is able to accommodate the current traffic demand of the area, the proposal is needed to satisfactorily accommodate future traffic demand from both current approved developments and future proposed development.

The objectives of the proposal are:

- improve efficiency of the intersection of Pacific Highway and Chain Valley Bay Road, including to facilitate future predicted traffic demand
- improve safety of the Pacific Highway and Chain Valley Bay Road intersection by separating traffic flow and regulating turning movements in and out of Chain Valley Bay Road to reduce the likelihood and severity of intersection crashes
- provide *Disability Discrimination Act 1992* (DDA) compliant dedicated footpath and shared user path connections between the intersection and nearby bus stops and Parktrees Village
- support future residential growth in the Lake Munmorah area.

Construction of the proposal has the potential to temporarily impact stormwater services within the proposal area associated with proposed drainage upgrades, pavement works and excavation activities. Stormwater services would be upgraded or reinstated following construction of the proposal, therefore operational impacts to Council owned stormwater services are not expected.

To ensure the safety of construction workers and road users, temporary lane closures or construction speed limits may be required where construction works occur within and directly next to the existing Pacific Highway and Chain Valley Bay Road corridors. As such, construction of the proposal has the potential to temporarily disrupt traffic along the Pacific Highway and Chain Valley Bay Road. Operation of the proposal would improve road safety and efficiency of the Pacific Highway and Chain Valley Bay Road intersection.

Construction of the proposal may also require use of water from a water supply system owned by Council. If this is required, Transport for NSW would submit a residential feed application to Council prior to construction commencing, or during the construction phase.

Minor Works Review of Environmental Factors

A minor works review of environmental factors (MWREF) is currently being prepared to assess the likely impacts of the proposal under Division 5.1 of the *Environmental Planning and Assessment Act 1979*.

Transport for NSW will publish the MWREF on the project website once completed and determined, which is expected to be early 2025.

Under section 2.10 of SEPP (Transport and Infrastructure), Transport for NSW is required to undertake consultation with Council where proposed activities may impact on public places under the ownership of Council, have an impact on vehicle movements or have an impact to stormwater management services.

The proposal would involve works that have the potential to impact stormwater services, bus stops, public transport users, enclose a public place that may disrupt vehicular traffic, potential excavation of the surface of a road for which Council is the roads authority, and may require use of water from a water supply system. These are all services for which Central Coast Council are the responsible authority.

It would be appreciated if Central Coast Council could provide comments on the proposal by 5pm on 24 January 2025.

Feedback received will assist Transport for NSW in its decision to determine whether the proposal should proceed.

Transport for NSW would be pleased to provide further information if required. In this regard, Mackenzie Pierpoint may be contacted on 0477 451 758 or by email **mackenzie.pierpoint@transport.nsw.gov.au**

Yours sincerely,

Mackenzie Pierpont

Project Manager

0447 451 785 | Mackenzie.Pierpoint@transport.nsw.gov.au

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- ancillary works (such as reinstating road furniture and road signs)
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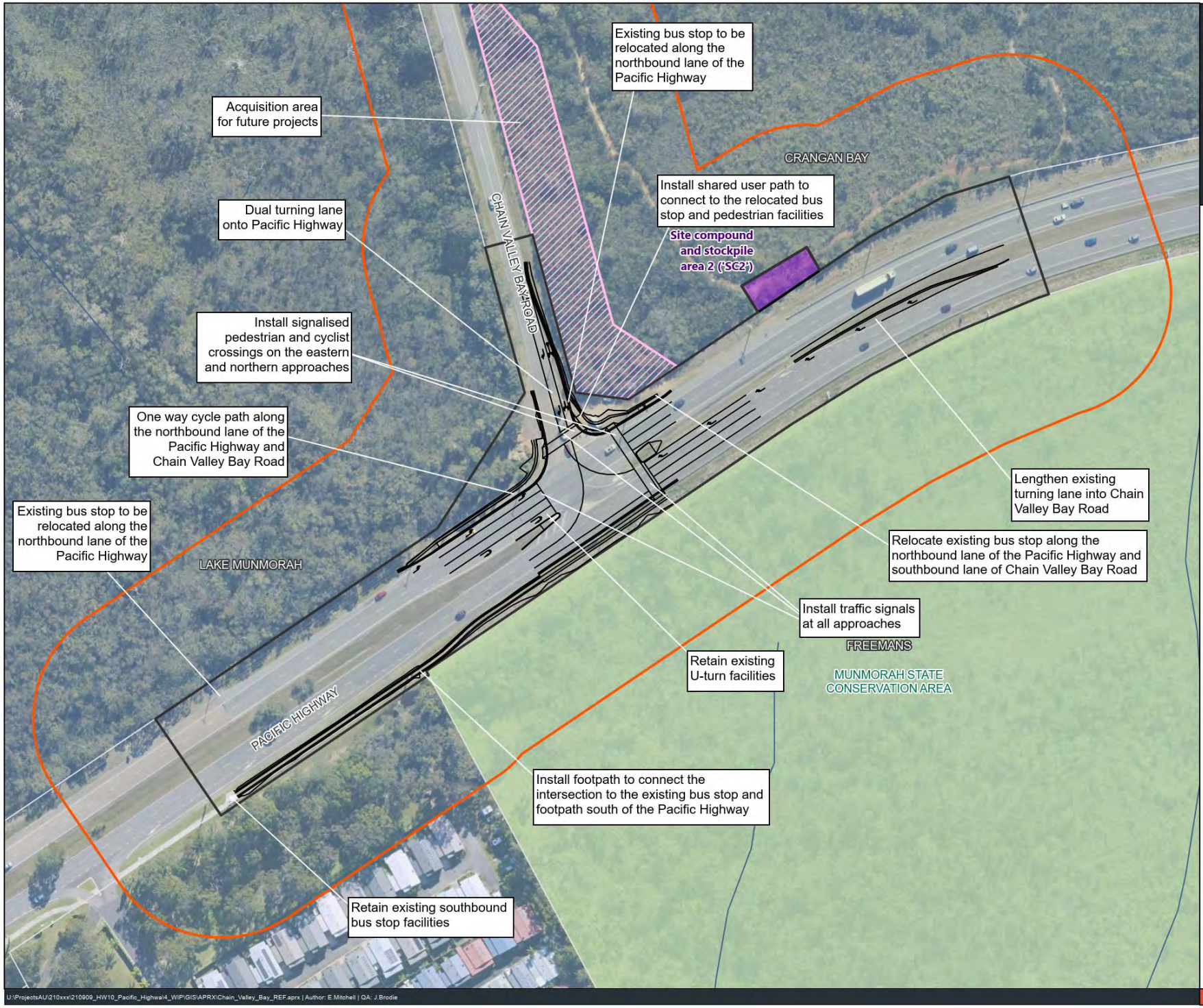
Key features of the proposal are shown in the following figures.



wsp

HW10 Pacific Highway and Chain Valley Bay Road Intersection Upgrade

Key features of the proposal

Legend

- Study area (construction footprint with 50 metre buffer)
- Construction footprint
- Site compound and stockpile areas
- Future acquisition area (out of scope of this proposal)
- Cadastre (surveyed)
- Watercourse
- Waterbody
- National Parks and Wildlife Service managed land

Coordinate system: GDA2020 MGA Zone 56
Scale ratio correct when printed at A3

1:1,500 Date: 28/11/2024

GDA 2020

Data sources: TfNSW, NSWSS, Geoscience Australia
Australia latest: Metromap 2024

wsp

HW10 Pacific Highway and Chain Valley Bay Road Intersection Upgrade

Figure 2-2
Proposal area overview

Legend

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- Watercourse
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- National Parks and Wildlife Service managed land

Coordinate system: GDA2020 MGA Zone 56
Scale ratio correct when printed at A3

1:2,500 Date: 2/12/2024

GDA 2020

Subsidence Advisory

Our Ref: EOTH24-00354
6 January 2025

Attention: Bishal Ghimire
Via email: bishal.ghimire@wsp.com

Address: Chain Valley Bay Road/Pacific Highway Intersection
Proposal: Intersection Upgrade

Dear Bishal Ghimire

Thank you for your enquiry regarding an upgrade of the intersection of Chain Valley Bay Road and the Pacific Highway at Crangan Bay.

In accordance with the *Coal Mine Subsidence Compensation Act (2017)*, Subsidence Advisory regulates development within mine subsidence districts to help protect homes, buildings and infrastructure from potential subsidence damage.

The proposed development is within the Swansea North Entrance mine subsidence district and is covered by an active mining lease. The site is not undermined.

The lease holder advises that future mining under the site is unlikely. Design measures to account for future coal mine subsidence are not required.

If you have any queries concerning this matter, please contact our office on (02) 4908 4300.

Kind Regards,

Melanie Fityus
Senior Risk Engineer

From: Stacy Wilson
Sent on: Tuesday, 24 December 2024 9:39:43 AM
To: [redacted]
CC: Benjaman Mcdougall
Subject: FW: SEPP (Transport and Infrastructure) consultation Re: Intersection upgrade Pacific Highway and Chain Valley Bay Road
Attachments: EMF-PA-PR-0070-TT06 Resource 6 - Statutory consultation letter_DCCEEW.pdf (1.05 MB)

Hi Bishal and Mackenzie,

NPWS thank you for reaching out and informing us of the works adjacent to Munmorah SCA. Once the MWREF is complete are you able to please share this with me so that I can determine the level of impact on park via the assessment. I am more interested in the proposed drainage works and runoff that may impact the Park.

I will then provide a formal response for this consultation.
Regards

Stacy Wilson
Ranger – Central Coast Area
Hunter Central Coast Branch
NSW National Parks and Wildlife Service
Darkinjung Country

1 Blue Wren Drive, Wybung 2259
T 02 4972 9029 **M** 0439 750 998
W nationalparks.nsw.gov.au
Department of Climate Change, Energy, the Environment and Water

---

From: Lj Smith [redacted] **On Behalf Of** NPWS Area Mailbox - Central Coast
Sent: Monday, December 23, 2024 11:03 AM
To: Benjaman Mcdougall [redacted]
Cc: Stacy Wilson [redacted]
Subject: FW: SEPP (Transport and Infrastructure) consultation Re: Intersection upgrade Pacific Highway and Chain Valley Bay Road

Hi Ben,

Consultant requires feedback.

Lj Smith
Visitor Service Assistant
Hunter Central Coast Brach (Central Coast Area)
NSW National Parks and Wildlife Service

1 Blue Wren Drive, Wybung NSW 2259
T 02 4972 9000 **T** 02 4320 4200
W nationalparks.nsw.gov.au

From: Ghimire, Bishal [redacted]
Sent: Wednesday, December 18, 2024 4:02 PM
To: NPWS Area Mailbox - Central Coast <npws.centralcoast@environment.nsw.gov.au>; media@environemnt.nsw.gov.au
Subject: SEPP (Transport and Infrastructure) consultation Re: Intersection upgrade Pacific Highway and Chain Valley Bay Road

Hi Team,

I am writing on behalf of Transport for NSW to seek feedback on proposed intersection upgrade of Pacific Highway and Chain Valley Bay Road. A minor works review of environmental factors (MWREF) is currently being prepared to assess the likely impacts of the proposal under Division 5.1 of the *Environmental Planning and Assessment Act 1979*.

The proposal site is adjacent to Munmorah State Conservation Area which requires Transport for NSW to consult with NPWS/DCCEEW to seek feedback on the proposal.

I have attached a letter which explains the proposal.

Please feel free to contact me or Transport for NSW contact as mentioned in the letter.

Kind regards,

Bishal Ghimire
Environmental Consultant

[redacted]

[redacted]

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WSP acknowledges that every project we work on takes place on First Peoples lands. We recognise Aboriginal and Torres Strait Islander Peoples as the first scientists and engineers and pay our respects to Elders past and present.

-LAEmHhHzdJzBlTWfa4Hgs7pbKl

Appendix D: Construction Noise Estimator Tool

Transport for NSW

Distanced Based Assessment (Noisiest Plant)

Please pick from drop-down list in orange cells

Noise area category		R2
RBL or L_{A90} Background level (dB(A))	Day	45
	Evening	40
	Night	35
$L_{Aeq(15minute)}$ Noise Mangement Level (dB(A))	Day	55
	Day (OOHW)	50
	Evening	45
	Night	40
Noisiest plant		Asphalt Profiler
Is there line of sight to receiver?		Yes

Steps for 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 noisiest plant. If not found in drop-down list, refer to 'Source List' and select a representative plant with equivalent sound power level.
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 sightoiaw to receiver' drop-down list. Solid barriers can be in the form of road cutting, timber lapped and capped fence, shipping container, site office, etc. Substantial solid barriers are barriers greater than 5 metres in height or multiple rows of houses or a sound barrier specifically designed to mitigate construction noise. 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.

5. Determine if there are any receivers (both residential and non-residential receivers) within the affected distance for each relevant time period . Consider background LA90 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 and Maintenance Noise Estimator should be investigated on a project-by-project basis. Please contact a Roads and Maritime noise speciliast for more information)

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) Noticeable			10 to 20 dB(A) Clearly audible			20 to 30 dB(A) Moderately intrusive			> 30 dB(A) 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	200							N	95	65	N, PC, RO	30	75	N, PC, RO	30	75	
	Day (OOHW)	290				N, R1, DR	200	55	N, R1, DR	95	65	N, R1, DR, PC, SN	30	75	N, PC, RO	30	75	
	Evening	420				N, R1, DR	290	50	N, R1, DR	140	60	N, R1, DR, PC, SN	55	70	N, PC, RO	30	75	
	Night	610	N	610	40	N, R2, DR	420	45	N, PC, SN, R2, DR	200	55	AA, N, PC, SN, R2, DR	95	65	N, PC, RO	30	75	160
	Highly Affected	30													N, PC, RO	30	75	
Developed settlements (urban and suburban)	Day	240							N	105	65	N, PC, RO	35	75	N, PC, RO	35	75	
	Day (OOHW)	360				N, R1, DR	240	55	N, R1, DR	105	65	N, R1, DR, PC, SN	35	75	N, PC, RO	35	75	
	Evening	545				N, R1, DR	360	50	N, R1, DR	155	60	N, R1, DR, PC, SN	60	70	N, PC, RO	35	75	
	Night	805	N	805	40	N, R2, DR	545	45	N, PC, SN, R2, DR	240	55	AA, N, PC, SN, R2, DR	105	65	N, PC, RO	35	75	185
	Highly Affected	35													N, PC, RO	35	75	
Propagation across a valley / over water	Day	310							N	115	65	N, PC, RO	45	75	N, PC, RO	45	75	
	Day (OOHW)	485				N, R1, DR	310	55	N, R1, DR	115	65	N, R1, DR, PC, SN	45	75	N, PC, RO	45	75	
	Evening	750				N, R1, DR	485	50	N, R1, DR	190	60	N, R1, DR, PC, SN	70	70	N, PC, RO	45	75	
	Night	1125	N	1125	40	N, R2, DR	750	45	N, PC, SN, R2, DR	310	55	AA, N, PC, SN, R2, DR	115	65	N, PC, RO	45	75	230
	Highly Affected	45													N, PC, RO	45	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)		
		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	200				N	95	65	N, PC, RO	30	75
Hospital wards and operating theatres	Day	65	95							N, PC, RO	30	75
Place of worship	Day	55	200				N	95	65	N, PC, RO	30	75
Active recreation	Day	65	95							N, PC, RO	30	75
Passive recreation	Day	60	140				N	55	70	N, PC, RO	30	75
Industrial premise	Day	75	30							N, PC, RO	30	75
Offices, retail outlets	Day	70	55							N, PC, RO	30	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	95				N, R1, DR	55	70	N, R1, DR	17	80	N, R1, DR, PC, SN	5	90
	Night	65	95	N	95	65	N, R2, NR	55	70	N, PC, SN, R2, DR	17	80	AA, N, PC, SN, R2, DR	5	90
Place of worship	Evening	55	200				N, R1, DR	140	60	N, R1, DR	55	70	N, R1, DR, PC, SN	17	80
	Night	55	200	N	200	55	N, R2, NR	140	60	N, PC, SN, R2, DR	55	70	AA, N, PC, SN, R2, DR	17	80
Active recreation	Evening	65	95				N, R1, DR	55	70	N, R1, DR	17	80	N, R1, DR, PC, SN	5	90
Passive recreation	Evening	60	140				N, R1, DR	95	65	N, R1, DR	30	75	N, R1, DR, PC, SN	9	85
Industrial premise	Evening	75	30				N, R1, DR	17	80	N, R1, DR	5	90	N, R1, DR, PC, SN	2	100
	Night	75	30	N	30	75	N, R2, NR	17	80	N, PC, SN, R2, DR	5	90	AA, N, PC, SN, R2, DR	2	100
Offices, retail outlets	Evening	70	55				N, R1, DR	30	75	N, R1, DR	9	85	N, R1, DR, PC, SN	3	95
	Night	70	55	N	55	70	N, R2, NR	30	75	N, PC, SN, R2, DR	9	85	AA, N, PC, SN, R2, DR	3	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)
	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	240				N	105	65	N, PC, RO	35	75
Hospital wards and operating theatres	**Day**	65	105							N, PC, RO	35	75
Place of worship	**Day**	55	240				N	105	65	N, PC, RO	35	75
Active recreation	**Day**	65	105							N, PC, RO	35	75
Passive recreation	**Day**	60	155				N	60	70	N, PC, RO	35	75
Industrial premise	**Day**	75	35							N, PC, RO	35	75
Offices, retail outlets	**Day**	70	60							N, PC, RO	35	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	105				N, R1, DR	60	70	N, R1, DR	20	80	N, R1, DR, PC, SN	6	90
	Night	65	105	N	105	65	N, R2, NR	60	70	N, PC, SN, R2, DR	20	80	AA, N, PC, SN, R2, DR	6	90
Place of worship	**Evening**	55	240				N, R1, DR	155	60	N, R1, DR	60	70	N, R1, DR, PC, SN	20	80
	Night	55	240	N	240	55	N, R2, NR	155	60	N, PC, SN, R2, DR	60	70	AA, N, PC, SN, R2, DR	20	80
Active recreation	**Evening**	65	105				N, R1, DR	60	70	N, R1, DR	20	80	N, R1, DR, PC, SN	6	90
Passive recreation	**Evening**	60	155				N, R1, DR	105	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	60				N, R1, DR	35	75	N, R1, DR	11	85	N, R1, DR, PC, SN	4	95
	Night	70	60	N	60	70	N, R2, NR	35	75	N, PC, SN, R2, DR	11	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	310				N	115	65	N, PC, RO	45	75
Hospital wards and operating theatres	**Day**	65	115							N, PC, RO	45	75
Place of worship	**Day**	55	310				N	115	65	N, PC, RO	45	75
Active recreation	**Day**	65	115							N, PC, RO	45	75
Passive recreation	**Day**	60	190				N	70	70	N, PC, RO	45	75
Industrial premise	**Day**	75	45							N, PC, RO	45	75
Offices, retail outlets	**Day**	70	70							N, PC, RO	45	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	115				N, R1, DR	70	70	N, R1, DR	25	80	N, R1, DR, PC, SN	6	90
	Night	65	115	N	115	65	N, R2, NR	70	70	N, PC, SN, R2, DR	25	80	AA, N, PC, SN, R2, DR	6	90
Place of worship	**Evening**	55	310				N, R1, DR	190	60	N, R1, DR	70	70	N, R1, DR, PC, SN	25	80
	Night	55	310	N	310	55	N, R2, NR	190	60	N, PC, SN, R2, DR	70	70	AA, N, PC, SN, R2, DR	25	80
Active recreation	**Evening**	65	115				N, R1, DR	70	70	N, R1, DR	25	80	N, R1, DR, PC, SN	6	90
Passive recreation	**Evening**	60	190				N, R1, DR	115	65	N, R1, DR	45	75	N, R1, DR, PC, SN	15	85
Industrial premise	**Evening**	75	45				N, R1, DR	25	80	N, R1, DR	6	90	N, R1, DR, PC, SN	2	100
	Night	75	45	N	45	75	N, R2, NR	25	80	N, PC, SN, R2, DR	6	90	AA, N, PC, SN, R2, DR	2	100
Offices, retail outlets	**Evening**	70	70				N, R1, DR	45	75	N, R1, DR	15	85	N, R1, DR, PC, SN	4	95
	Night	70	70	N	70	70	N, R2, NR	45	75	N, PC, SN, R2, DR	15	85	AA, N, PC, SN, R2, DR	4	95

Transport for NSW

Distanced Based Assessment (Noisiest Plant)

Please pick from drop-down list in orange cells

Noise area category		R2
RBL or L_{A90} Background level (dB(A))	Day	45
	Evening	40
	Night	35
$L_{Aeq(15minute)}$ Noise Mangement Level (dB(A))	Day	55
	Day (OOHW)	50
	Evening	45
	Night	40
Noisiest plant		Chainsaw
Is there line of sight to receiver?		Yes

Steps for 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 noisiest plant. If not found in drop-down list, refer to 'Source List' and select a representative plant with equivalent sound power level.
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 sightoiaw to receiver' drop-down list. Solid barriers can be in the form of road cutting, timber lapped and capped fence, shipping container, site office, etc. Substantial solid barriers are barriers greater than 5 metres in height or multiple rows of houses or a sound barrier specifically designed to mitigate construction noise. 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.

5. Determine if there are any receivers (both residential and non-residential receivers) within the affected distance for each relevant time period . Consider background LA90 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 and Maintenance Noise Estimator should be investigated on a project-by-project basis. Please contact a Roads and Maritime noise speciliast for more information)

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	175							N	75	65	N, PC, RO	25	75	N, PC, RO	25	75	
	Day (OOHW)	250				N, R1, DR	175	55	N, R1, DR	75	65	N, R1, DR, PC, SN	25	75	N, PC, RO	25	75	
	Evening	365				N, R1, DR	250	50	N, R1, DR	120	60	N, R1, DR, PC, SN	45	70	N, PC, RO	25	75	
	Night	525	N	525	40	N, R2, DR	365	45	N, PC, SN, R2, DR	175	55	AA, N, PC, SN, R2, DR	75	65	N, PC, RO	25	75	120
	Highly Affected	25													N, PC, RO	25	75	
Developed settlements (urban and suburban)	Day	200							N	85	65	N, PC, RO	30	75	N, PC, RO	30	75	
	Day (OOHW)	305				N, R1, DR	200	55	N, R1, DR	85	65	N, R1, DR, PC, SN	30	75	N, PC, RO	30	75	
	Evening	460				N, R1, DR	305	50	N, R1, DR	135	60	N, R1, DR, PC, SN	50	70	N, PC, RO	30	75	
	Night	690	N	690	40	N, R2, DR	460	45	N, PC, SN, R2, DR	200	55	AA, N, PC, SN, R2, DR	85	65	N, PC, RO	30	75	135
	Highly Affected	30													N, PC, RO	30	75	
Propagation across a valley / over water	Day	255							N	95	65	N, PC, RO	35	75	N, PC, RO	35	75	
	Day (OOHW)	405				N, R1, DR	255	55	N, R1, DR	95	65	N, R1, DR, PC, SN	35	75	N, PC, RO	35	75	
	Evening	630				N, R1, DR	405	50	N, R1, DR	160	60	N, R1, DR, PC, SN	60	70	N, PC, RO	35	75	
	Night	960	N	960	40	N, R2, DR	630	45	N, PC, SN, R2, DR	255	55	AA, N, PC, SN, R2, DR	95	65	N, PC, RO	35	75	160
	Highly Affected	35													N, PC, RO	35	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)		
	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	175				N	75	65	N, PC, RO	25	75
Hospital wards and operating theatres	Day	65	75							N, PC, RO	25	75
Place of worship	Day	55	175				N	75	65	N, PC, RO	25	75
Active recreation	Day	65	75							N, PC, RO	25	75
Passive recreation	Day	60	120				N	45	70	N, PC, RO	25	75
Industrial premise	Day	75	25							N, PC, RO	25	75
Offices, retail outlets	Day	70	45							N, PC, RO	25	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	75				N, R1, DR	45	70	N, R1, DR	14	80	N, R1, DR, PC, SN	4	90
	Night	65	75	N	75	65	N, R2, NR	45	70	N, PC, SN, R2, DR	14	80	AA, N, PC, SN, R2, DR	4	90
Place of worship	Evening	55	175				N, R1, DR	120	60	N, R1, DR	45	70	N, R1, DR, PC, SN	14	80
	Night	55	175	N	175	55	N, R2, NR	120	60	N, PC, SN, R2, DR	45	70	AA, N, PC, SN, R2, DR	14	80
Active recreation	Evening	65	75				N, R1, DR	45	70	N, R1, DR	14	80	N, R1, DR, PC, SN	4	90
Passive recreation	Evening	60	120				N, R1, DR	75	65	N, R1, DR	25	75	N, R1, DR, PC, SN	8	85
Industrial premise	Evening	75	25				N, R1, DR	14	80	N, R1, DR	4	90	N, R1, DR, PC, SN	1	100
	Night	75	25	N	25	75	N, R2, NR	14	80	N, PC, SN, R2, DR	4	90	AA, N, PC, SN, R2, DR	1	100
Offices, retail outlets	Evening	70	45				N, R1, DR	25	75	N, R1, DR	8	85	N, R1, DR, PC, SN	3	95
	Night	70	45	N	45	70	N, R2, NR	25	75	N, PC, SN, R2, DR	8	85	AA, N, PC, SN, R2, DR	3	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)
	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	200				N	85	65	N, PC, RO	30	75
Hospital wards and operating theatres	**Day**	65	85							N, PC, RO	30	75
Place of worship	**Day**	55	200				N	85	65	N, PC, RO	30	75
Active recreation	**Day**	65	85							N, PC, RO	30	75
Passive recreation	**Day**	60	135				N	50	70	N, PC, RO	30	75
Industrial premise	**Day**	75	30							N, PC, RO	30	75
Offices, retail outlets	**Day**	70	50							N, PC, RO	30	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	85				N, R1, DR	50	70	N, R1, DR	17	80	N, R1, DR, PC, SN	5	90
	Night	65	85	N	85	65	N, R2, NR	50	70	N, PC, SN, R2, DR	17	80	AA, N, PC, SN, R2, DR	5	90
Place of worship	**Evening**	55	200				N, R1, DR	135	60	N, R1, DR	50	70	N, R1, DR, PC, SN	17	80
	Night	55	200	N	200	55	N, R2, NR	135	60	N, PC, SN, R2, DR	50	70	AA, N, PC, SN, R2, DR	17	80
Active recreation	**Evening**	65	85				N, R1, DR	50	70	N, R1, DR	17	80	N, R1, DR, PC, SN	5	90
Passive recreation	**Evening**	60	135				N, R1, DR	85	65	N, R1, DR	30	75	N, R1, DR, PC, SN	9	85
Industrial premise	**Evening**	75	30				N, R1, DR	17	80	N, R1, DR	5	90	N, R1, DR, PC, SN	2	100
	Night	75	30	N	30	75	N, R2, NR	17	80	N, PC, SN, R2, DR	5	90	AA, N, PC, SN, R2, DR	2	100
Offices, retail outlets	**Evening**	70	50				N, R1, DR	30	75	N, R1, DR	9	85	N, R1, DR, PC, SN	3	95
	Night	70	50	N	50	70	N, R2, NR	30	75	N, PC, SN, R2, DR	9	85	AA, N, PC, SN, R2, DR	3	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	255				N	95	65	N, PC, RO	35	75
Hospital wards and operating theatres	**Day**	65	95							N, PC, RO	35	75
Place of worship	**Day**	55	255				N	95	65	N, PC, RO	35	75
Active recreation	**Day**	65	95							N, PC, RO	35	75
Passive recreation	**Day**	60	160				N	60	70	N, PC, RO	35	75
Industrial premise	**Day**	75	35							N, PC, RO	35	75
Offices, retail outlets	**Day**	70	60							N, PC, RO	35	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	95				N, R1, DR	60	70	N, R1, DR	20	80	N, R1, DR, PC, SN	5	90
	Night	65	95	N	95	65	N, R2, NR	60	70	N, PC, SN, R2, DR	20	80	AA, N, PC, SN, R2, DR	5	90
Place of worship	**Evening**	55	255				N, R1, DR	160	60	N, R1, DR	60	70	N, R1, DR, PC, SN	20	80
	Night	55	255	N	255	55	N, R2, NR	160	60	N, PC, SN, R2, DR	60	70	AA, N, PC, SN, R2, DR	20	80
Active recreation	**Evening**	65	95				N, R1, DR	60	70	N, R1, DR	20	80	N, R1, DR, PC, SN	5	90
Passive recreation	**Evening**	60	160				N, R1, DR	95	65	N, R1, DR	35	75	N, R1, DR, PC, SN	15	85
Industrial premise	**Evening**	75	35				N, R1, DR	20	80	N, R1, DR	5	90	N, R1, DR, PC, SN	2	100
	Night	75	35	N	35	75	N, R2, NR	20	80	N, PC, SN, R2, DR	5	90	AA, N, PC, SN, R2, DR	2	100
Offices, retail outlets	**Evening**	70	60				N, R1, DR	35	75	N, R1, DR	15	85	N, R1, DR, PC, SN	3	95
	Night	70	60	N	60	70	N, R2, NR	35	75	N, PC, SN, R2, DR	15	85	AA, N, PC, SN, R2, DR	3	95

Appendix E: PACHCI

18/ 09/ 2024

Mackenzie Pierpoint
Level 1, 6 Stewart Avenue
Newcastle NSW 2302

Dear Mackenzie,

Preliminary assessment results for Chain Valley Bay Road Intersection Upgrade 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, 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.
- The study area does not contain landscape features that indicate the presence of Aboriginal objects, based on the Heritage NSW's *Due diligence Code of Practice for the Protection of Aboriginal objects in NSW* and the Transport for NSW's procedure.
- The cultural heritage potential of the study area appears to be reduced due to past disturbance.
- There is an absence of sandstone rock outcrops likely to contain Aboriginal art.

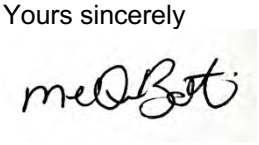
Your project may proceed in accordance with the environmental impact assessment process, as relevant, and all other relevant approvals.

If the scope of your project changes, you must contact me and your regional environmental staff 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's *Unexpected Archaeological Finds Procedure*.

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

Yours sincerely



Merredy Quinn- Bates
Aboriginal Cultural Heritage Officer

Appendix F: Background searches

AHIMS Web Services (AWS)
Search Result

Your Ref/PO Number : chain valley bay

Client Service ID : 892054

WSP Pty Ltd

Level 1/121 Marcus Clarke St
Canberra Australian Capital Territory 2602

Attention: Cleopatra Courtney

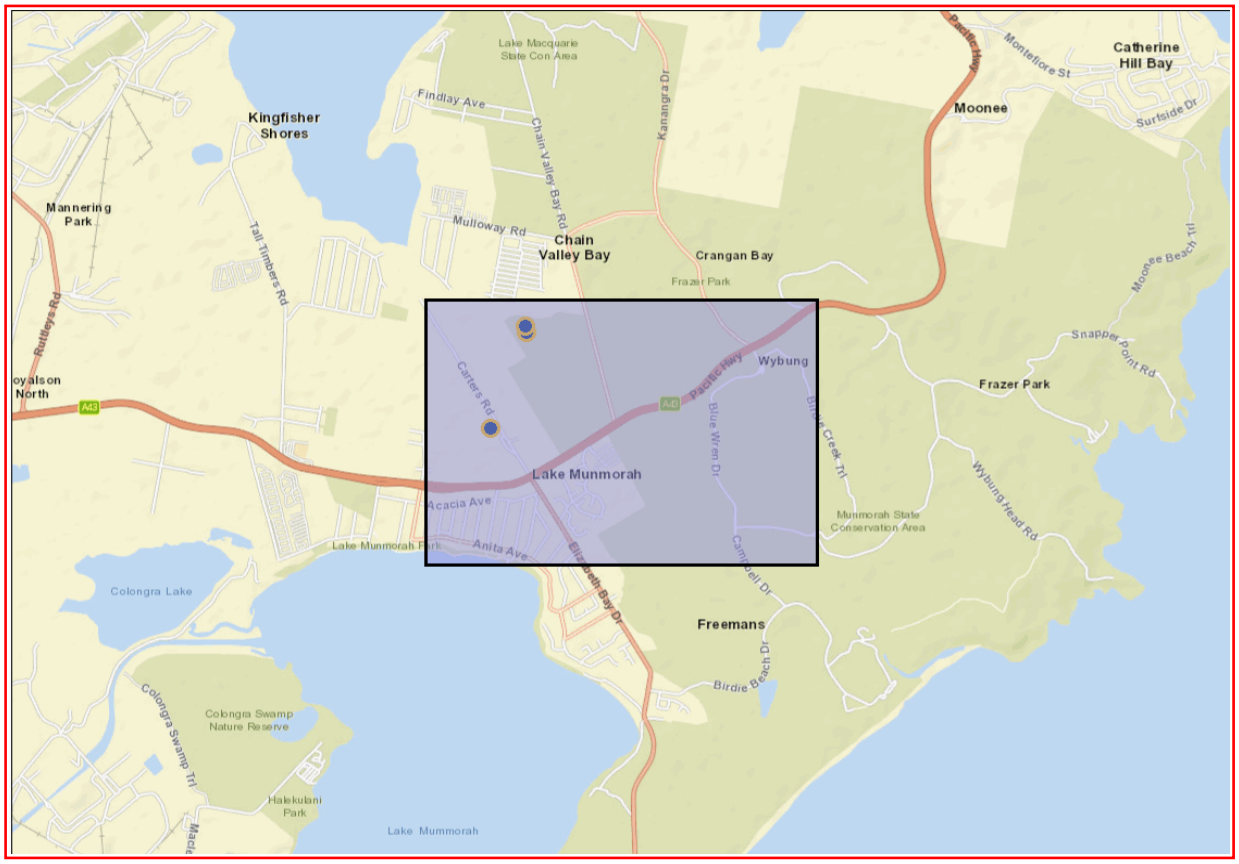
Email: cleo.courtney@wsp.com

Date: 14 May 2024

Dear Sir or Madam:

AHIMS Web Service search for the following area at Lat, Long From : -33.196, 151.5691 - Lat, Long To : -33.1781, 151.6, conducted by Cleopatra Courtney on 14 May 2024.

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

Site and notice details

Your search for: LGA: LAKE MACQUARIE CITY COUNCIL

77 notices on 9 sites were matched.

Return to list of search results

Search Again Refine Search

Area No: 3358

The information below was correct at the time the notices were issued.

Site: Former Service Station
Address: 555 and 565 Pacific HIGHWAY, CRANGAN BAY
LGA: LAKE MACQUARIE, CENTRAL COAST

Owner: DIPNR/Brora Pty Ltd

Notices relating to this site (2 current and 1 former)

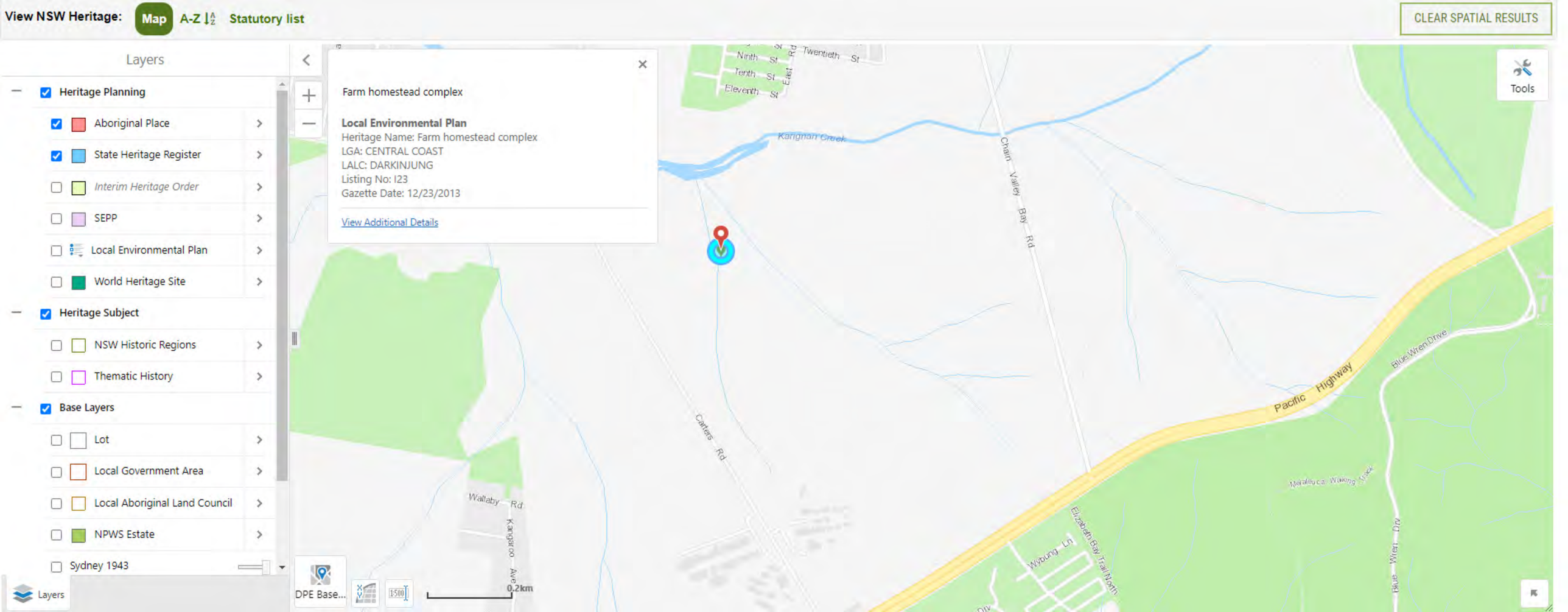
(Map) where available, maps show the part of the site affected by the notice

* notice matched search criteria

Notice recipient	Notice type & number	Status	Date
Super Sub's Pty Limited	Approved Voluntary Management Proposal * 20221704	Current	Issued 06 Jul 2022
Not Applicable	Declaration of Investigation Area * 15017	Current	Issued 14 Feb 2003
Brora Pty. Ltd.	Agreed Voluntary Investigation Proposal * 19030	Former	Issued 27 Apr 2006

24 July 2024


Address
Lot
LGA
POI
Address, eg: 320 Pitt Street Sydney 2000
Layers
Legends
ePlanning Layers - Mapservice 6
Protection
Salinity
VALLEY BAY ROAD
PACIFIC HIGHWAY
KANGAROO AVENUE
COLONGRA BAY ROAD
BORONIA ROAD
ACACIA AVENUE
QUEENS ROAD
LAKE MUNMORAH
High School
Primary School
Park
Club
RFS
0.3 km


View NSW Heritage:
Map
A-Z
Statutory list
CLEAR SPATIAL RESULTS
Layers
Heritage Planning
Aboriginal Place
State Heritage Register
Interim Heritage Order
SEPP
Local Environmental Plan
World Heritage Site
Heritage Subject
NSW Historic Regions
Thematic History
Base Layers
Lot
Local Government Area
Local Aboriginal Land Council
NPWS Estate
Sydney 1943
Farm homestead complex
Local Environmental Plan
Heritage Name: Farm homestead complex
LGA: CENTRAL COAST
LALC: DARKINJUNG
Listing No: I23
Gazette Date: 12/23/2013
View Additional Details
Tools
Karignan Creek
Chain Valley Bay Rd
Pacific Highway
Blue Wren Drive
Carters Rd
Wallaby Rd
Kangaroo Ave
Elizabeth Bay Trail North
Wybung Ln
Ninth St
Tenth St
Eleventh St
Twentieth St
DPE Base...
0.2km

AHIMS Web Services (AWS)
Search Result

Your Ref/PO Number : CVBR

Client Service ID : 910507

WSP

Date: 16 July 2024

Level 27 680 George Street
Sydney New South Wales 2000

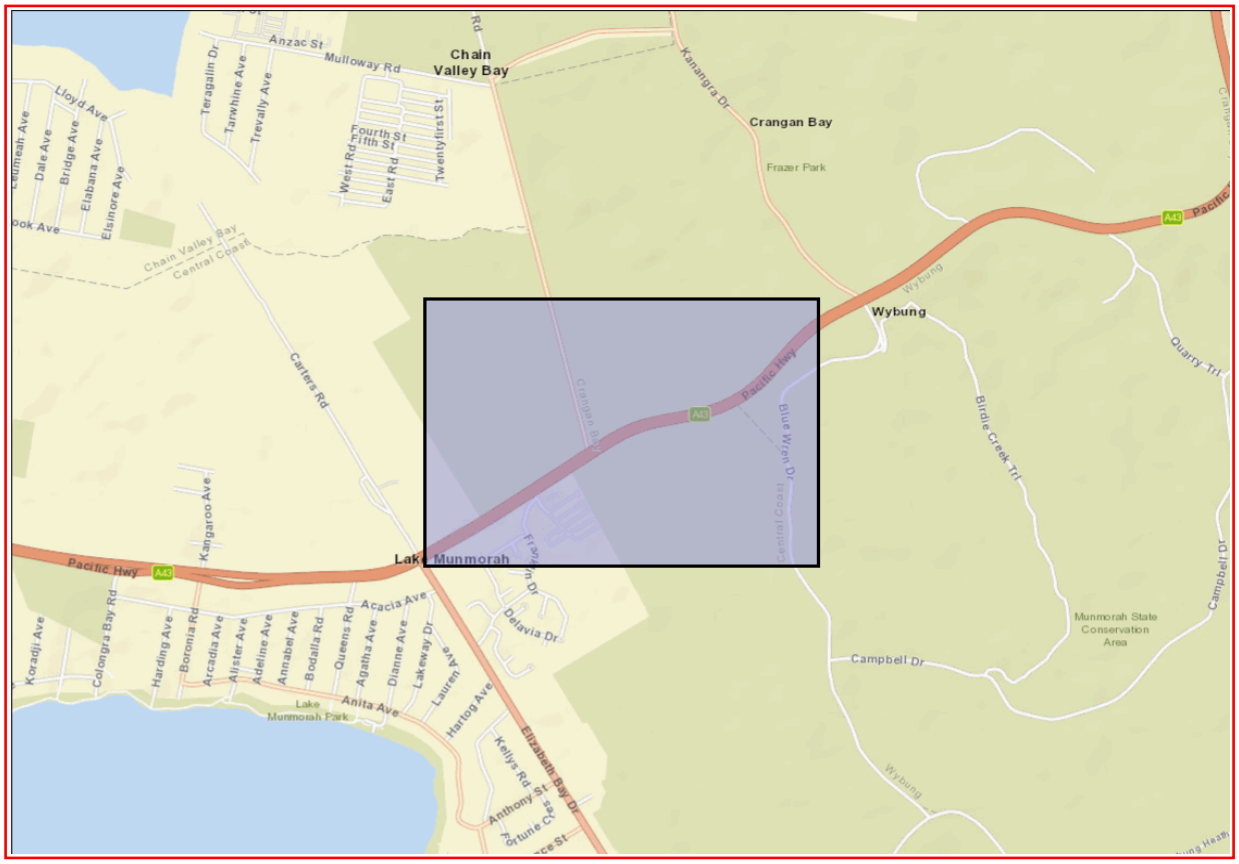
Attention: Bernadette Quirk

Email: bernadette.quirk@wsp.com

Dear Sir or Madam:

AHIMS Web Service search for the following area at Lat, Long From : -33.1903, 151.5776 - Lat, Long To : -33.1813, 151.5931, conducted by Bernadette Quirk on 16 July 2024.

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:

0	**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)
Search Result

Your Ref/PO Number : CVBR_broader_study_area

Client Service ID : 910509

WSP

Level 27 680 George Street
Sydney New South Wales 2000

Attention: Bernadette Quirk

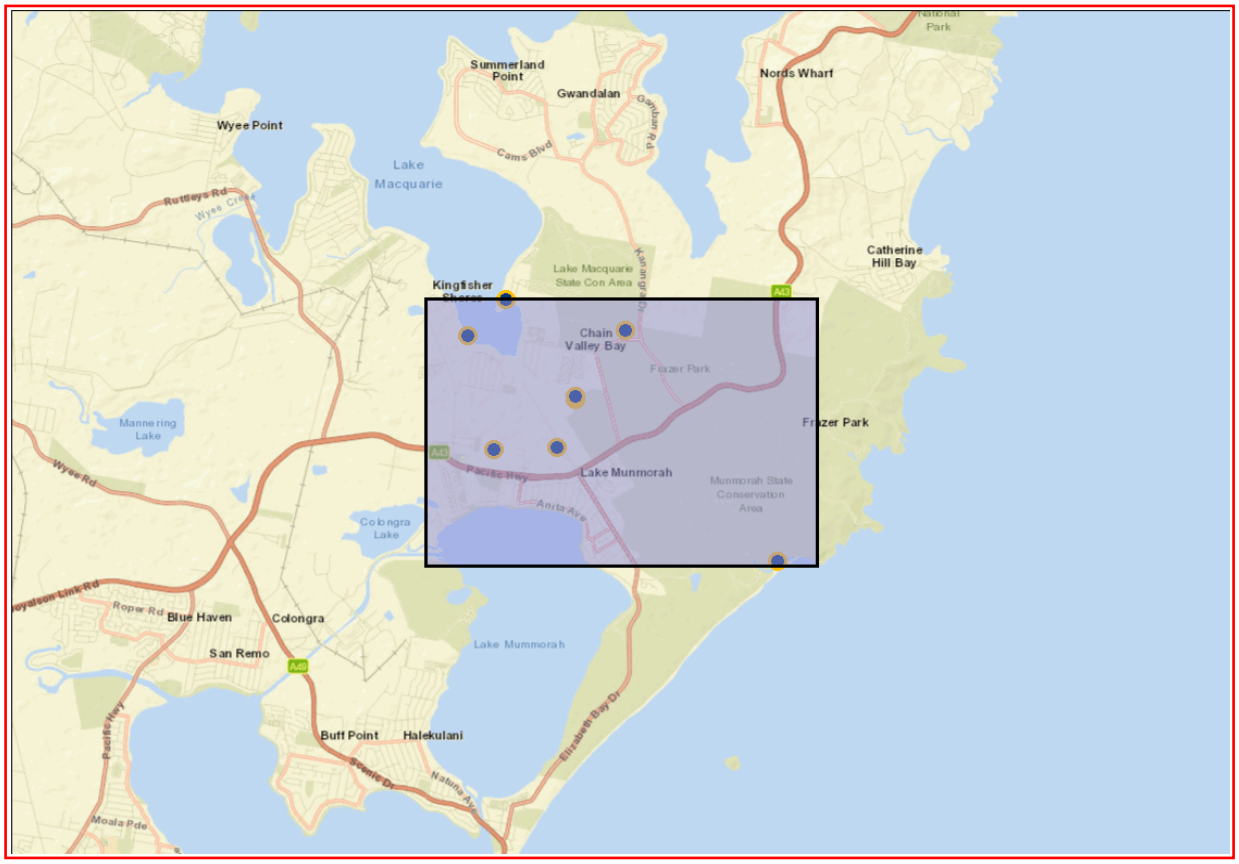
Email: bernadette.quirk@wsp.com

Date: 16 July 2024

Dear Sir or Madam:

AHIMS Web Service search for the following area at Lat, Long From : -33.2027, 151.5534 - Lat, Long To : -33.1667, 151.6152, conducted by Bernadette Quirk on 16 July 2024.

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:

8	**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.

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Email: ahims@environment.nsw.gov.au
Web: www.heritage.nsw.gov.au

AHIMS Web Services (AWS)
Search Result

Your Ref/PO Number : CVBR

Client Service ID : 910324

WSP

Date: 16 July 2024

Level 27 680 George Street
Sydney New South Wales 2000

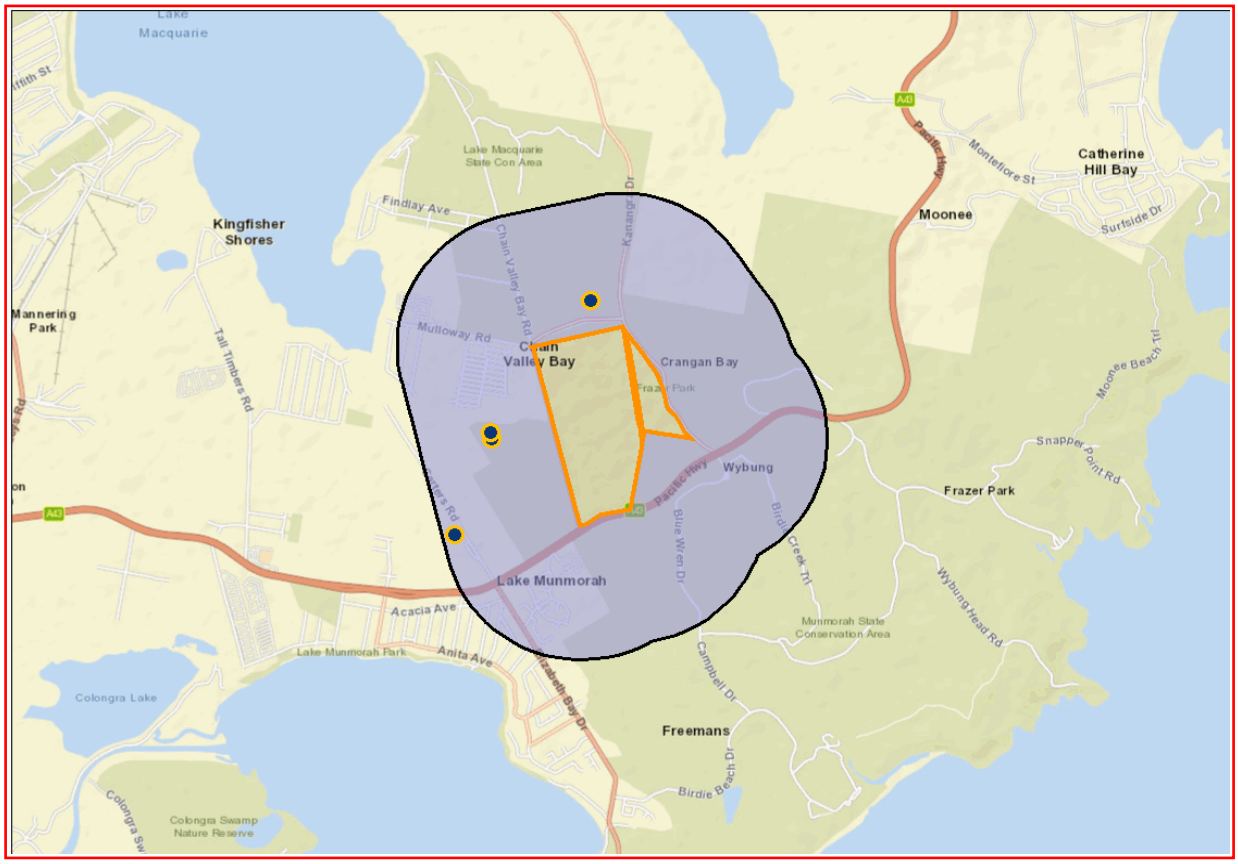
Attention: Bernadette Quirk

Email: bernadette.quirk@wsp.com

Dear Sir or Madam:

AHIMS Web Service search for the following area at Lot : 100, DP:DP1044282, Section : - with a Buffer of 1000 meters, conducted by Bernadette Quirk on 16 July 2024.

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:

4	**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.

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Tel: (02) 9585 6345

ABN 34 945 244 274
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Web: www.heritage.nsw.gov.au

Appendix G: PMST search results

Scientific Name	Common Name	Status	Type of listing (BC Act or EPBC Act)	Distance from works
Diomedea antipodensis	Antipodean Albatross	Vulnerable	EPBC Act	In feature area
Botaurus poiciloptilus	Australasian Bittern	Endangered	EPBC Act	In feature area
Sternula nereis nereis	Australian Fairy Tern	Vulnerable	EPBC Act	In feature area
Rostratula australis	Australian Painted Snipe	Endangered	EPBC Act	In feature area
Thalassarche melanophris	Black-browed Albatross	Vulnerable	EPBC Act	In feature area
Limosa limosa	Black-tailed Godwit	Endangered	EPBC Act	In feature area
Neophema chrysostoma	Blue-winged Parrot	Vulnerable	EPBC Act	In feature area
Climacteris picumnus victoriae	Brown Treecreeper (south-eastern)	Vulnerable	EPBC Act	In feature area
Thalassarche bulleri	Buller's Albatross, Pacific Albatross	Vulnerable	EPBC Act	In feature area
Thalassarche impavida	Campbell Albatross, Campbell Black-browed Albatross	Vulnerable	EPBC Act	In feature area
Thalassarche eremita	Chatham Albatross	Endangered	EPBC Act	In feature area
Tringa nebularia	Common Greenshank, Greenshank	Endangered	EPBC Act	In feature area
Calidris ferruginea	Curlew Sandpiper	Critically Endangered	EPBC Act	In feature area
Stagonopleura guttata	Diamond Firetail	Vulnerable	EPBC Act	In feature area
Numenius madagascariensis	Eastern Curlew, Far Eastern Curlew	Critically Endangered	EPBC Act	In feature area
Pachyptila turtur subantarctica	Fairy Prion (southern)	Vulnerable	EPBC Act	In feature area
Callocephalon fimbriatum	Gang-gang Cockatoo	Endangered	EPBC Act	In feature area
Diomedea antipodensis gibsoni	Gibson's Albatross	Vulnerable	EPBC Act	In feature area
Pterodroma leucoptera leucoptera	Gould's Petrel, Australian Gould's Petrel	Endangered	EPBC Act	In buffer area only
Calidris tenuirostris	Great Knot	Vulnerable	EPBC Act	In feature area
Charadrius leschenaultii	Greater Sand Plover, Large Sand Plover	Vulnerable	EPBC Act	In feature area
Falco hypoleucos	Grey Falcon	Vulnerable	EPBC Act	In feature area
Pluvialis squatarola	Grey Plover	Vulnerable	EPBC Act	In feature area
Thalassarche carteri	Indian Yellow-nosed Albatross	Vulnerable	EPBC Act	In buffer area only
Pterodroma neglecta neglecta	Kermadec Petrel (western)	Vulnerable	EPBC Act	In buffer area only
Gallinago hardwickii	Latham's Snipe, Japanese Snipe	Vulnerable	EPBC Act	In feature area
Charadrius mongolus	Lesser Sand Plover, Mongolian Plover	Endangered	EPBC Act	In feature area

Scientific Name	Common Name	Status	Type of listing (BC Act or EPBC Act)	Distance from works
Thalassarche bulleri platei	Northern Buller's Albatross, Pacific Albatross	Vulnerable	EPBC Act	In feature area
Macronectes halli	Northern Giant Petrel	Vulnerable	EPBC Act	In feature area
Diomedea sanfordi	Northern Royal Albatross	Endangered	EPBC Act	In feature area
Limosa lapponica baueri	Nunivak Bar-tailed Godwit, Western Alaskan Bar-tailed Godwit	Endangered	EPBC Act	In feature area
Grantiella picta	Painted Honeyeater	Vulnerable	EPBC Act	In feature area
Pycnoptilus floccosus	Pilotbird	Vulnerable	EPBC Act	In feature area
Erythrotriorchis radiatus	Red Goshawk	Endangered	EPBC Act	In feature area
Calidris canutus	Red Knot, Knot	Vulnerable	EPBC Act	In feature area
Anthochaera phrygia	Regent Honeyeater	Critically Endangered	EPBC Act	In feature area
Arenaria interpres	Ruddy Turnstone	Vulnerable	EPBC Act	In feature area
Thalassarche salvini	Salvin's Albatross	Vulnerable	EPBC Act	In feature area
Calidris acuminata	Sharp-tailed Sandpiper	Vulnerable	EPBC Act	In feature area
Thalassarche cauta	Shy Albatross	Endangered	EPBC Act	In feature area
Phoebetria fusca	Sooty Albatross	Vulnerable	EPBC Act	In buffer area only
Ardenna grisea	Sooty Shearwater	Vulnerable	EPBC Act	In feature area
Calyptorhynchus lathami lathami	South-eastern Glossy Black-Cockatoo	Vulnerable	EPBC Act	In feature area
Melanodryas cucullata cucullata	South-eastern Hooded Robin, Hooded Robin (south-eastern)	Endangered	EPBC Act	In feature area
Macronectes giganteus	Southern Giant-Petrel, Southern Giant Petrel	Endangered	EPBC Act	In feature area
Diomedea epomophora	Southern Royal Albatross	Vulnerable	EPBC Act	In feature area
Lathamus discolor	Swift Parrot	Critically Endangered	EPBC Act	In feature area
Xenus cinereus	Terek Sandpiper	Vulnerable	EPBC Act	In feature area
Diomedea exulans	Wandering Albatross	Vulnerable	EPBC Act	In feature area
Fregetta grallaria grallaria	White-bellied Storm-Petrel (Tasman Sea), White-bellied Storm-Petrel (Australasian)	Vulnerable	EPBC Act	In buffer area only
Thalassarche steadi	White-capped Albatross	Vulnerable	EPBC Act	In feature area
Hirundapus caudacutus	White-throated Needletail	Vulnerable	EPBC Act	In feature area
Epinephelus daemelii	Black Rockcod, Black Cod, Saddled Rockcod	Vulnerable	EPBC Act	In feature area
Hippocampus whitei	White's Seahorse, Crowned Seahorse, Sydney Seahorse	Endangered	EPBC Act	In buffer area only
Prototroctes maraena	Australian Grayling	Vulnerable	EPBC Act	In buffer area only
Seriolella brama	Blue Warehou	Conservation Dependent	EPBC Act	In buffer area only
Litoria aurea	Green and Golden Bell Frog	Vulnerable	EPBC Act	In feature area

Scientific Name	Common Name	Status	Type of listing (BC Act or EPBC Act)	Distance from works
Mixophyes balbus	Stuttering Frog, Southern Barred Frog (in Victoria)	Vulnerable	EPBC Act	In feature area
Uperoleia mahonyi	Mahony's Toadlet	Endangered	EPBC Act	In feature area
Chalinolobus dwyeri	Large-eared Pied Bat, Large Pied Bat	Endangered	EPBC Act	In feature area
Dasyurus maculatus maculatus (SE mainland population)	Spot-tailed Quoll, Spotted-tail Quoll, Tiger Quoll (southeastern mainland population)	Endangered	EPBC Act	In feature area
Notamacropus parma	Parma Wallaby	Vulnerable	EPBC Act	In feature area
Petauroides volans	Greater Glider (southern and central)	Endangered	EPBC Act	In feature area
Petaurus australis australis	Yellow-bellied Glider (south-eastern)	Vulnerable	EPBC Act	In feature area
Phascolarctos cinereus (combined populations of Qld, NSW and the ACT)	Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory)	Endangered	EPBC Act	In feature area
Potorous tridactylus tridactylus	Long-nosed Potoroo (northern)	Vulnerable	EPBC Act	In feature area
Pseudomys novaehollandiae	New Holland Mouse, Pookila	Vulnerable	EPBC Act	In feature area
Pteropus poliocephalus	Grey-headed Flying-fox	Vulnerable	EPBC Act	In feature area
Caretta caretta	Loggerhead Turtle	Endangered	EPBC Act	In feature area
Chelonia mydas	Green Turtle	Vulnerable	EPBC Act	In feature area
Dermochelys coriacea	Leatherback Turtle, Leathery Turtle, Luth	Endangered	EPBC Act	In feature area
Eretmochelys imbricata	Hawksbill Turtle	Vulnerable	EPBC Act	In feature area
Natator depressus	Flatback Turtle	Vulnerable	EPBC Act	In feature area

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