Appendix B

# Terrestrial Ecology Impact Assessment

MARINUS LINK

entura

# Marinus Link Heybridge Converter Station

## Terrestrial ecology baseline and impact assessment

May 2024

Prepared by Hydro-Electric Corporation ABN48 072 377 158

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# Executive summary

This report presents a baseline characterisation of ecological values within the Marinus Link Heybridge converter station and shoreline crossing areas based on available data resources and the results of field surveys. This report also presents an impact assessment that considers the potential impact of the project on those ecological values and whether there is likely to be a significant impact on Matters of National Environmental Significance (MNES) protected under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), and/or species protected under the Tasmanian *Threatened Species Protection Act 1995* (TSP Act) or vegetation communities protected under the *Nature Conservation Act 200*2 (NC Act).

The baseline assessment identified:

- The presence of three native vegetation communities, one of which is listed under the NC Act.
    - *Eucalyptus amygdalina* coastal forest and woodland (DAC) –NC Act listed – on the shoreline crossing
    - Coastal scrub (SSC), on the shoreline crossing
    - *Eucalyptus viminalis–Eucalyptus globulus* coastal forest and woodland (DVC), on the converter station site
- The potential presence of five EPBC Act listed fauna species
    - Tasmanian devil (*Sarcophilus harrisii*)
    - Spotted tail quoll (*Dasyurus maculatus* subsp*. maculatus*)
    - Tasmanian wedge-tailed eagle (*Aquila audax* subsp*. fleayi*)
    - White-throated needletail (*Hirundapus caudacutus*)
    - Fork-tailed swift (*Apus pacificus*)
- The potential presence of one NC Act listed fauna species
    - White bellied sea-eagle (*Haliaeetus leucogaster)*

The significance assessment considers the sensitivity of a value and magnitude of impact. This approach assesses the sensitivity of an environmental value by considering its conservation status, intactness, uniqueness or rarity, sensitivity to change and replacement potential.

The impact assessment found that the significance of the pre-mitigation impact to the vegetation communities and most fauna species was low. This low impact assessment is primarily determined by the negligible magnitude of impact to most of the above native vegetation communities and threatened species at this site.

The only species assessed as being potentially impacted at a moderate significance level, following the implementation of EPRs, were Tasmanian devils (*Sarcophilus harrisii*) and spotted-tailed quolls (*Dasyurus maculatus* subsp*. maculatus*). Tasmanian devils and spotted-tailed quolls are highly sensitive to roadkill risk, given that vehicle strikes are often lethal and both species frequently are attracted to foraging on carcasses of other roadkill species. The magnitude of roadkill impact due to construction activities was assessed as minor, prior to the implementation of mitigation measures to comply with EPRs. However, with implementation of measures to comply with the Environmental Performance Requirements (EPRs), the residual magnitude of roadkill impacts will be reduced to negligible, and the significance of the impact on devils and quolls will be low.

The significance of the impact due to the construction and operation of the Heybridge converter station and shoreline crossing is therefore low. The recommended EPRs will minimise impacts to ecological values through:

- Minimising vegetation removal and disturbance during construction
- Implementing vegetation protection measures during construction
- Implementing measures to protect fauna during construction
- Implementing measures to protect raptors during construction
- Implementing vegetation protection measures during operation
- Implementing measures to protect raptors during operation.

This assessment found that any impacts from the project on threatened ecological communities, threatened flora or threatened fauna species at the either the converter station or the shore crossing will be reduced to manageable levels.

# Glossary and Abbreviations

| | |
|---|---|
| CEMP | Construction Environmental Management Plan |
| EFOS | Environmental Field Observation System |
| EPA Tas | Environmental Protection Agency Tasmania |
| EPBC Act | *Environment Protection and Biodiversity Conservation Act 1999* |
| EPRs | Environmental Performance Requirements |
| GIS | gas insulated switchgear |
| HDD | horizontal directional drills |
| HVAC | high voltage alternating current |
| HVDC | high voltage direct current |
| MNES | Matters of Environmental Significance |
| NC Act | *Nature Conservation Act 2002* |
| NEM | National Electricity Market |
| NVA | Natural Values Atlas |
| PMST | Protected Matters Search Tool |
| $SF_6$ | Sulfur hexafluoride |
| TSP Act | *Threatened Species Protection Act 1995* |

# 1. Introduction

The proposed Marinus Link (the project) comprises a high voltage direct current (HVDC) electricity interconnector between Tasmania and Victoria, to allow for the continued trading and distribution of electricity within the National Electricity Market (NEM).

The project was referred to the Australian Minister for the Environment 5 October 2021. On 4 November 2021, a delegate of the Minister for the Environment determined that the proposed action is a controlled action as it has the potential to have a significant impact on the environment and requires assessment and approval under the Environment Protection and Biodiversity Conservation Act 1999 (Cwlth) (EPBC Act) before it can proceed. The delegate determined that the appropriate level of assessment under the EPBC Act is an environmental impact statement (EIS).

In July 2022 a delegate of the Director of the Environment Protection Authority Tasmania determined that the project be subject to environmental impact assessment by the Board of the Environment Protection Authority (the Board) under the Environmental Management and Pollution Control Act 1994 (Tas) (EMPCA).

On 12 December 2021, the former Victorian Minister for Planning under the Environment Effects Act 1978 (Vic) (EE Act) determined that the project requires an environment effects statement (EES) under the EE Act, to describe the project's effects on the environment to inform statutory decision making.

As the project is proposed to be located within three jurisdictions, the Victorian Department of Energy, Environment and Climate Action (DEECA), Tasmanian Environment Protection Authority (Tasmanian EPA) and Australian Department of Climate Change, Energy, Environment and Water (DCCEEW) have agreed to coordinate the administration and documentation of the three assessment processes. Two EISs are being prepared to address the Tasmanian EPA requirements for the Heybridge converter station and shore crossing. A separate EIS/EES is being prepared to address the requirements of DTP and DCCEEW.

This report has been prepared by Entura for the Tasmanian jurisdiction to support both the Tasmanian EISs and the EIS/EES being prepared for the project.

## 1.1 Purpose of this report

Marinus Link Pty Ltd (MLPL) is proposing the development of a second Bass Strait electricity interconnector, known as Marinus Link. Entura has been engaged by Tetra Tech Coffey Pty Ltd (Tetra Tech Coffey) on behalf of MLPL to undertake an assessment of the terrestrial ecological values of the proposed converter station at Heybridge and shore crossing sites. This report presents a baseline characterisation of ecological values within the study area based on available data resources and the results of field surveys. The impact assessment considers the potential impact of the project on those ecological values and whether there is likely to be a significant impact on Matters of National Environmental Significance (MNES) protected under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), and/or species protected under the Tasmanian *Threatened Species Protection Act 1995* (TSP Act) or vegetation communities protected under the *Nature Conservation Act 200*2 (NC Act).

## 1.2 Project overview

The project is a proposed 1500-megawatt (MW) HVDC electricity interconnector between Heybridge in North West Tasmania (Figure 1.1) and the Latrobe Valley in Victoria.

The project is proposed to provide a second link between the Tasmanian renewable energy resources and the Victorian electricity grids enabling efficient energy trade, transmission and distribution from a diverse range of generation sources to where it is most needed and will increase energy capacity and security across the National Electricity Market (NEM).

Marinus Link Pty Ltd (MLPL) is the proponent for the project and is a wholly owned subsidiary of Tasmanian Networks Pty Ltd (TasNetworks). TasNetworks is owned by the State of Tasmania and owns, operates and maintains the electricity transmission and distribution network in Tasmania.

Tasmania has significant renewable energy resource potential, particularly hydroelectric power and wind energy. The potential size of the resource exceeds both the Tasmanian demand and the capacity of the existing Basslink interconnector between Tasmania and Victoria. The growth in renewable energy generation in mainland states and territories participating in the NEM, coupled with the retiring of baseload coal-fired generators, is reducing the availability of dispatchable generation that is available on demand.

Tasmania's existing and potential renewable resources are a valuable source of dispatchable generation that could benefit electricity supply in the NEM. The project will allow for the continued trading, transmission and distribution of electricity within the NEM. It will also manage the risk to Tasmania of a single interconnector across Bass Strait and complement existing and future interconnectors on mainland Australia. The project is expected to facilitate the reduction in greenhouse gas emissions at a state and national level.

Interconnectors are a key feature of the future energy landscape. They allow power to flow between different regions to enable the efficient transfer of electricity from renewable energy zones to where the electricity is needed. Interconnectors can increase the resilience of the NEM and make energy more secure, affordable and sustainable for customers. Interconnectors are common around the world including in Australia. They play a critical role in supporting Australia's transition to a clean energy future.


Figure 1.1: Heybridge converter station overview

### 1.2.1 Tasmanian converter station

Two converter stations and a high voltage alternating current (HVAC) switching station will be located near the coast at Heybridge, on the site of the former titanium dioxide plant. The site and all components located on it will be referred to as the Heybridge converter station site.

The subsea cables will connect directly into the two converter stations, which are connected to the HVAC switching station that facilitates the project connecting to the Tasmanian 220 kV HVAC network. The high-voltage direct current (HVDC) voltage will be either ±320 kV or ±400 kV.

The development footprint of the converter stations and associated HVAC switching station is expected to be 280m by 220m. A preliminary overview is set out in Figure 1.1 and a preliminary general layout is set out in Figure 1.2. The site will have internal access roads that will be sealed.

The Heybridge converter station will comprise the following key components and equipment:

- Overhead steel lattice gantries on which the HVAC 220 kV transmission lines (connection to Tasmanian transmission network) will terminate.
- HVAC 220 kV AC switching station with gas insulated switchgear (GIS). Sulfur hexafluoride ($SF_6$) gas will be used in the switchgear. A building will enclose the GIS equipment.
- HVAC 220 kV filter banks, assumed to be housed within a building, however there is potential for open air depending on the visual impacts.
- Converter transformers and coolers. The transformers will be housed in bunds designed in accordance with applicable Australian standards. A spare transformer (without transformer oil) will be stored adjacent to the western transformer bays.
- Main building that will include a phase reactor hall, a valve hall and an HVDC hall. The three halls are separate areas in the one building.
    - HVAC phase reactor hall containing valve reactors.
    - Valve hall containing the converter modules and valves.
    - HVDC hall with HVDC reactors and HVDC land cable terminations.
- Two-storey service and control building containing system control, protection and data acquisition equipment, station services such as UPS systems with batteries, fire suppression systems, control room and amenities.
- Spare parts buildings and workshop (common to both converter stations).
- Telecoms building for purposes of providing control systems for the project and commercial telecoms services where there is available capacity (common to both converter stations).
- Firefighting systems including 1,000,000 L (estimated) fire water tank.
- Stormwater drainage system. Potentially contaminated water from bunded areas will be directed to and collected in a gross pollutant trap or triple interceptor trap which will be periodically pumped out by a licensed wastewater disposal contractor. Clean surface water runoff and overflow from the traps will discharge to a form of water sensitive urban design (e.g., swale drain), before discharge to the ocean via the existing site drainage culvert.

- Greywater and sewerage will be managed through a septic tank. The site will also have underground oil separator tanks. Security fencing will be weldmesh, 3.25m high, with barbed wire on top section. Onsite temporary fuel storage for backup generators.
- Two 1500 kVA diesel generators with above ground fuel storage of 5000L (sufficient for 8 hours at full load), (2500 L diesel per converter).
- Building materials: roof and walls will be a standard sheet steel construction; however, alternatives may include adding insulating panels or pre-cast concrete tilt panels if required for acoustic attenuation.

The phase reactor hall, valve hall and HVDC hall will have maximum dimensions (based on ±400 kV design) of approximately 70m wide, 90m long and 27m high, as indicated in Figure 1.2. The attached control and auxiliaries building will be approximately 40m long by 25m wide by 10m high. The GIS switching station building will be a portal frame building approximately 49 m long, 16 m wide and 10m high.

### 1.2.2 Tasmanian landfall and shore crossing

The shore crossing area extends from the Bass Strait shoreline, under the Bass Highway and Western Line Railway, to the Heybridge converter station site, as shown in Figure 1.2.

The shore crossing is west of the Blythe River mouth, in the vicinity of the former titanium dioxide plant outfall pipeline.

The shore crossing will be comprised of six horizontal directional drills (HDD). This will consist of two cable bundles each requiring three drills (for two power and one fibre optic cable). Each HDD will be drilled from one of two pads located within the Heybridge converter station site. Three ducts will be installed from each of the two drill pads. The crossings will be drilled under the Bass Highway and Western Line which are adjacent to the proposed converter site. The HDD rigs will be located within the Heybridge site and drill out along the subsea cable route alignment. The HDD bores will extend approximately 1 km offshore and end in approximately 10m water depth. The subsea cables will be pulled from the cable laying vessel to the converter station HDD drill pads.

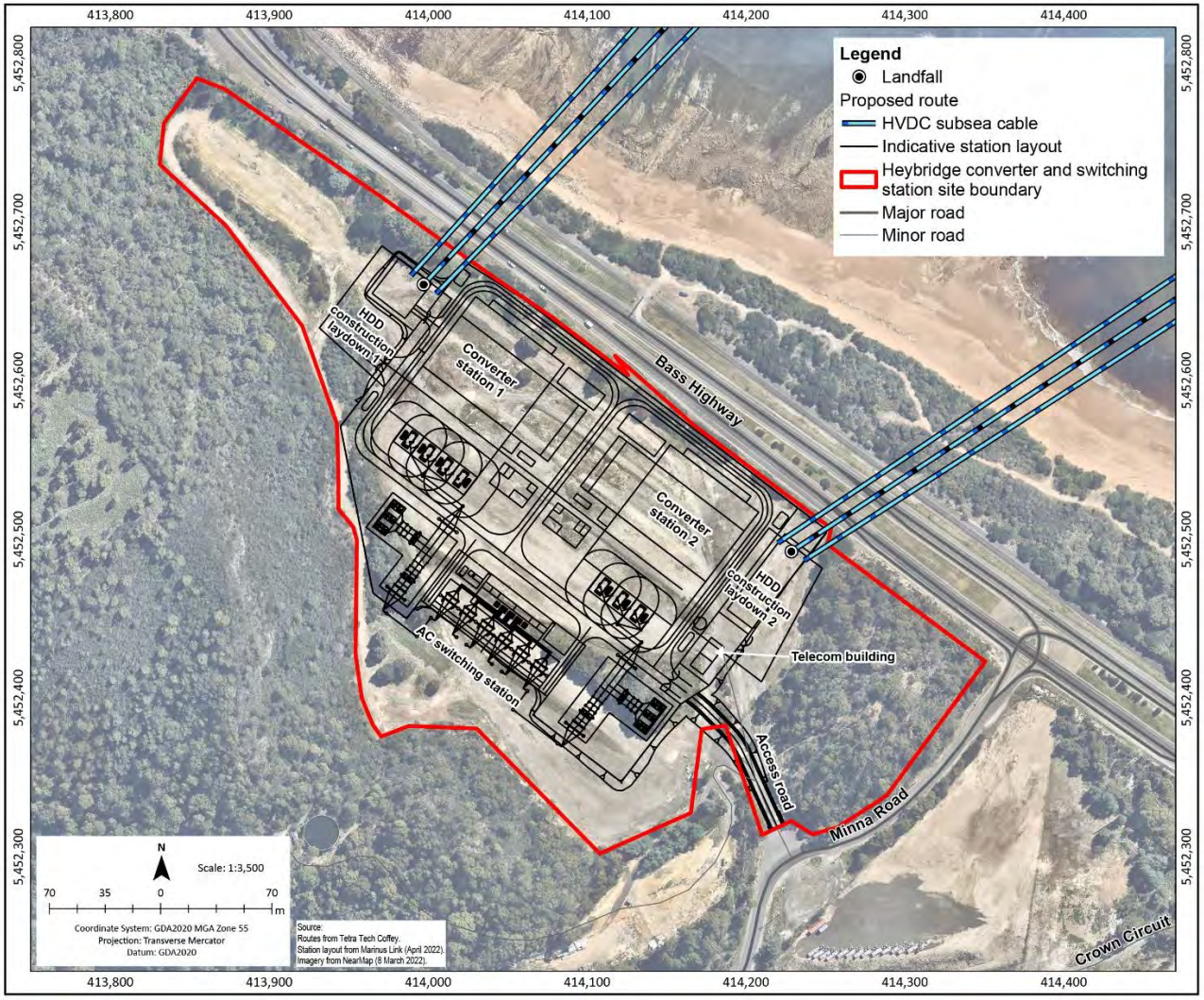


Figure 1.2: Converter station site preliminary general layout.

## 1.3 Assessment context

This report assesses the likely impacts of the project on threatened flora, fauna and ecological communities. It is a requirement to undertake this assessment , as the project has the potential to have impacts on flora, fauna and ecological communities that are listed as threatened under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), and/or on flora and fauna species protected under the Tasmanian *Threatened Species Protection Act 1995* (TSP Act) or vegetation communities protected under the *Nature Conservation Act 200*2 (NC Act).

In the event that this assessment identifies that the project will result in the taking or disturbance to a threatened species listed under the TSP Act 'A 'permit to take is likely to be required. Under the TSP Act a person must not knowingly kill, injure or collect a listed species without a permit. Similarly, a person must not disturb a listed species on land subject to an interim protection order or subject to a land management agreement without a permit. It is also an offense under TSP Act to disturb wildlife on reserved land under the *National Parks and Reserves Management Regulation 2019*.

If a native vegetation community listed under the NC Act is impacted, then usually a Forest Practices Plan (FPP) is required. However, there are exemptions under the *Forest Practices Regulations 2017* including for the construction of electrical infrastructure (Regulation4 (l)). In the event that a threatened species or community listed under the EPBC Act is assessed as likely to be significantly impacted, mitigation measures and/or offsets may be an approval requirement.

The field surveys targeted flora and fauna species listed under the TSP Act which were identified as likely to occur within the survey area so that potential impacts could be assessed.

# 2. Assessment guidelines

This section outlines the assessment guidelines relevant to terrestrial ecology and the linkages to other EIS/EES technical assessments. Two EISs are being prepared to address the Tasmanian EPA requirements for the Heybridge converter station and shore crossing. A separate EIS/EES is being prepared to address the requirements of DTP and DCCEEW.

This report has been prepared by Entura for the Tasmanian jurisdiction to support both the Tasmanian EISs and the EIS/EES being prepared for the project.

## 2.1 Commonwealth

DCCEEW have published the following guidelines for the EIS: 'Guidelines for the Content of a Draft Environmental Impact Statement – Environment Protection and Biodiversity Conservation Act 1999 – Marinus Link underground and subsea electricity interconnector cable (EPBC 2021/9053)'.

The guidelines relevant to the terrestrial ecology stated in Section 5.5 for terrestrial impacts:

*'The EIS must include an assessment of the potential direct and indirect impacts to listed and threatened species and communities arising from the terrestrial components of the project, particularly native vegetation clearance for the onshore converter station. The following will be required:*

- *identify and characterise threatened species and ecological communities present within terrestrial environments of the project, supported by maps and survey work;*
- *determine the total amount of vegetation likely to be removed during construction and the potential impacts on protected matters, including the presence of hollow bearing trees…and other critical habitat features within vegetation proposed for removal; and*
- *details of the extent, intensity, and duration of potential impacts of the action on the identified threatened species and/or ecological communities*.'

## 2.2 Tasmania

The EPA Tasmania has published two sets of guidelines (September 2022) for the preparation of an EIS for the Marinus Link converter station and shore crossing. A separate set of guidelines has been prepared for each of these project components. The sections relevant to the terrestrial ecology assessment are included in Table 2.1: .

Table 2.1: EIS guidelines issued by EPA Tasmania relevant to this terrestrial ecology assessment

| EIS guideline section | Key issue detail | Reference in this report |
|---|---|---|
| **Existing Environment** | | |
| CS[#] Section 6.2<br>SC[Σ] Section 10.1 | Specify and map known records of species and their habitat, with particular reference to rare and threatened species, communities, and habitats, including those listed under the relevant Schedules of the Commonwealth EPBC Act and the Tasmanian Threatened Species Protection Act 1995 (TSP Act) and Tasmanian Nature Conservation Act 2002 (NC Act). | 5.1, 6.4, 6.5, 6.6, 0 |
| CS Section 6.2<br>SC Section 10.1 | Undertake and provide the results of a current natural values survey for the site. | 5, 6, 7 |
| CS Section 6.2<br>SC Section 10.1 | Identify any known occurrences of species of conservation significance, threatened fauna species or flora species or potential habitat in the vicinity of the proposal footprint, or potentially impacted offsite, including aquatic species and shorebirds. | 6.3, 6.4, 6.5, 0 |
| CS Section 6.2<br>SC Section 10.1 | Identify areas or habitats of conservation significance, including designated conservation areas, areas relating to the requirements of international treaties (e.g., Japan-Australia and China-Australia Migratory Bird Agreements (JAMBA/CAMBA) and Ramsar (wetlands) Convention). | 6, 7 |
| CS Section 6.2<br>SC Section 10.1 | Specify and map known sites of geoconservation significance or natural processes (such as fluvial or coastal features), including sites of geoconservation significance listed on the Tasmanian Geoconservation Database. | 6.1 |
| CS Section 6.2<br>SC Section 10.1 | Demonstrate that any surveys comply with requirements in *Guidelines for Terrestrial Natural Values Surveys*. | 5 |
| CS Section 6.2<br>SC Section 10.1 | Identify any environmental weed species present on or near the site. | 6.8 |
| CS Section 6.2<br>SC Section 10.1 | Describe natural processes of particular importance for the maintenance of the existing environment (e.g., fire, flooding, etc). | N/A (see 6.4.1, 6.4.2) |
| CS Section 6.2<br>SC Section 10.1 | Provide all results in a natural values assessment, undertaken by a suitably qualified person. | 6, 7 |
| SC Section 9.2 | Any existing conservation reserves located on or within 500 metres of the site/route. | N/A (see 6.2) |
| SC Section 9.2 | Information on species, sites or areas of landscape, aesthetic, wilderness, scientific or otherwise special conservation significance which may be affected by the proposal. Relevant information resources include the LIST and Natural Values Atlas | 6 |
| **Potential impacts** | | |
| CS Section 6.2<br>SC Section 10.1 | Describe potential impacts of construction and operation of the proposal on flora, vegetation communities and habitat, with particular reference to rare and threatened species, communities, and habitats, including those listed under the relevant Schedules of the TSP Act and NC Act. | 8.1, 8.2 |

| EIS guideline section | Key issue detail | Reference in this report |
|---|---|---|
| CS Section 6.2<br>SC Section 10.1 | Describe potential impacts of construction and operation of the proposal on fauna, including impacts on species, communities, and habitats. Provide details of impacts to rare and threatened species, migratory species, communities, and habitats, including those listed under the relevant Schedules of the TSP Act and NC Act. | 8.1, 8.2 |
| CS Section 6.2 | In discussion of impacts on flora and fauna, including consideration of:<br>• Habitat clearance and disturbance<br>• Activity causing potential disturbance (e.g., movement)<br>• Noise and vibration emissions<br>• Lighting and vehicle movements (including roadkill)<br>• Mobilised contaminated material or sediment | 8 |
| SC Section 10.1 | In discussion of impacts on flora and fauna, including consideration of:<br>• Habitat clearance and disturbance<br>• Activity causing potential disturbance (e.g., movement)<br>• Noise and vibration emissions<br>• Lighting and vehicle movements (including roadkill)<br>• Mobilised contaminated material or sediment<br>• The potential for the proposed works to result in subsidence and resultant impact on shorebird habitat above and adjacent to the drill holes. | 6.1, 8 |
| CS Section 6.2<br>SC Section 10.1 | Discuss impacts on existing conservation reserves which may be affected by the proposal, with reference to the management objectives of the reserve(s) and the reserve management plan(s) (if any). | N/A (see 6.2) |
| CS Section 6.2<br>SC Section 10.1 | Discuss impacts on other species, sites or areas of special conservation significance, including areas of wilderness or scientific value. | 8 |
| CS Section 6.2<br>SC Section 10.1 | Discuss the potential introduction or spread of pests, weeds and plant and animal diseases as a result of construction and operation of the proposal. Information about controlling the introduction and spread of weeds and the development of weed and disease management plans can be found in Section 4 of the NRE (2015) *Weed and Disease Planning and Hygiene Guidelines - Preventing the spread of weeds and diseases in Tasmania.* | 8.6, 8.7 |
| CS Section 6.2<br>SC Section 10.1 | Discuss impacts on sites of geoconservation significance or natural processes (such as fluvial or coastal features), including sites of geoconservation significance listed on the Tasmanian Geoconservation Database. | N/A (see 6.1) |
| CS Section 6.2 | In consideration of all issues, discuss any potential for cumulative impact with the proposed Heybridge shore crossing for Marinus Link. | 8.4 |

| EIS guideline section | Key issue detail | Reference in this report |
|---|---|---|
| SC Section 10.1 | In consideration of all issues, discuss any potential for cumulative impact with the proposed Heybridge converter station for Marinus Link. | 8.4 |
| **Avoidance and mitigation measures** | | |
| CS Section 6.2<br>SC Section 10.1 | Describe management measures to mitigate adverse impacts to threatened fauna, flora and vegetation communities and other natural values where they cannot be avoided. | 8 |
| SC Section 10.1 | It is noted that the shore crossings will be drilled continuously over 24 hours, 7 days a week to ensure borehole stability. It is important that illumination of the site at night is minimised as this can disorient seabirds and shorebirds. If there is to be any form of additional night-time lighting associated with the construction area for safety (or other) reasons, the illumination should be kept to a minimum and red light should be used. It is recommended that the guidance principles outlined in the Commonwealth National Light Pollution Guidelines for Wildlife be considered for incorporation into the lighting design, in particular those specified in Appendix A (Best Practice Lighting Design). | 8.1.3.1, 8.1.3.2, 8.7 |
| CS Section 6.2<br>SC Section 10.1 | Where impacts cannot be avoided, present proposed measures to mitigate and/or compensate adverse impacts on biodiversity and nature conservation values. | 8 |
| CS Section 6.2<br>SC Section 10.1 | Develop a plan to control the spread of weeds, pests and diseases and ensure that weeds present at the impact site are properly managed. | 8.1 |
| CS Section 6.2<br>SC Section 10.1 | Discuss rehabilitation of disturbed areas following the completion of construction activities and cessation of the activity, including any proposed seed collection and progressive rehabilitation programme. | 8.1, 8.3, 8.5 |
| CS Section 6.2<br>SC Section 10.1 | Provide a conclusion regarding the significance of likely impacts on natural values. | 8.6, 9 |
| **Requirements for surveys** | | |
| CS Section 6.2<br>SC Section 10.1 | Any flora and fauna surveys must, as a minimum, comply with the requirements of the document Guidelines for Terrestrial Natural Values Surveys published by the Department of Natural Resources | 5 |

# CS = Converter station EIS guidelines; Σ SC = Shore crossing EIS guidelines

## 2.3 Victoria

The Victorian component of the project is being assessed in accordance with the EES Scoping Requirements approved by the Minister for Planning (February, 2023). This assessment is documented in a separate report [Eco Logical Australia, 2023. Terrestrial Ecology Impact Assessment – Marinus Link].

## 2.4 Linkages to other reports

The Tasmanian terrestrial ecology report describes the baseline conditions at the Heybridge converter station site and the shore crossing of the undersea cable to the converter station. It also assesses the impacts of the terrestrial ecology within the survey area. The Tasmanian terrestrial ecology report together with the Victorian terrestrial ecology report characterise the baseline condition of the terrestrial ecological values within the project footprint and assesses the impacts on them. They also describe the Environmental Performance Requirements (EPRs) set out the environmental outcomes that must be achieved during design, construction, operation and decommissioning of the project which will minimise impacts and the risk of harm to the terrestrial ecology values.

This report is informed by the technical assessments outlined in Table 2.2.

Table 2.2: Reports with relevance to this report

| Technical assessment | Relevance to this assessment |
|---|---|
| Marinus Link Project<br>Environmental Impact Statement (Tasmania)<br>Technical Report – Traffic & Transport<br>(Stantec, 2023) | Characterisation of traffic movements to and from site |
| Geomorphology Technical Report produced by Environmental GeoSurveys Pty Ltd and A.S. Miner Geotechnical Pty Ltd (2023) | Characterisation of expected impacts on geomorphology and soils |
| North Barker (2022). North West Transmission Upgrades Project – Viewshed Analysis Active Eagle Nests 21/22 Season. Report written for Tetra Tech Coffey, Northwest Transmission Developments, 13 January 2022. | Utilises raptor searches undertaken on behalf of TasNetworks for the North West Transmission Development project. The search area also covers the necessary area for the Heybridge Converter Station. Permission has been provided by TasNetworks for use in this assessment. |

# 3. Legislation, policy and guidelines

This section describes the Australian Government and Tasmanian Government legislation that protects threatened species and ecological communities that will apply to the proposed Heybridge converter station project and landfall and shore crossing.

## 3.1 Commonwealth

### 3.1.1 *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)

The EPBC Act is Australian Government legislation that protects Matters of Environmental Significance (MNES). The EPBC Act provides for Commonwealth involvement in the assessment and approval of proposed actions that could have an impact on an MNES.

MNES include:

- world heritage properties
- national heritage places
- the Great Barrier Reef Marine Park
- nationally listed threatened species and ecological communities
- migratory species
- wetlands of international importance (listed under the Ramsar Convention)
- Commonwealth marine areas
- nuclear actions (including uranium mining
- a water resource, in relation to coal seam gas development and large coal mining development.

A proponent who proposes to take an action that will have or is likely to have a significant impact on MNES must refer that action to the Minister for assessment. The Minister determines whether the activity can proceed with no further assessment by the Australian Government, or whether it will be a controlled action for which assessment is required.

## 3.2 Tasmania

### *3.2.1 Threatened Species Protection Act 1995*

Under the Tasmanian Threatened Species Protection Act 1995 (TSP Act) a person must not knowingly kill, injure or collect a listed species without a permit. Similarly, a person must not disturb a listed species on land subject to an interim protection order or subject to a land management agreement without a permit. It is also an offense under TSP Act to disturb wildlife on reserved land under the *National Parks and Reserves Management Regulation 2019*.

The field surveys targeted flora and fauna species listed under the TSP Act which were identified as likely to occur within the survey area so that potential impacts could be assessed.

### 3.2.2 Nature Conservation Act 2002

The Nature Conservation Act 2002 (NC Act) provides for the conservation and protection of the fauna, flora and geological diversity in Tasmania and for the declaration of national parks and other reserved land.

Schedule 3A of the NC Act lists the native vegetation communities in Tasmania that are threatened. Communities listed under the NC Act are protected from clearance and conversion under the *Forest Practices Act* 1985 and are also afforded higher levels of protection under some local government planning schemes). Clearing or conversion of listed threatened vegetation communities usually requires the preparation and certification of a Forest Practices Plan (FPP). However, Regulation 4 (l) of the *Forest Practices Regulations 2017* describes the circumstances in which a forest practices plan is not required:

> *Regulation 4 (l)*
>
> *The harvesting of timber or the clearing of trees on any land, or the clearance and conversion of a threatened native vegetation community on any land, to enable the construction and maintenance of electricity infrastructure, if –*
>
> *(i) there is an easement on the land that enables the electricity infrastructure to be constructed or used, or, if there is no such easement, if the owner of the land consents to the construction or maintenance of the electricity infrastructure on the land; and*
>
> *(ii) the clearance and conversion is undertaken in accordance with an environmental management system endorsed by the Forest Practices Authority.*

Therefore, a Forest Practices Plan will not be required if listed threatened communities were affected by the proposed Heybridge substation.

### 3.2.3 Weed Management Act 1999 and Biosecurity Act 2019

The *Weed Management Act 1999* consists of sections relating to the declaration, management, compliance requirements, and powers of inspectors appointed under the Act. It is essential that declared weeds within the project area are identified and measures to comply with EPRs are implemented to prevent their spread through construction, operation and maintenance of the site. This report identifies declared weeds within the project area and EPRs that will inform measures to reduce project-related impacts.

Note that the *Biosecurity Act 2019* has superseded seven separate pieces of legislation, including the *Weed Management Act 1999*. The recently passed Biosecurity Regulations 2022 will allow for the full implementation of the *Biosecurity Act 2019*, following repeal of the *Weed Management Act*. It is understood that in relation to weed management, the major regulatory tool under the *Weed Management Act 1999* – the Statutory Management Plans – will be replaced by Biosecurity Management Plans under the *Biosecurity Act 2022*. It is understood the content of these plans will be identical to the current Statutory Management Plans.

# 4. Project description

## 4.1 Overview

The project is proposed to be implemented as two 750 MW circuits to meet transmission network operation requirements in Tasmania and Victoria. Each 750 MW circuit will comprise two power cables and a fibre-optic communications cable bundled together in Bass Strait and laid in a horizontal arrangement on land. The two 750MW circuits would be installed in two stages with the western circuit being laid first as part of stage one, and the eastern cable in stage 2.

The key project components for each 750 MW circuit are, from south to north are:

- HVAC switching station and HVAC-HVDC converter station at Heybridge in Tasmania. This is where the project will connect to the North West Tasmania transmission network being augmented and upgraded by the North West Transmission Developments (NWTD).
- Shore crossing in Tasmania adjacent to the converter station.
- Subsea cable across Bass Strait from Heybridge in Tasmania to Waratah Bay in Victoria.

In Tasmania, a converter station is proposed to be located at Heybridge near Burnie. The converter station would facilitate the connection of the project to the Tasmanian transmission network. There will be two subsea cable landfalls at Heybridge with the cables extending from the converter station across the Bass Strait to Waratah Bay in Victoria. The preferred option for shore crossings is horizontal directional drilling (HDD) to about 10 m water depth where the cables would then be trenched, where geotechnical conditions permit.

Approximately 255 kilometres (km) of subsea HVDC cable would be laid across Bass Strait. The preferred technology for Marinus Link is two 750 megawatt (MW) symmetrical monopoles using ±320 kV, cross-linked polyethylene insulated cables and voltage source converter technology. Each symmetrical monopole is proposed to comprise two identical size power cables and a fibre-optic communications cable bundled together. The cable bundles for each circuit will transition from approximately 300m apart at the HDD (offshore) exit to 2km apart in offshore waters.

This assessment is focused on the Tasmanian terrestrial and shore crossing section of the project. This report will inform the two EISs being prepared to assess the project's potential environmental effects in accordance with the legislative requirements of the Tasmanian government (Figure 4.1).

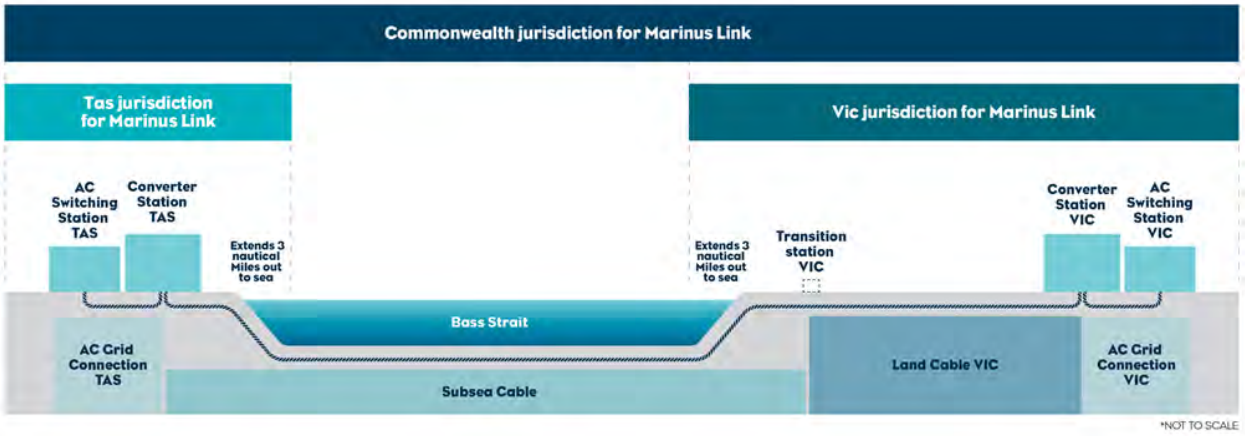


Figure 4.1: Project components considered under applicable jurisdictions (MLPL 2022, Consultation Plan).

The project is proposed to be constructed in two stages over approximately five years following the award of works contracts to construct the project. On this basis, stage 1 of the project is expected to be operational by 2030, with Stage 2 to follow, with final timing to be determined by market demand. The project will be designed for an operational life of at least 40 years.

## 4.2 Construction

The construction activities for the Heybridge converter station and shoreline crossing that are of relevance to the assessment of impacts to terrestrial ecological values include:

- Vegetation and habitat clearing for the construction of the substation and shore crossing

It is planned that an area of up to 6.5 ha will be required on the converter station site for the two the converter stations, switching station, HDD drill pads and laydown, with some clearing of modified vegetation types that is on site. The clearing of the native vegetation in the south east portion of the converter station site (Figure 5.2) will be avoided.

- No clearing of vegetation will occur on the shoreline crossing site, with HDD proposed to occur from the Heybridge converter station site and progressing underneath the road and shoreline. Construction work times and traffic movements
    - The majority of heavy vehicle and worker traffic movements will occur at the start and end of the working day (Stantec 2023). Transport movements for the period of the year between October and March will for the most part occur during daylight hours. However, during the shorter days between April and September, it will be likely for worker and heavy vehicle transport, to and from site, to occur at or just after dawn and just before or at dusk.
    - HDD for the shore crossings will be drilled continuously over 24-hours /7 days a week to ensure borehole stability, for a period of 8-12 months. Some night-time traffic at shift changes is likely.

## 4.3 Operation

The project will operate 24 hours per day, 365 days per year over an anticipated minimum 40-year operational lifespan.

Operation and maintenance activities include:

- Routine inspections of the land cable easement for potential operational and maintenance issues, including:
  - Unauthorised activities and structures.
  - Land stability.
  - Rehabilitation issues.
  - Weed infestations resulting from construction activities.
  - Cover at watercourse crossings.
- Periodic inspection of the subsea cable routes by remotely operated vehicles.
- Remote monitoring of shipping activity near the subsea cables for potential anchoring issues.
- Servicing, testing and repair of the subsea and land cables and converter stations equipment and infrastructure including scheduled minor and major outages.

# 5. Assessment method

## 5.1 Survey area

The terrestrial ecology survey area was defined by the property boundary of the Heybridge converter station site and the location of the shore crossings, which extends from the converter station site, under the Bass Highway and Western Line railway to Bass Strait (Figure 5.1). Note that survey area was extended to 2 km around the converter station site to identify any potential eagle nests (wedge-tailed eagle and white-bellied sea-eagle) that may be affected by the proposed Heybridge substation.

The converter station survey area is 10 ha in area and is a previously cleared industrial site that is highly disturbed. Within the 10-ha converter station site, approximately 6.5 ha are required for the two converter stations, the switching station, construction HDD and laydown areas.

The shore crossing survey area is 6.5 ha, and it is primarily comprised of the beach and coastal vegetation between the Bass Highway and the sea; this beach and coastal vegetation extends from the Blythe River mouth in the east to the rocky headland to the north approximately 700 m (Figure 5.2). Note that the shore crossing will be horizontally directionally drilled underground from the converter station to a location the offshore, and there will be no above ground disturbance at the shore crossing.

## 5.2 Database and literature review

A desktop review was completed to identify ecological values that may occur within the study area and to gather associated supporting information.

- Database and literature sources reviewed as part of this work were:
- Natural Values Atlas (NVA)
- EPBC Act Protected Matters Search Tool (PMST)
- TASVEG 4 mapping
- Threatened Native Vegetation Communities (TNVC 2020) mapping (DPIPWE 2021) derived from TASVEG 3, TASVEG 4 and previous TNVC 2014 maps
- Tasmanian Geoconservation database
- Publicly available aerial imagery, including current and historical images from Google Earth™ and Environmental Systems Research Institute (ESRI)

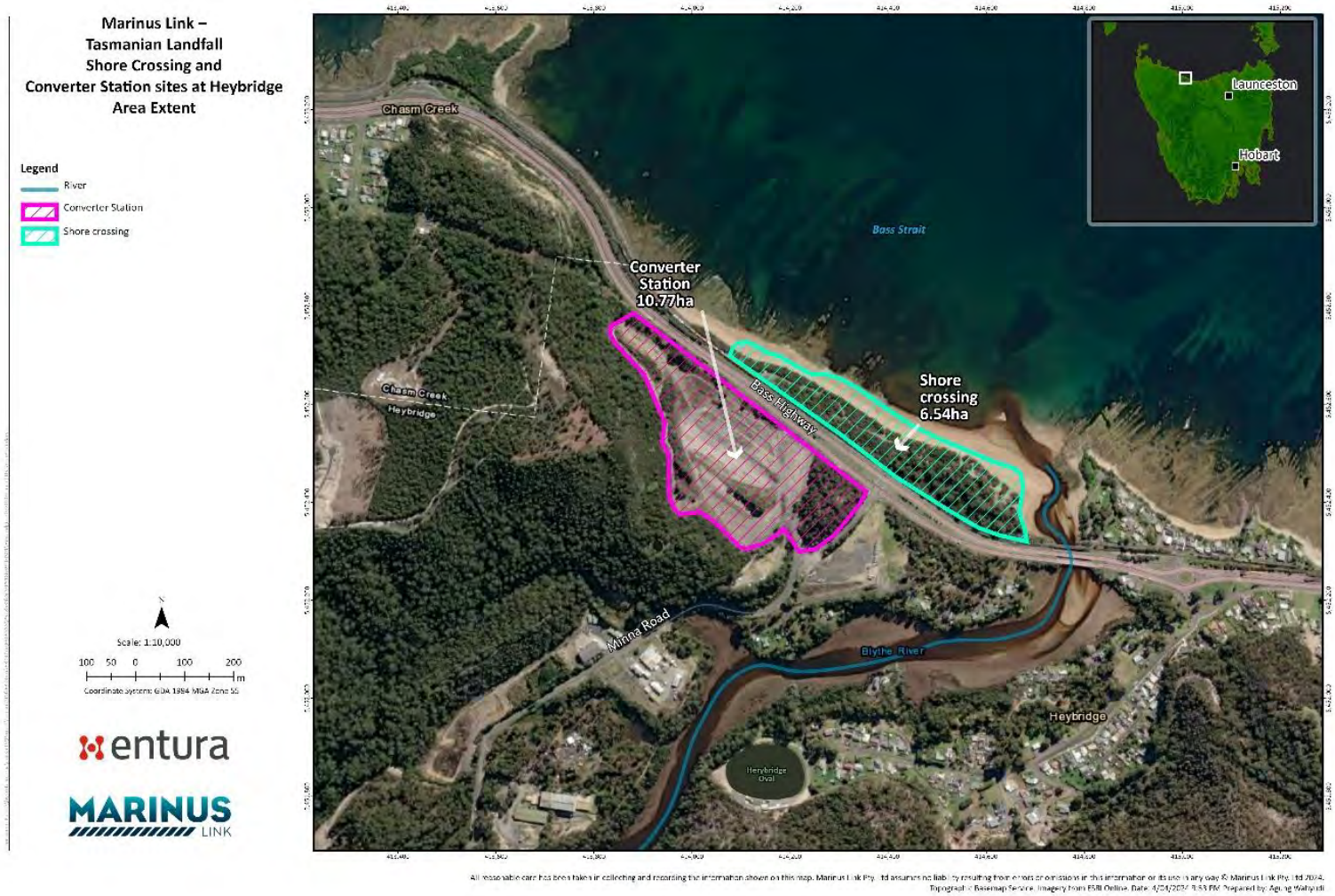


Figure 5.1: Converter station survey area and shore crossing survey area.

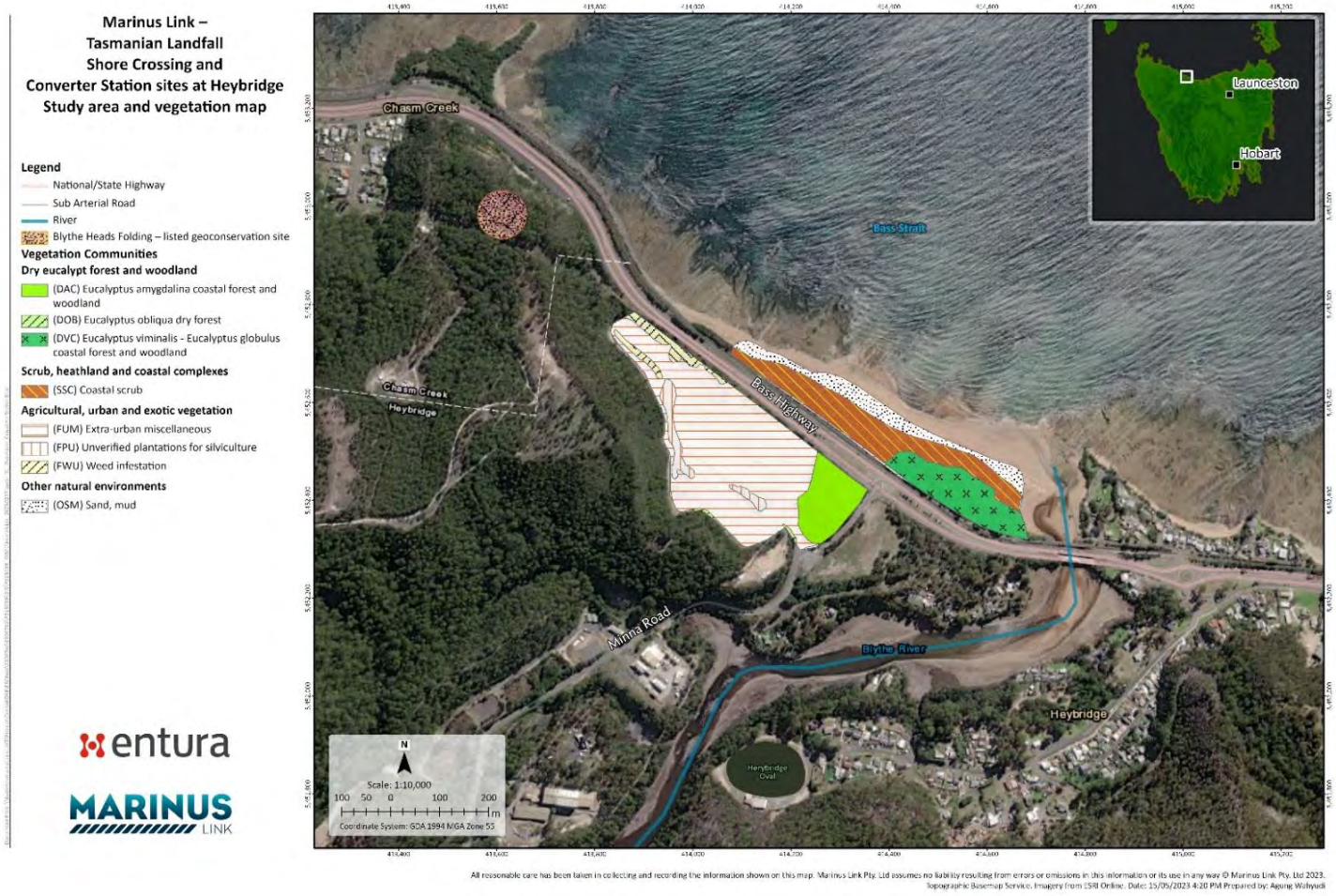


Figure 5.2: Map of study area, vegetation communities and nearest site of geoconservation significance

## 5.3 Field surveys

A field survey of the converter station site and the shore crossing was undertaken between 17 -18 January 2023. There had been a previous localised terrestrial ecology survey of geotechnical sites both within the converter station and at the shore crossing on 12 February 2021. There had also been two previous surveys of the shore crossing site targeting little penguins between 21 - 23 November 2018, 3 February 2022 and January 2023.

The field surveys included:

- The verification and mapping of the vegetation communities present within the converter station or shore crossing survey areas.
- The identification of vegetation communities listed as threatened under the NC Act and ecological communities listed under the EPBC Act, if present. Where encountered the complete extent of threatened vegetation and/or ecological communities was surveyed and mapped, even where it extended outside of the survey areas.
- Searching for flora species listed under the TSP Act (Tas) and EPBC Act (Commonwealth) in potential habitat and in the vicinity of known locations that were identified in the desktop survey.
- The recording of declared weeds listed on the schedules of the superseded *Weed Management Act 1999* (Tas) and listed as part of the Biosecurity Regulations 2022 under the *Biosecurity Act 2019*.
- The identification and assessment of potential habitat for fauna species listed as threatened under the TSP Act and EPBC Act.

Searches for evidence of little penguins inhabiting the shore, including searches for burrows. The vegetation, flora and fauna surveys were undertaken in a manner that is consistent with the Guidelines for Natural Values Surveys - Terrestrial Development Proposals (Natural and Cultural Heritage Division 2015).

## 5.4 Flora surveys

The field surveys used a meandering method to undertake flora surveys within the survey area. A meandering search method involves walking over the survey area in a random manner and recording all flora species encountered. The flora survey covered the converter station site and the shore crossing area with adequate walkovers to confirm absence of species and suitable habitat (but see section 5.7 for an explanation of the limitations of the survey method and of the assumptions underlying the survey method). The flora survey targeted habitats and vegetation communities that were likely to support threatened species. All species of flora encountered during the survey were recorded on a computer tablet with GPS capability using Entura's EFOS (Environmental Field Observation System) which records data using fields that are consistent with Tasmania's Natural Values Atlas (NVA).

In addition, all mapped TASVEG communities within the converter station and shoreline crossing survey areas were verified during the flora survey which included recording characteristic flora species and their cover abundance where required to determine the vegetation community.

## 5.5 Fauna surveys

Important fauna habitat components were also recorded during the survey where encountered (e.g. important habitat trees, rock outcrops suitable for Tasmanian devil and spotted-tailed quolls). Indirect evidence of the presence of threatened fauna was also recorded using EFOS where encountered (e.g. scats, diggings, burrows, shelters). No fauna capture surveys were undertaken during the surveys, however the information gathered in relation to indirect evidence and identification of suitable habitats are included in this report.

A search for Tasmanian devil and spotted-tailed quoll dens within the survey area was also undertaken in a manner that is consistent with the DPIPWE Survey Guidelines and Management Advice for Development Proposals that May Impact on the Tasmanian Devil (Natural and Cultural Heritage Division 2015b). This involved the survey team of two people targeting likely den sites and also looking for scats in accordance with the 'Survey guidelines for Australia's threatened mammals' (Commonwealth of Australia 2011).

An eagle nest survey was undertaken by North Barker in April 2022 for the Remaining NWTD project (Appendix D) in accordance with the FPA *Technical Note No. 1 for eagle nest searching* (FPA 2014), and also in accordance with the *Survey guidelines for Australia's threatened birds* (Commonwealth of Australia 2010). Raptor nest identification was based on a database search within a 1 km search radius and subsequent February 2023 aerial surveys within 1 km and 2 km radius of the NWTD route's operational area, which also included the converter station and shoreline crossings (North Barker 2022; see Figure 5.3). The surveys were conducted from the air by helicopter using a search area of 2 km either side of the proposed alignment, which included the area around the converter station and shore crossing with a team of three ecologists, of which at least two were experienced in aerial and ground-based eagle nest surveying and identification of suitable habitat (North Barker 2022; see Figure 5.3). There are plans to undertake annual surveys prior to construction as part of the TasNetworks NWTD project which will also cover the area around the Heybridge Converter Station, and may be utilised in agreement with TasNetworks.

The previous surveys (21-23 November 2018 and 3 February 2022) of the shore crossing were undertaken by Entura to target little penguins (*Eudyptula minor*), as colonies are known to be scattered along the north coast including east of Leith at the eastern end of Lillico beach, and between Sulphur Creek and Somerset in the vicinity of the Heybridge crossing point (NVA data). A survey was undertaken to search for penguin burrows at the crossing point west of the Blythe River mouth. Little penguins feed during the day and return to their burrows and mates at dusk. Consequently, evening surveys were also undertaken on 21 and 22 November 2018 at the shore crossing area, to identify if any little penguins returned to their burrows at dusk. Subsequent searches for burrows and evidence of penguins were also undertaken on 3 February 2022 and 18 January 2023.

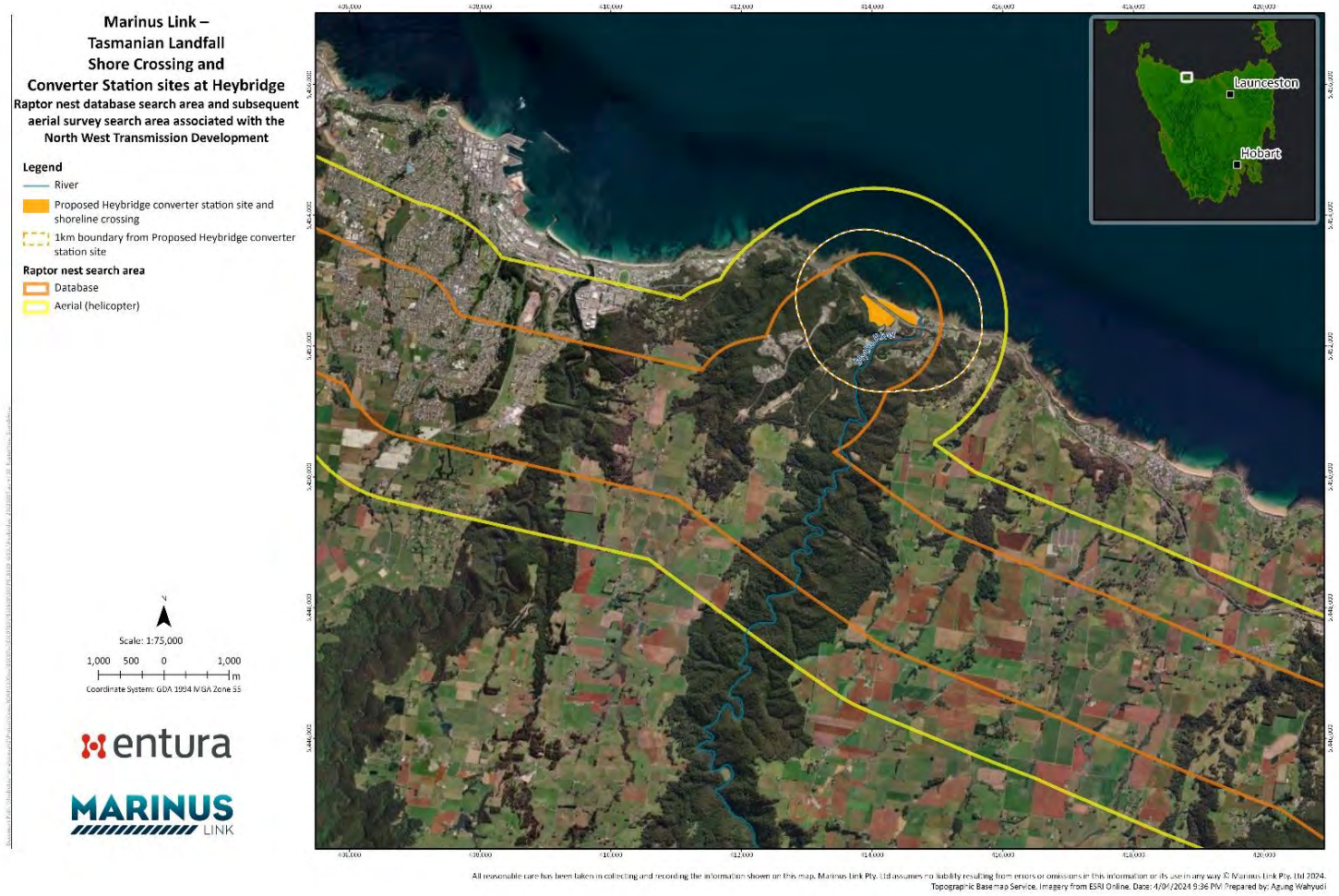


Figure 5.3: Raptor nest database search area and subsequent aerial raptor nest search area associated with the North West Transmission Development, undertaken by North Barker Ecosystem Services

## 5.6 Analysis and impact assessment

The baseline characterisation and impact assessment comprised the following steps:

- A likelihood of occurrence assessment to determine which ecological values are considered likely to occur within 5 km of the survey area. In some instances, ecological values identified in the 5 km radius study areas will occur in habitats significantly different from those in which the project is located and therefore can be excluded from further consideration (e.g. species occurring on floodplains when considering a project situated within foothills). This informed the likelihood of whether these ecological values were considered likely to occur within the survey area, and therefore at risk of impact.
- A field survey across both the converter station and the shore crossing area undertaken in January 2023 to verify the vegetation communities, fauna habitats and flora species.
- An ecological impact assessment of those values identified as occurring or likely to occur within the survey area from the baseline characterisation. The impact assessment considered impacts to ecological values in the absence of any further mitigation.

### 5.6.1 Likelihood of occurrence

The likelihood of occurrence is a determination of the potential for threatened flora, fauna or ecological communities to be present and for threatened fauna to make use of the survey area. The likelihoods of occurrence ranking of species' or ecological communities within the survey area was determined by assessing:

- information collated through the database, literature review and field surveys; and
- species habitat requirements (including surrounding habitat connectivity).

Based on these assessments the species or ecological community was determined as one of the following:

- Known to occur: the species/ecological community has been recorded (NVA or field surveys) in the survey area.
- May occur: the species/ecological community has been recorded on the NVA in the study area and suitable species habitat exists or could exist in the survey area following detailed ecological studies.
- Unlikely to occur: there are no species/ecological community records on the NVA in the study area and/or suitable species habitat does not exist in or adjacent to the survey area.
- Does not occur or absent: the species/community potential distribution identified by the PMST includes the study area but there are no records on the NVA in the study area.

The likelihood of occurrence of threatened flora and fauna species listed under the EPBC Act and TSP Act were assessed using a 5 km search radius from the converter station site on the PMST and NVA databases. The likelihood for threatened flora species was recorded as 'known to occur' if it was recorded on site during the ecology field surveys or if there were NVA records from within the survey area.

If the species was not recorded in the survey area during the ecology field surveys but there were NVA records within the study area and suitable habitat was present in the survey area and it was within the species known range, they were assessed as 'may occur'. If there was no suitable habitat present within the survey area they were assessed as 'unlikely to occur' instead of 'absent' under a conservative approach.

Restrictions to construction activities are triggered within a 1 km line-of-sight of an active raptor nest during breeding seasons to minimise disturbance to breeding raptors, as per the *Threatened Tasmanian Eagles Recovery Plan 2006-2010* and the Environment Protection Authority's *Guide to Eagle Nest Searching and Nest Activity Checks*, Version 1 Records of raptor nests were therefore assessed within a 1 km search radius from the converter station site. The assessment of likelihood of occurrence of threatened raptor species under the TSP Act or EPBC Act including *Aquila audax* subsp. *fleayi* (Tasmanian wedge-tailed eagle), *Accipiter novaehollandiae* (grey goshawk) and *Haliaeetus leucogaster* (white-bellied sea-eagle) were only assessed as 'known to occur' if there is a known nest within the survey area.

### 5.6.2 Impact assessment

An impact assessment has been undertaken for threatened vegetation and threatened flora and fauna species determined as occurring or likely to occur within the survey area.

Conservation advice, recovery plans and relevant Tasmanian Government guidelines have also informed the impact assessment including the Natural Heritage Strategy for Tasmania (DPIPWE 2013) and the Threatened Species Strategy for Tasmania (DPIPWE 2020). These guidelines include:

- Conservation Advice for *Leucochrysum albicans* subsp. *tricolor* (Hoary Sunray)
- *Hirundapus caudacutus* (White-throated Needletail) Conservation Advice (2019).
- Recovery Plan for the Giant Freshwater Crayfish (*Astacopsis gouldi*) (2017).
- *Engaeus yabbimunna* (Burnie burrowing crayfish) – Advice to the Minister for the Environment and Heritage from the Threatened Species Scientific Committee (TSSC) on Amendments to the List of Threatened Species under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). Available from: https://www.dcceew.gov.au/environment/biodiversity/threatened/conservation-advices/engaeus-yabbimunna Accessed Wed, 20 Jul 2022.
- *Haliaeetus leucogaster* in Species Profile and Threats Database, Department of the Environment, Canberra. Available from: http://www.environment.gov.au/sprat .
- National Recovery Plan for the Spotted-tailed Quoll *Dasyurus maculatus* (2016).
- *Conservation Advice for* Numenius madagascariensis *(eastern curlew)*. Department of the Environment, Canberra. Available from: http://www.environment.gov.au/biodiversity/threatened/species/pubs/847-conservation-advice.pdf
- *Draft Referral guideline for 14 birds listed as migratory species under the EPBC Act* (2015b)
- *Acanthornis magnus* subsp*. greeniana* in Species Profile and Threats Database, Department of the Environment, Canberra. Available from: http://www.environment.gov.au/sprat .
- *Apus pacificus* in Species Profile and Threats Database, Department of the Environment, Canberra. Available from: http://www.environment.gov.au/sprat.

- *Calidris acuminata* in Species Profile and Threats Database, Department of the Environment, Canberra. Available from: http://www.environment.gov.au/sprat .
- *Calidris ferruginea* in Species Profile and Threats Database, Department of the Environment, Canberra. Available from: http://www.environment.gov.au/sprat
- *Calidris melanotos* in Species Profile and Threats Database, Department of the Environment, Canberra. Available from: http://www.environment.gov.au/sprat
- *Gallinago hardwickii* in Species Profile and Threats Database, Department of the Environment, Canberra. Available from: http://www.environment.gov.au/sprat
- Industry guidelines for avoiding, assessing and mitigating impacts on EPBC Act listed migratory shorebird species. (2017)
- Tasmanian *Recovery Plan for the Giant Freshwater Crayfish (*Astacopsis gouldi*)* (2017).
- Approved Conservation Advice for *Perameles gunnii* (Eastern Barred Bandicoot, Tasmania)
- Significant impact guidelines for 36 migratory shorebird species – Migratory species
- Conservation Advice for *Sarcophilus harrisii* (Tasmanian Devil, 2009)
- Approved Conservation Advice for *Tyto novaehollandiae castanops* (Tasmanian Masked Owl, 2010)
- Tasmanian Burrowing Crayfish Group Recovery Plan 2001-2005.
- *Identifying Tasmanian devil and spotted-tailed quoll habitat,* Fauna Technical Note No. 10. Forest Practices Authority
- *Identifying masked owl habitat*. Fauna Technical Note No. 17, Forest Practices Authority
- *Forest Practices Code.* Forest Practices Authority
- *Eagle nest searching, activity checking and nest management.* Fauna Technical Note No. 1 (Version 4.0), Forest Practices Authority
- Survey Guidelines and Management Advice for Development Proposals that may impact on the Tasmanian Devil (*Sarcophilus harrisii*). Tasmanian Department of Natural Resources and Environment.
- Conservation of Tasmanian Plant Species & Communities threatened by *Phytophthora.* Strategic Regional Plan for Tasmania. Technical Report 03/03
- Listing Statement for *Caladenia caudata* (tailed spider-orchid, 2014)
- Threatened Species and Marine Section (2014b). Listing Statement for *Tetratheca 26iliate* (northern pinkbells), Department of Primary Industries, Parks, Water and Environment, Tasmania.
- Threatened Species Scientific Committee (2015). Conservation Advice *Dasyurus viverrinus* (eastern quoll). Department of the Environment and Energy, Canberra.
- Threatened Species Scientific Committee (2016). Conservation Advice *Lathamus discolor* swift parrot. Department of the Environment, Canberra.
- Threatened Species Scientific Committee (2017). Conservation Advice *Astacopsis gouldi* (giant freshwater crayfish, Tasmanian giant freshwater lobster). Department of the Environment and Energy, Canberra.
- *Threatened Tasmanian Eagles Recovery Plan 2006-2010*. Threatened Species Section of the Tasmanian Department of Natural Resources and Environment (2006).

- Listing Statement for *Baumea gunnii* (slender twigsedge). Threatened Species Section of the Tasmanian Department of Natural Resources and Environment (2016).
- National Recovery Plan for the Tasmanian Giant Freshwater Crayfish (*Astacopsis gouldi*). Threatened Species Section of the Tasmanian Department of Natural Resources and Environment (2006).
- Listing Statement for *Ceyx azureus* subsp. *diemenensis* (Azure Kingfisher). Threatened Species Section of the Tasmanian Department of Natural Resources and Environment (2006).
- Notesheet for *Leucochrysum albicans* subsp. *triclor* (grassland paperdaisy). Threatened Species Section of the Tasmanian Department of Natural Resources and Environment (2006).
- Listing Statement for *Senecio psilocarpus* (swamp fireweed). Threatened Species Section of the Tasmanian Department of Natural Resources and Environment (2011).
- Notesheet for *Pomaderris phylicifolia* subsp*. ericoides* (revolute narrowleaf dogwood) and *Pomaderris phylicifolia* subsp*. phylicifolia* (narrowleaf dogwood). Threatened Species Section of the Tasmanian Department of Natural Resources and Environment (2017).
- *Accipiter novaehollandiae* (Grey Goshawk): Species Management Profile for Tasmania's Threatened Species Link. Accessed on 10/2/2021.
- Aquila audax subsp. fleayi (Tasmanian Wedge-tailed Eagle): Species Management Profile for Tasmania's Threatened Species Link. Threatened Species Section of the Tasmanian Department of Natural Resources and Environment (2021).
- Listing statement for *Caladenia patersonii* (Paterson's spider orchid). Threatened Species Section of the Tasmanian Department of Natural Resources and Environment (2001).
- Listing statement for *Persicaria decipiens* (slender knotweed) Threatened Species Section of the Tasmanian Department of Natural Resources and Environment (2003).

The assessment determined the likelihood of impacts occurring to the threatened ecological communities, and flora and fauna species listed under the EPBC Act using the thresholds and criteria defined under the significant impact guidelines for the EPBC Act (Department of the Environment 2013). Impacts to threatened flora and fauna listed under the TSP Act were assessed using the information provided in species listing statements and technical notes and the requirements of the TSP Act. Impacts to state listed vegetation communities under the NC Act were assessed using the Tasmanian Threatened Native Vegetation Communities descriptions.

The impact assessment was carried out based on the project description in Section 4 with no additional mitigation implemented, other than those avoidance measures indicated in the project description. EPRs proposed to mitigate the potential impacts identified to threatened species and ecological communities are consistent with Australian Government documents including conservation advice and recovery plans considered in the impact assessment, therefore no residual impacts for these species or communities are likely.

The assessment of impacts on those threatened ecological communities and species listed under Tasmanian and Australian Government legislation was carried out using:

- the results of the desktop assessment of the likelihood of occurrence of threatened species and ecological communities
- the results of the 2023 field survey
- the 2018 and 2022 targeted penguin surveys

- technical experience and understanding of the distribution and ecology of the species and communities and their sensitivity to disturbance.

The impact thresholds that are outlined in the EPBC Significant impact guidelines 1.1- Matters of National Environmental Significance Environment Protection and Biodiversity Conservation Act 1999' (Department of the Environment 2013) that include specific guidelines which have been prepared for listed species and communities, if required, were then used to assess the impacts without mitigation. The assessment of the degree of impact without mitigation on State listed species was assessed using the information on the current status and extent of populations, the sensitivity of a species to impacts and the current threats provided in listing statements and technical notes and with regard to regulatory requirements.

Impacts on other natural values including conservation reserves and species with special conservation significance that may occur in the project area have been assessed using a significance-based method by considering the sensitivity of a value and magnitude of impact. This method was used to assess the significance of impacts on ecological values in the absence of statutory, nationally, internationally or industry accepted criteria for assessing significance. This approach assesses the sensitivity of an environmental value by considering its conservation status, intactness, uniqueness or rarity, sensitivity to change and replacement potential. The sensitivity (Table 5.1) and magnitude (Table 5.2) criteria, and impact significance matrix used for the impact assessment for other environmental values were used where appropriate and are described in the three tables below. The significance of each impact was assessed based on the combination of the sensitivity of a value and the magnitude of the impact; the significance matrix is shown in Table 5.3.

Cumulative impacts of other proposed developments and impacts of the project to ecosystem resilience are considered in section 8.4.

Table 5.1: Sensitivity criteria

| Sensitivity level | Criteria |
|---|---|
| Very high sensitivity | The environmental value is listed on a recognised or statutory state, national or international register as being of conservation significance (e.g., listed as a Matter of National Environmental Significance under the EPBC Act). |
| | The environmental value is intact and retains its intrinsic value. |
| | It is unique. It is isolated to the affected system/area which is poorly represented in the region, territory, country or the world. |
| | It is fragile and predominantly unaffected by threatening processes. Small changes would lead to substantial changes to the prescribed value. |
| | It is not widely distributed throughout the system/area and consequently would be difficult or impossible to replace. |
| High sensitivity | The environmental value is listed on a recognised or statutory state or national conservation significance (e.g., listed as a Matter of National Environmental Significance under the EPBC Act). |
| | The environmental value is relatively intact and retains most of its intrinsic value. |
| | It is locally unique to the environment in which it occurs, with few regionally available alternatives. |

| | |
|---|---|
| | It is predominantly unaffected by threatening processes. Small changes would lead to changes to the prescribed value. |
| | It is not widely distributed throughout the system/area and consequently recovery potential would be limited. |
| Moderate sensitivity | The environmental value is recorded as being important at a regional level, and may have been nominated for listing on recognised or statutory registers (e.g., nominated for listing as a Matter of National Environmental Significance under the EPBC Act). |
| | The environmental value is in a moderate to good condition despite it being exposed to threatening processes. It retains many of its intrinsic characteristics and structural elements. |
| | It is relatively well represented in the systems/areas in which it occurs but its abundance and distribution are limited by threatening processes. |
| | Threatening processes have reduced the environmental value's resilience to change. Consequently, changes resulting from project activities may lead to degradation of the prescribed value. |
| | Replacement of unavoidable losses is possible due to its abundance and distribution. |
| Low sensitivity | The environmental value is not listed nor nominated for listing on a recognised or statutory state or national conservation significance. |
| | The environmental value is in a moderate to poor condition and is exposed to threatening processes. It does not retain many of its intrinsic characteristics and structural elements. |
| | It is relatively well represented in the systems/areas in which it occurs, and its abundance and distribution are not limited by threatening processes. |
| | The environmental value is not sensitive to threatening processes, or threatening processes have already degraded the environmental value's condition, such that changes resulting from project activities are unlikely to lead to further degradation of the prescribed value. |
| | Replacement of unavoidable losses is possible due to its abundance and distribution. |

Table 5.2: Magnitude criteria definitions.

| Magnitude level | Criteria |
|---|---|
| Severe | An impact on an environmental value (ecological community, species population or ecosystem) that extends beyond the operational area and adjacent area to the surrounding area and is evident with respect to natural variability. Viability of environmental value substantially reduced resulting in a highly modified ecological community or severely depleted species population or ecosystem. Effects are long term (>20 years) and affect the viability of an ecological community or ecosystem at the regional level or result in a permanently reduced species population. |
| Major | An impact on an environmental value (ecological community, species population or ecosystem) that extends beyond the operational area to the adjacent area and is readily detectable with respect to natural variability. Viability of environmental value reduced resulting in a modified ecological community or depleted species population or ecosystem. Effects are longer term (10 to 20 years) and affect the viability of an ecological community or ecosystem at the local level or result in the displacement of a local population. |
| Moderate | An impact on an environmental value (ecological community, local species population or ecosystem) that extends beyond the operational area to the adjacent area and is detectable with respect to natural variability. Limited reduction in viability of environmental value resulting in partially modified ecological community or locally depleted species population. Effects are medium term (5 to 10 years) with recovery of a partially modified ecological community or species population or ecosystem expected within that timeframe. |
| Minor | A localised impact on an environmental value (ecological community or individuals) that is short term (<5 years) and does not extend beyond the operational area. Reduction in viability of ecological community, species or ecosystem unlikely. Full recovery expected within that timeframe. |
| Negligible | A localised impact on an environmental value (ecological community or individuals) that is temporary or short term (< 1 year) and does not extend beyond the operational area. Effects on the ecological community, species or ecosystem are unlikely to be detectable with full recovery expected. |

Table 5.3: Matrix for the assessment of significance of impacts

| | Sensitivity of environmental value | | | |
|---|---|---|---|---|
| **Magnitude of impact** | **Very High** | **High** | **Moderate** | **Low** |
| **Severe** | Major | Major | Major | High |
| **Major** | Major | Major | High | Moderate |
| **Moderate** | High | High | Moderate | Low |
| **Minor** | Moderate | Moderate | Low | Low |
| **Negligible** | Moderate | Low | Low | Low |

### 5.6.3 Cumulative impact assessment

The EIS guidelines and EES scoping requirements both include requirements for the assessment of cumulative impacts. Cumulative impacts result from incremental impacts caused by multiple projects occurring at similar times and within proximity to each other.

To identify possible projects that could result in cumulative impacts, the International Finance Corporation (IFC) guidelines on cumulative impacts have been adopted. The IFC guidelines (IFC, 2013) define cumulative impacts as those that 'result from the successive, incremental, and/or combined effects of an action, project, or activity when added to other existing, planned, and/or reasonably anticipated future ones.'

The approach for identifying projects for assessment of cumulative impacts considers:

- Temporal boundary: the timing of the relative construction, operation and decommissioning of other existing developments and/or approved developments that coincides (partially or entirely) with the project.
- Spatial boundary: the location, scale and nature of the other approved or committed projects are expected to occur in the same area of influence as Marinus Link. The area of influence is defined at the spatial extent of the impacts a project is expected to have.

Proposed and reasonably foreseeable projects were identified based on their potential to credibly contribute to cumulative impacts due their temporal and spatial boundaries (See Appendix E). Projects were identified based on publicly available information at the time of assessment. The projects considered for cumulative impact assessment across Tasmania, Bass Strait and Victoria are:

- The Remaining North West Transmission Developments component of the North West Transmission Developments[1] (see Figure 5.4).
- Guilford Windfarm
- Robbins Island Renewable Energy Park
- Jim's Plain Renewable Energy Park
- Robbins Island Road to Hampshire Transmission Line
- Bass Highway upgrades between Deloraine and Devonport
- Bass Highway upgrades between Cooee and Wynard
- Hellyer Windfarm
- Western Plains Wind Farm
- Cethana PHES
- Table Cape Luxury Resort
- Youngmans Road Quarry
- Port Latta Windfarm
- Port of Burnie Shiploader Upgrade
- Quaylink – Devonport East Redevelopment.

[1] Note that the Staverton to Hampshire Hills 220 kV overhead transmission line (OHTL) and upgrades to the existing OHTLs between Sheffield and Staverton are being assessed separately from the Remaining North West Transmission Developments; the two components comprise the North West Transmission Developments. The Staverton to Hampshire Hills component is not within proximity to the Heybridge Converter Station to be considered as a potential contributor to cumulative impacts.

The Remaining North West Transmission Developments component of the North West Transmission Developments was considered relevant to this assessment based on the potential for cumulative impacts associated with construction activities.


Figure 5.4: Location of the two North West Transmission Development components in relation to the location of the Heybridge converter station and shore crossing.

## 5.7 Limitations and assumptions

The terrestrial ecology impact assessment is based on desktop and field verified information that was obtained through field surveys undertaken in 2023 along with previous surveys undertaken for penguin presence in 2018 and 2022. However, it is possible that not all flora species that occur across the site were recorded in the survey because of varying flowering times and seasonality of occurrence. In particular, short lived annuals and lilies that may be present at the site may have been missed because they were not able to be identified (they were not flowering) or they were not evident at the time of survey (they were annual plants that had died back or not emerged at the time of survey). None of the species (grasses and short-lived annual plants) that had the potential to be present were listed threatened species. The survey is therefore considered adequate to identify listed threatened species and communities at the site because there were no listed threatened annual flora species that were identified as potentially occurring at the site.

The impact assessment in this report considered potential impacts on listed threatened species and communities based on the assumption that mitigation measures, beyond avoidance measures already used in the project, were not in place. The residual impact assessment then assumed the successful implementation of proposed mitigation measures.

# 6. Baseline characterisation

## 6.1 Geomorphological considerations

The Tasmanian Geoconservation Database is an inventory of geodiversity features, processes and systems of conservation significance. There are no geoconservation features in the study area (Tasmanian Geoconservation Database; Environmental GeoSurveys Pty Ltd and A.S. Miner Geotechnical Pty Ltd. 2023). However, there is a listed localised site located approximately 400 m to the north west of the converter station: the Blythe Heads Folding (Figure 5.2) and the significance statement notes that this site is a 'Notable example' of this type of feature (Tasmanian Geoconservation Database). The Blythe Heads Folding will not be impacted by project activities given its distance from the converter station site and the shoreline crossing.

The Geomorphology Technical Report produced by Environmental GeoSurveys Pty Ltd and A.S. Miner Geotechnical Pty Ltd (ESG, 2023) details the fluvial and coastal processes that will be relevant to this coastal site adjacent to the Blythe River and estuary over a "decadal time scale." These processes include "riverine flood and channel dynamics" and "potential erosion and inundation consequences of sea-level rise." The geomorphology report (2023) assesses the overall sensitivity of the converter station site to the processes of riverine flood, coastal erosion and vulnerability, and coastal recession as "non-sensitive."

The converter station site's overall sensitivity to "vegetation Loss/ removal," however, is assessed as "sensitive" from a technical geomorphological perspective (ESG,2023). That is, removal of the "extant vegetation," i.e., the patch of *Eucalyptus amygdalina* coastal forest and woodland (DAC), could "promote instability and erosivity" on that eastern elevated area of the converter station site. This potential impact will be avoided by not clearing this area of verified *Eucalyptus amygdalina* coastal forest and woodland.

The risk of subsidence or collapse of the sand, coastal scrub, and modified land overlying the tunnels (as a result of the sub-surface cable tunnels created by the horizontal directional drilling (HDD) was assessed as part of the Geomorphology Technical Report (ESG,). This potential impact was assessed as primarily relevant during HDD operations, when "ground vibration" may cause "soil movement through ground subsidence" and potentially even "collapse of the surface into the borehole." The risk of subsidence or collapse during HDD operations may be "exacerbated by management or mechanical error and be related to location of the borehole in relation to the surface, drill fluids, migration of water and obstructions and encountered by the drill head." The geomorphology report states that "appropriate conduct of HDD and monitoring to avoid/minimise instability of tunnel and overlying materials is required to reduce the risk of subsidence" and therefore to avoid/minimise impacts of HDD operations on the sand and coastal scrub overlying the tunnel routes.

There is a continued risk of subsidence or collapse of the materials overlying the cable tunnels during cable stringing, during the project's operational phase, and potentially during decommissioning when the cables are removed. This potential impact can be mitigated through the implementation of the following EPRs listed in the geomorphological report (ESG,2023):

- "Develop and implement an **inspection program of ground conditions along the surface HDD alignment** during and following construction to confirm if ground movement or changes in surface conditions is occurring during construction and operation."

- "Develop and implement a **plan for addressing any ground movement identified through the inspection program** which could affect the HDD construction and stability of the surrounding area. Separate plans may be prepared for construction and operation."

Ultimately, the geomorphology report (ESG,2023))) concludes that "implementation of appropriate management measures to comply with EPRs would ensure minimal impact [of HDD to create the tunnels for the cables], and as such no significant residual impacts have been identified in this study, assuming appropriate design, operational protocols and longer-term management actions." Therefore, no residual impacts on the sand and coastal scrub overlying the tunnel routes are expected[2].

## 6.2 Conservation reserves

There are no conservation reserves within 500 m of the project site. The nearest conservation reserve is the Blythe River Conservation Reserve. This is located 570 m from the south eastern boundary of the site, on the opposite side of the Blythe River.

## 6.3 Land management agreements and interim protection orders

There are no land management agreements or interim protection orders associated with the project site.

## 6.4 Vegetation communities

This section provides a baseline characterisation of ecological values within the converter station site and the shore crossing. The converter station survey area was 10.8 ha and was comprised of 1.5 ha of native vegetation and 9.3 ha of modified land, namely cleared land (8.2 ha), with smaller areas of tree plantings (0.6 ha) and weeds (0.5 ha). The shore crossing survey area was 6.5 ha and included 2 ha of native forest, 3 ha of native scrub and 1.5 ha of sandy beach. Note the vegetation discussed in this section is referred to using the three lettered mapping units under TASVEG 4.0 Vegetation Communities (DPIPWE 2020).

### 6.4.1 Converter Station

The area of native vegetation within the converter station operational area is 1.5 ha of *Eucalyptus amygdalina* coastal forest and woodland (DAC). The remainder of the converter station site (9.3 ha) is comprised of modified communities including extra-urban miscellaneous (FUM), other plantations (FPU) and weed infestation (FWU).

***Eucalyptus amygdalina* coastal forest and woodland (DAC)**

This vegetation community occurs as a remnant patch on an elevated area in the south-east corner of the converter station site (Figure 6.1, Figure 5.2). The *Eucalyptus amygdalina* coastal forest and woodland occurs on infertile siliceous soils in coastal and sub-coastal areas of northern and eastern

[2] Given this assessment, no impact is expected on shorebirds that might use this coastal area. The listed shorebird species *Limosa lapponica baueri* (Nunivak bar-tailed godwit) and *Numenius madagascariensis* (eastern curlew) were identified as potentially occurring near the survey area by the Protected Matters Search Tool (PMST). However, the likelihood of occurrence for both species was assessed as "Absent" based on there being no records on Natural Values Atlas database within 5 km of the survey area (Appendix A.1).

Tasmania (Kitchener and Harris 2013). At the site, *Eucalyptus amygdalina* (black peppermint) formed the dominant canopy species to approximately 8 to 10 m with the occasional *E. obliqua* (stringybark tree). The tree layer was comprised of small relatively young trees with no hollow development. The understorey was dominated by a shrub layer of 1 to 2 m height which included *Acacia terminalis* (sunshine wattle), *Leptospermum scoparium* (common teatree), *Allocasuarina zephyrea* (western sheoak), *Leucopogon parviflorus* (coast beardheath), *Banksia marginata* (*silver banksia*), *Leptomeria drupacea* (erect currantbush) and *Exocarpos cupressiformis* (cherry ballart). There were scattered low shrubs including *Epacris impressa* (common heath), *Leucopogon collinus* (white beardheath), *Dillwynia sericea* (showy parrotpea). Herbs, sedges and native grasses were sparsely present and included *Stylidium graminifolium* (triggerplant), *Gonocarpus tetragynus* (common raspwort), *Rytidosperma* species (wallaby grass), *Lomandra longifolia* (sagg), and *Lepidosperma laterale* (variable swordsedge).

There is 1.5 ha of *Eucalyptus amygdalina* coastal forest and woodland within the converter station site (Figure 5.2). *Eucalyptus amygdalina* coastal forest and woodland is not listed as threatened under the *Nature Conservation Act 2002*. This community is quite common and widespread in Woolnorth bioregion with over 23,000 ha (Forest Practices Authority Annual Report, 2021–22). There are no specific natural processes (e.g. fire, flood) important for the maintenance of this native vegetation community.

Figure 6.1: *Eucalyptus amygdalina* coastal forest and woodland (DAC)

**Extra-urban miscellaneous (FUM)**

Apart from the remnant of *Eucalyptus amygdalina* coastal forest and woodland the rest of the site has been cleared for past industrial uses including a titanium dioxide plant which was decommissioned and removed, and its subsequent use as a log storage area (Figure 5.2). The surface of the urban miscellaneous component is either gravelled or has a cover of introduced pasture grasses and herbs (Figure 6.2).

Figure 6.2: Extra-urban miscellaneous (FUM)

**Other plantations other (FPU)**

There are two patches of planted native trees within the site one is comprised of *Eucalyptus regnans* (mountain ash) and *Acacia melanoxylon* (blackwood) (Figure 6.3, Figure 5.2). The other is mostly *Acacia melanoxylon* with some *Banksia marginata* which may be regenerating naturally. There were other shrubs present which may also have been regenerating naturally including *Pomaderris elliptica* (yellow dogwood) and *Leptospermum scoparium*. The ground fern *Pteridium esculentum* (bracken) was also commonly present.

Figure 6.3: Other plantation (FPU)

**Weed infestation (FWU)**

There are patches of weed infestation around the far western boundary of the converter station site (Figure 6.4,Figure 6.5). The introduced mainland species *Kunzea ericoides (*burgan*)* and the introduced shrub *Psoralea pinnata* (blue butterfly bush) along with the native *Acacia longiflora* (coast teatree) were three dominant species present. Other tree and shrub species present included *Buddleja davidii* (butterfly bush) and *Metrosideros excelsa* (pōhutukawa), *Populus alba* (white poplar) and *Pinus radiata* (Monterey pine). Common introduced herbs included *Euphorbia peplus* (petty spurge), *Cirsium vulgare* (spear thistle) and *Conyza* species (fleabane) which was abundant in bare areas (Figure 6.4).

Figure 6.4: Weed infestation (FWU)

Figure 6.5: Weed infestation (FWU)

### 6.4.2 Shore crossing

The vegetation at the shore crossing is comprised of a narrow coastal strip of native vegetation up to 120 m wide growing on a sandy beach. Two native vegetation communities at the shore crossing area are coastal scrub (SSC) and *Eucalyptus viminalis–Eucalyptus globulus* coastal forest and woodland (DVC; listed as threatened under the *Nature Conservation Act 2002*) were present at the shore crossing site (Figure 5.2).

**Coastal scrub (SSC)**

Coastal scrub generally occurs on consolidated dunes, sand sheets and rocky headlands close to the coast (Kitchener and Harris 2013). The coastal scrub at the shore crossing is growing on a sand sheet that extends from the Blyther River mouth to the north west where it meets a rocky headland (Figure 5.2). This vegetation community is characterised by the presence of a relatively diverse tall shrub/small tree layer to a height of 2 to 3 m comprised of *Acacia longifolia*, *Allocasuarina verticillata* (drooping sheoak), *Leptospermum laevigatum* (coast teatree), *Leptospermum scoparium*, *Banksia marginata* and *Acacia dealbata* (silver wattle) (Figure 6.6). The dominant feature of the shrub layer was the sprawling coastal shrub *Tetragonia implexicoma* (bower spinach). Other shrubs that were commonly present were *Correa alba* (white correa), *Rhagodia candolleana* (coastal saltbush), *Leucopogon parviflorus* and *Myoporum insulare* (common boobyalla). The spreading herb *Carpobrotus rossii* (native pigface) was commonly present as was the introduced erect herb *Euphorbia paralias* (sea spurge) which grew at the interface of the coastal scrub and the beach. The native grasses *Spinifex sericeous* (beach spinifex), *Poa labillardierei* (silver tussock) and *Austrostipa* species (spear grass) were also present as were the introduced grasses *Dactylus glomerata* (cocksfoot) and *Ammophila arenaria* (marram grass).

There is 3 ha of coastal scrub at the shore crossing. Coastal scrub is not listed as threatened under the NC Act. There is approximately 14,000 ha of this community across Tasmania. There are no specific natural processes (e.g. fire, flood) important for the maintenance of this native vegetation community.

Figure 6.6: Coastal scrub (SSC)

***Eucalyptus viminalis–Eucalyptus globulus* coastal forest and woodland (DVC)**

*Eucalyptus viminalis* (white gum)–*Eucalyptus globulus* (Tasmanian blue gum) coastal forest and woodland occurs on coastal and near coastal areas on sandy soils. The 2 ha patch of forest was located at the south eastern end of the shore crossing area near the Blythe River mouth (Figure 5.2). *Eucalyptus viminalis* was the dominant tree species to 20 m high. *Eucalyptus amygdalina* and *E. obliqua* were also present as minor components of the canopy layer (Figure 6.7). The tree canopy layer trees appeared to be older regrowth trees with no obvious hollow development. There were no *Eucalyptus globulus* trees present in the vegetation community. Note that the north west coast is outside the natural range of *Eucalyptus globulus*. *Acacia melanoxylon* was present as a sub-canopy tree along with *Exocarpos cupressiformis* and *Banksia marginata*. The shrub layer included *Goodenia ovata* (hop native-primrose), *Cassinia aculeata* (dollybush), *Aotus ericoides* (golden pea) and *Olearia lirata* (forest daisybush). The understorey was dominated by the ground fern *Pteridium esculentum*. The native graminoid *Lepidosperma concavum* (sand sword sedge) was also commonly present. Other graminoids present were *Lomandra longifolia* and *Dianella revoluta* (spreading flaxlily). The native grasses *Poa labillardierei* and *Rytidosperma* species were sparsely present as were the native herbs *Acaena novae-zelandiae* (buzzy), *Senecio linearifolius* (fireweed groundsel) and *Senecio pinnatifolius* (coast groundsel).

There is 2 ha of *Eucalyptus viminalis–Eucalyptus globulus* coastal forest and woodland at the shore crossing. *Eucalyptus viminalis–Eucalyptus globulus* coastal forest is listed as threatened under the *Nature Conservation Act 2002*. There 9.6 ha of this community in the Woolnorth bioregion (Forest Practices Authority Annual Report 2021–22). There are no specific natural processes (e.g. fire, flood) important for the maintenance of this native vegetation community.

Figure 6.7: *Eucalyptus viminalis–Eucalyptus globulus* coastal forest and woodland (DVC)

## 6.5 Threatened ecological communities

The PMST identified two terrestrial ecological communities that are listed as critically endangered under the EPBC Act as potentially occurring within 5 km of the survey area:

- Tasmanian Forests and Woodlands dominated by black gum or Brookers gum (*Eucalyptus ovata / E. brookeriana*).
- Tasmanian white gum (*Eucalyptus viminalis*) wet forest.

Neither of the two terrestrial ecological communities Tasmanian Forests and Woodlands dominated by black gum or Brookers gum (*Eucalyptus ovata / E. brookeriana*; listed as critically endangered under the EPBC Act) and Tasmanian white gum (*Eucalyptus viminalis*; listed as critically endangered under the EPBC Act) wet forest were recorded within the survey area.

As noted above, the *Eucalyptus viminalis–Eucalyptus globulus* coastal forest community, which occurs at the south eastern end of the shore crossing area adjacent to the Blythe River, is listed as threatened under the NC Act.

## 6.6 Threatened fauna

### 6.6.1 EPBC Act listed species

#### *6.6.1.1 Threatened fauna*

No threatened fauna species listed under the EPBC Act have been recorded within the survey area. However, the Tasmanian devil (*Sarcophilus harrisii*; listed as endangered under both the EPBC Act and TSP Act) and the spotted-tailed quoll (*Dasyurus maculatus* subsp. *maculatus*; the Tasmanian population of which is listed as vulnerable under the EPBC Act and as rare under the TSP Act) have previously been recorded adjacent to the site (see Appendix A.1), as incidences of roadkill. These species may forage over both the converter station site and the shore crossing, but there is no suitable denning habitat for either species and limited habitat for prey species such as small and medium sized mammals (e.g. *Trichosurus vulpecula*, brush-tailed possum). Thus, these species are unlikely to reside permanently at either site. The shore crossing area is also separated from the native forest to the south by the Bass Highway. This would limit access to the shore area by both Tasmanian devils and spotted-tailed quolls and is less likely to be used by either species. Both the Tasmanian devil and spotted-tailed quoll are highly sensitive to roadkill risk.

There is also one eagle nest recorded on the NVA located over 1.6 km to the west of the converter station (nest # 1323; see Figure 6.8). It is listed as an eagle nest of indeterminate eagle species nests (i.e. wedge-tailed eagle or white-bellied sea-eagle). This nest could not be found in the eagle nest survey undertaken in April 2022 (North Barker 2022). The nest was last observed in 2006 (NVA data) and is now considered to be absent. The next nearest confirmed wedge-tailed eagle nest (nest # 2573) is recorded on the NVA and is 1.7 km to the south of the survey area. Nest #2573 was most recently recorded on 1 April 2022 (NVA data). The wedge-tailed eagle (*Aquila audax* subsp. *fleayi*; listed as endangered under both the EPBC Act and TSP Act) may occasionally overfly the site given that they have large home ranges.

The white-throated needletail (*Hirundapus caudacutus*; listed as vulnerable under the EPBC Act) was also identified as potentially occurring within the survey area namely because it is an aerial species which can occur over coastal areas. The white-throated needletail is a summer visitor to Australia including Tasmania from its breeding grounds in Asia. It is almost exclusively aerial within its Australian distribution and can occur over most types of habitats, most often found above wooded areas including open forests and rainforest. This species may land and roosting habitat can be important. This species prefers to land in areas with tall trees that are well spaced.

There are no records on the NVA within 5 km of the survey area but may occur flying over the site on occasions during the summer months.

#### *6.6.1.2 Listed migratory species*

One species, listed as migratory under the EPBC Act, was identified as potentially occurring within the survey area is the fork-tailed swift (*Apus pacificus*; listed as both a marine and migratory species under the EPBC Act). Similar to the white-throated needletail, the fork-tailed swift is migratory species which visits Tasmania during the summer months. It is also an aerial species which rarely comes to land and occurs over wide range of open habitats. Although there are no NVA records within 5 km of proposed route, the species still could potentially occur flying over the site on occasions during the summer months.

### 6.6.2 TSP Act listed species

One species, listed under the TSP Act, was identified as potentially occurring within the survey area, the white-bellied sea-eagle (*Haliaeetus leucogaster*; listed as vulnerable under the TSP Act). The eagle nest is also mentioned above under the EPBC Act listed species (Section 6.6.1.1), is recorded on the NVA as nest #1323. This nest is located over 1.6 km to the west of the converter station and is listed as an eagle nest of indeterminate species (see Figure 6.8). Note that this nest could also have been used by the white-bellied sea-eagle. As stated above, this nest was unable to be found in the eagle nest survey undertaken in April 2022 (North Barker 2022) and was last observed in 2006 (NVA data). Nest #1323 is now considered to be absent. The nearest known white-bellied sea-eagle nest (nest # 2273) is located on the Emu River, 4.8 km to the south west, and was most recently recorded in February 2023 (NVA data).

### 6.6.3 Other fauna species

There were no observations during field surveys of little penguin (*Eudyptula minor*; a listed marine species under the EPBC Act) burrows or individuals at the Heybridge shore crossing point.

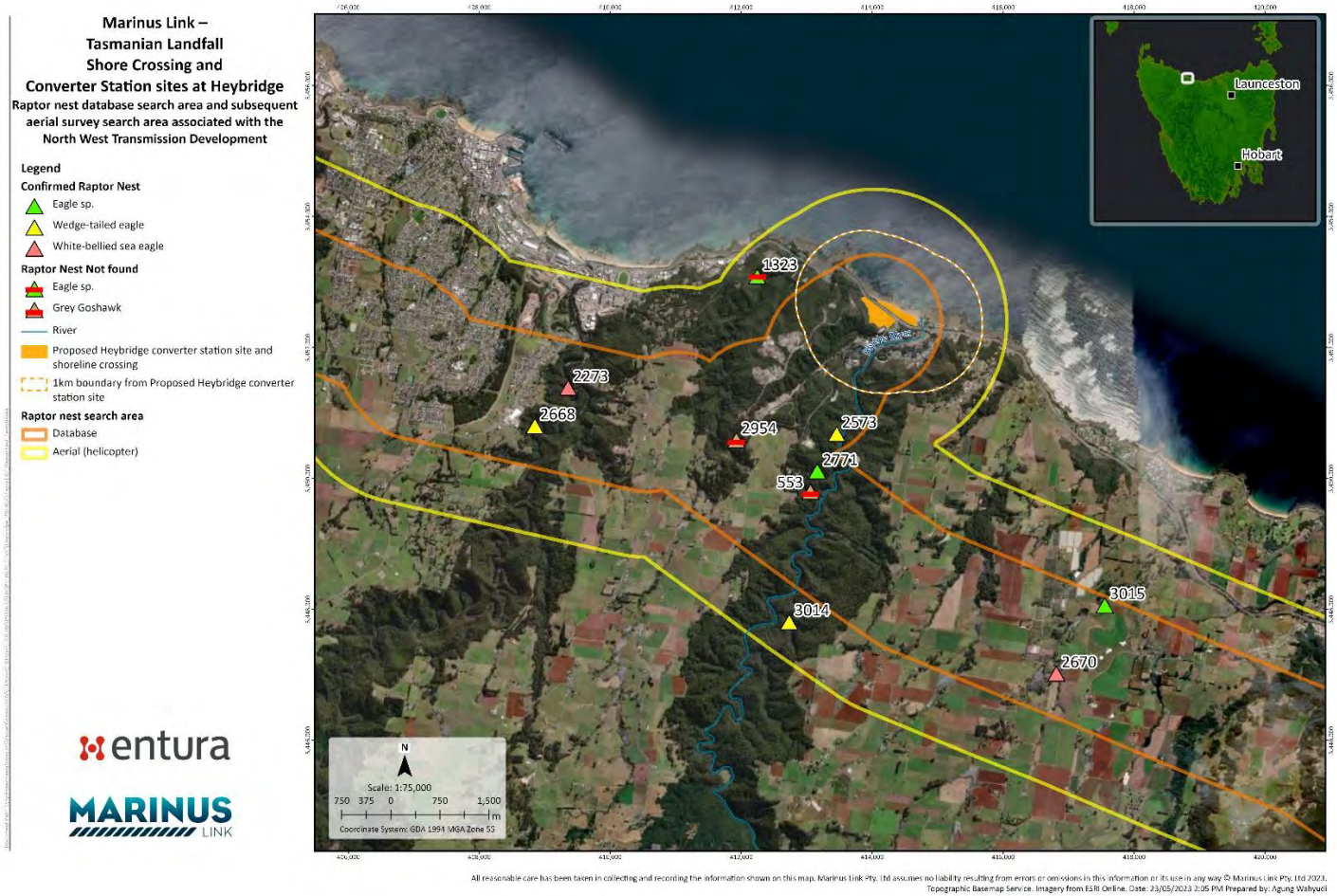


Figure 6.8: Raptor nests in the vicinity of the Heybridge Converter Station as identified by review of NVA data and recent nest searches undertaken for the North West Transmission Developments. Nest search area indicated overlaps with the 1 km boundary of the site.

## 6.7 Threatened flora

### 6.7.1 EPBC Act listed species

No threatened flora species were identified as potentially occurring within the converter station site or the shore crossing. Three flora species were identified in the baseline assessment within the survey area through the PMST tool or with records on the NVA. These species were *Caladenia caudata* (tailed spider orchid; listed as vulnerable under the EPBC Act), *Leucochrysum albicans* var. *tricolo*r (hoary sunray; listed as Endangered under the EPBC Act) and *Senecio psilocarpus* (swamp fireweed; listed as vulnerable under the EPBC Act),).

However, a review of the current range and habitat requirements found that they were either absent, i.e. they were outside of their known range and had no NVA records within 5 km; or unlikely to occur because of the absence of suitable habitat within the survey area. A complete list of threatened flora species and their likelihood of occurrence is provided in (see Appendix A.2).

### 6.7.2 TSP Act listed species

No threatened flora species were identified as potentially occurring within the converter station site or the shore crossing. Eight flora species listed as threatened under the TSP Act were identified as potentially occurring in the study area in the baseline assessment through records on the NVA. These species were *Baumea gunnii* (slender twigsedge), *Caladenia patersonii* (Paterson's spider-orchid), *Caladenia pusilla* (tiny fingers), *Persicaria decipiens* (slender waterpepper), *Tetratheca ciliate* (northern pinkbells), *Caladenia caudata* (tailed spider orchid), *Leucochrysum albicans* var. *tricolo*r (hoary sunray) and *Senecio psilocarpus* (swamp fireweed).

However, a review of the current range and habitat requirements found that they were either absent, i.e. they were outside of their known range and had no NVA records within 5 km; or unlikely to occur because of the absence of suitable habitat within the survey area. A complete list of threatened flora species and their likelihood of occurrence is provided in (see Appendix A.2).

## 6.8 Weeds and diseases

### 6.8.1 Declared weeds

A total of 44 introduced flora species were recorded within the survey area (see Appendix B). Seven of these are declared weeds under the *Weed Management Act 1999* (TAS) and *Biosecurity Act 2019*. Four of these declared weeds occurred at the shore crossing:

- *Chrysanthemoides monilifera* subsp. *monilifera* (boneseed): Two plants were recorded in the coastal scrub (SSC) community.
- *Rubus fruticosus* aggregate (blackberry): was recorded across the coastal scrub community.
- *Senecio jacobaea* (ragwort): One plant recorded within the coastal scrub community.
- *Ulex europaeus* (gorse): Three plants recorded within the coastal scrub community.

Three declared weed species were encountered within the converter station site:

- *Cirsium arvense* var. *arvense* (Californian thistle): a number of small patches were observed across the site.
- *Cortaderia species* (pampas grass): five plants were recorded along the southern boundary of the site, however they were not flowering at the time of the survey so the species could not be confirmed.
- *Erica lusitanica* (Spanish heath): 10 plants were recorded adjacent the eastern most end of the other plantation community.

The survey area is within the Burnie Local Government Area. The management objectives for declared weeds are identified in the Statutory Weed Management plans and are defined for each weed by whether the weeds are identified as Zone A or Zone B within each municipality. The objective of weed management for Zone A species within the municipality is to 'Implement integrated control program for eradication and prevent future occurrences.' The objective of weed management for Zone B species within the municipality is 'Containment within municipal boundaries, protection of specified areas within municipal boundaries, prevention of spread to Zone A municipalities.' The relevant management zone for each of the declared weed species is shown in Table 6.1

Under the *Biosecurity Act* 2019 it is a requirement to fulfill the General Biosecurity Duty. With respect to weeds, this requires that actions are taken to prevent the introduction or spread of weeds in accordance with Statutory Weed Management plans or Biosecurity Plans.

Table 6.1: Principal management objectives in Statutory Weed Management Plans for declared weeds recorded within the survey area

| Species | Common name | Burnie |
|---|---|---|
| *Rubus fruticosus* aggregate | Blackberry | Zone B |
| *Chrysanthemoides monilifera* subsp. *monilifera* | Boneseed | Zone B |
| *Cirsium arvense var. arvense* | California thistle | Zone B |
| *Ulex europaeus* | Gorse | Zone B |
| *Cortaderia species* | Pampas grass | Zone A |
| *Senecio jacobaea* | Ragwort | Zone A |
| *Erica lusitanica* | Spanish heath | TBC[3] |

### 6.8.2 *Phytophthora cinnamomi*

Commonly known as root rot or dieback, *Phytophthora cinnamomi* is a soil-borne fungal pathogen that invades the roots of plants and starves them of nutrients and water. It is generally spread by the transportation of soil on vehicles, construction machinery and walking boots. Soils that are more favourable for the spread of *Phytophthora* are generally the low nutrient types that support healthy communities. The vegetation types most affected in Tasmania are heathland, moorland and dry sclerophyll forest.

[3] TBC – pending confirmation as Statutory Weed Management Plan was not available on the NRE website at the time of writing. In the absence of a Statutory Weed Management Plan for this species, it is recommended conservatively treating Burnie municipality as being Zone A in relation to the control of *Erica lusitanica*

There are native vegetation communities within the survey area that are potentially susceptible to *Phytophthora.* The *Eucalyptus amygdalina* coastal forest and woodland (shown in Figure 5.2) is considered highly susceptible to *Phytophthora* (Schahinger et. al. 2003). Whereas the coastal scrub and the *Eucalyptus viminalis–Eucalyptus globulus* coastal forest are considered to have variable or moderate susceptibility (Schahinger et. al. 2003). There are no *Phytophthora cinnamomi* records on the NVA within 5 km of the survey area although there are two records from 1984 just over 5 km away. No symptoms of infection (i.e. dieback in susceptible species) were recorded during field surveys.

# 7. Ecological values and sensitivity

## 7.1 Ecological communities

Three native vegetation communities were recorded at the converter station or shore crossing site: *Eucalyptus amygdalina* coastal forest and woodland (DAC), coastal scrub (SSC), *Eucalyptus viminalis–Eucalyptus globulus* coastal forest and woodland (DVC). None of these communities are listed under the EPBC Act. However, the *Eucalyptus viminalis–Eucalyptus globulus* coastal forest and woodland (DVC) which was recorded within the shore crossing survey area is listed as threatened under the NC Act. This community occurs as small remnants across eastern and northern Tasmania and all patches would be considered important for the conservation of the community; thus it would have high sensitivity.

## 7.2 Flora

No flora species listed under the TSP Act or EPBC Act have been recorded at the converter station nor at the shore crossing site.

## 7.3 Fauna

Six threatened fauna species were identified as potentially occurring at the converter station and shore crossing area (Table 7.1). Two of these are bird species listed as threatened under the EPBC Act; the fork-tailed swift (*Apus pacificus*) and white-throated needletail (*Hirundapus caudacutus*). Both are aerial species which may fly over the site but will not use the site, as they do not come to land. As listed species, they have high sensitivity to disturbance from the activities associated with the construction and operation of the converter station and shore crossing.

Two other bird species, the Tasmanian wedge-tailed eagle (*Aquila audax* subsp. *fleayi*) and the white-bellied sea-eagle (*Haliaeetus leucogaster*) were identified as potentially occasionally overflying the site as they have been sighted within 5 km of the converter station and shore crossing. There are no known eagle nests within 1 km of the survey area and the nearest eagle nest is over 1.5 km but has not been verified as present since 2006. Therefore, it is unlikely that the construction and operation of the converter station and shore crossing will disturb breeding birds. However, as listed species both of these have high sensitivity.

Two mammal species – the Tasmanian devil (*Sarcophilus harrisii*) and spotted-tailed quoll (*Dasyurus maculatus* subsp*. maculatus*) – may occasionally pass over the converter station and shore crossing site and will be unlikely to be affected by activities associated with the construction and operation of the converter station and shore crossing site. However, roadkill has been identified as a major threat to Tasmanian devils and spotted-tailed quolls, with records of roadkill carcasses of both of these species from the Bass Highway and Minna Road. As listed species both have high sensitivity to impacts.

Tasmanian devils and spotted-tail quolls are most susceptible to road mortality at “night-time”, between the period one hour before dusk to one hour after sunrise. Construction activities and associated traffic movements for the most part will involve morning traffic (7 am) arriving at site during the period just after sunrise. While most traffic leaving site (4 pm) will be during daylight hours. However, during the shorter days in April to September there will be potential for heavy vehicle and worker transport movements to site to occur at dawn and dusk periods, when there is potential for animal activity (see section 8.1.3). In addition, the horizontal directional drilling for the shore crossing will progress 24 hours a day, seven days a week until the drilling is completed and may also involve transport movements between dusk and dawn.

Table 7.1: Fauna species sensitivity

| Species name | Common name | Sensitivity | Sensitivity rationale |
|---|---|---|---|
| *Sarcophilus harrisii* | Tasmanian devil | High | Listed species<br>No important habitat components on sites (den)<br>Potential to use site; known previous observations of carcasses on Minna Rd and Bass Hwy nearby, and therefore roadkill risk<br>Frequently are attracted to foraging on carcasses of other roadkill species<br>Vehicle strikes are often lethal |
| *Dasyurus maculatus* subsp. *maculatus* | Spotted-tailed quoll | High | Listed species<br>No important habitat components<br>Potential to use site; known previous observations of carcasses on Minna Rd and Bass Hwy nearby, and therefore roadkill risk<br>Frequently are attracted to foraging on carcasses of other roadkill species<br>Vehicle strikes are often lethal |
| *Apus pacificus* | fork-tailed swift | High | Aerial species that may occur over survey area but will not use survey area<br>Listed species |
| *Aquila audax subsp. fleayi* | Tasmanian wedge-tailed eagle | High | No nest currently within 1 km of site. No disturbance to breeding birds.<br>Listed species |
| *Haliaeetus leucogaster* | white-bellied sea-eagle | High | No nest currently within 1 km of site.<br>Listed species |
| *Hirundapus caudacutus* | white-throated needletail | High | Primarily aerial species that may occur over survey area but will not use survey area<br>Listed species |

# 8. Impact assessment

## 8.1 Construction

This section describes pathways for potential impacts to terrestrial ecological values as a result of the construction at the converter station site and the shoreline crossing are covered in this section. These provide an outline of the ecological value, the significance of the impact to the value and Environmental Performance Requirements (EPRs) that are recommended for implementation to limit the impact to these. The assessment of the significance of the impact for each of the terrestrial ecological values is summarised in Table 8.4. Note that there are no sites of geoconservation significance within the study area (Figure 5.2).

### 8.1.1 Native vegetation communities

There are areas of native vegetation located on the converter station and shore crossing sites. These include:

- On the converter station site, an area of 1.5 ha of *Eucalyptus amygdalina* coastal forest and woodland community (DAC)
- On the shore crossing, 3 ha of coastal scrub vegetation community (SSC) and 2 ha of the NC Act listed *Eucalyptus viminalis–Eucalyptus globulus* coastal forest and woodland vegetation community (DVC).

#### *8.1.1.1 Impact pathway and significance*

Disturbance to both of the above vegetation communities is avoided as part of the project description, and therefore there is no impact pathway and no impacts to these. No triggers under either the NC Act or EPBC Act are activated, as there are no threatened vegetation communities impacted. The following details the project plans to preserve native vegetation communities, and also identifies potential threats to these from construction activity. The project will avoid impacts to native vegetation through implementation measures to comply with EPRs (detailed in Table 8.5). These measures will be documented in the CEMP .

The current project plan in relation to the disturbance of these vegetation communities indicates the following:

- The *Eucalyptus viminalis–Eucalyptus globulus* coastal forest and woodland (DVC) at the shore crossing site will not be impacted as the cable will be connected to the converter station by horizontal direct drilling from the converter site to the sea, underneath the shoreline. The HDD for the HDVC subsea cable will not be drilled underneath the *Eucalyptus viminalis–Eucalyptus globulus* coastal forest and woodland and therefore will not impact this State-listed community. Zero hectares of the *Eucalyptus viminalis–Eucalyptus globulus* coastal forest and woodland (DVC) are expected to be cleared.
- Zero hectares of the coastal scrub (SSC) are expected to be cleared.
- The *Eucalyptus amygdalina* coastal forest and woodland community at the converter station site is not part of the construction footprint or planned to be cleared. Zero hectares of the *Eucalyptus amygdalina* coastal forest and woodland (DAC) will be cleared.

- The potential to transport of weeds and diseases (*Phytophthora*) to/from site poses risks to the existing native vegetation community, particularly vectors such as construction vehicles. Specifically, the *Eucalyptus amygdalina* coastal forest and woodland community on the converter station site is very susceptible to *Phytophthora* infection.
- The depth at which the HDD will pass under the shoreline will exceed 10 m and will be well below the vegetation root zone.

The project's EPRs (Table 8.5) below aim to preserve native vegetation, avoiding native vegetation clearing, while also preventing the introduction or spread of weeds, pests and pathogens in compliance with the Biosecurity Regulations 2022 and the *Biosecurity Act 2019*. It will be important to ensure that mitigation measures are developed and incorporated into the design and construction in order to meet the EPRs. The following mitigation measures are recommended measures to comply with EPRs (Table 8.5):

- Continue to use areas of existing disturbance (i.e. the currently cleared areas) to access and construct infrastructure to eliminate disturbance to native vegetation, where practicable.
- Flag and/or fence-off areas of native vegetation to be preserved.
- If hazard trees are located within areas of native vegetation to be preserved, these hazard trees should be clearly identified and marked for removal. Hazard trees include dead or dying trees, and trees with obvious externally visible defects, at high risk of failure in foreseeable weather conditions, and upon failure may provide safety risks during construction.
- Felling hazard trees into the open area on site to avoid damage to adjacent vegetation, where safe to do so. Where unsafe, fell tree and leave in-situ.
- Avoid movement of vehicles and machinery through native vegetation.
- Implement a Hot Work Process in consultation with TasFire that (as a minimum) to reduce risk of bushfire ignition.
    - Requires weather conditions and fire risk to be monitored.
    - Prohibits hot work on total fire ban days.
    - Permits hot work in cleared areas only.
    - Requires appropriate fire suppression equipment at site.
    - Requires monitoring of works for sparks that might ignite vegetation.
- If necessary to clear native vegetation, do so in a manner that allows fauna to disperse into adjacent native vegetation.
- Induct contractors and employees in the identification of weeds, specifically declared weeds.
- Induct contractors and employees in the identification of plant pathogens including dieback.
- Provide onsite vehicle hygiene training and implement a vehicle clean-down checklist that includes the requirements outlined in the Weed and Disease Planning and Hygiene Guidelines - Preventing the spread of weeds and diseases in Tasmania (DPIPWE 2015).
- Identify, map, demarcate and treat/eradicate weed infestations.
- Work from clean sites to weed infested sites, if weed infested sites cannot be avoided. Clearly identify access routes.
- Avoid working in weed infested sites while in seed, if weed infested sites cannot be avoided.

- Follow quarantine notices or directions from relevant authorities for the control of declared weeds, considering the General Biosecurity Duty.
- Do not drive through weed infestations without implementing appropriate or recommended biosecurity procedures.
- Wash down vehicles, plant and equipment and boots prior to entering and on leaving declared weed infested areas in accordance with the *Weed and Disease Planning and Hygiene Guidelines - Preventing the spread of weeds and diseases in Tasmania* (DPIPWE 2015) and in accordance with the Biosecurity Regulations 2022 under the *Biosecurity Act 2019*.

#### *8.1.1.2 Environment Performance Requirements*

The following EPRs are proposed to protect native vegetation communities from clearing and introduction of weeds, pests or pathogens.

**EPR ECO1: Minimise vegetation removal and implement vegetation protection measures**

1. To inform the project design, develop and implement measures to avoid and otherwise minimise to the extent practicable impacts on native vegetation. The design must avoid the eucalyptus woodland vegetation in the northeast corner of the site.
2. Prior to commencement of project works, develop a vegetation management plan to avoid and otherwise minimise impacts to vegetation, covering as a minimum:
   (a) Identification of areas of important flora and fauna habitat to be protected during construction.
   (b) Fencing protected areas and no-go zones to prevent access during construction.
   (c) Pre-construction site assessment to confirm that vegetation and trees to be retained have been adequately protected from impact.
   (d) Vegetation clearing controls and protection measures.
   (e) Implementation of appropriate measures to manage the risk of spread and introduction of weeds and pathogens during construction.
   (f) Procedures if unexpected threatened species are identified.

The vegetation management plan must be a sub plan of the CEMP and implemented during construction.

**EPR ECO4: Operational implementation of vegetation protection measures**

1. As part of the OEMP, develop a vegetation management plan for operations to avoid and otherwise minimise impacts that covers:
   (a) Demarcation of areas of important flora and fauna habitat to be protected during normal maintenance and operations.
   (b) Implementation of appropriate measures to manage the risk of spread and introduction of weeds and pathogens during normal maintenance and operations.

The vegetation management plan must be a sub plan to the OEMP and implemented in operation.

### 8.1.2 Flora

There are no flora species listed under either the TSP Act or the EPBC Act located on site. With the absence of any protected flora there will be no impact to protected floral values.

### 8.1.3 Fauna - Tasmanian devils and spotted-tailed quolls

Threatened fauna which have the potential to be impacted are Tasmanian devils and spotted-tailed quolls.

The EPBC listed mammals Tasmanian devil (*Sarcophilus harrisii*) and spotted-tailed quoll (*Dasyurus maculatus* subsp*. maculatus*) may occasionally pass over and exist in the vicinity of the converter station and shore crossing site. Whilst there are no previous records or observations during the survey of suitable denning habitat in the vicinity of the sites, there is the possibility of roadkill from road traffic movements between dusk and dawn, and there have been a small number of nearby records of roadkill of both species on Minna Road (one spotted-tailed quoll, one Tasmanian devil) and the Bass Highway (one Tasmanian devil).

#### *8.1.3.1 Impact pathway and significance*

The EPBC significant impact criteria for the Tasmanian devil and spotted-tail quoll were used in the assessment of impacts to these species. The criteria are included in Appendix C.

The *Survey Guidelines and Management Advice for Development Proposals that May Impact on the Tasmanian Devil* (Natural and Cultural Heritage Division 2015b) propose that where there is increased night-time road use (between one hour before dusk and one hour after dawn) that a traffic impact assessment is undertaken and is used in conjunction with assessments of the local Tasmanian devil population information from both desktop and survey data to determine if there is a potential for a substantial impact (i.e. predicted >10% increase in deaths due to roadkill). Note that guidelines to be released will redefine the night-time period to one hour before sunrise to one hour after sunrise, and this is used here in determining the quantum of increase in night-time traffic. The traffic impact assessment and assessment of increase in roadkill of the local Tasmanian devil population is provided below.

Construction and associated traffic movements are planned to occur at the beginning and end of each working day, which will be at 7 am and 4 pm (Stantec 2023). The majority of heavy vehicle and worker traffic movements will occur at these times (Stantec 2023). Some of these movements will be considered night-time movements occurring in periods one hour after sunrise or one hour before sunset (Table 8.1). Most night-time movements will occur in the morning transit to site (at 7 am) with 288 days annually having sunrises after 6 am.

Transport movements occurring in the evening from the construction site will mostly be considered daylight movements; however, there are 39 days a year when sunsets occur before 5 pm, when both morning and evening movements will occur at night-time during mid-winter. There will also be 77 days each year when neither the morning or evening movements will occur during night-time. Therefore, in this assessment, a typical day has been estimated as having one period per day when all heavy vehicle and worker transport traffic movements will occur at “night-time”.

Table 8.1: No. of days and proportion of year when timing of vehicle movements at 7 am and 4 pm will be considered night-time movements (i.e. sunrises after 6 am or sunsets before 5 pm). Calculations from Geoscience Australia data for 2023.

| **Morning** | | **Evening** | |
|---|---|---|---|
| **Sunrises after 6 am (annual number)** | **Sunrises after 6 am (% of year)** | **Sunsets before 5 pm (annual number)** | **Sunsets before 5 pm (% of year)** |
| 288 | **79** | 39 | **11** |

Table 8.2: No. of days per year when heavy vehicle and worker movements occur at day-time or night-time, and estimated daily night-time traffic movements

| **Worker transit periods timing relative to day-time/night-time** | **No. of days per year** | **Daily night-time traffic movements** |
|---|---|---|
| Two day-time periods (7am and 4 pm) | 77 | 0 |
| One night-time period (7 am) and one day time period (4 pm) | 249 | 210 |
| Two night-time periods (7 am and 4 pm) | 39 | 420 |

The proposed maximum increase in traffic movements are 30 heavy vehicles and 180 light vehicles movements – a total of 210 movements each in the morning and evening (Stantec 2023). The calculation of the relative increase in night-time traffic volume (estimated as 5 pm-7 am) as a result of construction assumes one transit period per day is typically during night-time occurs (i.e. morning). On this basis, there will be an approximately 2.65-fold increase in night time traffic on Minna Road between the Bass Highway intersection and the entrance to the site. The busier Bass Highway would have an approximate increase night-time traffic of 3.2 % (Table 8.3).

Table 8.3: Night-time increases in vehicle movements to and from site relative to recent traffic measurements.

| **Measured weekday night-time movements (5pm-7am)** | **Average additional daily night-time vehicle movements** | **% increase in night-time traffic** |
|---|---|---|
| **Minna Road** | | |
| 127 | 210 | 165 % |
| **Bass Highway** | | |
| 6501 | 210 | 3.2 % |

Traffic movements are also expected to occur at night-time whilst the HDD is being undertaken - as the potential exists for the change-over of operator shifts of the drilling equipment. The number of movements likely to occur in relation to the HDD operation has not been specified, however is assumed by Stantec (2023) to be only ten movements each at 7 am and 7 pm, which would provide only a minor increase in proportion of traffic movements.

Minna Road between the intersection with the Bass Highway and the entrance to the site, has a potential increased risk of roadkill as a result of the level of increase in night-time traffic. This includes the HDD operator vehicle movements that may occur at night, but particularly the 165 % increase in traffic from general worker and heavy vehicle transport movements arriving at site in the morning. As required in the guidelines (Natural and Cultural Heritage Division 2015b), a number of factors have been taken into consideration in assessing the impact on the local population due to roadkill of Tasmanian devils or spotted-tailed quolls. In particular:

- The increase in traffic volume of 165%
- Populations of these species in the area are low, with very few observation records over a 20-year period
- There is a lack of evidence of individuals residing in the surveyed locations (e.g. no scats)
- There is a lack of suitable denning habitat in the vicinity

The length of the section of Minna Road with increased traffic is short; less than 200 m between the Bass Highway and the site entrance. As a consequence of being a short stretch of road the potential to reach high speeds over this distance, especially for heavy vehicles, is considered low. Based on the above information, whilst the potential increase in risk is not easily quantified, it suggests that the risk to the local population of Tasmanian devils and spotted-tailed quolls is likely to be low. However, in order to mitigate the potential for increased risk of roadkill, it is advisable to instigate mitigations proposed below as part of the EPRs.

The Bass Highway has an estimated increase in night-time traffic of 3.2 %. As this is lower than 10 %, the impact of increases in traffic on roadkill are considered to be negligible, and mitigation measures are not considered necessary to satisfy the EPR.

Measures will be developed to comply with EPRs (Section 8.1.3.2, Table 8.5) and documented in the CEMP, to reduce impacts to Tasmanian devils and spotted-tailed quolls on Minna Road, and may include:

- Education on wildlife-vehicle collisions and maintaining low speeds between dusk and dawn as part of inductions and daily toolbox sessions. Operating procedure developed and distributed to all staff with instructions on what to do in the event of a fauna road incident, including injured or orphaned wildlife.
- Monitoring Minna Road daily (between the Bass Highway and the site entrance) for roadkill, with mortalities moved off the road immediately when encountered to limit the likelihood of threatened carnivorous fauna including Tasmanian devils and quolls being attracted to the carrion and the increased risk of road mortality.
- Recording and reporting process for incidents of vehicle strikes and/or roadkill of Tasmanian devils and spotted-tailed quolls on Minna Road between intersection with Bass Highway and the entry to site via the online Natural Resources and Environment Tasmania roadkill report form, which can be accessed at https://nre.tas.gov.au/wildlife-site/Pages/Report a Roadkill Sighting.aspx.
- Reducing the amount of night-time construction traffic with measures compliance with recommended measures such as:
    - Maintain converter station construction hours, where possible, to daylight hours
    - If night-time, dawn or dusk transport to work is required, minimise traffic movements by providing bus services for the majority of the staff during the construction period.

- Schedule known night-time work (HDD) operator shift changes to coincide, as much as practicable, to daylight hours.

- Design and use lighting in a manner that attempts to employ the use of minimal light for safety on sight and minimises light impacts on surrounding areas, reducing the disturbance to fauna.
- Manage trenching to minimise impacts to fauna through the following recommended measures:
  - Minimising the period that trenches remain open
  - Construction of trenches to allow exit of fauna that may fall into trenches (e.g. ramping at trench ends)
  - Checking trenches each morning for the presence of fauna
  - Having procedures for notification of wildlife rescue organisations, should these be required.

#### *8.1.3.2 Environmental Performance Requirements*

The following EPR will be implemented to protect Tasmanian devils, spotted-tailed quolls and other fauna from impact during construction.

**EPR ECO2: Implement measures to protect fauna**

1. Prior to commencement of project works, develop a fauna management plan to avoid and otherwise minimise impacts to fauna, covering as a minimum:
   (a) Protection measures for Tasmanian devils and spotted-tailed quolls with a focus on construction traffic and awareness regarding roadkill included in site inductions
   (b) Recording and reporting process for incidents of vehicle strikes and/or roadkill of Tasmanian devils and spotted-tailed quolls on Minna Road between intersection with Bass Highway and the entry to site, where vehicles associated with the project will travel, via the online Natural Resources and Environment Tasmania roadkill report form**,** which can be accessed at https://nre.tas.gov.au/wildlife-site/Pages/Report a Roadkill Sighting.aspx. Removing mortalities off the road within a specified distance of site to reduce attracting carnivorous fauna
   (c) Design and utilisation of night lighting to a minimum amount required to safely operate the site and to reduce light pollution and adverse effects to fauna species.
   (d) Trench management procedures to avoid animals entering trenches or being recovered from trenches
   (e) Pre-clearance surveys of construction areas for threatened fauna species prior to vegetation removal and undertaken by a suitably qualified ecologist.

The fauna management plan must be a sub plan of the CEMP and implemented during construction.

### 8.1.4 Fauna - Raptors

The EPBC listed wedge-tailed eagle (*Aquila audax* subsp. *fleayi*) and the TSP Act listed white-bellied sea-eagle (*Haliaeetus leucogaster)* have no known nest sites within 1 km of the site. The nearest eagle nest is 1.5 km from site, but has not been verified as present since 2006. Individuals of both species may occasionally overfly the site as they have large home ranges.

#### 8.1.4.1 Impact pathway and significance

Both species of raptor are currently unlikely to be impacted by the construction of the converter station and shoreline crossing as there are no known nests within 1 km of the site. However, if a raptor nest is constructed within a distance of 500 m (with or without line-of-sight) or located within 1 km (with line-of-sight) in the period prior to construction, then there is the potential for the project to impact on raptors, as per the *Threatened Tasmanian Eagles Recovery Plan 2006-2010* and the Environment Protection Authority's *Guide to Eagle Nest Searching and Nest Activity Checks*, Version 1.

In order to comply with the EPR (Table 8.5) below, possible mitigation measures to reduce impacts to raptors to both detect nests and reduce impacts in the event of finding nests within a distance of 500 m or within 1 km line-of-sight include:

- Conduct additional nest searches (within 1 km of site) annually until construction is completed, to detect any new nests, to schedule construction and scheduled maintenance (excluding emergency access and repairs) outside of the breeding season.
- Undertake nest searches using the methods outlined in Section 4 of the 'Eagle nest searching, activity checking and nest management' Technical Note (Forest Practices Authority 2023) by a suitably qualified person. Conduct activity checks outside the eagle breeding season (July to January inclusive).

#### 8.1.4.2 Environmental Performance requirements

The following EPR is proposed to protect raptors from impact during construction.

**EPR ECO3: Implement measures to protect raptors**

1. Prior to commencement of project works confirm that there are no nests within a distance of 500 m, or within 1 km line-of-sight prior to construction using data collected within one year of construction commencing.
2. Undertake further nest survey if there is no current (within one year) survey of nest presence and to avoid impacts to raptors outside of the breeding season, as per the *Threatened Tasmanian Eagles Recovery Plan 2006-2010* and the Environment Protection Authority's *Guide to Eagle Nest Searching and Nest Activity Checks*, Version 1.
    (a) If a nest is observed within a distance of 500 m, or within 1 km line-of-sight prior to construction the following will be required:
        (i) Avoid project activities within a distance of 500 m, or within 1 km line-of-sight of active eagle nests during breeding season in accordance with guidelines outlined in the FPA Fauna Technical Note No. 1
        (ii) Construction to be deferred until outside of the breeding season if a nest within a distance of 500 m, or within 1 km line-of-sight is determined to be active as per FPA Fauna Technical Note No. 1. All nests are to be treated as active during the breeding season until determined as inactive by a suitable qualified person.

### 8.1.5 Fauna - Fork-tailed swift and white-throated needletail

Two further bird species listed as threatened under the EPBC Act; the fork-tailed swift (*Apus pacificus*) and white-throated needletail (*Hirundapus caudacutus*) are aerial species. These may fly over the site but will not use the site. While both species are considered aerial species, the white-throated needletail has been known to roost amongst dense foliage and hollows (Corben et al. 1982; Quested 1982; Day 1993; Tarburton 1993, 2015), preferring areas that have widely spaced trees. These two aerial bird species have low sensitivity to disturbance from the activities associated with the construction and operation of the converter station and shore crossing, by virtue of their primarily aerial habit. The small amount of vegetation cleared in relation to the potential for the white-throated needletail roosting trees to be affected, the degree of clearing on site is minimal, and are unlikely to be impacted.

### 8.1.6 Residual impacts

The pre-mitigated assessments of the impact magnitude to most of the values was considered to be negligible. Only Tasmanian devils and spotted-tailed quolls had pre-mitigated assessment of minor magnitude of impact. The significance of the impacts were considered to be low for most identified ecological communities, flora and fauna species (Table 8.4) on the basis of the matrix that considers both the sensitivity of the value and the magnitude of the potential impact (Section 5.6.2). As a result of the high sensitivity and low magnitude of impact for Tasmanian devils and spotted-tailed quolls, the significance of the impact was assessed as moderate.

Through the implementation of measures to comply with EPRs (Table 8.5), which aim to further reduce the impact, there is an assessed reduction in the potential magnitude of impact to Tasmanian devils and spotted-tailed quolls from minor to negligible.

The magnitude of the residual impact on all identified values due to the construction of the converter station and shore crossing is therefore considered to be negligible and of low significance.

There are a number of mitigation measures expected to be implemented to achieve the EPRs and reduce the residual risk. These include measures to mitigate against:

- Impacts to Tasmanian devils and spotted-tailed quolls (e.g. limiting traffic movements to daylight hours, if night-time work utilise buses to limit traffic)
- Impacts to raptors (e.g. undertake pre-construction nest survey, construction mitigations in the event of finding a nest)
- Ongoing risks related to weed management (e.g. identification and eradication of weeds on site, site hygiene) as well as the appropriate management of native vegetation on site (e.g. avoiding use of areas where native vegetation is present, avoiding removal of vegetation by only removing trees that may be hazardous), in compliance with the Biosecurity Regulations 2022 under the *Biosecurity Act 2019*.

## 8.2 Operation

### 8.2.1 Native vegetation communities

There are areas of native vegetation located on the converter site and shore crossing sites. These include:

- On the converter station site, an area of 1.5 ha of *Eucalyptus amygdalina* coastal forest and woodland community (DAC)
- On the shore crossing, 3 ha of coastal scrub vegetation community (SSC) and 2 ha of the NC Act listed *Eucalyptus viminalis–Eucalyptus globulus* coastal forest and woodland vegetation community (DVC)

#### *8.2.1.1 Impact pathway and significance*

The native vegetation communities on the sites will be maintained during the operation of the converter station. It will be necessary to manage these to minimise disturbance to these communities and reduce the potential impacts from introduction of weeds, pests and pathogens.

The project's EPRs (Table 8.5) are designed to avoid any disturbance of native vegetation and the introduction of weeds, pests and pathogens. It will be important to ensure that mitigation measures are developed and incorporated into the operation procedures in order to meet the EPRs. Available mitigation measures to satisfy the EPRs may include the following:

- Continue to use areas of existing disturbance (i.e. the currently cleared areas) to access the site to reduce disturbance to native vegetation.
- Avoid clearing by clearly identifying and marking hazard trees outside the currently cleared site. Hazard trees include dead or dying trees, and trees with obvious externally visible defects, at high risk of failure in foreseeable weather conditions, and upon failure may provide safety risks during operation.
- Felling trees into the open area on site to avoid damage to adjacent vegetation, where safe to do so. Where unsafe, fell tree and leave in-situ.
- Implement a Hot Work Process in consultation with TasFire that (as a minimum) to reduce risk of bushfire ignition.
    - Requires weather conditions and fire risk to be monitored.
    - Prohibits hot work on total fire ban days.
    - Permits hot work in cleared areas only.
    - Requires appropriate fire suppression equipment at site.
    - Requires monitoring of works for sparks that might ignite vegetation.
- If necessary to clear native vegetation, do so in a manner that allows fauna to disperse into adjacent native vegetation
- Induct contractors and employees in the identification of weeds, specifically declared weeds.
- Induct contractors and employees in the identification of plant pathogens including dieback.
- Provide onsite vehicle hygiene training and implement a vehicle clean-down checklist that includes the requirements outlined in the Tasmanian Washdown Guidelines for Weed and Disease Control - Machinery, Vehicles and Equipment, Edition 1.
- Identify, map and demarcate weed infestations.
- Treat weeds with appropriate control measures.
- Work from clean sites to weed infested sites, if weed infested sites cannot be avoided. Clearly identify access routes.

- Avoid working in weed infested sites while in seed, if weed infested sites cannot be avoided.
- Follow quarantine notices or directions from relevant authorities or land managers for the control of declared weeds.
- Do not drive through weed infestations without implementing appropriate or recommended biosecurity procedures.
- Wash down vehicles, plant and equipment and boots prior to entering and on leaving declared weed infested areas in accordance with the *Tasmanian Washdown Guidelines for Weed and Disease Control - Machinery, Vehicles and Equipment*, Edition 1 and in accordance with the Biosecurity Regulations 2022 under the *Biosecurity Act 2019*..

#### *8.2.1.2 Environment Performance Requirements*

Ensure that as per the construction project description (section 4), that operations do not specifically require clearing of native vegetation on either the converter station site or the shore crossing. The aim of the EPR below (Table 8.5) is to ensure that operational procedures recognise the need to preserve the native vegetation located on site.

**EPR ECO4: Operational implementation of vegetation protection measures**

1. As part of the OEMP, develop a vegetation management plan for operations to avoid and otherwise minimise impacts that covers:
   (a) Demarcation of areas of important flora and fauna habitat to be protected during normal maintenance and operations.
   (b) Implementation of appropriate measures to manage the risk of spread and introduction of weeds and pathogens during normal maintenance and operations.

The vegetation management plan must be a sub plan to the OEMP and implemented in operation.

### 8.2.2 Flora

There are no flora listed under either the TSP Act or the EPBC Act located on site. With the absence of any protected flora there will be no impact to protected floral values.

### 8.2.3 Fauna - Tasmanian Devils and spotted-tailed quolls

The EPBC listed mammals Tasmanian devil (*Sarcophilus harrisii*) and spotted-tailed quoll (*Dasyurus maculatus* subsp*. maculatus*) may occasionally pass over and in the vicinity of the converter station and shore crossing site. Whilst there is no suitable denning habitat in the vicinity of the sites, there is the possibility of roadkill from road traffic movements between dusk and dawn, and there have been a small number of records of roadkill of both species on Minna Road (one quoll, one devil) and the Bass Highway (one devil) nearby. The sensitivity of each of these two carnivore species to the risk of roadkill is high.

#### 8.2.3.1 Impact pathway and significance

As traffic movements are likely to be minimal during operation, it is not expected that there will be an impact from roadkill to these species as a result of operations. Operation and maintenance vehicles entering and exiting the converter station site per day will be a maximum of five light vehicles per day (for operational personnel). On some days, it may be as low as two vehicles per day. In the context of the heavily trafficked Bass Highway, these operational vehicles addition to traffic is negligible. The approximately 250m of Minna Road to be traversed by these vehicles poses a negligible increase on roadkill risk, especially in the context of the regular use of Minna Road by private landfill operator vehicles.

#### 8.2.3.2 Environment Performance Requirements

There will be no requirement for environmental performance requirements during operation.

### 8.2.4 Fauna - Raptors

The EPBC listed wedge-tailed eagle (*Aquila audax* subsp. *fleayi*) and the TSP Act listed white-bellied sea-eagle (*Haliaeetus leucogaster)* have no known nest sites within 1 km of the site. The nearest eagle nest is over 1.5 km but has not been verified as present since 2006 Individuals of both species may occasionally overfly the site as they have large home ranges

#### 8.2.4.1 Impact pathway and significance

Both species of raptor are currently unlikely to be impacted by the operation of the converter station and shoreline crossing as there are no known nests within 1 km of the site. However, if a raptor nest is constructed within a distance of 500 m, or within 1 km line-of-sight in the period prior to construction, then there is the potential for major operational maintenance activities to impact on raptors.

Measures will be developed to comply with the EPR below. Possible mitigation measures to reduce impacts to raptors to both detect nests and reduce impacts in the event of finding nests within a distance of 500 m, or within 1 km line-of-sight include:

- Nest management may be conducted during the operational phase of the project that includes regular nest searches in the vicinity of the converter station.

#### 8.2.4.2 Environment Performance Requirements

The following EPR is proposed to protect raptors from impact during operation. The intent of this EPR is to ensure that in the event that major operational maintenance activities (which have the potential to disturb raptors) are planned, that appropriate surveys are undertaken to identify nest locations. In addition it identifies requirements for the undertaking of such activities if a nest is nearby.

**EPR ECO5: Operational implementation of measures to protect raptors**

1. As part of the OEMP, develop a nest management strategy to avoid impacts to raptors during major operational and maintenance activities (e.g. long-term increase in site activity that includes use of crane/s for lifting and replacing large components and equipment)
2. Prior to major operational and maintenance activities, confirm that there are no nests within a distance of 500 m, or within 1 km line-of-sight prior to activities, using data collected within one year prior to the commencement of construction.

3. Undertake a further nest survey if there is no recent (within one year) survey data of nest presence outside of the breeding season as per the *Threatened Tasmanian Eagles Recovery Plan 2006*-2010 and the Environment Protection Authority's *Guide to Eagle Nest Searching and Nest Activity Checks.*

   (a) If a nest is observed within a distance of 500 m, or within 1 km line-of-sight prior to major operational/maintenance activities the following will be required:

      (i) Avoid major activities within a distance of 500 m, or within 1 km line-of-sight of active eagle nests during breeding season in accordance with guidelines outlined in the FPA Fauna Technical Note No. 1

      (ii) Defer major activities until outside of the breeding season if a nest within 500 m or 1 km line of sight is determined to be active as per FPA Fauna Technical Note No. 1. All nests are to be treated as active during the breeding season until determined as inactive by a suitable qualified person.

### 8.2.5 Fork-tailed swift and white-throated needletail

Two further bird species listed as threatened under the EPBC Act; the fork-tailed swift (*Apus pacificus*) and white-throated needletail (*Hirundapus caudacutus*) are aerial species. These may fly over the site but will not use the site, as they do not come to land.

#### *8.2.5.1 Impact pathway and significance*

Both species are unlikely to be impacted by the operation of the converter station and shoreline crossing.

#### *8.2.5.2 Environment Performance Requirements*

There will be no requirement environmental performance requirements during operation.

### 8.2.6 Residual impacts

The pre-mitigation assessments of impacts were all considered to be low for the ecological communities, flora and fauna. Based on the above implementation of EPRs, which aim to further reduce the impact, there will be no residual impacts due to the operation of the converter station and shore crossing (Table 8.5). There are a number of mitigation measures expected to be implemented to achieve the EPRs and further reduce the residual risk. These include measures to mitigate against ongoing risks related to weed management (e.g., identification and eradication of weeds on site, site hygiene) in accordance with the Biosecurity Regulations 2022 under the *Biosecurity Act 2019*.

A further EPR to protect raptors in the vicinity will require confirmation hat there are no nests within a distance of 500 m of the site boundary, or within 1 km line-of-sight prior to construction using data collected within one year of construction commencing.

## 8.3 Decommissioning

The operational lifespan of the project is a minimum 40 years. At this time Marinus Link will be either decommissioned or upgraded to extend its operational lifespan. Decommissioning will be planned and carried out in accordance with regulatory requirements at the time. A decommissioning plan in accordance with approvals conditions will be prepared prior to planned end of service and decommissioning of the project. Requirements at the time will determine the scope of decommissioning activities and impacts. The key objective of decommissioning is to leave a safe, stable and non-polluting environment.

In the event that the project is decommissioned, all above-ground infrastructure will be removed and the site rehabilitated. Decommissioning activities required to meet the objective will include, as a minimum, removal of above ground buildings and structures. Remediation of any contamination and reinstatement and rehabilitation of the site will be undertaken to provide a self-supporting landform suitable for the end land use.

Decommissioning and demolition of project infrastructure will implement the waste management hierarchy principles being avoid, minimise, reuse, recycle and appropriately dispose. Waste management will accord with applicable legislation at the time.

Decommissioning activities may include recovery of land and subsea cables. The conduits and shore crossing ducts would be left in-situ as removal may cause significant environmental impact. Subsea cables would be recovered by water jetting or removal of rock mattresses or armouring to free the cables from the seabed.

A decommissioning plan will be prepared to outline how activities would be undertaken and potential impacts managed.

## 8.4 Cumulative impacts

If mitigation measure are implemented, the project is not expected to impact threatened ecological communities, threatened flora or threatened fauna species at either the converter station or the shore crossing site. However, additional pressure on roadkill risk on the Bass Highway from nearby projects where construction works occur at the same time as construction works for the project may generate residual cumulative impact.

Construction activities for the Remaining North West Transmission Developments[4] are likely to occur in proximity and in similar timeframes to the project, such that the same transportation routes may experience increased traffic due to simultaneous project works. Both projects will result in an increase in vehicle traffic during construction. Twilight and night traffic movements on Minna Road will increase by at least 10 % at times due to construction activities associated with the two projects, and they may approach a 10 % increase on the Bass Highway. Therefore, there is a possibility for cumulative impacts to Tasmanian devils and spotted-tailed quolls, related to roadkill from twilight and night-time traffic movements from construction of both the project and Remaining North West Transmission Developments on these roads. Both species are highly sensitive to roadkill risk.

[4] Note that the Staverton to Hampshire Hills 220 kV overhead transmission line (OHTL) and upgrades to the existing OHTLs between Sheffield and Staverton are being assessed separately from the Remaining North West Transmission Developments; the two components comprise the North West Transmission Developments. The Staverton to Hampshire Hills component is not within sufficient proximity to the Heybridge Converter Station to be considered as a potential contributor to cumulative impacts.

With the application of standard management measures, the Remaining North West Transmission Developments project is unlikely to result in a significant impact or decrease in population of these species. Given the limited extent of roads where the project may contribute to roadkill, and with the application of measures to comply with EPRs, the project is unlikely to contribute to a significant decrease in the population of Tasmanian devil and spotted-tailed quolls in Tasmania when combined with the impacts from the Remaining North West Transmission Developments project.

The other projects identified in section 5.6.3 are not likely to contribute to the impacts expected from the project to the extent that a cumulative residual impact would be expected.

## 8.5 Inspection, monitoring and review

The implementation of measures to comply with EPRs will be monitored during construction. The program of monitoring and review will be detailed in the CEMP and may include the following measures.

This will include:

- Monitoring during the construction and operation the areas of native vegetation removed, including the reasons for removal (EPR ECO1, EPR ECO4).
- Audit the implementation of procedures in the vegetation management plan (EPR ECO1, EPR ECO4)
- Monitoring and recording of vehicle strikes and roadkill on Minna Road between the Bass Highway intersection and the site entrance during the construction period, to ensure that mitigation measures to minimise roadkill are effective (EPR ECO2).
- Undertake annual nest survey for raptors, to monitor for any newly constructed nests within a distance of 500 m, or within 1 km line-of-sight (EPR ECO3).
- Annually assess (during construction and operation) the need to implement measures (i.e. stop work during breeding season in the event that a new nest within a distance of 500 m, or within 1 km line-of-sight is identified) in regard to raptor nests (EPR ECO3, EPR ECO5), following nest surveys.
- Review the implementation of procedures in the operational nest management strategy (EPR ECO5), particularly in preparation for undertaking of major maintenance activities.

## 8.6 Summary of impacts

For the construction and operation of the Heybridge converter station and its shoreline crossing, there are a number of ecological values and their significance assessments listed in Table 8.4.

The assessment identified:

- The presence of three native vegetation communities, one of which is listed on the NC Act.
    - *Eucalyptus amygdalina* coastal forest and woodland (DAC) – NC Act listed – on the shoreline crossing
    - Coastal scrub (SSC), on the shoreline crossing
    - *Eucalyptus viminalis–Eucalyptus globulus* coastal forest and woodland (DVC), on the converter station site
- The potential presence of five EPBC Act listed fauna species

  - Tasmanian devil (*Sarcophilus harrisii*)
  - spotted-tailed quoll (*Dasyurus maculatus* subsp. *maculatus*)
  - Tasmanian wedge-tailed eagle (*Aquila audax* subsp. *fleayi*)
  - white-throated needletail (*Hirundapus caudacutus*)
  - fork-tailed swift (*Apus pacificus*).
- The potential presence of one NC Act listed fauna species

  white bellied sea-eagle (*Haliaeetus leucogaster).*

After the implementation of the EPRs, these listed vegetation communities and fauna species were assessed as having low significance of being impacted, with negligible magnitude of impact due to the construction and operation, and consequently a low significance of impact.

The project is not expected to impact threatened ecological communities, threatened flora or threatened fauna species at either the converter station or the shore crossing site.

Table 8.4: Significance assessment summary table

| Affected value | Project phase | Impact Assessment | | | Environmental Performance Requirements | Residual Impact | | |
|---|---|---|---|---|---|---|---|---|
| | | **Sensitivity** | **Magnitude** | **Significance** | | **Sensitivity** | **Magnitude** | **Significance** |
| Remnant patch *E. amygdalina* coastal forest and woodland<br>1.5 ha on converter station site | Construction, operation | Low | Negligible | Low | EPR ECO1<br>EPR ECO4 | Low | Negligible | Low |
| Coastal scrub vegetation community<br>3 ha at shore crossing | Construction, operation | Low | Negligible | Low | EPR ECO1<br>EPR ECO4 | Low | Negligible | Low |
| *E. viminalis-E.globulus* coastal forest and woodland (NC Act listed)<br>2ha at crossing adjacent to Blythe River mouth | Construction, operation | High | Negligible | Low | EPR ECO1<br>EPR ECO4 | High | Negligible | Low |
| Tasmanian devils and spotted-tailed quolls | Construction | High | Minor | Moderate | EPR ECO2 | High | Negligible | Low |
| Wedge-tailed eagle | Construction, operation | High | Negligible | Low | EPR ECO3<br>EPR ECO5 | High | Negligible | Low |
| White bellied sea-eagle | Construction, operation | High | Negligible | Low | EPR ECO3<br>EPR ECO5 | High | Negligible | Low |
| Fork-tailed swift | Construction, operation | High | Negligible | Low | None required<br>Aerial species | High | Negligible | Low |
| White-throated needletail | Construction, operation | High | Negligible | Low | None required<br>Primarily aerial, no suitable habitat. | High | Negligible | Low |

## 8.7 Environmental performance requirements

The EPRs discussed above in the impact assessment, are listed in Table 8.5. These EPRs are designed to minimise the impacts of construction and operational activities on the ecological values of the Heybridge converter station site and shoreline crossing areas.

The EPRs have also been developed with consideration of industry standards and relevant legislation, guidelines and policies.

Table 8.5: Summary of EPRs for construction and operation of the Heybridge converter station and shoreline crossing

| EPR ID | Environmental Performance Requirement | Project Stage |
|---|---|---|
| EPR ECO1 | **Minimise vegetation removal and implement and implement vegetation protection measures**<br>1. To inform the project design, develop and implement measures to avoid and otherwise minimise to the extent practicable impacts on native vegetation. The design must avoid the eucalyptus woodland vegetation in the northeast corner of the site.<br>2. Prior to commencement of project works, develop a vegetation management plan to avoid and otherwise minimise impacts to vegetation, covering as a minimum:<br>(a) Identification of areas of important flora and fauna habitat to be protected during construction.<br>(b) Fencing protected areas and no-go zones to prevent access during construction.<br>(c) Pre-construction site assessment to confirm that vegetation and trees to be retained have been adequately protected from impact.<br>(d) Vegetation clearing controls and protection measures.<br>(e) Implementation of appropriate measures to manage the risk of spread and introduction of weeds and pathogens during construction.<br>(f) Procedures if unexpected threatened species are identified.<br>The vegetation management plan must be a sub plan of the CEMP and implemented during construction. | Construction |
| EPR ECO2 | **Implement measures to protect fauna**<br>1. Prior to commencement of project works, develop a fauna management plan to avoid and otherwise minimise impacts to fauna, covering as a minimum:<br>(a) Protection measures for Tasmanian devils and spotted-tail quolls with a focus on construction traffic and awareness regarding roadkill included in site inductions.<br>(b) Recording and reporting process for incidents of vehicle strikes and/or roadkill of Tasmanian devils and spotted-tail quolls on Minna Road between intersection with Bass Highway and the | Construction |

| EPR ID | Environmental Performance Requirement | Project Stage |
|---|---|---|
| | entry to site, where vehicles associated with the project will travel. Reporting of roadkill of Tasmanian devils and spotted-tail quolls to the Department of Natural Resources and Environment Tasmania. Removing mortalities off the road within a specified distance of site to reduce attracting carnivorous fauna.<br>(c) Utilisation of night lighting to a minimum amount required to safely operate the site and to reduce light pollution and adverse effects to fauna species.<br>(d) Management procedures to avoid animals entering trenches or being recovered from trenches and excavated areas.<br>(e) Preclearance surveys of construction areas for threatened fauna species prior to vegetation removal and undertaken by a suitably qualified ecologist.<br>The fauna management plan must be a sub plan of the CEMP and implemented during construction. | |
| EPR ECO3 | **Implement measures to protect raptors**<br>1. Prior to commencement of project works confirm that there are no nests within a distance of 500 m of the site boundary, or within 1 km line-of-sight prior to construction using data collected within one year of construction commencing.<br>2. Undertake further nest survey if there is no current (within one year) survey of nest presence and to avoid impacts to raptors outside of the breeding season, as per the *Threatened Tasmanian Eagles Recovery Plan 2006-2010* and the Environment Protection Authority's *Guide to Eagle Nest Searching and Nest Activity Checks*.<br>(a) If a nest is observed within a distance of 500 m of the site boundary, or within 1 km line-of-sight prior to construction the following will be required:<br>**(i)** Avoid project activities within a distance of 500 m, or within 1 km line-of-sight of active eagle nests during breeding season in accordance with guidelines outlined in the FPA Fauna Technical Note No. 1<br>(ii) Construction to be deferred until outside of the breeding season if a nest within a distance of 500 m, or within 1 km line of sight is determined to be active as per FPA Fauna Technical Note No. 1. All nests are to be treated as active during the breeding season until determined as inactive by a suitable qualified person. | Construction |
| EPR ECO4 | **Operational implementation of vegetation protection measures**<br>3. As part of the OEMP, develop a vegetation management plan for operations to avoid and otherwise minimise impacts that covers:<br>(a) Demarcation of areas of important flora and fauna habitat to be protected during normal maintenance and operations. | Construction |

| EPR ID | Environmental Performance Requirement | Project Stage |
|---|---|---|
| | (b) Implementation of appropriate measures to manage the risk of spread and introduction of weeds and pathogens during normal maintenance and operations.<br>(i) The vegetation management plan must be a sub plan to the OEMP and implemented in operation. | |
| EPR ECO5 | **Operational implementation of measures to protect raptors**<br>1. As part of the OEMP, develop a nest management strategy to avoid impacts to raptors during major operational and maintenance activities (e.g. long-term increase in site activity that includes use of crane/s for lifting and replacing large components and equipment)<br>2. Prior to major operational and maintenance activities, confirm that there are no nests within a distance of 500 m of the site boundary, or within 1 km line-of-sight prior to activities, using data collected within one year prior to the commencement of construction.<br>3. Undertake a further nest survey if there is no recent (within one year) survey data of nest presence outside of the breeding season, as per the *Threatened Tasmanian Eagles Recovery Plan 2006*-2010 and the Environment Protection Authority's *Guide to Eagle Nest Searching and Nest Activity Checks*<br>(a) If a nest is observed within a distance of 500 m, or within 1 km line-of-sight prior to major operational/maintenance activities the following will be required:<br>(i) Avoid major activities within a distance of 500 m, or within 1 km line of sight of active eagle nests during breeding season in accordance with guidelines outlined in the FPA Fauna Technical Note No. 1<br>(ii) Defer major activities until outside of the breeding season if a nest within a distance of 500 m, or within 1 km line of sight is determined to be active as per FPA Fauna Technical Note No. 1. All nests are to be treated as active during the breeding season until determined as inactive by a suitable qualified person. | Operation |

# 9. Conclusion

This report presents a baseline characterisation of ecological values within the study area of the Heybridge converter station and shoreline crossing based on available data resources and the results of field surveys. The report also presents an impact assessment that considers the potential impact of the project on those ecological values and whether there is likely to be a significant impact on MNES protected under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), and/or species protected under the Tasmanian *Threatened Species Protection Act 1995* (TSP Act) or vegetation communities protected under the *Nature Conservation Act 200*2 (NC Act).

The key values identified as part of this assessment were:

- The presence of three native vegetation communities, one of which is listed on the NC Act.
    - *Eucalyptus amygdalina* coastal forest and woodland (DAC) –NC Act listed – on the shoreline crossing
    - Coastal scrub (SSC), on the shoreline crossing
    - *Eucalyptus viminalis–Eucalyptus globulus* coastal forest and woodland (DVC), on the converter station site
- The potential presence of five EPBC Act listed fauna species
    - Tasmanian devil (*Sarcophilus harrisii*)
    - spotted tail quoll (*Dasyurus maculatus* subsp*. maculatus*)
    - Tasmanian wedge-tailed eagle (*Aquila audax* subsp. *fleayi*)
    - white-throated needletail (*Hirundapus caudacutus*)
    - fork-tailed swift (*Apus pacificus*)
- The potential presence of one NC Act listed fauna species
    - white bellied sea-eagle (*Haliaeetus leucogaster)*

This assessment found that any impacts from the project on threatened ecological communities, threatened flora or threatened fauna species at the either the converter station or the shore crossing site will be manageable. EPRs were developed to further minimise the impacts of this project activity.

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# Appendices

# A Likelihood of occurrence tables

Table A.1: Terms utilised in Likelihood of occurrence tables

| Likelihood of occurrence | TSP Act | EPBC Act |
|---|---|---|
| **FLORA AND FAUNA AND VEGETATION COMMUNITIES**<br>**Known to occur (K)** - the species/ecological community has been recorded in the survey area.<br>**May occur (M)** - the species/ecological community has been recorded in the study area and suitable species habitat exists or could exist in the survey area following detailed ecological studies.<br>**Unlikely to occur (U)** - the species/ecological community has not been recorded in the study area and/or suitable species habitat does not exist in or adjacent to the survey area.<br>**Does not occur or absent (A)** - the species/community potential distribution includes the study area but has never been recorded in or adjacent to the study area. | **x:** Extinct<br>**en:** Endangered<br>**vu:** Vulnerable<br>**r:** Rare | **EX:** Extinct<br>**CR:** Critically endangered<br>**EN:** Endangered<br>**VU:** Vulnerable<br>**CD:** Conservation dependent<br>**MiW**: Migratory wetland species<br>**MiT:** Migratory terrestrial species<br>**MiM**: Migratory marine birds<br>**Mar:** Marine birds |

## A.1 Listed fauna

Table A.2: Listed fauna likelihood of occurrence for the converter station and shore crossing

| Scientific name | Common name | TSP Act | EPBC Act | EPBC Migratory/Marine | Count (sum) | Last record | Source | Likelihood of Occurrence | Habitat | Rationale |
|---|---|---|---|---|---|---|---|---|---|---|
| Terrestrial/non-marine species | | | | | | | | | | |
| *Accipiter novaehollandiae* | grey goshawk | en | | | 71 | 04/10/2021 | NVA | A | A medium sized white goshawk that inhabits wet forest, mixed forest and swamp forest, particularly where blackwood is present generally below 600 m (Threatened Species Section 2021). The species nests in mature wet forest, usually in the vicinity of a watercourse. | There are no known nests within 1 km of the converter station or shore crossing. |
| *Actitis hypoleucos* | common sandpiper | | | Mi W | 0 | N/A | PMST | A | A small sandpiper of 19–21 cm in length with a wingspan of 32–35 cm found along all coastlines of Australia and in many areas inland, the common sandpiper is widespread in small numbers. The population when in Australia is concentrated in northern and western Australia (Department of the Environment 2020a) | No NVA records within 5 km of converter station and shore crossing. No suitable coastal wetland habitat within survey area. |
| *Apus pacificus* | fork-tailed swift | | | MiM | 0 | N/A | PMST | M | Medium-sized swift to 18-21 cm, characterised by a long and deeply forked tail. Almost exclusively aerial, flying from less than 1 m to at least 300 m above ground. In Australia, mostly occur over inland plains, over dry or open habitats, including riparian woodland and teatree swamps, low scrub, heathland or saltmarsh (Department of the Environment 2015b). Department of the Environment 2019a). | There are no NVA records within 5 km of converter station and shore crossing. Aerial species which could occur over the survey area. |
| *Aquila audax subsp. fleayi* | Tasmanian wedge-tailed eagle | en | EN | | 530 | 08/10/2022 | NVA | M | Large brown-black eagle with feathered legs. Occurs across Tasmania in forested habitats. Nesting habitat is large tracts (more than 10 ha) of | There are no known wedge-tailed eagle nests within 1 km of the converter station or shore crossing: The nearest known |

| Scientific name | Common name | TSP Act | EPBC Act | EPBC Migratory/Marine | Count (sum) | Last record | Source | Likelihood of Occurrence | Habitat | Rationale |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | eucalypt or mixed forest (Threatened Species Section 2006). | eagle nest is nest# 1323 which is located over 1.6 km to the west of the converter station. It is listed on the NVA as an eagle nest of indeterminate eagle species nests (i.e. wedge-tailed eagle or white-bellied sea-eagle). This nest could not be found in the 2022 eagle nest survey undertaken by North Barker for the NWTD (North Barker 2022). The nest was last recorded in 2006 (NVA data). The next nearest confirmed wedge-tailed eagle nest (nest # 2573) is recorded on the NVA and is 1.7 km to the south of the survey area. No suitable nesting habitat is at the converter station or shore crossing. May overfly site on occasions. |
| *Astacopsis gouldi* | giant freshwater crayfish | vu | VU | | 30 | 20/02/2021 | NVA | A | A large slow-growing and long-lived freshwater crayfish that can weigh up to 3 kg. The species is endemic to rivers, lakes and streams of northern Tasmania (Threatened Species Scientific Committee 2017). | The closest record to the converter station is over 4 km south in Chasm Creek. No suitable stream habitat in survey area. |
| *Botaurus poiciloptilus* | Australasian bittern | en | EN | Mi W | ) | N/A | PMST | U | A large (to 76 cm tall), stocky, thick–necked heron–like bird with mottled brown and dark brown to black plumage. Its preferred habitat is freshwater wetlands with tall dense vegetation particularly those dominated by sedges, rushes and reeds. | No suitable wetland habitat within survey area. No NVA records within 5 km. |
| *Calidris acuminata* | sharp-tailed sandpiper | | | Mi W | 0 | N/A | PMST | A | A small to medium-sized wader, that spends the non-breeding season in Australia. Prefers muddy edges of shallow fresh or brackish waters, with inundated or emergent sedges, grass, saltmarsh or other low vegetation. In Tasmania, they mostly occur in coastal areas in the east from George Town to Hobart, with scattered records on the north-west coast, and west coast from Henty River | No suitable estuarine wetland habitat within the survey area. No NVA records within 5 km of converter station and shore crossing. |

| Scientific name | Common name | TSP Act | EPBC Act | EPBC Migratory/Marine | Count (sum) | Last record | Source | Likelihood of Occurrence | Habitat | Rationale |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | and Port Davey (Department of the Environment 2019b). | |
| *Calidris canutus* | red knot | | EN | Mi W | 0 | N/A | PMST | U | A small to medium coastal bird that inhabits intertidal mudflats, sandflats and sandy beaches of sheltered coasts, in estuaries, bays, inlets, lagoons and harbours; sometimes on sandy ocean beaches or shallow pools on exposed wave-cut rock platforms or coral reefs. They rarely use inland lakes or swamps. They generally travel through Tasmania from August to September, but does not breed in Australia. | No suitable estuarine wetland habitat within the survey area. No NVA records within 5 km of converter station and shore crossing. |
| *Calidris ferruginea* | curlew sandpiper | | CR | Mi W | 0 | N/A | PMST | A | Small, slim sandpiper 18-23 cm long that mainly occur on intertidal mudflats in sheltered coastal areas and around non-tidal swamps, lakes and lagoons near the coast. They are also recorded inland around ephemeral and permanent lakes, dams etc. They mostly occur in eastern Tasmania, but also at several sites in the northwest (Department of the Environment 2019c). | No suitable estuarine wetland habitat within the survey area. No NVA records within 5 km of converter station and shore crossing. |
| *Calidris melanotos* | pectoral sandpiper | | | Mi W | 0 | N/A | PMST | A | Small to medium-sized sandpiper with a length of 19-24 cm, that occurs in coastal lagoons, estuaries, bays, swamps, lakes, inundated grasslands, saltmarshes, river pools, creeks, floodplains and artificial wetlands. The pectoral sandpiper in Tasmania is very rare, with records existing for Cape Portland, Orielton Lagoon-Sorell, Barilla Bay, Clear Lagoon, Cameron Inlet and Flinders Island (Department of the Environment 2019d). | No suitable estuarine wetland habitat within the survey area. No NVA records within 5 km of converter station and shore crossing. |

| Scientific name | Common name | TSP Act | EPBC Act | EPBC Migratory/Marine | Count (sum) | Last record | Source | Likelihood of Occurrence | Habitat | Rationale |
|---|---|---|---|---|---|---|---|---|---|---|
| *Ceyx azureus diemenensis* | Tasmanian azure kingfisher | en | EN | | 11 | 01/01/2009 | NVA | A | A small brightly coloured kingfisher with a long slender black bill and red legs (Threatened Species Section 2012b). The head, neck, and back are deep blue and the breast is orange-red. This species inhabits the forested margin of rivers. | Three NVA records from Blythe River adjacent to site from early 2000's. No suitable habitat on site or at shore crossing. |
| *Dasyurus maculatus subsp. maculatus* | spotted-tail quoll | r | VU | | 4 | 11/02/2020 | NVA | M | A medium-sized carnivorous marsupial found in wet forest and coastal habitats across Tasmania (DELWP 2016). | There is a NVA record of a roadkill carcass on Minna Road near the intersection with the Bass Highway on 11/02/2020. No suitable habitat on the converter station site but potentially suitable habitat in the coastal vegetation at the shore crossing. |
| *Dasyurus viverrinus* | eastern quoll | | EN | | 1 | 01/05/1996 | NVA | U | A small carnivorous marsupial whose preferred habitat includes inhabits dry grassland and forest mosaics which are bounded by agricultural land (Threatened Species Scientific Committee 2015). | There is one NVA record over 800 m to the east in Heybridge. There is no suitable grassland or agricultural land habitat at the converter station and shore crossing. |
| *Engaeus yabbimunna* | Burnie burrowing crayfish | vu | VU | | 2 | 08/05/1996 | NVA | A | A small grey-blue freshwater crayfish which is less than 10 cm in length (Threatened Species Scientific Committee 2016). They inhabit stream banks and seepages with remnant riparian vegetation within the Burnie area and the area around Mt Hicks and at Ridgeley. They dig burrows that generally intersect the water table so that they can keep moist. They are rarely ever seen outside their burrows (Doran 2000), . | NVA records from Emu River over 4 km west of the converter station. No suitable habitat within survey area. |
| *Galaxiella pusilla* | eastern dwarf galaxias | vu | VU | | 0 | N/A | PMST | A | Tiny slender freshwater fish that averages 30-40 mm in length. In Tasmania this species is only known from Flinders Island, Piper-Ringarooma Rivers and Smithton-Burnie Coast. Occurs in slow flowing and still, shallow, permanent and temporary freshwater habitats often containing dense aquatic macrophytes and emergent plants. | No NVA records within 5 km of survey area current known range. |

| Scientific name | Common name | TSP Act | EPBC Act | EPBC Migratory/Marine | Count (sum) | Last record | Source | Likelihood of Occurrence | Habitat | Rationale |
|---|---|---|---|---|---|---|---|---|---|---|
| *Gallinago hardwickii* | Lathams snipe | | | Mi<br>W | 0 | N/A | PMST | A | Medium-sized wader 29-33 cm in length and occurs in permanent and ephemeral wetlands up to 2000 m above sea level. May be found in a variety of vegetation types or communities including tussock grasslands with rushes, reeds and sedges, coastal and alpine heathlands, lignum or tea-tree scrub, button-grass plains, alpine herbfields and open forest. This species is widespread in Tasmania, with the Central Plateau supporting large colonies of Latham's snipe (Department of the Environment 2019e). | No suitable wetland habitat within survey area. No NVA records within 5 km from proposed route. |
| *Haliaeetus leucogaster* | white-bellied sea-eagle | v | | Mar | 198 | 04/02/2022 | NVA | M | The White-bellied Sea-eagle is a large raptor that has long, broad wings and a short, wedge-shaped tail. The White-bellied Sea-eagle is distributed along the coastline (including offshore islands) of mainland Australia and Tasmania. In Tasmania, nesting habitat is forest with old-growth eucalypts within 5 km of the coast (nearest coast including shores, bays, inlets and peninsulas), rivers, lakes or farm dams. | There are no known white-bellied sea-eagle nests within 1 km of the converter station or shore crossing: As noted above under the wedge-tailed eagle there is an eagle nest is nest# 1323 which is located over 1.6 km to the west of the converter station. It is listed on the NVA as an eagle nest of indeterminate eagle species nests (i.e. wedge-tailed eagle or white-bellied sea-eagle) and was last recorded in 2006. No suitable nesting habitat is the at the converter station or shore crossing. The nearest known white-bellied sea-eagle nest (nest # 2273) is located on the Emu River, 4.8 km to the south west. May overfly site on occasions. |
| *Hirundapus caudacutus* | white-throated needletail | | VU | MiT | 0 | N/A | PMST | M | The White-throated Needletail is a large (20 cm in length and approximately 115–120 g in weight) swift with a thickset, cigar-shaped body, stubby tail and long pointed wings. Migratory species, almost exclusively aerial within its Australian distribution Department of the Environment (2015b). Although they occur over most types of habitats, they are | There are no NVA records within 5 km of converter station and shore crossing. Aerial species which could occur over the survey area. Impact on potential roosting sites negligible. |

| Scientific name | Common name | TSP Act | EPBC Act | EPBC Migratory/Marine | Count (sum) | Last record | Source | Likelihood of Occurrence | Habitat | Rationale |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | probably recorded most often above wooded areas, including open forest and rainforest, and may also fly between trees or in clearings. The species is known to roost in live and dead trees (including isolated trees) amongst dense foliage in the canopy or in hollows (Corben et al. 1982; Quested 1982; Day 1993; Tarburton 1993, 2015).They also commonly occur over heathland (Cooper 1971; Learmonth 1951; McFarland 1988). Mainly within Australia during non-breeding season from September to November. | |
| *Lathamus discolor* | swift parrot | en | CR | | 10 | 09/10/2015 | NVA | A | A small bright green parrot with red under the wings and a red face (Threatened Species Scientific Committee 2016). Breeding range (foraging and nesting habitat) is mostly within 10 km of the coast (including shores, bays, inlets or peninsulas) predominantly in eastern and south eastern Tasmania, although there is breeding in some years on the central north and north western coast of Tasmania. Foraging habitat is Eucalyptus globulus dry and wet forest and E. ovata forest. Nesting habitat is forest with large eucalyptus trees with hollows in close proximity to foraging habitat. | The Heybridge converter station site and the shoreline crossing are located within North West Breeding Range of swift parrots. There are two sighting record on the NVA over 700m to the east of the converter Station from 1987 and 2015. There are also 4 records over 1.6 km to the west of the converter Station including one nest record from 2006. There is no suitable priority foraging or nesting habitat at the converter station or the shore crossing. |
| *Limosa lapponica baueri* | Nunivak bar-tailed godwit | | VU | Mi W | 0 | N/A | PMST | A | A large migratory shorebird that occurs mainly in coastal habitats such as large intertidal sandflats, banks, mudflats, estuaries, inlets, harbours, coastal lagoons and bays (Higgins & Davies 1996). | No records on NVA within 5 km of the survey area. |
| *Myiagra cyanoleuca* | satin flycatcher | | | MiT | 10 | 04/02/2018 | PMST | U | Glossy blue-black bird with a length around 17.5 cm, a wingspan of 23 cm and a weight of 17 g. Satin Flycatchers inhabit heavily vegetated gullies in eucalypt-dominated forests and taller woodlands, and on migration, occur in coastal | There are records from 10 locations within 5 km of the survey area with the nearest record over 1 km to the south that was recorded in 2016. There is no |

| Scientific name | Common name | TSP Act | EPBC Act | EPBC Migratory/Marine | Count (sum) | Last record | Source | Likelihood of Occurrence | Habitat | Rationale |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | forests, woodlands, mangroves and drier woodlands and open forests (Blakers et al. 1984; Emison et al. 1987; Officer 1969). | suitable habitat present at the converter station or the shore crossing |
| *Numenius madagascariensis* | eastern curlew | en | CR | Mi W | 0 | N/A | PMST | A | The largest migratory shorebird with a characteristic long down-curved bill. During the non-breeding season in Australia, the eastern curlew is most commonly associated with sheltered coasts, especially estuaries, bays, harbours, inlets and coastal lagoons, with large intertidal mudflats or sandflats. Eastern curlews are rarely recorded inland (Department of the Environment 2015). | No records on NVA within 5 km of the survey area. |
| *Perameles gunnii gunnii* | eastern barred bandicoot | | VU | | 2 | 24/04/2001 | NVA | A | A small marsupial with long pink nose and large ears and characteristic pale bars across its hindquarters (DEWHA 2008a). Occurs in a range of agricultural habitats across Tasmania where improved pasture is interspersed with patches of native bush. | The nearest NVA record is 4 km to east of Sulphur Creek. There is no potential suitable habitat within the Converter Statom or the shore crossing. |
| *Prototroctes maraena* | Australian grayling | vu | VU | | 26 | 03/06/1964 | NVA | A | Dark green to dark grey fish with silvery sides and a dark mid-lateral stripe to 30 cm. An anadromous species where fish are born in freshwater, then migrate to the ocean as juveniles where they grow into adults before migrating back into freshwater to spawn (Fulton 1990). | Two records from the Blythe River in 1964. No suitable habitat at the converter station and shore crossing. |
| *Sarcophilus harrisii* | Tasmanian devil | en | EN | | 371 | 29/02/2020 | NVA | M | A medium-sized carnivorous marsupial that inhabits forest, woodland and agricultural areas across Tasmania (DEWHA 2009). | There are NVA records of a roadkill carcass on Minna Road from 17/02/2017 and a carcass on the Bass Highway dated 26/12/2018. There is no suitable habitat on the converter station site or at the shore crossing. |
| *Sternula nereis subsp. nereis* | Australian fairy tern | vu | VU | | 4 | 07/03/2012 | NVA | U | A small grey and white tern; 22 to 27 cm in length with long, narrow wings and a bright orange bill (Threatened Species Scientific Committee 2011). Inhabits coasts and offshore islands including | There are two records from the early 1980's with poor position accuracy (18,500 m) within 5 km. No suitable habitat at the converter station may occasionally occur on the spit at the |

| Scientific name | Common name | TSP Act | EPBC Act | EPBC Migratory/Marine | Count (sum) | Last record | Source | Likelihood of Occurrence | Habitat | Rationale |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | beaches, bays, estuaries and lagoons (Higgins and Davies 1996). | mouth of the Blyther River at the southern end of the shore crossing area. |
| *Thinornis cucullatus cucullatus* | hooded plover (eastern) | | VU | | 2 | 17/03/2012 | PMST | U | A stocky, medium-sized wading bird about 20 cm long. Both males and females are similar and have a black 'hood' and a white 'collar' across the back of the neck. Occurs around the coast of Tasmania on ocean beaches where they may be observed singly, in pairs, family groups or flocks (Department of the Environment. 2014). | There are two NVA records within 5 km of converter station and shore crossing. However, these are over 4 km away. No birds have been observed at the shore crossing during surveys and the shore crossing provides limited suitable habitat as it is close to residential areas and has high visitation rates including dog walkers which are disturbing to hooded plovers. |
| *Tringa nebularia* | Common greenshank | | | Mi W | 0 | N/A | PMST | U | Heavily-built wader 30-35 cm in length that is mostly found along the coast in Tasmania from Temma in the northwest to Hobart in the southeast. Found in a variety of inland wetlands and sheltered coastal habitats. The species uses both permanent and ephemeral terrestrial wetlands, including swamps, lakes, dams, rivers, creeks, billabongs, waterholes and inundated floodplains, claypans and saltflats (Department of the Environment 2019g). | No suitable estuarine wetland habitat within the survey area. No NVA records within 5 km of converter station and shore crossing. |
| *Tyto novaehollandiae castanops* | Tasmanian masked owl | en | VU | | 2 | 6/06/2020 | NVA | A | A large owl with white disc face that occurs in native forests and woodlands as well as agricultural areas with a mosaic of native vegetation and pasture (DEWHA 2010). Nests in hollows in large old trees. | There are two records from the Emu River over 4.8 km to the south west of the survey area. There is no suitable masked owl habitat at the converter station and shore crossing. No potential nesting trees with no trees occurring > 1m DBH with nest hollows > 15cm dia. |
| **Marine/migratory animals** | | | | | | | | | | |
| *Ardenna carneipes* | fleshy-footed shearwater | | | MiM | 0 | N/A | PMST | A | Marine bird species. | No suitable habitat within survey area. |

| Scientific name | Common name | TSP Act | EPBC Act | EPBC Migratory/Marine | Count (sum) | Last record | Source | Likelihood of Occurrence | Habitat | Rationale |
|---|---|---|---|---|---|---|---|---|---|---|
| *Ardenna grisea* | sooty shearwater | | | MiM | 0 | N/A | PMST | A | Marine bird species. | No suitable habitat within survey area. |
| *Balaenoptera musculus* | blue whale | | EN | MiM | 0 | N/A | PMST | A | Marine whale species. | No suitable habitat within survey area. |
| *Caperea marginata* | pygmy right whale | | | MiM | 0 | N/A | PMST | A | Marine whale species. | No suitable habitat within survey area. |
| *Carcharodon carcharias* | great white shark | | VU | MiM | 0 | N/A | PMST | A | Marine shark species. | No suitable habitat within survey area. |
| *Chelonia mydas* | Green sea turtle | vu | VU | MiM | 1 | 30/06/1959 | NVA | A | Marine turtle species. | No suitable habitat within survey area. |
| *Diomedea antipodensis* | Antipodean albatross | | VU | MiM | 0 | N/A | PMST | A | Pelagic albatross species. | No suitable habitat within survey area. |
| *Diomedea antipodensis gibsoni* | Gibson's albatross | | VU | | 0 | N/A | PMST | A | Pelagic albatross species. | No suitable habitat within survey area. |
| *Diomedea epomophora* | southern royal albatross | | VU | MiM | 0 | N/A | PMST | A | Pelagic albatross species. | No suitable habitat within survey area. |
| *Diomedea exulans* | wandering albatross | | VU | MiM | 0 | N/A | PMST | A | Pelagic albatross species. | No suitable habitat within survey area. |
| *Diomedea sanfordi* | northern royal albatross | | EN | MiM | 0 | N/A | PMST | A | Pelagic albatross species. | No suitable habitat within survey area. |
| *Eubalaena australis* | southern right whale | en | EN | MiM | 4 | 11/04/2014 | NVA | A | Marine whale species. | No suitable habitat within survey area. |
| *Fregetta grallaria grallaria* | white-bellied storm-petrel | | VU | | 0 | N/A | PMST | A | Marine bird species. | No suitable habitat within survey area. |
| *Galeorhinus galeus* | School shark | | CD | | 0 | N/A | PMST | A | Marine shark species | No suitable habitat within survey area |
| *Halobaena caerulea* | blue petrel | vu | VU | | 0 | N/A | PMST | A | Marine bird species. | No suitable habitat within survey area. |
| *Lagenorhynchus obscurus* | dusky dolphin | | | MiM | 0 | N/A | PMST | A | Marine dolphin species. | No suitable habitat within survey area. |
| *Lamna nasus* | mackerel shark | | | MiM | 0 | N/A | PMST | A | Marine shark species. | No suitable habitat within survey area. |
| *Macronectes giganteus* | southern giant-petrel | vu | EN | MiM | 0 | N/A | PMST | A | Pelagic albatross species. | No suitable habitat within survey area. |
| *Macronectes halli* | northern giant-petrel | | VU | MiM | 0 | N/A | PMST | A | Pelagic albatross species. | No suitable habitat within survey area. |

| Scientific name | Common name | TSP Act | EPBC Act | EPBC Migratory/Marine | Count (sum) | Last record | Source | Likelihood of Occurrence | Habitat | Rationale |
|---|---|---|---|---|---|---|---|---|---|---|
| *Megaptera novaeangliae* | humpback whale | en | VU | MiM | 10 | 12/11/2017 | NVA | A | Marine whale species. | No suitable habitat within survey area. |
| *Mirounga leonina subsp. macquariensis* | southern elephant seal | en | VU | | 4 | 9/11/2007 | NVA | A | Marine seal species. | No suitable habitat within survey area. |
| *Pachyptila turtur subantarctica* | fairy prion | en | VU | | 0 | N/A | PMST | A | Marine bird species. | No suitable habitat within survey area. |
| *Phoebetria fusca* | sooty albatross | | VU | MiM | 0 | N/A | PMST | A | Pelagic albatross species. | No suitable habitat within survey area. |
| *Pterodroma leucoptera leucoptera* | Australian Gould's Petrel | | EN | Mar | 0 | N/A | PMST | A | Small slightly-built petrel about 70 cm in length, and is a pelagic marine species spending much of its time foraging at sea and coming ashore only to breed (Department of the Environment 2019f). | No suitable habitat as species is a pelagic marine species. |
| *Pterodroma mollis* | soft-plumaged petrel | en | VU | Mar | 0 | N/A | PMST | A | Pelagic petrel species that breeds on Maatsuyker Island off southern Tasmania. | No suitable habitat as species is a pelagic marine species. |
| *Thalassarche bulleri* | Buller's albatross | | VU | MiM | 0 | N/A | PMST | A | Pelagic albatross species. | No suitable habitat within survey area. |
| *Thalassarche bulleri platei* | Pacific albatross | | VU | | 0 | N/A | PMST | A | Pelagic albatross species. | No suitable habitat within survey area. |
| *Thalassarche cauta* | shy albatross | vu | EN | MiM | 78 | 20/10/2018 | NVA | A | Pelagic albatross species. | No suitable habitat within survey area. |
| *Thalassarche chrysostoma* | grey-headed albatross | | EN | MiM | 0 | N/A | PMST | A | Pelagic albatross species. | No suitable habitat within survey area. |
| *Thalassarche impavida* | Campbell albatross | | VU | MiM | 0 | N/A | PMST | A | Pelagic albatross species. | No suitable habitat within survey area. |
| *Thalassarche melanophris* | Black-browed albatross | en | VU | MiM | 6 | 25/10/2013 | NVA | A | Pelagic albatross species. | No suitable habitat within survey area. |
| *Thalassarche salvini* | Salvin's albatross | | VU | MiM | 0 | N/A | PMST | A | Pelagic albatross species. | No suitable habitat within survey area. |
| *Thalassarche steadi* | white-capped albatross | | VU | MiM | 0 | N/A | PMST | A | Pelagic albatross species. | No suitable habitat within survey area. |
| *Thunnus maccoyii* | Southern Bluefin Tuna | | CD | | 0 | N/A | PMST | A | Marine shark species | No suitable habitat within survey area |

## A.2 Listed flora

Table A.3: Listed flora likelihood of occurrence for the converter station and shore crossing

| *Scientific name* | Common name | TSP Act | EPBC | No. of records | Last record | Source | Likelihood of Occurrence | Habitat | Rationale |
|---|---|---|---|---|---|---|---|---|---|
| *Baumea gunnii* | slender twigsedge | r | | 1 | 6/07/2009 | NVA | A | Perennial sedge to 70 cm that inhabits wet moors, creeks and riverbanks and can extend into poorly-drained sedgy/ grassy forest and woodland (Threatened Species Section 2016a). | One NVA record from east of the Blythe River at Heybridge. No suitable habitat within the survey area. |
| *Caladenia caudata* | tailed spider-orchid | vu | VU | 0 | N/A | PMST | A | A small terrestrial orchid, found mainly in dry heathland and heathy woodland habitats on sandy and loamy soils, in lowland areas of northern, eastern and south-eastern Tasmania (Threatened Species and Marine Section 2014a).. | No NVA records within 5 km of survey area. Converter station and shore crossing are outside of the species' known range. No suitable heathland and heathy woodland habitats on sandy soils within survey area. |
| *Caladenia patersonii* | Paterson's spider-orchid | vu | | 1 | 12/10/1978 | NVA | U | Small orchid up to 35 cm tall with a wiry and densely hairy stem bearing 1-2 flowers. Known to occur in coastal and near coastal areas in the north from south of Marrawah to Bridport. Occurs in low shrubby heathland in moist to well-drained sandy and clay loam (Threatened Species Unit 2001) . | One historic NVA record from southeast of Heybridge. No suitable coastal shrubby heathland habitat within survey area, therefore unlikely to occur. |
| *Caladenia pusilla* | tiny fingers | r | | 2 | 17/10/1976 | NVA | U | Small pink spider orchid to 10 cm tall. Occurs in coastal and near coastal areas in the north west and north east Tasmania and on King Island and Cape Barren Island (Jones et al. 1999). Grows in heathland and open forest often on well-drained sandy soils. | Two historic records; one from near the Cam River and one west of Heybridge. No suitable heathland or open forest habitat on sandy soils within the survey area therefore is unlikely to occur. |
| *Leucochrysum albicans var. tricolor* | hoary sunray | en | EN | 0 | N/A | PMST | A | Perennial herb with greenish-yellow flowers that occurs in the west and on the Central Plateau and the Midlands, mostly on basalt soils in open grassland. Would have originally occupied Eucalyptus pauciflora woodland and tussock grassland, though most of its habitat is now converted to pasture or cropland (Threatened Species Section 2017). | No NVA records within 5 km of survey area. Outside of species known range. No suitable habitat within the survey area. |

| *Scientific name* | Common name | TSP Act | EPBC | No. of records | Last record | Source | Likelihood of Occurrence | Habitat | Rationale |
|---|---|---|---|---|---|---|---|---|---|
| *Persicaria decipiens* | slender waterpepper | vu | | 20 | 23/10/2018 | NVA | A | An annual or perennial sprawling herb with branched, slender stems that grow up to 60 cm long. Grows locally on the banks of rivers and streams (Threatened Species Unit 2003a). | One record on the NVA from within 5 km of converter station and shore crossing. No suitable present. |
| *Senecio psilocarpus* | Swamp fireweed | en | VU | 0 | N/A | PMST | A | Habitat characteristics for swamp fireweed includes the following elements: swampy habitats including broad valley floors associated with the Midlands river systems (Cressy area), edges of farm dams amongst low-lying grazing/cropping ground (Forth area), herb-rich native grassland in a broad swale between stable sand dunes (Nook Swamps, King Island), adjacent to wetlands in native grassland (Mount William), herbaceous marshland (Dukes Marshes), and low-lying lagoon systems (Flinders Island) (Threatened Species Section 2011). | Outside of known range. No NVA records within 5 km of the Converter station or shoreline crossing. |
| *Tetratheca ciliata* | northern pinkbells | r | | 2 | 14/09/1892 | NVA | A | A slender shrub that in Tasmania with pink flowers that has been recorded from mostly near-coastal sites from Rocky Cape in the north west to the Tomahawk/Boobyalla area in the north east, It grows in heathland or heathy woodland on sandy well-drained soils (Threatened Species and Marine Section 2014b). | Two historic records from 1892 within 5 km of the survey area. There is no suitable heathland or heathy woodland habitat on sandy well-drained soils within the survey area. |

# B List of flora recorded within the survey area

Key: i – introduced, e – endemic, t – threatened under the Threatened Species Act 1995, D – declared weed under the Weed Management Act 1999.

| Species | Preferred common name | Status |
|---|---|---|
| **DICOTYLEDON** | | |
| **Apiaceae** | | |
| *Hydrocotyle hirta* | hairy pennywort | |
| **Aizoaceae** | | |
| *Tetragonia implexicoma* | ice-plant | |
| **Amaranthaceae** | | |
| *Rhagodia candolleana* | seaberry saltbush | |
| **Asteraceae** | | |
| *Arctotheca calendula* | cape dandelion | |
| *Cassinia aculeata* | dolly bush | |
| *Chrysanthemoides monilifera subsp. monilifera* | boneseed | D |
| *Cirsium arvense var. arvense* | Californian thistle | D |
| *Cirsium vulgare* | spear thistle | i |
| *Conyza sp* | fleabane | i |
| *Euchiton involucratus* | star cottonleaf | |
| *Euchiton japonicus* | common cottonleaf | |
| *Helichrysum luteoalbum* | Jersey cudweed | |
| *Hypochaeris radicata* | cats ear | i |
| *Leontodon saxatilis* | hairy hawkbit | i |
| *Olearia lirata* | forest daisybush | |
| *Olearia stellulata* | sawleaf daisybush | |
| *Osteospermum fruticosum* | shrubby daisybush | i |
| *Senecio jacobaea* | ragwort | D |
| *Senecio linearifolius* | fireweed groundsel | |
| *Senecio sp.* | groundsel | |
| *Sonchus asper* | prickly sowthistle | i |
| *Sonchus oleraceus* | common sowthistle | i |
| **Campanulaceae** | | |
| *Wahlenbergia gymnoclada* | naked bluebell | |
| *Wahlenbergia sp* | bluebells | |
| **Caryophyllaceae** | | |

| Species | Preferred common name | Status |
|---|---|---|
| *Cerastium glomeratum* | sticky mouse-ear | i |
| *Moenchia erecta* | erect chickweed | i |
| *Polycarpon tetraphyllum* | fourleaf allseed | i |
| **Casuarinaceae** | | |
| *Allocasuarina littoralis* | black sheoak | |
| *Allocasuarina verticillata* | dropping sheoak | |
| *Allocasuarina zephyrea* | western sheoak | e |
| **Cyperaceae** | | |
| *Cyperus eragrostis* | tall flatsedge | i |
| **Crassulaceae** | | |
| | | |
| *Crassula sieberiana* | Australian stonecrop | |
| **Dilleniaceae** | | |
| *Hibbertia procumbens* | spreading guineaflower | |
| *Hibbertia sericea* | silky guinea-flower | |
| **Ericaceae** | | |
| *Astroloma humifusum* | native cranberry | |
| *Epacris impressa* | common heath | |
| *Erica lusitanica* | Spanish heath | D |
| *Leucopogon collinus* | white beardheath | |
| *Leucopogon parviflorus* | coast beardheath | |
| *Monotoca glauca* | goldey wood | |
| **Euphorbiaceae** | | |
| *Euphorbia paralias* | sea spurge | i |
| *Euphorbia peplus* | petty spurge | i |
| **Fabaceae** | | |
| *Aotus ericoides* | golden pea | e |
| *Dillwynia sericea* | showy parrotpea | |
| *Goodia lotifolia* | golden tip | |
| *Lotus sp.* | trefoil | i |
| *Lotus suaveolens* | hairy birds-foot trefoil | i |
| *Medicago polymorpha* | burr medick | i |
| *Pultenaea gunnii* | golden bushpea | |
| *Psoralea pinnata* | African scurf-pea | i |
| *Ulex europaeus* | gorse | D |

| Species | Preferred common name | Status |
|---|---|---|
| **Fumariaceae** | | |
| *Fumaria muralis subsp. muralis* | wall fumitory | i |
| **Gentianaceae** | | |
| *Centaurium erythraea* | common centaury | i |
| **Geraniaceae** | | |
| *Geranium sp.* | cranesbill | |
| **Gleicheniaceae** | | |
| *Gleichenia microphylla* | scrambling coral fern | |
| **Goodeniaceae** | | |
| *Goodenia ovata* | hop native-primrose | |
| **Haloragaceae** | | |
| *Gonocarpus tetragynus* | common raspwort | |
| *Gonocarpus teucrioides* | forest raspwort | |
| **Lauraceae** | | |
| *Cassytha glabella* | slender dodderlaurel | |
| *Cassytha melantha* | large dodderlaurel | |
| **Mimosaceae** | | |
| *Acacia dealbata subsp. dealbata* | silver wattle | |
| *Acacia longifolia* | coast wattle | |
| *Acacia melanoxylon* | blackwood | |
| *Acacia mucronata* | caterpillar wattle | |
| *Acacia myrtifolia* | redstem wattle | |
| *Acacia suaveolens* | sweet wattle | |
| *Acacia terminalis* | sunshine wattle | |
| *Acacia verticillata* | prickly moses | |
| **Myoporaceae** | | |
| *Myoporum insulare* | boobyalla | |
| **Myrtaceae** | | |
| *Eucalyptus amygdalina* | black peppermint | e |
| *Eucalyptus caesia* | weeping eucalypt | i |
| *Eucalyptus obliqua* | stringybark | |
| *Eucalyptus regnans* | giant ash | |
| *Eucalyptus viminalis subsp. viminalis* | white gum | |
| *Kunzea ericoides* | burgan | i |
| *Leptospermum glaucescens* | smoky teatree | e |

| Species | Preferred common name | Status |
|---|---|---|
| *Leptospermum laevigatum* | coast tea tree | |
| *Leptospermum scoparium* | common tea tree | |
| *Melaleuca sp* (garden escapees) | garden escapee tea trees | |
| *Metrosideros excelsa* | New Zealand Christmas tree | i |
| **Oxalidaceae** | | |
| *Oxalis exilis* | feeble woodsorrel | |
| *Oxalis pes-caprae* | African woodsorrel | i |
| *Oxalis sp.* | woodsorrel | |
| **Pittosporaceae** | | |
| *Billardiera heterophylla* | bluebell creeper | i |
| *Bursaria spinosa subsp. spinosa* | prickly box | |
| **Plantaginaceae** | | |
| *Plantago coronopus* | Buck's-horn plantain | i |
| *Plantago lanceolata* | ribwort plantain | i |
| **Primulaceae** | | |
| *Lysimachia arvensis* | scarlet pimpernel | i |
| **Proteaceae** | | |
| *Banksia marginata* | silver banksia | |
| *Hakea salicifolia* | willow-leaved hakea | |
| *Hakea sp* | ornamental hakeas | i |
| **Rhamnaceae** | | |
| *Pomaderris apetala subsp. apetala* | common dogwood | |
| *Pomaderris elliptica* | yellow dogwood | |
| **Rosaceae** | | |
| *Acaena novae-zelandiae* | common buzzy | |
| *Rubus fruticosus aggregate* | blackberry | D |
| *Sanguisorba minor* | salad burnet | i |
| **Rubiaceae** | | |
| *Galium aparine* | cleavers | i |
| *Galium australe* | tangled bedstraw | |
| **Rutaceae** | | |
| *Correa alba* | white correa | |
| *Zieria arborescens subsp. arborescens* | stinkwood | |
| **Salicaceae** | | |
| *Populus sp.* | poplar | i |

| Species | Preferred common name | Status |
|---|---|---|
| **Santalaceae** | | |
| *Exocarpos cupressiformis* | common native-cherry | |
| *Leptomeria drupacea* | erect currantbush | |
| **Solanaceae** | | |
| *Solanum laciniatum* | kangaroo apple | |
| *Solanum nigrum* | blackberry nightshade | i |
| **Stylidiaceae** | | |
| *Stylidium graminifolium* | narrowleaf triggerplant | |
| **Thymelaeaceae** | | |
| *Pimelea linifolia* | slender riceflower | |
| **GYMNOSPERMAE** | | |
| **Pinaceae** | | |
| *Pinus radiata* | radiata pine | i |
| **MONOCOTYLEDON** | | |
| **Cyperaceae** | | |
| *Carex appressa* | tall sedge | |
| *Carex sp.* | sedge | |
| *Lepidosperma concavum* | sandhill swordsedge | |
| *Lepidosperma filiforme* | common rapiersedge | |
| *Lepidosperma laterale* | variable swordsedge | |
| **Iridaceae** | | |
| *Diplarrena moraea* | white iris | |
| **Juncaceae** | | |
| *Juncus bufonius* | toad rush | |
| *Juncus pallidus* | pale rush | |
| *Juncus pauciflorus* | looseflower rush | |
| *Juncus procerus* | tall rush | |
| *Juncus sarophorus* | broom rush | |
| *Juncus subsecundus* | finger rush | |
| **Liliaceae** | | |
| *Dianella revoluta* | spreading flaxlily | |
| **Orchidaceae** | | |
| *Microtis sp.* | onion-orchid | |
| **Poaceae** | | |
| *Agrostis capillaris* | browntop bent | i |

| Species | Preferred common name | Status |
|---|---|---|
| *Agrostis stolonifera* | creeping bent | i |
| *Ammophila arenaria subsp. arenaria* | marram grass | i |
| *Anthoxanthum odoratum* | sweet vernal grass | i |
| *Austrostipa sp* | speargrass | |
| *Avena fatua* | oat | i |
| *Briza maxima* | greater quaking-grass | i |
| *Briza minor* | lesser quaking-grass | i |
| *Cortaderia sp.* | pampasgrass | D |
| *Dactylis glomerata* | cocksfoot | i |
| *Festuca arundinacea* | tall fescue | i |
| *Holcus lanatus* | Yorkshire fog | i |
| *Hordeum marinum* | barleygrass | i |
| *Lachnagrostis filiformis* | common blowngrass | |
| *Lolium sp.* | ryegrass | i |
| *Microlaena stipoides var. stipoides* | weeping grass | |
| *Poa labillardierei* | silver tussock grass | |
| *Poa annua* | annual meadow grass | |
| *Poa poiformis* | coast tussockgrass | |
| *Rytidosperma caespitosum* | common wallabygrass | |
| *Rytidosperma sp.* | wallabygrass | |
| *Spinifex sericeus'* | coastal spinifex | |
| **Xanthorrhoeaceae** | | |
| *Lomandra longifolia* | sagg | |
| **PTERIDOPHYTA** | | |
| **Dennstaedtiaceae** | | |
| *Histiopteris incisa* | batswing fern | |
| *Pteridium esculentum subsp. esculentum* | bracken | |
| **Dryopteridaceae** | | |
| *Polystichum proliferum* | mother shield fern | |

# C Significant impact criteria for EPBC listed species with moderate sensitivity to the project

## C.1 Tasmanian devil - vulnerable species

### C.1.1 Significant impact criteria

An action is likely to have a significant impact on a **vulnerable** species if there is a real chance or possibility that it will:

- lead to a long-term decrease in the size of an important population of a species
- reduce the area of occupancy of an important population
- fragment an existing important population into two or more populations
- adversely affect habitat critical to the survival of a species
- disrupt the breeding cycle of an important population
- modify, destroy, remove or 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 vulnerable species becoming established in the vulnerable species' habitat
- introduce disease that may cause the species to decline, or
- interfere substantially with the recovery of the species.

### C.1.2 What is an important population of a species?

- An 'important population' is 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.

## C.2 Spotted-tailed Quoll - endangered species

### C.2.1 Significant impact criteria

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.

### C.2.2 What is a population of a 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.

### C.2.3 What is an invasive species?

- 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.

### C.2.4 What is habitat critical to the survival of a species or ecological community?

- '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.

# D Eagle nest search report undertaken for TasNetworks for the North West Transmission Developments project, by North Barker (2022)

northbarker
ECOSYSTEM SERVICES

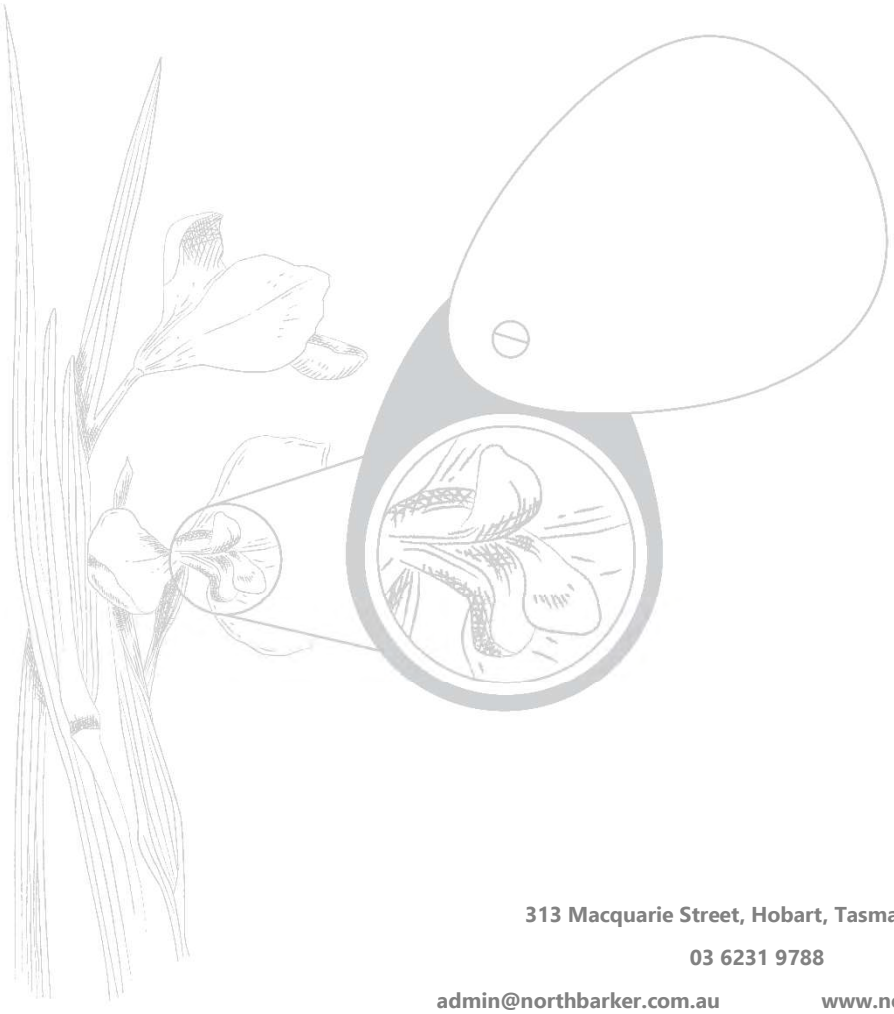
# Remaining North-West Transmission Developments
# **Eagle Nesting Habitat Survey**

*Balance Report of the North-West Tasmania Strategic Transmission Plan*

6th April 2023

Tetra Tech Coffey
on behalf of TasNetworks

COF011



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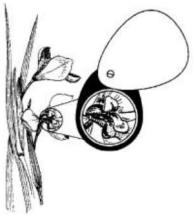
# PROJECT INFORMATION

| | |
|---|---|
| Project | Remaining North-West Transmission Developments (NWTD) |
| Location | Hampshire to Poatina |
| Client | Tetra Tech Coffey |
| Client Contact | Ben Casillas-Smith (bens@ecoaus.com.au) |
| NBES Job Code | COF011 |
| NBES Project Manager | Grant Daniels (gdaniels@northbarker.com.au) |
| NBES Project Summary | Eagle habitat and nest surveys |
| Reporting | Karen Dick and Erin Harris |
| Mapping | Eric Hong |

# DOCUMENT CONTROL

| Document Control | Version | Date | Personnel | Position |
|---|---|---|---|---|
| Version 0.1 | Draft- data | 03/03/23 | Karen Dick<br>Erin Harris | Principal Ecologist<br>Senior Ecologist |
| Version 0.2 | Draft - report | 15/03/23 | Karen Dick<br>Erin Harris | |
| Version 0.3 | Draft - report | 03/04/23 | Erin Harris | |
| Version 0.4 | Report reviewed | 04/04/2023 | Karen Dick | |
| Version 0.5 | Report reviewed | 04/04/2023 | Grant Daniels | Managing Director |
| Version 0.6 | Report updated with minor edits | 06/04/2023 | Karen Dick<br>Erin Harris | |
| Version 1.0 | Approved for issue to client | 06/04/2023 | Grant Daniels | |



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# EXECUTIVE SUMMARY

TasNetworks is proposing a new transmission line route for the northern section of the Remaining North-West Transmission Developments, spanning from Hampshire to Poatina.

As part of the assessment pathway through the *Major Infrastructure Development Approvals Act 1999* (MIDAA), schedule 2, section 6.1.2 of the project assessment criteria specifies that aerial surveys for eagle[1] nests are to be conducted annually until construction.

North Barker Ecosystem Services was commissioned to carry out nest searches within 2 km of the proposed route, with this commission being the fifth consecutive year of aerial surveys for the project.

Prior to the 2023 survey, a total of fifty-nine raptor nests were on record (on the Tasmanian Natural Values Atlas) as present on the proposed alignment from Hampshire to Poatina transmission route (fifty-two eagles and seven Grey Goshawks).

During the 2023 survey, eleven previously unrecorded ('new') eagle nests were found.

One of the previously reported eagle nests (a small nest classified as a remnant) was re-classified as a goshawk nest. With this change included, forty previously recorded eagle nests were relocated (and one Grey Goshawk nest).

Eleven eagle and seven goshawk nests that had been previously recorded were 'not found' or 'not searched for' (due to land access permissions).

Within this group of nests, seven attributed to eagles have met the parameters to be formally declared 'absent' on the NVA, with three of these having fallen and four having not been found over three consecutive aerial surveys.

In total, with the seven absent nests excluded, there are sixty-three raptor nests known within 2 km of the alignment of the remaining NWTD (fifty-five eagles and eight Grey Goshawk).

[1] Tasmanian Wedge-tailed Eagle and White-bellied Sea Eagle

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# 1. INTRODUCTION AND BACKGROUND

## 1.1. Introduction

North Barker Ecosystem Services (NBES) was commissioned by Tetra Tech Coffey on behalf of Tasmanian Networks Pty Ltd (TasNetworks) to carry out a survey of nesting habitats of Tasmanian Wedge-tailed Eagle (*Aquila audax fleayi)* and White-bellied Sea Eagle (*Haliaeetus leucogaster)* – referred to collectively as eagles throughout the report. The route covered was from Hampshire to East Cam, East Cam to Sheffield and Sheffield to Poatina, as well as the respective parts of the routes around Heybridge and Kimberley.

The route is part of the broader North-West Transmission Developments (NWTD) proposed by TasNetworks, , which includes a span from Staverton to Hampshire, with the balance of the alignment and the section pertaining to this report referred to as the 'Remaining NWTD' – together these form part of the transmission network proposed to facilitate the North-West Tasmania Strategic Transmission Plan.

## 1.2. Background to the Remaining North-west Transmission Developments

In 2018, the Australian Energy Market Operator prepared an Integrated System Plan (ISP) for the National Electricity Market that identified the north-west as one of three Renewable Energy Zones in Tasmania. Building on the ISP, TasNetworks has prepared the North-West Tasmania Strategic Transmission Plan, which sets out how the network could be advanced to support development of the north-west.

TasNetworks proposes to develop a series of new double-circuit 220 kilovolt (kV) overhead transmission lines (OHTLs) in north-west Tasmania, upgrade the existing Palmerston, Sheffield and Burnie substations, and construct a new switching station at Hampshire Hills. The project comprises:

- Palmerston–Sheffield OHTL. – A new double circuit 220 kV OHTL between Poatina/Palmerston substation) and Sheffield. The existing single circuit 220 kV OHTL (TL503) between the Palmerston and Sheffield substations will be dismantled.
- Sheffield–Heybridge OHTL and Heybridge–Burnie OHTL – A new double circuit 220 kV OHTL between Sheffield and Burnie substations with a new in-out spur to a proposed switching station at Heybridge (the proposed switching station at Heybridge is not part of this project). The existing single circuit 220 kV OHTL (TL504) between Sheffield and Burnie substations will be dismantled.
- Burnie–East Cam OHTL and East Cam–Hampshire Hills OHTL – A new double circuit 220 kV OHTL from between Burnie substation and a proposed switching station at Hampshire Hills, via East Cam.

Including the above substation upgrades and switching station, the project area for the Remaining NWTD will also include:

- A 60-m-wide operational area required for construction and operation of the new 220 kV OHTLs.
- Access tracks to towers where they extend outside the operational area to join the road network.

- Temporary winch and brake sites that may extend 90 m outside the operational area, (e.g., at bends in the OHTL) for the purpose of conductor stringing.

### 1.3. Eagle nest searches background

As part of the assessment pathway through the *Major Infrastructure Development Approvals Act 1999* (MIDAA), schedule 2, section 6.1.2 of the project assessment criteria specifies that aerial surveys for eagle nests are to be conducted annually until construction.

This is the fifth consecutive year of project-specific aerial surveys, which commenced in 2019.

The area surveyed for the 2023 survey was approximately 161 km long, with a buffer of 2 km either side of the proposed transmission line alignment.

## 2. METHODS

### 2.1. Survey area

The proposed transmission line route was supplied in spatial data to NBES by the client. It consisted of a 90 m corridor for the preferred alignment, which was then buffered by a 2 km wide corridor to give the entire survey area of approximately 66,561 ha (Figure 1).

#### 2.1.1. *Background research and planning*

As an exploratory desktop process, all habitat within this search area was considered against the suitability index of the Forest Practices Authority's (FPA) eagle habitat model[2]. Whilst this model provides guidance for areas of highest eagle nesting potential, it is best-practice to consider all habitat within a survey area when conducting the aerial search, to ensure the model has not misrepresented habitat patches and to establish if nests are present outside of areas mapped as suitable. Within partly modified environments such as the current survey area, marginal habitats can include wildlife habitat clumps and streamside reserves adjacent to forest and agriculture operations. It was thus proposed to search the entire area of habitat to determine habitat suitability[3], and to prioritise nest searches where habitat was suitable.

#### 2.1.2. *Survey team*

The survey was led by NBES Senior Ecologist Erin Harris, who has more than 300 hours of experience searching for eagle nests and a Master's degree in eagle nesting habitat management. Erin was accompanied by a team that included NBES Principal Ecologist and bird specialist Karen Dick, who has 35 years' experience as an ornithologist and has carried out more than 800 hours of raptor surveys. The team also comprised Adam Hardy, who runs Raptor Care NW and has extensive experience of eagles, their nests and habitats, and Laura Cardona, a current PhD candidate studying bird interactions, who has carried out a number of eagle nest searches and eagle utilisation surveys with NBES. Flights were conducted using Helicopter Resources Tasmania, with experienced pilots Damien Hennessy and Hoey Stobart. Damien has been a low-altitude helicopter pilot for a range of surveys and fireground work, and Hoey has many years of experience undertaking eagle nest surveys.

[2] Forest Practices Authority (2014a)

[3] DEWHA (now DCCEEW) 2010. *Survey effort guide for the Tasmanian Wedge-tailed Eagle within Commonwealth of Australia* in:. Survey guidelines for Australia's threatened birds - Guidelines for detecting birds listed as threatened under the Environment Protection and Biodiversity Conservation Act 1999, pp 213-214.

## 2.2. Aerial nest search surveys

Aerial searches were undertaken by helicopter[4] (according to current best practice[5]) between 13th and 23rd February 2023, in mostly fine weather conditions, with generally excellent visibility and predominantly calm conditions. Conditions permitted constant surveying and no weather-induced downtime during the whole survey programme.

The surveys involved slow flying (5-10 knots) above the tree canopy or where possible, below the adjacent canopy level, such as through gullies and river valleys. Transects were flown to ensure complete coverage of the area.

Marginal potential habitat was also checked and transects were also flown over areas of plantations and rainforest to ensure small wildlife habitat clumps and coupes of potential nesting habitat were not missed.

All known nests within the survey area (with locations extracted from the Natural Values Atlas [NVA] database) were visited to verify condition and presence, except for one nest on the border of a no-fly zone.

Any previously reported nest(s) that could not be found were searched for using both their reported position and spatial accuracy as a guide, in addition to surrounding suitable trees and habitat. Further suitable habitat and trees in the broader vicinity of the reported nest position were also checked until it was considered that continued searching was futile.

Once a nest was located, its condition and features were described *in-situ*, including with the assistance of 12 x 50 mm binoculars, to enable observers to remain distant from the nest. Owing to the nature of the task that sometimes involved hovering near the canopy, and potentially presenting risks to local birds and to observers, nest checks were kept as short as possible and only long enough to verify presence and condition. In the case of known nests with existing informative photos and relatively accurate spatial locations, it was not necessary to repeat those tasks. To further reduce potential disturbance, all nest observations were photographed using a high-quality camera setup, with a Canon 5Dmk3 and 100-400mm prime lens and only GPS recorded (using a handheld non-differential GPS, Garmin Map 66s) if the previously reported position had low reported spatial accuracy and had evident scope for improvement.

To support the *in-situ* observations, images of each nest were later examined to further inform the condition assessment of each nest. Characteristics of each nest that were checked to determine its condition included: fresh green leaves, stick tone (brown or grey), whitewash,

[4] Aerial surveys are considered to be more effective and efficient in large survey areas, as well as tall wet forests, as per the guidelines below – noting this also satisfies schedule 2, section 6.1.2 of the MIDAA criteria.

[5] Forest Practices Authority (2014). *Eagle nest searching, activity checking and nest management*. Fauna Technical Note No. 1. Forest Practices Authority, Hobart.

algal leaching, nest shape (flat-topped or concave bowl), down/feathers, prey remains and bird presence[6].

The integrity of the nest was then assigned a classification of either: prime, viable, derelict or remnant. These factors represent the viability of the nest for breeding and correspond to the spectrum of poor/average/good/excellent used in the Forest Practices Authority's nest activity assessment forms. However, the categories used in this survey relate more to time since use (and likelihood of use in the near future), with prime being used to describe nests considered likely to be active in recent years, and remnant being those the least likely to be active. This is consistent with the definitions applied during past surveys of this location and use of similar viability classes in assessments of these species elsewhere[7].

### 2.2.1. *Limitations*

Owing to the large size of the project area, it was not possible to check every individual tree, nor to conduct multiple passes of all potentially suitable habitat. Therefore, there is a possibility that nests may have been missed owing to being obscured from view by other trees or dense canopy cover.

In particular, it should be noted that owing to a preference by Grey Goshawks for a dense canopy above the nest site, these nests are generally better checked and searched for from the ground (noting they are not the primary target species in this project with respect to the assessment conditions).

When navigating through different types of vegetation, the height at which observations were made varied with canopy cover and topography (*i.*e. where canopy cover was sparse, observations were taken at a higher altitude where more trees could be observed; conversely, where canopy cover was dense, lower flights under the canopy [where possible] were undertaken, with particular attention given to areas of high habitat suitability).

To minimise the chance of missing a nest, we used three observers and pilots with extensive experience in low-level flying and nest searches. We also utilised parallel transects as far as possible to minimise potential detection gaps, with additional forays into suitable habitat.

Tree and nest heights are estimates only, with the aid of the helicopters altimeter.

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[6] Forest Practices Authority's nest activity assessment forms.

[7] Enviro-Dynamics (2019). Helicopter Eagle Nest Survey in North West Tasmania. Report for TasNetworks, July 2019.
Wiersma, J, Koch, AJ, Livingston, D, Brown, B, Spencer, C, Mooney, N, Munks, S (2009). Eagle Nest Monitoring Project – Year 1 2007–08, Establishing monitoring sites and investigating the relationship between nesting success of the Tasmanian Wedge-tailed Eagle and environmental variables, report to Roaring 40s and the Forest Practices Authority, Forest Practices Authority Scientific Report 8.
Dennis, T.E., Detmar, S.A., Brooks, A.V. and Dennis, H.M. (2011). Distribution and status of White-bellied Sea Eagle, *Haliaeetus leucogaster*, and Eastern Osprey, *Pandion cristatus*, populations in South Australia. *South Australian Ornithologist*, 37 (1).
Cherriman, S.C., Foster, A., Debus, S.J.S. (2009). Supplementary Notes on the Breeding Behaviour of Wedge-tailed Eagles *Aquila audax*. *Australian Field Ornithology*, 26, pp. 142-147.

# 3. RESULTS

Photographs of all nests observed during the survey are presented in Appendix A.

## 3.1. Area covered

A total of 1961.98 km was covered, as shown in the flight maps in Figures 2-12 (Appendix B).

## 3.2. Newly located nests

Eleven previously unrecorded nests were found (Table 1, Figures 2 -12). All new nests, apart from one (which was found at the northern end of the south to north section of the alignment), were found along the east to west section of alignment between East Cam and Poatina and were relatively evenly spaced. One new nest (#3148) is potentially just outside the alignment buffer (by only by 20 m) but is still treated as present within the alignment for the sake of diligence and allowing for any geospatial inaccuracies. Details of the newly located nests can be found in Appendix C, with the Forest Practices Authority's (FPA) nest location form used as a template.

## 3.3. Relocated nests

Fifty-nine locations of previously reported raptor nests were visited. One remnant eagle nest (#3020) found in the previous year was re-determined during the 2023 survey as a Grey Goshawk nest. Thus, fifty-one eagle and eight Grey Goshawk nests were surveyed for. Forty of the previously known eagle nests and one previously known Grey Goshawk nest were relocated and verified as present (Table 2).

## 3.4. Previously reported nests not found or not able to be searched for

Eleven previously reported eagle nests and seven previously reported Grey Goshawk nests could not be found (Table 3, and Appendix D).

One of these eagle nests (#2503) was not searched for, as the nest was immediately adjacent to a 'No Fly Zone' and permission to access this nest on-foot could not be obtained from the landholder. As this nest was last seen in 2018, it is assumed that it is still present at this location.

Three of the 'not found' eagle nests (#2771, #2960 and #3022) have evidently fallen, based off photographs of the known nest tree from the previous year. Of these nests, the previous location of nest #2960 has a new nest being built approximately 150 to the NW.

## 3.5. Absent nests

Of the known nests in the 2023 survey, seven have now met the conditions to be formally treated as absent (Appendix D) and have been excluded from the maps in this report. This is based on: not being relocated during three consecutive aerial and/or ground searches, expert observation where it was known that the nest is now gone, and/or confirmation that a previously reported nest with uncertainty around its status was confirmed as 'not an eagle nest'. These nests will still show on TheLIST under a raptor nest search and will still be listed on the Natural Values Atlas (NVA), although the final entry of these nest will include an 'absent' status if 'include absent records' is included in the NVA search.

**Table 1.** Nest location details and integrity classifications for newly found/located nests from 2023 survey, in order of date found. WTE = Wedge-tailed Eagle; WBSE = White-bellied Sea Eagle.

| Date surveyed | NVA nest ID | Easting | Northing | Classification | Position accuracy (m) | Likely species | Comments |
|---|---|---|---|---|---|---|---|
| 14/02/2023 | 3144 | 401287 | 5450719 | Prime | 10 | Indeterminate[8] | A prime nest with large amounts of brown leaves on top and a slight bowl. The nest is roughly 45 m up a 50 m high *Eucalyptus obliqua* tree.<br>See Plates 1a and 1b and Figure 3. |
| 15/02/2023 | 3145 | 421717 | 5444021 | Prime | 10 | Indeterminate | A large robust nest with a flat top, brown sticks and whitewash on adjacent branches. The nest is roughly 47 m up a 57 m high *E. obliqua.*<br>See Plates 2a and 2b and Figure 5. |
| 16/02/2023 | 3146 | 428761 | 5441072 | Viable | 10 | Indeterminate | A small nest roughly 20 m up a 35 m *E. obliqua.* This nest is hard to see under canopy and has brown sticks and leaves on top but no signs of recent use.<br>See Plate 3 and Figure 5. |
| 17/02/2023 | 3147 | 433608 | 5432624 | Prime | 10 | WBSE | A large nest roughly 26 m up a 35 m high *E. viminalis.* This nest has a flat top, brown leaves and sticks. A juvenile White-bellied Sea Eagle was observed flushing from a nearby tree.<br>See Plates 4a and 4b and Figure 6. |

[8] All indeterminate nests are treated as eagle nests if it cannot be determined which of the two Tasmanian eagle species the nest belongs to.

| Date surveyed | NVA nest ID | Easting | Northing | Classification | Position accuracy (m) | Likely species | Comments |
|---|---|---|---|---|---|---|---|
| 17/02/2023 | 3148 | 442409 | 5426702 | Prime | 10 | Indeterminate | A large nest roughly 30 m up a dead 36 m *Eucalyptus* tree. This nest has lots of bark lining a nest bowl although the nest doesn't appear to have been used. This nest was found 20 m outside the survey area boundary.<br>See Plates 5a and 5b and Figure 6. |
| 20/02/2023 | 3149 | 456528 | 5417067 | Viable | 10 | Indeterminate | Large nest roughly 41 m up dead 45 m *Eucalyptus* tree. Nest is bleached with loose sticks on top and a slight bowl.<br>See Plates 6a and 6b and Figure 8. |
| 21/02/2023 | 3150 | 464078 | 5408092 | Viable | 10 | Indeterminate | A large nest with deep nest bowl. Sticks loose on top and bleaching. This nest is in 32 m up an exposed 33 m high *E. obliqua.*<br>See Plates 7a and 7b and Figure 9. |
| 21/02/2023 | 3151 | 475220 | 5404715 | Viable | 10 | Indeterminate | A large nest with a nest bowl roughly 28 m up a 35 m high dead *Eucalyptus* tree. Small pieces of down feather present on nest.<br>See Plates 8a and 8b and Figure 10. |
| 21/02/2023 | 3152 | 483427 | 5394802 | Remnant | 10 | Indeterminate | An atypical cluster of nesting material in tree. Sticks large enough for an eagle although the material is loose with no distinct nest shape. The material is 45 m up a 55 m high *E. viminalis.*<br>See Plate 9 and Figure 11. |

| Date surveyed | NVA nest ID | Easting | Northing | Classification | Position accuracy (m) | Likely species | Comments |
|---|---|---|---|---|---|---|---|
| 21/02/2023 | 3153 | 496087 | 5383187 | Viable | 10 | Indeterminate | A small nest roughly 20 m up a 30 m *E. amygdalina*. Materials on the nest appear loose and bleached. A slight nest bowl is present as well as brown leaves.<br>See Plates 10a and 10b and Figure 11. |
| 22/02/2023 | 3154 | 497647 | 5378353 | Viable | 10 | WBSE | A small newly built nest approximately 160 m to the NE of fallen nest #2960. It is likely this nest is from the same pair of White-bellied Sea Eagles that are attempting to rebuild on the same river line. The nest has lots of new material although at this point it is still loose in structure. The nest is roughly 35 m up a 45 m high *E. viminalis* tree.<br>See Plates 11a and 11b and Figure 11. |

**Table 2.** Nest location details from within the survey area and 2023 integrity classifications. WTE = Wedge-tailed Eagle; WBSE = White-bellied Sea Eagle; GG = Grey Goshawk.

| Date surveyed | NVA nest ID | Easting | Northing | Classification | Position accuracy (m) | Likely species | Comments |
|---|---|---|---|---|---|---|---|
| 13/02/2023 | 2674 | 393602 | 5432334 | Viable | 10 | WTE | This nest is obscured under dense canopy. It appears that new material has been added to this nest in the last year, resulting in it sloping less. The nest has a relatively flat top with brown sticks and leaves and is roughly 25 m up 35 m *E. obliqua* tree. A small amount of whitewash is present on adjacent branches.<br>See Plate 12 and Figure 2. |
| 13/02/2023 | 2675 | 397357 | 5435638 | Prime | 10 | WTE | This nest is hard to see nest under tree canopy. At the time of the survey, the nest was occupied by a young fledgling, which was only observed through the camera lens. The helicopter left the vicinity as soon as the fledgling was observed. The nest has a flat top with brown sticks, leaves, lots of whitewash and down, and algal leaching present. The nest is roughly 25 m up a 35m *E. obliqua*. Epiphytes are present on the nest.<br>See Plates 13a&b and Figure 2. |
| 13/02/2023 | 3007 | 397441 | 5436187 | Viable | 10 | WTE | No new material has been added to this nest this year. It doesn't appear to have been recently used. The nest is roughly 28 m up a 35 m dead tree.<br>See Plates 14a&b and Figure 2. |

| Date surveyed | NVA nest ID | Easting | Northing | Classification | Position accuracy (m) | Likely species | Comments |
|---|---|---|---|---|---|---|---|
| 13/02/2023 | 1498 | 398781 | 5441581 | Viable | 10 | WTE | This nest had not been observed since 2021 due to an aggressive Wedge-tailed Eagle. An eagle was observed during the survey soaring over a nearby ridge, but it showed no aggression towards the helicopter and kept its distance. The nest is still large and has a bowl with new nesting material.<br>See Plate 15 and Figure 2. |
| 13/02/2023 | 3011 | 401666 | 5442489 | Viable | 50 | WBSE | A large robust nest under dense canopy. This nest has a bowl and small amounts of whitewash on adjacent trunk, it doesn't appear to have been recently used. The coordinates for this nest have been updated on the *Natural Values Atlas*.<br>See Plates 16a&b and Figure 2. |
| 13/02/2023 | 2361 | 400268 | 5447522 | Prime | 10 | WTE | This nest has a slight nest bowl, algal leaching, and whitewash around surrounding branches. It is found roughly 30 m up a 33 m tall *E. obliqua*.<br>See Plate 17a&b and Figure 3. |
| 13/02/2023 | 2678 | 400493 | 5448226 | Viable | 10 | WTE | This nest is starting to slope slightly and bleach although still viable. No new brown sticks or leaves have been added. It is close to nest #743, #2772 and #3010. Slight algal leaching is present below the nest. Nest is roughly 25 m up a 35 m tall *E. obliqua*.<br>See Plate 18 and Figure 3. |

| Date surveyed | NVA nest ID | Easting | Northing | Classification | Position accuracy (m) | Likely species | Comments |
|---|---|---|---|---|---|---|---|
| 13/02/2023 | 2772 | 400444 | 5448346 | Viable | 10 | WTE | Large, old, composted platform. This nest has no sticks left and epiphytes are slowly taking over. Although this nest has no sticks it was active during the 2021/2022 activity assessment with an adult eagle present on the nest. The nest is located roughly 230 m northeast of nest #743 and 120 m north of nest #2678. It is in a roughly 30 m tall *E. amygdalina*, about 15 m up. These nests are likely all within one eagle territory. Two adult Wedge-tailed Eagles were seen circling nearby.<br>See Plates 19a&b and Figure 3. |
| 13/02/2023 | 743 | 400295 | 5448177 | Viable | 10 | WTE | The nest is roughly 25 m up a 35m *E. obliqua* and is robust but bleached with sticks beginning to loosen. Nest is close to nests #2678, #2772 and nest #3010.<br>See Plates 20a&b and Figure 3. |
| 13/02/2023 | 2957 | 401333 | 5446854 | Remnant | 10 | Indeterminate | A very small remnant nest, roughly 10 m up a 30 m tall *E. obliqua*. Nest material is bleached with a relatively flat top.<br>See Plates 21 and Figure 3. |

| Date surveyed | NVA nest ID | Easting | Northing | Classification | Position accuracy (m) | Likely species | Comments |
|---|---|---|---|---|---|---|---|
| 13/02/2023 | 3012 | 399987 | 5448450 | Prime | 10 | WTE | A large robust nest not too far from the nest clusters of #743, #2678 and #2772. This nest is likely within the same territory as these nests although being in a different gully there is a chance that this nest also belongs to a separate pair of eagles. The nest has a flat top with loose sticks. Nest is roughly 24 m up a 30 m tall *E. obliqua.*<br>See Plate 22 and Figure 3. |
| 14/02/2023 | 2676 | 401273 | 5452373 | Prime | 10 | WTE | The canopy around this nest has grown a lot making it hard to see. The nest appeared to still be in good condition. The nest is Roughly 27 m up a 35 m tall *E. obliqua*.<br>See Plate 23 and Figure 3. |
| 14/02/2023 | 3013 | 404232 | 5451221 | Viable | 10 | Indeterminate | A large robust nest in a dead eucalyptus tree roughly 20 m up. The nest has a slight bowl with whitewash present on adjacent branches and algal leeching under the nest. The nest is mainly all bleached with no new nesting material, although still viable.<br>See Plates 24a&b and Figure 3. |
| 14/02/2023 | 2669 | 402398 | 5454696 | Viable | 10 | WBSE | Very large nest, roughly 15 m up a 25 m *E. obliqua*. Nest has a slight bowl and is bleached. With better clarity, the large branch that was thought to be obstructing the nest last year doesn't in fact obstruct potential use.<br>See Plates 25a&b and Figure 3. |

| Date surveyed | NVA nest ID | Easting | Northing | Classification | Position accuracy (m) | Likely species | Comments |
|---|---|---|---|---|---|---|---|
| 14/02/2023 | 891 | 402490 | 5454678 | Derelict | 10 | WBSE | This nest is just behind nest #2668 and is situated roughly 20 m up a 22 m dead tree. The sticks on this nest are very loose and bleached.<br>See Plate 26 and Figure 3. |
| 14/02/2023 | 2668 | 408846 | 5450819 | Prime | 10 | WTE | Large robust nest with a flat top and algal leaching down the main trunk. Fresh sticks and brown leaves were present on the nest with down and feathers found in nest. Appears to have been recently used. The nest is roughly 28 m up a 35 m tall *E. obliqua*.<br>See Plates 27a&b and Figure 4. |
| 14/02/2023 | 2273 | 409238 | 5451491 | Prime | 10 | WBSE | Large robust nest with relatively flat top. Nest is roughly 25 m up a 28 m tall *E. obliqua* tree. Whitewash and some new fresh sticks were present. This nest was active in the 2022/2023 breeding season.<br>See Plate 28 and Figure 4. |
| 15/02/2023 | 2573 | 413457 | 5450697 | Prime | 10 | WTE | Large prime nest with a slight bowl, brown sticks and whitewash on adjacent branches. Down feathers present in nest. It is situated 25 m up a 30 m tall *E. obliqua*.<br>See Plates 29a&b and Figure 4. |

| Date surveyed | NVA nest ID | Easting | Northing | Classification | Position accuracy (m) | Likely species | Comments |
|---|---|---|---|---|---|---|---|
| 15/02/2023 | 3014 | 412731 | 5447825 | Prime | 10 | WTE | A medium nest with a bowl and brown leaves. The nest is roughly 32 m up a 42 m tall *E. obliqua.* Two Wedge-tailed Eagle was seen nearby.<br>See Plate 30 and Figure 4. |
| 15/02/2023 | 2670 | 416810 | 5447036 | Prime | 10 | WBSE | Large robust nest roughly 30 m up a 35 m tall *E. viminalis*. Flat top with loose sticks on top. Whitewash present on adjacent branches.<br>See Plates 31a&b and Figure 4. |
| 15/02/2023 | 3015 | 417551 | 5448077 | Viable | 10 | Indeterminate | This nest has been significantly added to this year and is now a viable nest. The nest is relatively low in an *E. viminalis.*, only 15 m up a 45 m tree. It has a flat, loose top.<br>See Plates 32a&b and Figure 4. |
| 15/02/2023 | 923 | 426566 | 5442534 | Viable | 10 | WTE | Large flat top nest lined mainly with reeds. Down feathers present on nest. The nest is roughly 28 m up a 35 m tall *E. obliqua*.<br>See Plates 33a&b and Figure 5. |
| 15/02/2023 | 2680 | 426421 | 5442200 | Viable | 10 | WTE | Large nest with flat top roughly 25 m up 40 m high *E. viminalis.* Nest appears to have fresh brown sticks on top and algal leaching around the base.<br>See Plates 34a&b and Figure 5. |

| Date surveyed | NVA nest ID | Easting | Northing | Classification | Position accuracy (m) | Likely species | Comments |
|---|---|---|---|---|---|---|---|
| 16/02/2023 | 3016 | 423848 | 5442013 | Prime | 10 | Indeterminate | A large nest with fresh brown sticks and leaves. Whitewash was present on the nest and adjacent branches as well as algal leaching underneath. This nest is close to nest #3017. Nest roughly 28 m up a 35 m tall *E. obliqua.*<br>See Plates 35a&b and Figure 5. |
| 16/02/2023 | 3017 | 423861 | 5441991 | Derelict | 10 | Indeterminate | A small sloping nest 25 m from nest #3016. It seems to have been a large nest that has now half collapsed on one side. Nest roughly 30 m up a 31 m tall *E. viminalis*.<br>See Plates 35b and Figure 5. |
| 16/02/2023 | 3018 | 427641 | 5438180 | Prime | 10 | Indeterminate | This nest has had a lot of new material added to it and its condition has gone from derelict and degraded to prime. Nest roughly 25 m up a 45 m tall *E. regnans.* It is situated between two plantations. Nest with fresh brown sticks and leaves, whitewash and down feathers present on nest.<br>See Plate 36 and Figure 5. |
| 16/02/2023 | 3019 | 432757 | 5437838 | Prime | 10 | Indeterminate | Large robust nest in valley. This nest appeared likely to have been used recently during the breeding season. A flat top and whitewash present, as well as new fresh sticks and brown leaves. Algal leaching is present on tree trunk. The nest is roughly 25 m high in a 50 m tall *E. regnans*.<br>See Plate 37 and Figure 6. |

| Date surveyed | NVA nest ID | Easting | Northing | Classification | Position accuracy (m) | Likely species | Comments |
|---|---|---|---|---|---|---|---|
| 17/02/2023 | 3020 | 434209 | 5434667 | Remnant | 10 | GG | This nest was thought to be a small remnant eagle nest. However, a Grey Goshawk was present at the nest during the survey. This change in species has been updated on the *Natural Values Atlas*. The nest has been recently added too with new nesting material and a deep bowl in the centre of the nest. The nest is in a regrowth 25 m tall *E. regnans* roughly 18 m up.<br>See Plates 38a&b and Figure 6. |
| 17/02/2023 | 3021 | 437213 | 5427479 | Prime | 10 | WBSE | Large robust nest with new material and a nest bowl. This nest was previously near nest #3022, which has now fallen. The nest is 25 m up a 30 m tall *E. obliqua*.<br>See Plates 39a&b and Figure 6. |
| 20/02/2023 | 2958 | 438667 | 5430396 | Prime | 10 | WTE | A juvenile Wedge-tailed Eagle was still in the nest during the nest survey and once spotted the helicopter vacated the vicinity immediately. Moderate-sized flat top nest in large fork, roughly 28 m up a 30 m tall *E. viminalis*. Fresh sticks and brown leaves were present with the nest. Whitewash was present on adjacent branches and fresh down on nest.<br>See Plate 40 and Figure 6. |

| Date surveyed | NVA nest ID | Easting | Northing | Classification | Position accuracy (m) | Likely species | Comments |
|---|---|---|---|---|---|---|---|
| 20/02/2023 | 3006 | 443060 | 5421352 | Prime | 10 | WTE | A prime nest with a flat top and lots of down and whitewash. The nest is approximately 28 m up a 40 m *E. delegatensis*. Two Wedge-tailed Eagles observed near the nest (Table 4).<br>See Plate 41 and Figure 7. |
| 20/02/2023 | 3008 | 454901 | 5417164 | Viable | 10 | Indeterminate | A large nest, roughly 30 m up a 40 m tall *E. obliqua*. The sticks on this nest are loose, with a large branch fallen across the nest centre, noting this fallen branch was there last year. This nest is close to nest #3009.<br>See Plate 42 and Figure 8. |
| 20/02/2023 | 3009 | 454689 | 5416841 | Prime | 10 m | Indeterminate | This nest is relatively close to nest #3008 and likely in the same territory. This nest is also prime, with loose new nesting material, a slight bowl and a small amount of whitewash. The nest is roughly 26 m up in a 30 m tall *E. delegatensis*.<br>See Plates 43a&b and Figure 8. |
| 21/02/2023 | 3010 | 456217 | 5413457 | Viable | 10 | Indeterminate | A medium-sized nest roughly 27 m up a 30 m tall *E. obliqua*. This nest has new brown sticks and leaves and a nest bowl although the sticks are loose on top.<br>See Plates 44a&b and Figure 8. |

| Date surveyed | NVA nest ID | Easting | Northing | Classification | Position accuracy (m) | Likely species | Comments |
|---|---|---|---|---|---|---|---|
| 21/02/2023 | 2682 | 474914 | 5404500 | Prime | 10 | WBSE | Large, round, robust nest with a nest bowl with brown sticks and leaves. The nest is roughly 30 m up in 45 m tall *E. viminalis*.<br>See Plates 45a&b and Figure 10. |
| 21/02/2023 | 3023 | 479252 | 5402029 | Viable | 10 | Indeterminate | Small nest in lone paddock tree. The nest has a flat top, few fresh brown sticks, whitewash, down feathers and green leaves in the centre. The nest is roughly 15 m up a 27 m tall *E. ovata*.<br>See Plates 46a&b and Figure 10. |
| 21/02/2023 | 3024 | 480882 | 5397755 | Viable | 10 | WTE | A small nest with a lot of whitewash present on adjacent branches. Nest sloping with flat top. Nest is roughly 17 m up a 25 m tall *E. obliqua*. An adult Wedge-tailed Eagle was observed nearby.<br>See Plate 47 and Figure 10. |
| 21/02/2023 | 192 | 483133 | 5395089 | Prime | 10 | WTE | A very large, deep, mostly bleached nest. A few brown sticks present on top with a slight bowl. Nest roughly 30 m up a 35 m tall dead *E. obliqua*.<br>See Plate 48 and Figure 10. |
| 21/02/2023 | 1613 | 497235 | 5379781 | Prime | 10 | WTE | Large nest in dead exposed tree. Nest has a slight nest bowl and is bleached overall with a few brown leaves lining the bowl.<br>See Plates 49a&b and Figure 12. |

| Date surveyed | NVA nest ID | Easting | Northing | Classification | Position accuracy (m) | Likely species | Comments |
|---|---|---|---|---|---|---|---|
| 22/02/2023 | 3025 | 491328 | 5391943 | Viable | 10 | Indeterminate | Nest found right on the boundary of a plantation near nest #3026. Nest roughly 14 m up a 20 m tall *E. amygdalina*. Nest is brown with loose sticks on top.<br>See Plates 50a&b and Figure 11. |
| 22/02/2023 | 3026 | 491012 | 5391532 | Prime | 10 | Indeterminate | Large robust nest near nest #3025 in thinned out forest. This nest has a lot of whitewash on adjacent branches and down feather within the nest. The top is flat and compressed. Nest roughly 28 m up 35 m tall *E. amygdalina.*<br>See Plates 50a&b and Figure 11. |

**Table 3:** Nest details of previously reported nests that could not be found or could not be searched for within the 2023 survey (excluding those that have met the parameters to be considered absent[9]. WTE = Wedge-tailed Eagle; WBSE = White-bellied Sea Eagle; GG = Grey Goshawk.

| Date surveyed | NVA nest ID | Easting | Northing | Classification | Position accuracy (m) | Likely species | Comments |
|---|---|---|---|---|---|---|---|
| 13/02/2023 | 1696 | 399880 | 5434600 | N/A | 50 | GG | This nest could not be found, even though the habitat patch is thinning out, making observation into the canopy easier. |
| 15/02/2023 | 553 | 413055 | 5449815 | N/A | 10 | GG | A viable nesting tree (*Acacia melanoxylon*) was observed at the purported location, but no nest found. Last recorded in 1985. Due to the nature of Grey Goshawks nesting under dense canopy it is possible that it was missed during the aerial search, although equally possible the tree simply no longer supports a nest. |
| 15/02/2023 | 1130 | 489513 | 5387684 | N/A | 10 | GG | Last recorded in 1985. Due to the nature of Grey Goshawks nesting under dense canopy it is possible that it was missed during the aerial search. |
| 17/02/2023 | 2705 | 436613 | 5430024 | N/A | 10 | GG | Nest hard to see under canopy, appears to be an atypical cluster of sticks in *E. viminalis*. No definitive conclusion on nest classification due to lack of visibility. Nest is roughly 20 m up 25 m tall tree. |
| 17/02/2023 | 1286 | 437663 | 5426827 | N/A | 30 | WTE | This nest could not be found. Last year it was a remnant and hardly recognisable as a nest with only a few sticks remaining. |

[9] Nests from the cohort of 'not-found' nests that have now met the parameters to be treated as 'absent' on the NVA can be found in Appendix D.

| Date surveyed | NVA nest ID | Easting | Northing | Classification | Position accuracy (m) | Likely species | Comments |
|---|---|---|---|---|---|---|---|
| 17/02/2023 | 1871 | 437921 | 5426026 | N/A | 10 | WTE | This nest could not be found and was last observed on the NVA in 2010 where it was described as a small nest with loose structure that was falling apart. It is likely that this nest has fallen. |
| 21/02/2023 | 2451 | 464955 | 5408790 | Viable | 10 | WTE | Nest hard to see under canopy. This nest could not be found but it is likely still present. The canopy has become very dense. |
| 16/02/2023 | 2963 | 429086 | 5439129 | N/A | 10 | GG | No nest observed although it is likely still present and obscured from view by the tree canopy. This nest was first recorded in 2021 with an adult likely incubating some eggs and is likely still present. |
| - | 2503 | 457775 | 5411586 | N/A | 10 | WTE | This nest was not searched for due to restricted access to the site. The property the nest is located on has a strict 'no fly' policy. The landholder also refused ecologists access to the property via a ground search. This nest was found in 2018 and is likely still present.<br>See Figure 8. |
| 22/02/2023 | 1838 | 491759 | 5385228 | N/A | 10 | GG | This goshawk nest was not found, it is purported to be within 25 m of Wedge-tailed Eagle nest #675. This nest was found in 2010 with white feather down and whitewash reportedly present. |
| 22/02/2023 | 2954 | 411923 | 5450603 | N/A | 10 | GG | This nest likely still exists as it was active in October 2021. |

**Table 4:** Incidental raptor observations and minor nests seen on each day of the survey.

| Survey date | Wedge-tailed Eagles | White-bellied Sea Eagles | Grey Goshawks | Minor nests seen[10] |
|---|---|---|---|---|
| 13/02/2023 | 8 | 0 | 2 | 0 |
| 14/02/2023 | 0 | 2 | 1 | 3 |
| 15/02/2023 | 6 | 0 | 2 | 6 |
| 16/02/2023 | 6 | 1 | 3 | 4 |
| 17/02/2023 | 7 | 1 | 2 | 3 |
| 20/02/2023 | 5 | 0 | 1 | 5 |
| 21/02/2023 | 7 | 1 | 0 | 6 |
| 22/02/2023 | 7 | 0 | 1 | 2 |

[10] Non-raptor species, primarily suspected corvid nests

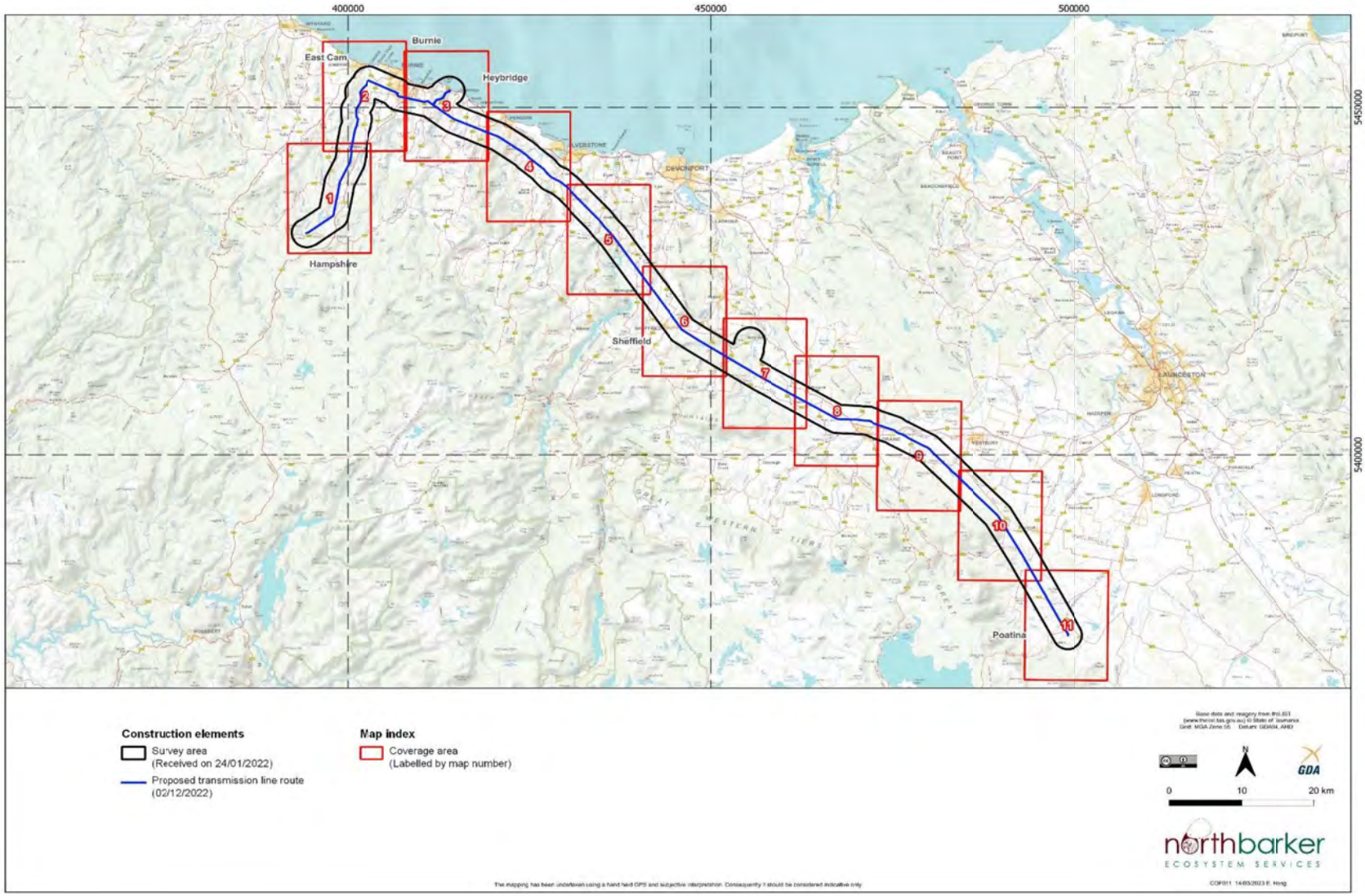


**Figure 1: Index map of proposed transmission line route, nest search buffer and individual map sections.**

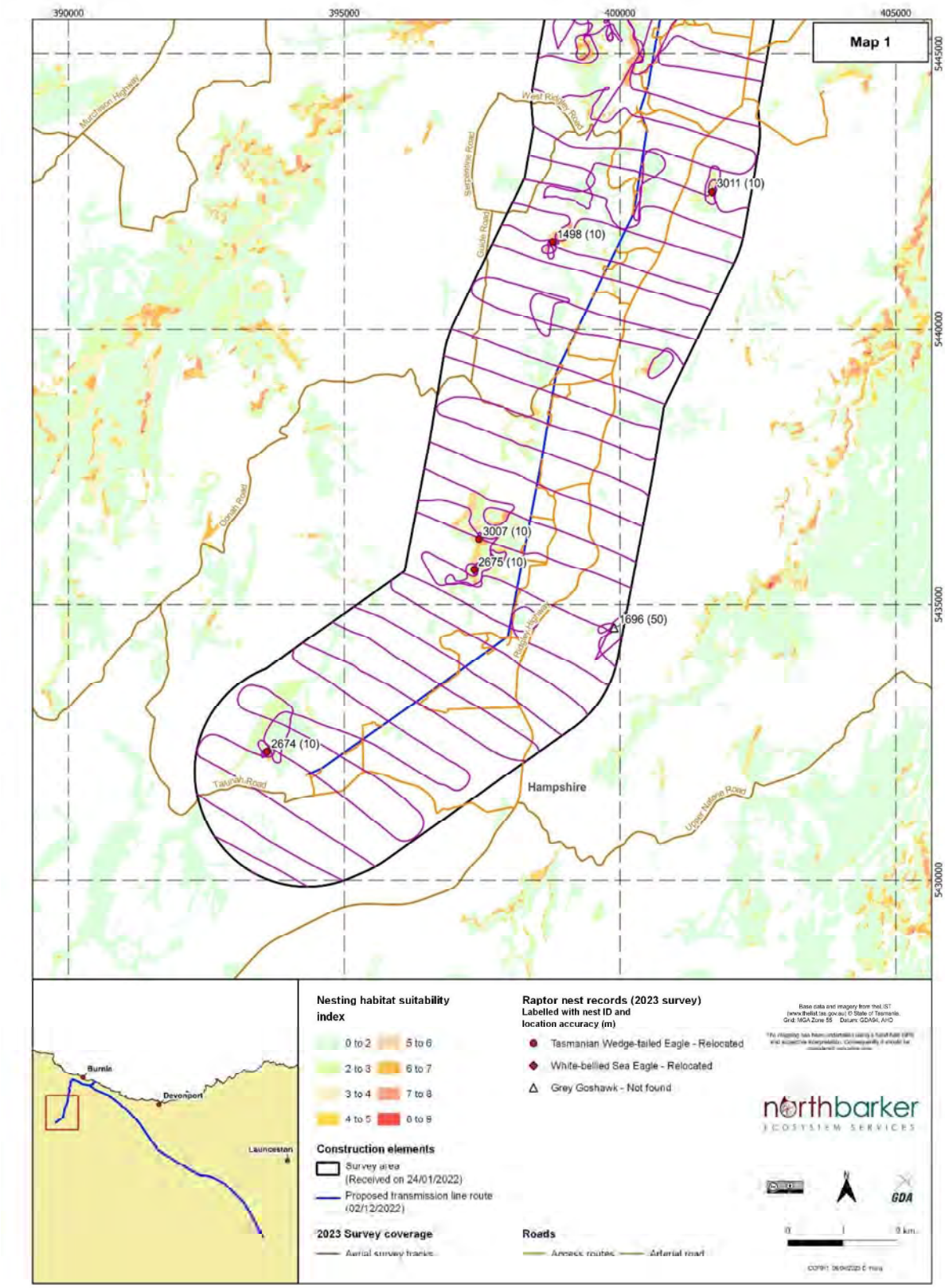


**Figure 2: Map 1 – Aerial survey tracks and survey results.**

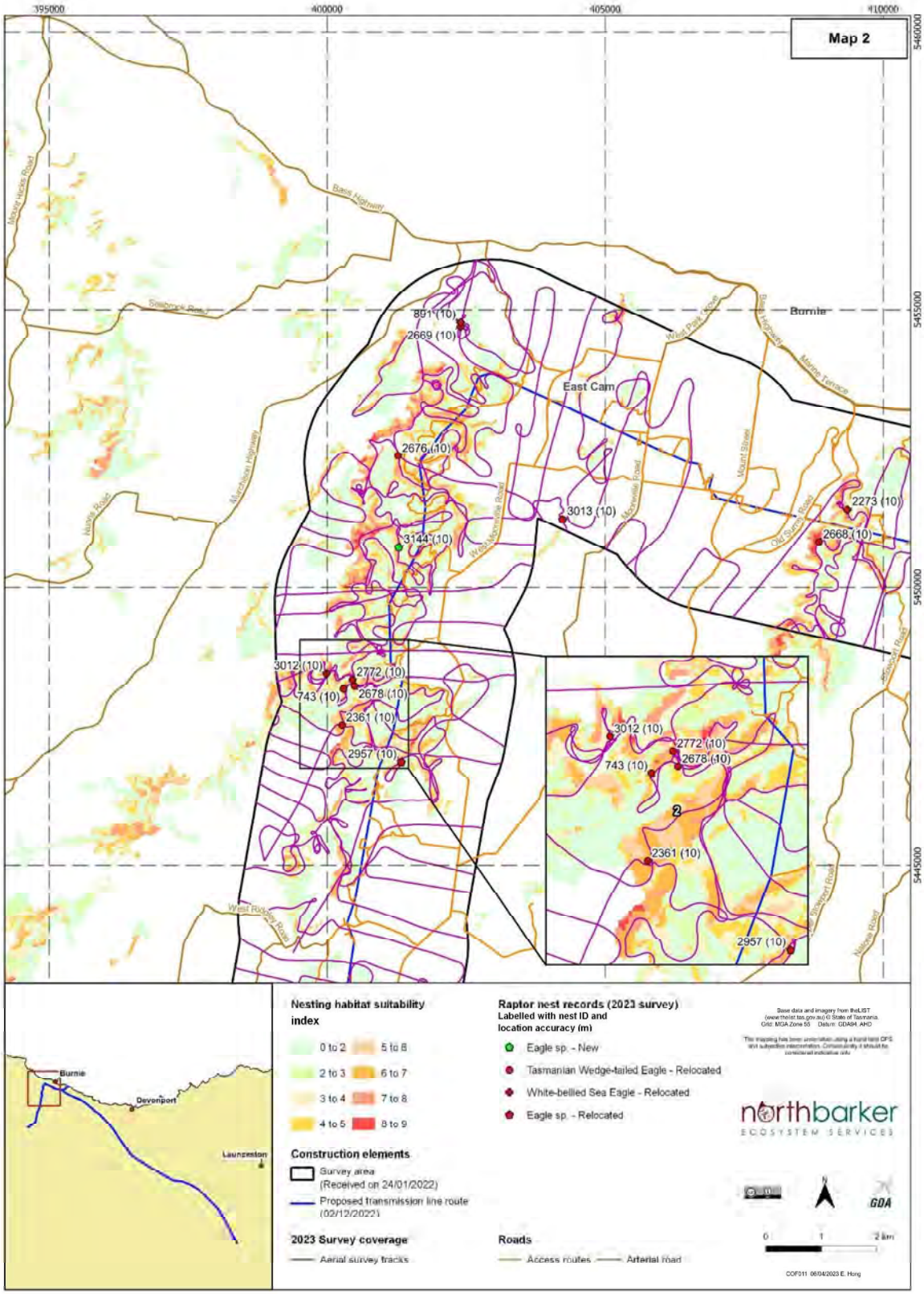


**Figure 3: Map 2 - Aerial survey tracks and survey results.**

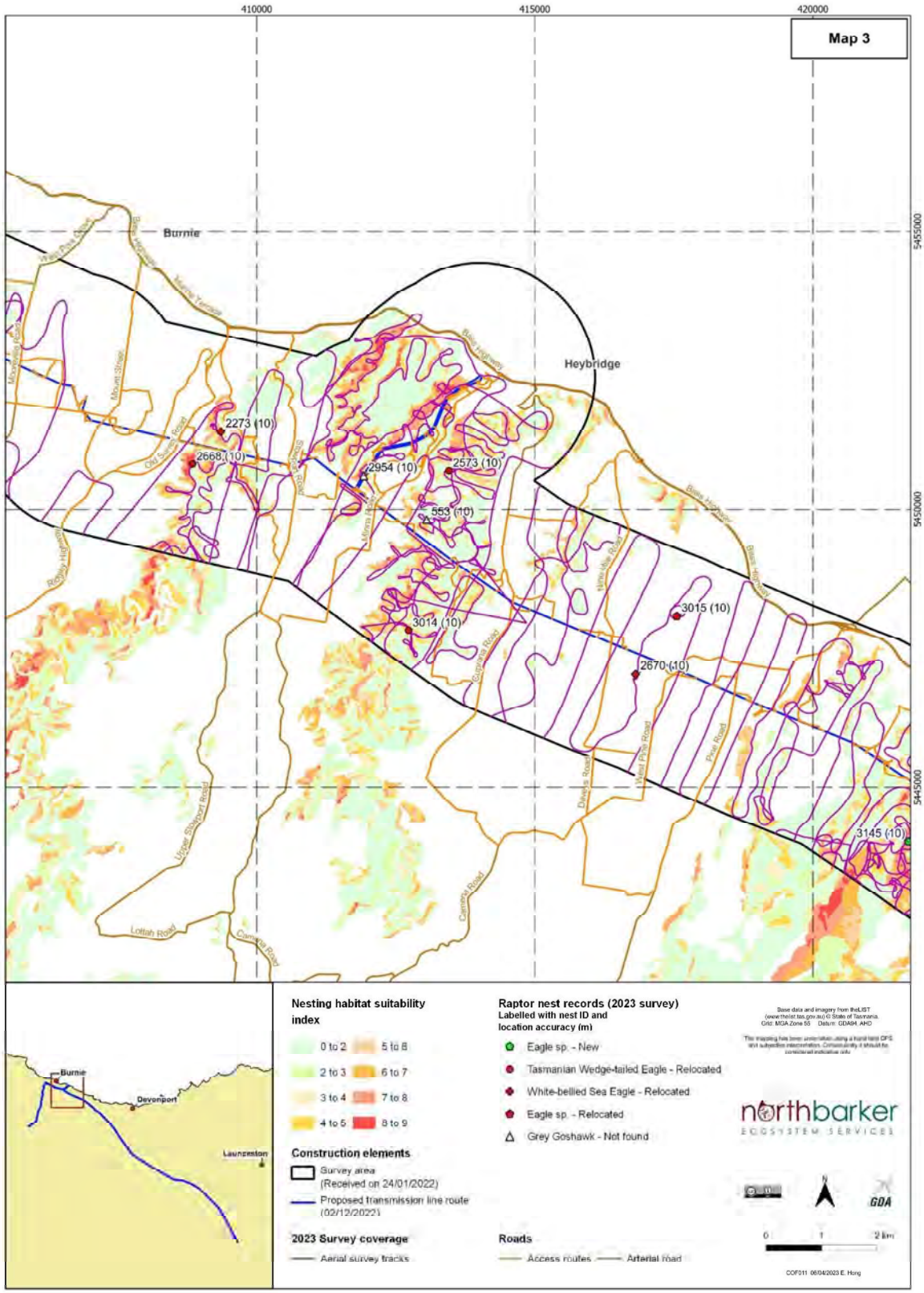


**Figure 4: Map 3 - Aerial survey tracks and survey results.**

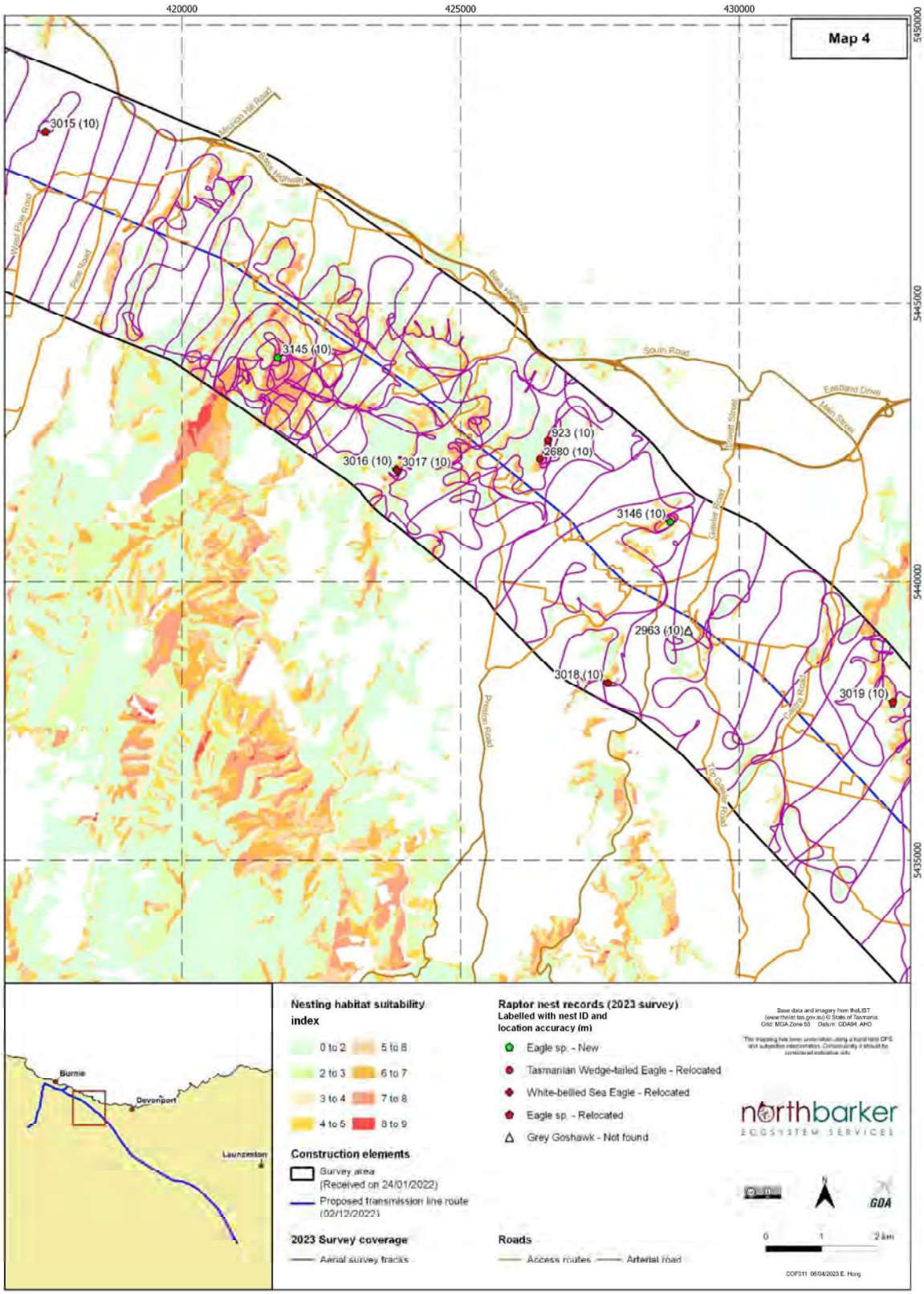


**Figure 5: Map 4 - Aerial survey tracks and survey results.**

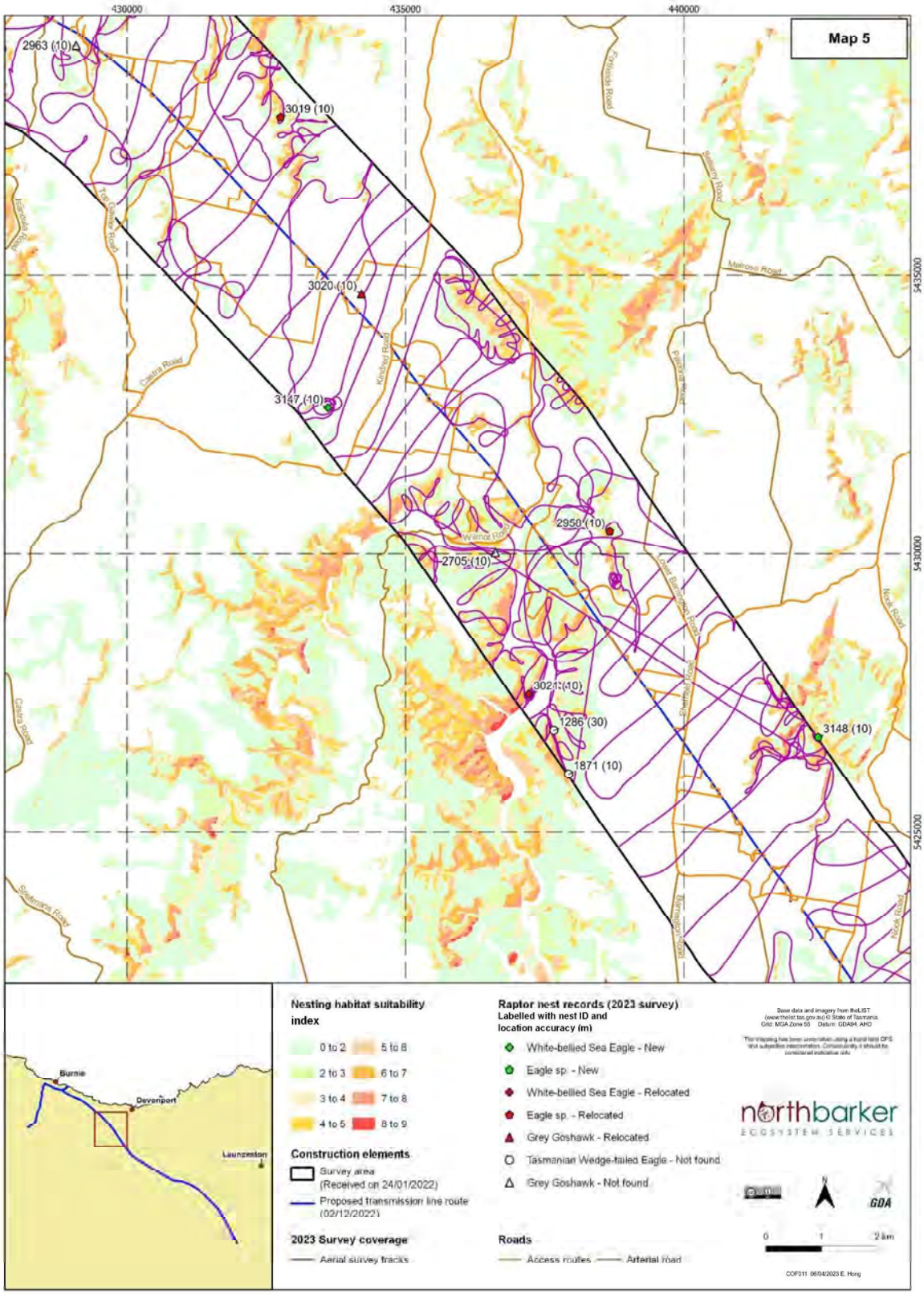


**Figure 6: Map 5 - Aerial survey tracks and survey results.**

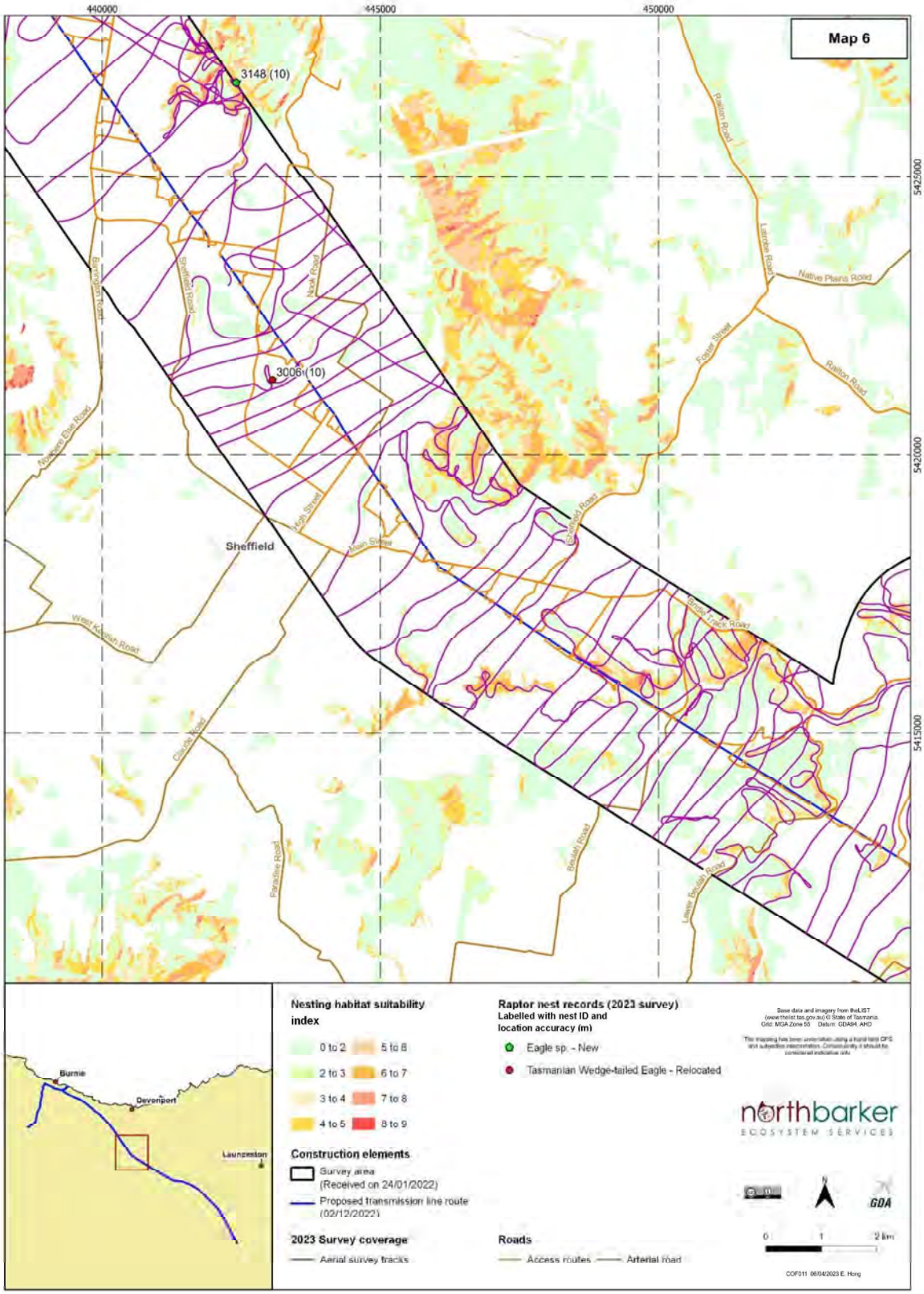


**Figure 7: Map 6- Aerial survey tracks and survey results.**

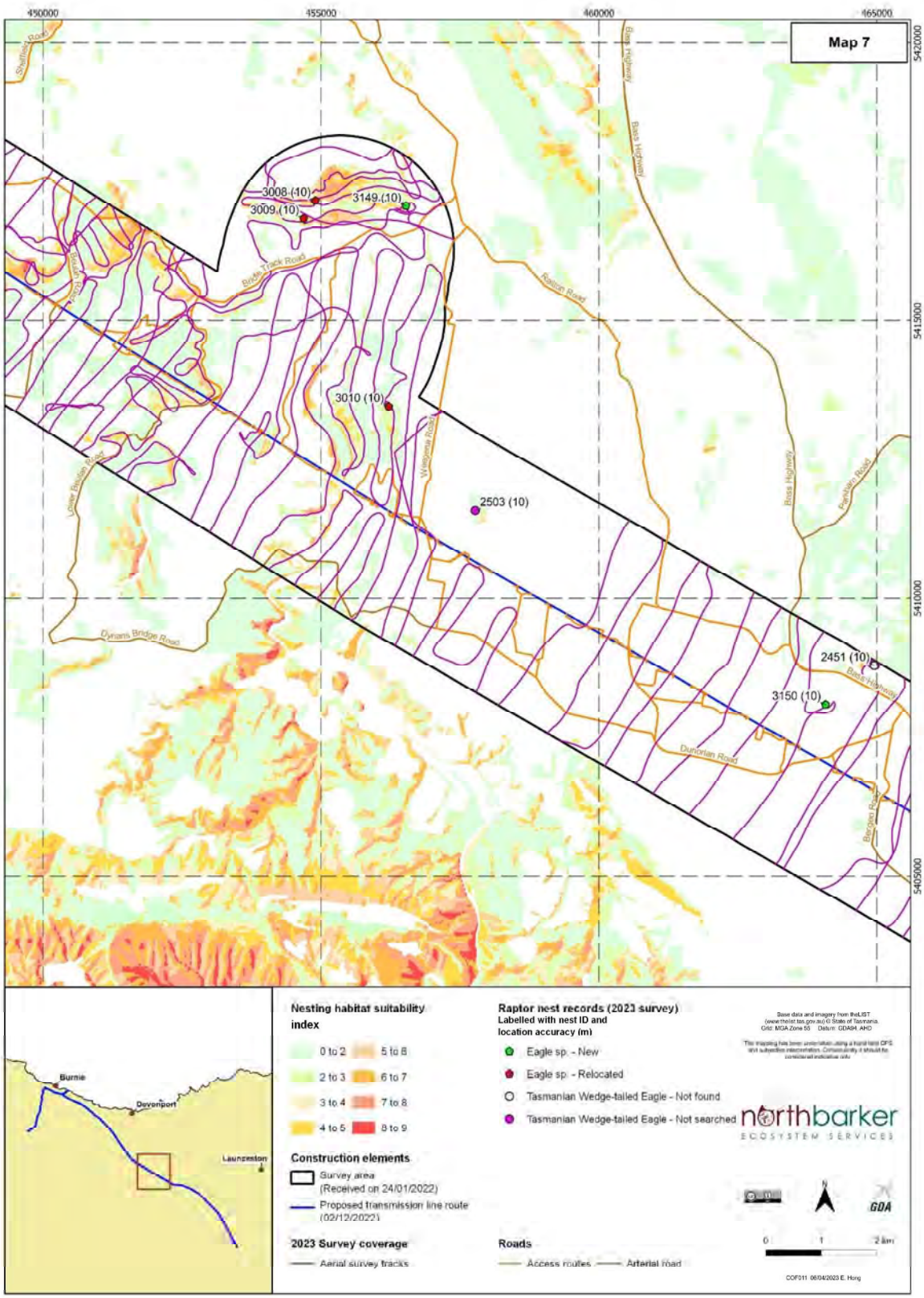


**Figure 8: Map 7- Aerial survey tracks and survey results.**

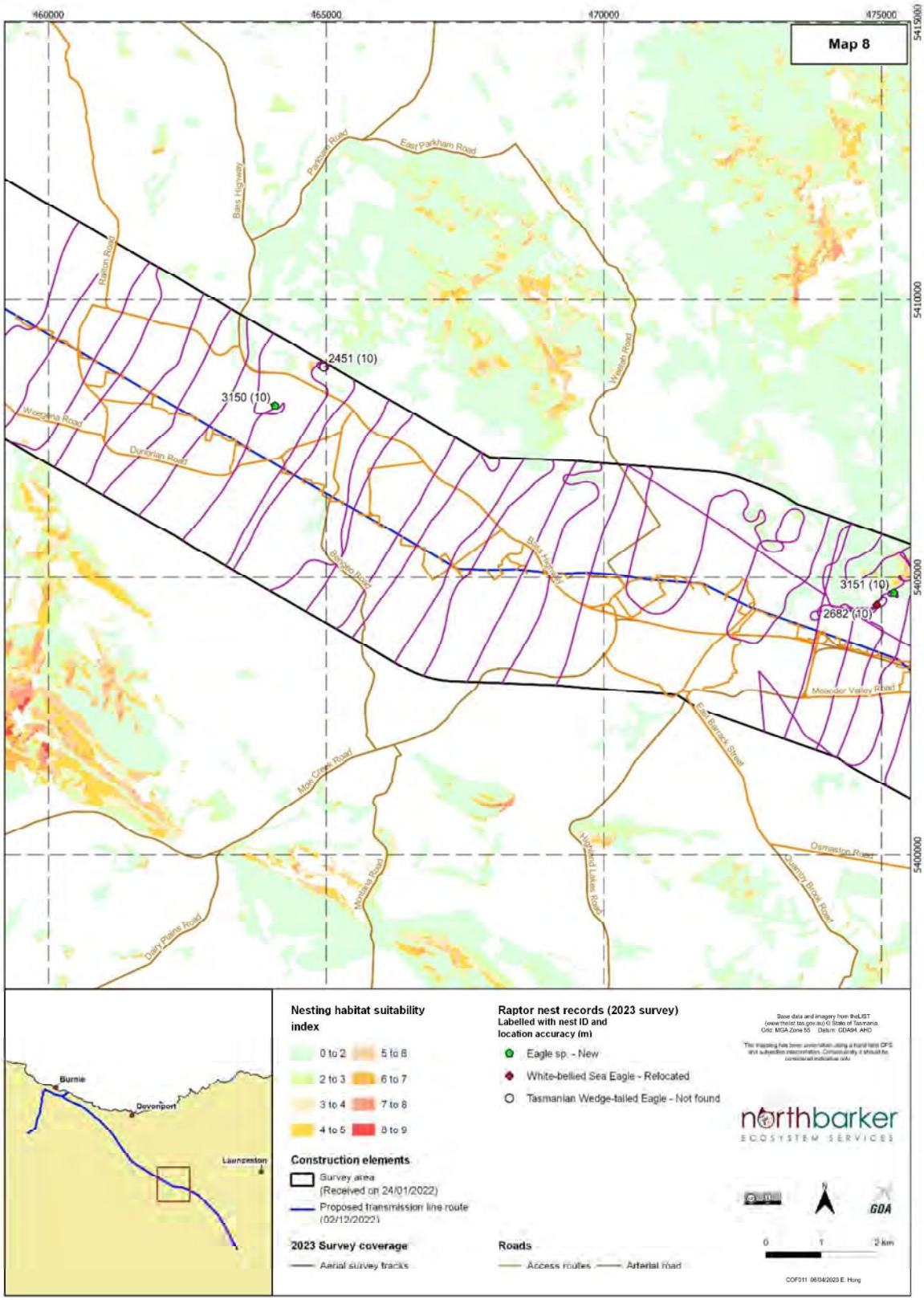


**Figure 9: Map 8- Aerial survey tracks and survey results.**

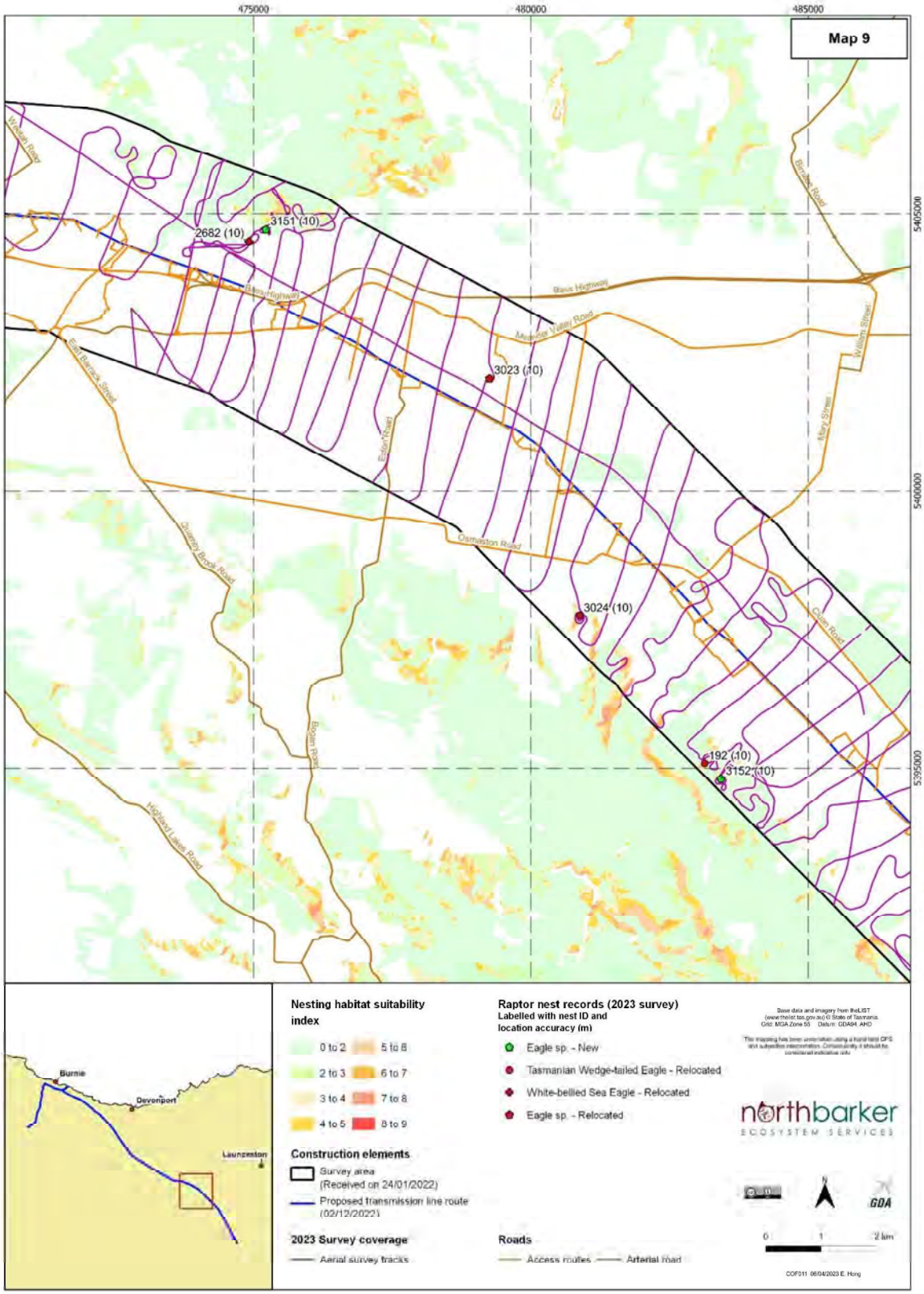


**Figure 10: Map 9- Aerial survey tracks and survey results.**

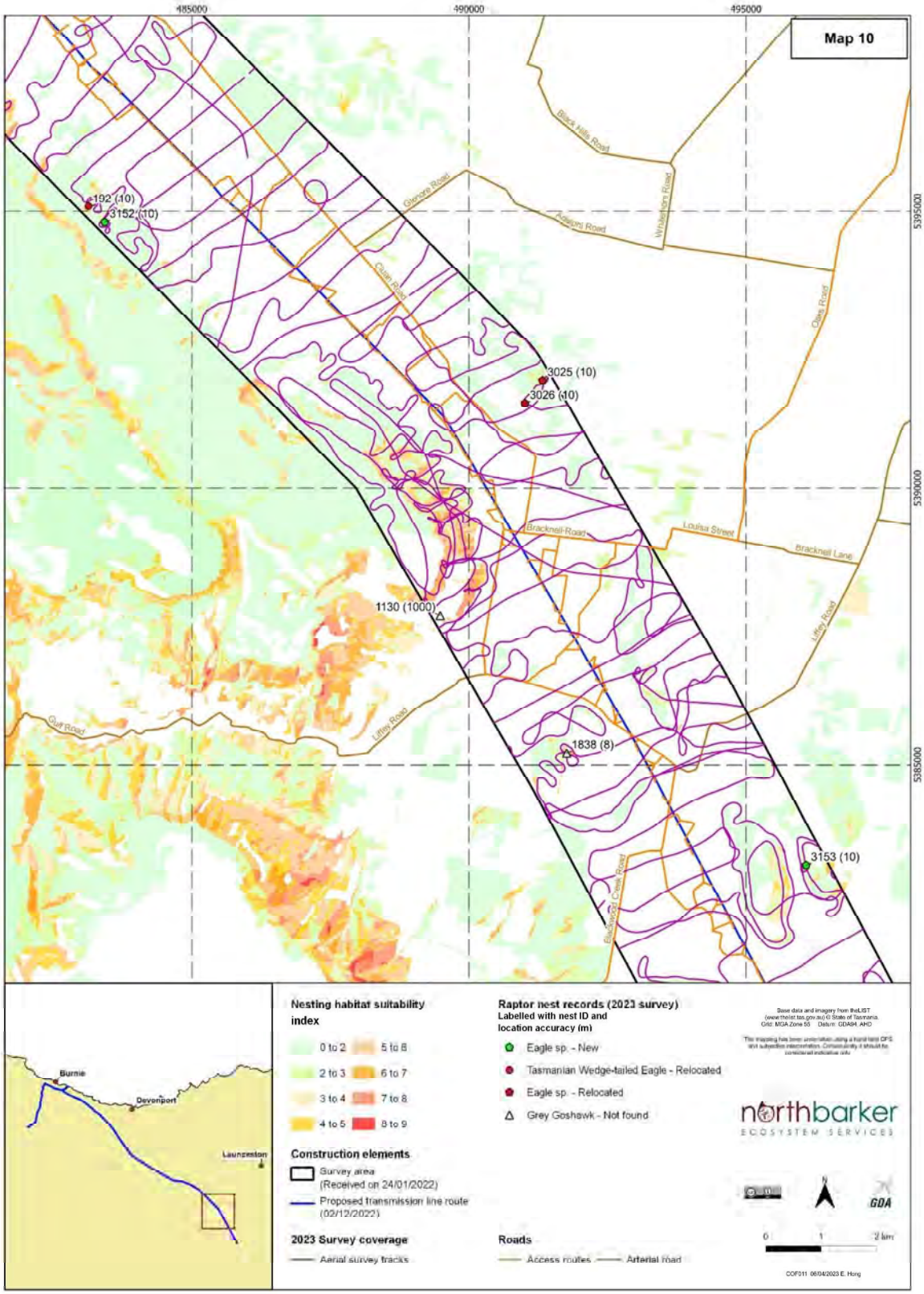


**Figure 11: Map 10- Aerial survey tracks and survey results.**

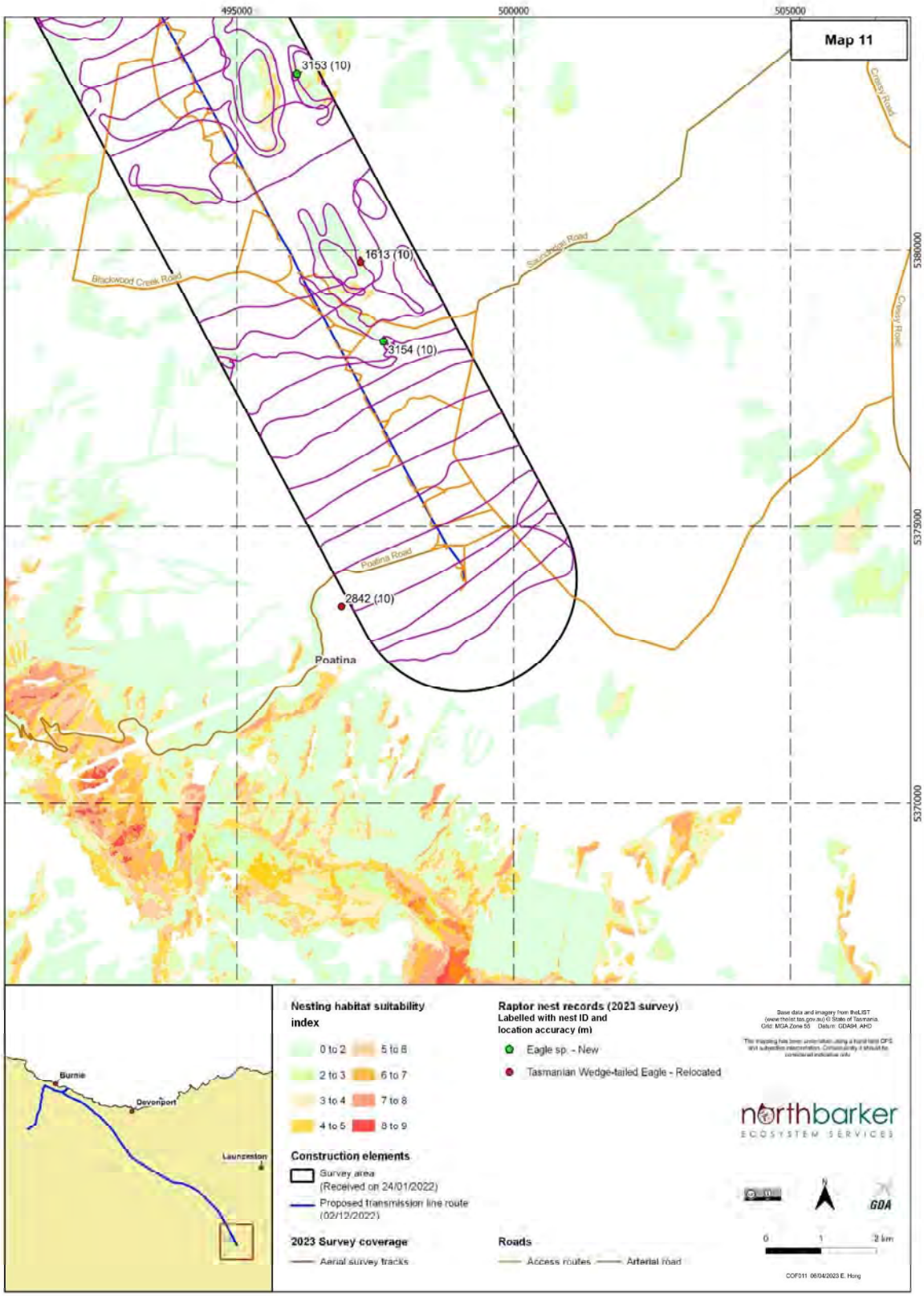


**Figure 12: Map 11- Aerial survey tracks and survey results.**

# 4. NEST LOCATIONS RELATIVE TO THE PROPOSED ALIGNMENT

Overall, nests along the entire alignment occurred within a range of habitat types, such as in locations mapped as having relatively high habitat suitable on the FPA's eagle habitat suitability model, such as gullies, river valleys and east facing slopes and locations mapped as having low habitat suitability such as in small native habitat patches surrounded by forestry and/or agricultural land.

Seven of the (fifty-seven) eagle nests[11] are within 500 m direct distance (taking into account potential GPS inaccuracy of 10 m) of the proposed alignment section (Table 5). Of these, seven nests five are currently considered 'prime' (nest #2273, #3144, #2670, #2668, and #2676), one is considered 'viable' (#2680) and one (#2957) is considered a remnant.

An additional eighteen nests are positioned less than 1 km away (Table 5). Of the eighteen nests between 500 m - 1 km, three were newly found nests (#3154, #3150 and #3145) and one of them (#2503) was not searched for but considered likely to remain extant. The remaining thirty-three nests are greater than 1 km from the alignment.

**Table 5:** Approximate horizontal distances of all extant eagle nests (excluding 'absent' nests) to the potential route alignment, in order of closest to farthest[12].

| NVA nest ID | Distance from favourable alignment (m) | Species | Nest Status |
|---|---|---|---|
| 2273 | 318.408 | White-bellied Sea Eagle | Relocated |
| 3144 | 335.144 | Eagle sp. | Found |
| 2957 | 338.887 | Eagle sp. | Relocated |
| 2670 | 356.778 | White-bellied Sea Eagle | Relocated |
| 2668 | 360.655 | Wedge-tailed Eagle | Relocated |
| 2676 | 404.089 | Wedge-tailed Eagle | Relocated |
| 2680 | 503.004 | Wedge-tailed Eagle | Relocated |
| 3006 | 530.626 | Wedge-tailed Eagle | Relocated |
| 3023 | 620.52 | Eagle sp. | Relocated |
| 2772 | 737.958 | Wedge-tailed Eagle | Relocated |
| 2573 | 741.29 | Wedge-tailed Eagle | Relocated |

[11] Grey Goshawks have not been included as they do not share the same management constraints as eagles.
[12] At the time of this report, these distances have been calculated from the most up to date information, received from the client on the 2nd of December 2022.

| NVA nest ID | Distance from favourable alignment (m) | Species | Nest Status |
|---|---|---|---|
| 3154 | 750.165 | Eagle sp. | Found |
| 2678 | 753.653 | Wedge-tailed Eagle | Relocated |
| 2682 | 792.541 | White-bellied Sea Eagle | Relocated |
| 2503 | 806.143 | Wedge-tailed Eagle | Not searched, restricted access |
| 2675 | 826.957 | Wedge-tailed Eagle | Relocated |
| 2674 | 829.004 | Wedge-tailed Eagle | Relocated |
| 3007 | 847.681 | Wedge-tailed Eagle | Relocated |
| 923 | 853.937 | Wedge-tailed Eagle | Relocated |
| 3015 | 885.186 | Eagle sp. | Relocated |
| 2361 | 897.361 | Wedge-tailed Eagle | Relocated |
| 3150 | 912.565 | Eagle sp. | Found |
| 3145 | 922.551 | Eagle sp. | Found |
| 743 | 951.325 | Wedge-tailed Eagle | Relocated |
| 2669 | 962.903 | White-bellied Sea Eagle | Relocated |
| 891 | 1030.968 | White-bellied Sea Eagle | Relocated |
| 1613 | 1063.539 | Wedge-tailed Eagle | Relocated |
| 2958 | 1079.984 | Eagle sp. | Relocated |
| 1498 | 1091.006 | Wedge-tailed Eagle | Relocated |
| 3151 | 1097.617 | Eagle sp. | Found |
| 3012 | 1168.465 | Wedge-tailed Eagle | Relocated |
| 675 | 1191.798 | Wedge-tailed Eagle | Not found |
| 3016 | 1297.703 | White-bellied Sea Eagle | Relocated |
| 3017 | 1300.975 | White-bellied Sea Eagle | Relocated |
| 3011 | 1341.825 | White-bellied Sea Eagle | Relocated |

| NVA nest ID | Distance from favourable alignment (m) | Species | Nest Status |
|---|---|---|---|
| 3146 | 1343.961 | Eagle sp. | Found |
| 3026 | 1376.01 | Eagle sp. | Relocated |
| 3019 | 1380.671 | Eagle sp. | Relocated |
| 3014 | 1479.205 | Wedge-tailed Eagle | Relocated |
| 3147 | 1553.764 | White-bellied Sea Eagle | Found |
| 3024 | 1575.523 | Wedge-tailed Eagle | Relocated |
| 1323 | 1590.38 | White-bellied Sea Eagle | Not found |
| 3010 | 1597.65 | Eagle sp. | Relocated |
| 3153 | 1665.732 | Eagle sp. | Found |
| 3018 | 1725.939 | Eagle sp. | Relocated |
| 3021 | 1783.54 | White-bellied Sea Eagle | Relocated |
| 1286 | 1788.657 | Wedge-tailed Eagle | Not found |
| 3025 | 1856.638 | Eagle sp. | Relocated |
| 3152 | 1861.127 | Eagle sp. | Found |
| 192 | 1867.455 | Wedge-tailed Eagle | Relocated |
| 3013 | 1868.336 | Eagle sp. | Relocated |
| 2451 | 1950.43 | Wedge-tailed Eagle | Not found |
| 1871 | 2020.931 | Wedge-tailed Eagle | Not found |
| 3148 | 2032.666 | Eagle sp. | Found |
| 3008 | 3665.011 | Eagle sp. | Relocated |
| 3009 | 4052.249 | Eagle sp. | Relocated |
| 3149 | 4829.171 | Eagle sp. | Found |

# 5. DISCUSSION

An aerial search for eagle nests and potential nesting habitat was conducted within 2 km of the proposed transmission line routes from Hampshire to East Cam, East Cam to Sheffield and Sheffield to Poatina/Palmerston substation in northwest Tasmania. This survey was the fifth consecutive annual project-specific survey for the Hampshire to East Cam route. The works undertaken were based on the best practice methodology for eagle nest searches[13]and in a manner that meets the MIDAA planning criteria for the proposal.

Of the fifty-nine previously known raptor nests surveyed in 2023, forty-one were classified as present, either by being relocated or considered likely to be extant (one nest that could not be surveyed due to landholder restrictions) – within these forty-one raptor nests, forty are attributed as eagle nests and one a Grey Goshawk.

Eighteen previously reported nests were 'not found' (eleven eagle nests and seven Grey Goshawk); of the eleven 'not found' eagle nests, seven have now meet the conditions to be formally treated as 'absent' on the NVA.

Eleven new nests were located during the 2023 survey. Details of the nests found, such as their condition and features, were documented to allow for monitoring nest changes over time, including potentially throughout the operational lifespan of this project.

Combining the 2023 survey results with past observations and excluding absent nests, a total of sixty-three raptor nests (fifty-seven eagle and eight Grey Goshawk) are known from the entire alignment (encompassing the Hampshire to Poatina/Palmerston substation route and the respective parts of the routes around Heybridge and Kimberly). Nineteen eagle nests previously known from within the area will still show up on the NVA and TheLIST raptor nest layers, although they can now be considered 'absent' (notwithstanding that the locations may support another nest in the future, but meaning annual breeding season constraints need not be applicable to a nest no longer present).

Disturbances from development are known to have a negative effect on breeding eagle species, particularly the Tasmanian Wedge-tailed Eagle, so provisions are made within the MIDAA criteria for works to minimise the risk of disturbance to breeding birds. Eagle breeding season constraints are typically applied between the 1st of July and 31st of January (but in some years are extended into February to capture late breeding events). Constraints typically include cessation of activities such as vegetation clearing, roading, and development of infrastructure within 500 m or 1 km line-of-sight of nests that are confirmed as active or not definitively inactive. Activity assessments are undertaken annually around October and November – within each season a nest must be assumed to be active until determined to be otherwise (*i.e.* the annual constraint period always applies from 1st of July until [if] an activity assessment determines the nest is inactive that season). Thus, the updated distribution of nests within the area around the alignment can be used to inform the proponent of potential constraints in the upcoming breeding season for 2023/24.

[13] Forest Practices Authority 2014 Fauna Technical Note No. 1: Eagle nest searching, activity checking and nest management.

# APPENDIX A: Photographs of recorded nests

**Plate 1a:** Nest ID #3144

**Plate1b:** Nest ID #3144

**Plate 2a:** Nest ID #3145

**Plate 2b:** Nest ID #3145

**Plate 3:** Nest ID #3146

**Plate 4a:** Nest ID #3147

**Plate 4b:** Nest ID #3147

**Plate 5a:** Nest ID #3148

**Plate 5b:** Nest ID #3148

**Plate 6a:** Nest ID #3149

**Plate 6b:** Nest ID #3149

**Plate 7a:** Nest ID #3150

**Plate 7b:** Nest ID #3150

**Plate 8a:** Nest ID #3151

**Plate 8b:** Nest ID #3151

**Plate 9:** Nest ID #3152

**Plate 10a:** Nest ID #3153

**Plate 10b:** Nest ID #3153

**Plate 11a:** Nest ID #3154

**Plate 11b:** Nest ID #3154

**Plate 12:** Nest ID #2674

**Plate 13a:** Nest ID #2675

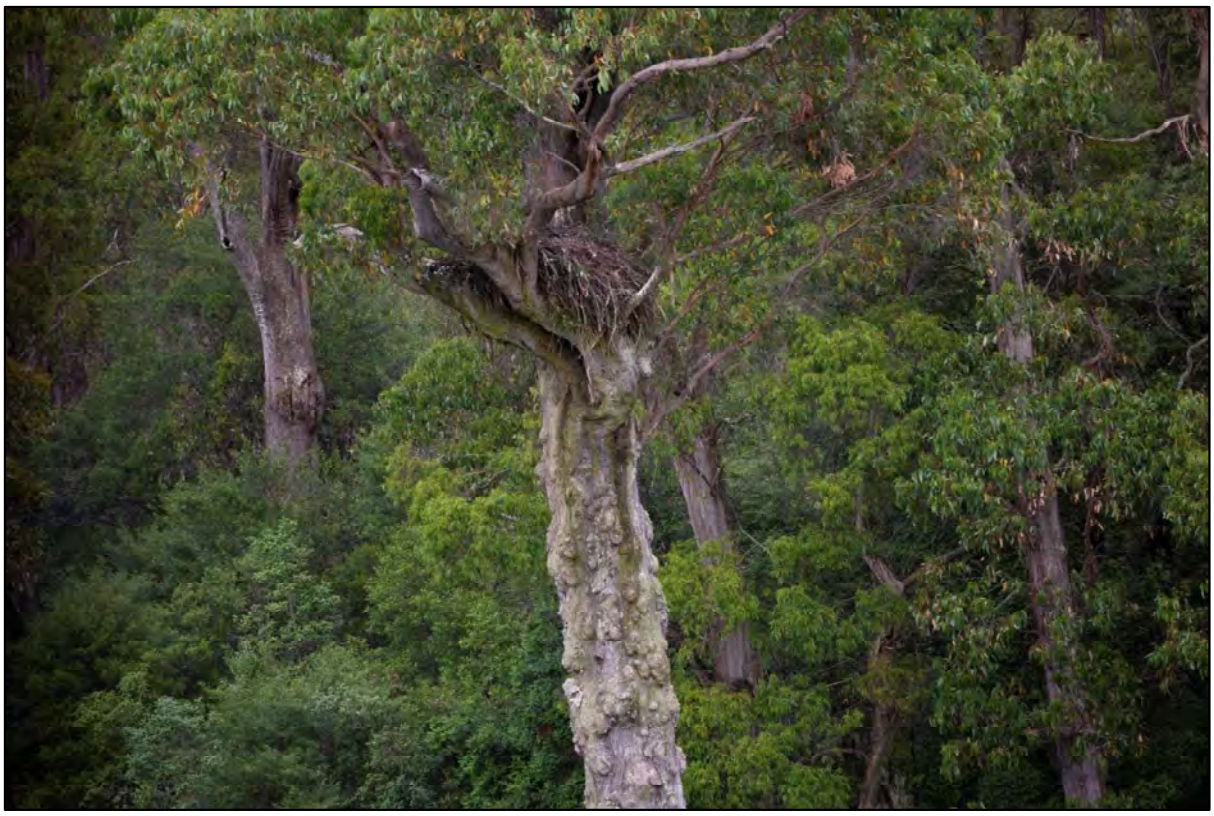

**Plate 13b:** Nest ID #2675

**Plate 14a:** Nest ID #3007

**Plate 14b:** Nest ID #3007

**Plate 15:** Nest ID #1498

**Plate 16a:** Nest ID #3011

**Plate 16b:** Nest ID #3011

**Plate 17a:** Nest ID #2361

**Plate 17b:** Nest ID #2361

**Plate 18:** Nest ID #2678

**Plate 19a:** Nest ID #2772

**Plate 19b:** Nest ID #2772

**Plate 20a:** Nest ID #743

**Plate 20b:** Nest ID #743

**Plate 21:** Nest ID #2957 (photo from 2022)

**Plate 22a:** Nest ID #3012

**Plate 22b:** Nest ID #3012

**Plate 23:** Nest ID #2676

**Plate 24a:** Nest ID #3013

**Plate 24b:** Nest ID #3013

**Plate 25a:** Nest ID #2669

**Plate 25b:** Nest ID #2669

**Plate 26:** Nest ID #891

**Plate 27a:** Nest ID #2668

**Plate 27b:** Nest ID #2668

**Plate 28:** Nest ID #2273

**Plate 29a:** Nest ID #2573

**Plate 29b:** Nest ID #2573

**Plate 30:** Nest ID #3014

**Plate 31a:** Nest ID #2670

**Plate 31b:** Nest ID #2670

**Plate 32a:** Nest ID #3015

**Plate 32b:** Nest ID #3015

**Plate 33a:** Nest ID #923

**Plate 33b:** Nest ID #923

**Plate 34a:** Nest ID #2680

**Plate 34b:** Nest ID #2680

**Plate 35a:** Nest ID #3016

**Plate 35b:** Nest ID #3016 and 3017

**Plate 36:** Nest ID #3018

**Plate 37:** Nest ID #3019

**Plate 38a:** Nest ID #3020

**Plate 38b:** Nest ID #3020

**Plate 39a:** Nest ID #3021

**Plate 39b:** Nest ID #3021

**Plate 40:** Nest ID #2958

**Plate 41:** Nest ID #3006

**Plate 42:** Nest ID #3008

**Plate 43a:** Nest ID #3009

**Plate 43b:** Nest ID #3009

**Plate 44a:** Nest ID #3010

**Plate 44b:** Nest ID #3010

**Plate 45a:** Nest ID #2682

**Plate 45b:** Nest ID #2682

**Plate 46a:** Nest ID #3023

**Plate 46b:** Nest ID #3023

**Plate 47:** Nest ID #3024

**Plate 48:** Nest ID #192

**Plate 49a:** Nest ID #1613

**Plate 49a:** Nest ID #1613

**Plate 50a:** Nest ID #3025

**Plate 50 b:** Nest ID #3025

**Plate 51a:** Nest ID #3026

**Plate 51b:** Nest ID #3026

# APPENDIX B: Raptor nest search form

**Location: East Cam to Poatina. Grid Coordinates - Centroid: 436063E, 5432989N (GDA)**
**Location East Cam to Hampshire Hills. Grid Coordinates – Centroid: 400217E, 5445609N (GDA)**

| Action | Person | Date | Result |
|---|---|---|---|
| **Previously searched?**<br><br>**Yes, however search area was broadened for the addition of alternative alignments in 2022,**<br><br>**Area searched in 2023 was the same as 2022.** | Nick Mooney<br>Jaidan Draper<br><br><br><br>And<br>Erin Harris<br>Tim Leaman<br>Janet Morley<br>Mel Hills<br>Liz Browne<br><br><br>And<br>Erin Harris<br>Frank Bird<br>Alice Grieve<br>Karen Ziegler<br>Mel Hills | 17/06/2019<br>28/06/2019<br><br><br><br>17/05/2021<br>18/05/2021<br>21/05/2021<br>24/05/2021<br>27/05/2021<br>28/05/2021<br>02/06/2021<br><br>24/03/2022 – 08/04/2022 | 11 new nests found<br>6 nests relocated<br>8 known nests not found<br><br><br>4 new nests found<br>21 nests relocated<br>15 known nests not found<br><br><br><br><br><br><br>21 new nests found<br>28 nests relocated<br>10 nests not found<br>12 nests confirmed absent |
| **Potential nesting habitat assessment** | NBES | 07/05/2020<br>14/05/2021<br>01/03/2022<br>01/02/2023 | Potential nesting habitat area as indicated but not limited to the FPA nesting suitability index (see Figures 2-11) |
| **Search of nesting habitat** | Erin Harris<br>Karen Dick<br>Adam Hardy<br>Laura Cardona | 13/02/2023– 17/02/2023<br>20/02/2023– 22/02/2023 | 11 new nests found<br>41 nests relocated<br>15 known nests not found<br><br>See Figures 2-11 for new nests |
| **Follow-up search(?)** | N/A | N/A | |
| **Notification to FPA** | NBES | Pending | |
| **Nest site added to NVA**<br><br>**Reserve added to planning maps/GIS** | NBES | 13/05/2022 | 11 new nests added – nest verification data was added to NVA |

# APPENDIX C: Raptor nest location forms

## Raptor nest location form – nest 3144

| **Nest number and name (Office use only):** |
|---|

| | |
|---|---|
| **SPECIES:** Undetermined | |
| **OBSERVER: name, address, phone/fax**<br>Erin Harris, Karen Dick, Adam Hardy<br>North Barker Ecosystem Services Pty Ltd, 313 Macquarie Street, Hobart.<br>(03) 6231 9788 | |
| **DATE OF THIS REPORT:**<br>**17/03/2023** | **WHEN WAS THE NEST FOUND?**<br>13/02/2023 |
| **HOW WAS THE NEST FOUND? eg. during pre-logging search, during forestry operation, etc.**<br>During aerial eagle nest search of selected area. | |
| **HAD THE AREA BEEN PREVIOUSLY SEARCHED**? give detail<br>Yes, during aerial eagle nest searches in 2022. | |
| **LOCATION OF NEST:**<br>1.3 km NW of West Mooreville<br>**Coordinates**: 401287E 5450719N **Datum (GDA/AGD):** GDA 94 MGA 55 **GPSed:** Yes<br>**Accuracy (m):** 10 m | |
| **NEST SITUATION**: **was it in a tree (species?), on a cliff, or on the ground?**<br>Nest is approximately 45 m up a 50 m tall *Eucalyptus obliqua* tree. | |
| **HISTORY OF NEST USE**: **known breeding attempts? results?**<br>Unsure. | |
| **NEST DISTURBANCE: forestry, recreation, roading, building, etc.?**<br>Proposed transmission line. | |
| **WHAT WAS SEEN? eggs, birds, droppings, nest material, prey, etc.?**<br>The nest had a large amount of brown leaves on top and a slight bowl.<br>See Plate 1a and 1b: Nest 3144. | |

# Raptor nest location form - nest 3145

| **Nest number and name (Office use only):** |
|---|

| | |
|---|---|
| **SPECIES:** Undetermined | |
| **OBSERVER: name, address, phone/fax**<br>Erin Harris, Adam Hardy, Laura Cardona<br>North Barker Ecosystem Services Pty Ltd, 313 Macquarie Street, Hobart.<br>(03) 6231 9788 | |
| **DATE OF THIS REPORT:**<br>**17/03/2023** | **WHEN WAS THE NEST FOUND?**<br>15/02/2023 |
| **HOW WAS THE NEST FOUND? e.g. during pre-logging search, during forestry operation, etc.**<br>During aerial eagle nest search of selected area. | |
| **HAD THE AREA BEEN PREVIOUSLY SEARCHED**? give detail<br>Yes, during aerial eagle nest searches in 2022. | |
| **LOCATION OF NEST:**<br>Mount Montgomery 4.2 km South of Penguin<br><br>**Coordinates**: 421717E 5444021N **Datum (GDA/AGD):** GDA 94 MGA 55 **GPSed:** Yes<br>**Accuracy (m):** 10 m | |
| **NEST SITUATION**: **was it in a tree (species?), on a cliff, or on the ground?**<br>Nest is approximately 47 m up a 57 m tall *Eucalyptus obliqua* tree. | |
| **HISTORY OF NEST USE**: **known breeding attempts? results?**<br>Unsure. | |
| **NEST DISTURBANCE: forestry, recreation, roading, building, etc.?**<br>Proposed transmission line. | |
| **WHAT WAS SEEN? eggs, birds, droppings, nest material, prey, etc.?**<br>This was a large robust nest with a flat top, brown sticks and whitewash on adjacent branches.<br>See Plate 2a and 2b: Nest 3145. | |

# Raptor nest location form – nest 3146

| **Nest number and name (Office use only):** |
|---|

| | |
|---|---|
| **SPECIES:** Undetermined | |
| **OBSERVER: name, address, phone/fax**<br>Erin Harris, Adam Hardy, Laura Cardona<br>North Barker Ecosystem Services Pty Ltd, 313 Macquarie Street, Hobart.<br>(03) 6231 9788 | |
| **DATE OF THIS REPORT:**<br>**17/03/2023** | **WHEN WAS THE NEST FOUND?**<br>16/02/2023 |
| **HOW WAS THE NEST FOUND? e.g. during pre-logging search, during forestry operation, etc.**<br>During aerial eagle nest search of selected area. | |
| **HAD THE AREA BEEN PREVIOUSLY SEARCHED**? give detail<br>Yes, during aerial eagle nest searches in 2022. | |
| **LOCATION OF NEST:**<br>150 m SW of the conjunction of Mckennas Road and West Gawler Road.<br>**Coordinates**: 428761E 5441072N **Datum (GDA/AGD):** GDA 94 MGA 55 **GPSed:** Yes<br>**Accuracy (m):** 10 m | |
| **NEST SITUATION**: **was it in a tree (species?), on a cliff, or on the ground?**<br>Nest is approximately 20 m up a 35 m tall *Eucalyptus obliqua* tree. | |
| **HISTORY OF NEST USE**: **known breeding attempts? results?**<br>Unsure. | |
| **NEST DISTURBANCE: forestry, recreation, roading, building, etc.?**<br>Proposed transmission line. | |
| **WHAT WAS SEEN? eggs, birds, droppings, nest material, prey, etc.?**<br>A small nest that is hard to see under the canopy, with brown sticks on top but no signs of recent use.<br>See Plate 3: Nest 3146. | |

# Raptor nest location form – nest 3147

| **Nest number and name (Office use only):** |
|---|

| | |
|---|---|
| **SPECIES:** White-bellied Sea Eagle | |
| **OBSERVER: name, address, phone/fax**<br>Erin Harris, Adam Hardy, Laura Cardona<br>North Barker Ecosystem Services Pty Ltd, 313 Macquarie Street, Hobart.<br>(03) 6231 9788 | |
| **DATE OF THIS REPORT:**<br>**17/03/2023** | **WHEN WAS THE NEST FOUND?**<br>17/02/2023 |
| **HOW WAS THE NEST FOUND? e.g. during pre-logging search, during forestry operation, etc.**<br>During aerial eagle nest search of selected area. | |
| **HAD THE AREA BEEN PREVIOUSLY SEARCHED**? give detail<br>Yes, during aerial eagle nest searches in 2022. | |
| **LOCATION OF NEST:**<br>Claytons Ruvulet 1.9 km NE of Moreton.<br>**Coordinates**: 433608E 5432624N **Datum (GDA/AGD):** GDA 94 MGA 55 **GPSed:** Yes<br>**Accuracy (m):** 10 m | |
| **NEST SITUATION**: **was it in a tree (species?), on a cliff, or on the ground?**<br>Nest is approximately 26 m up a 32 m tall *Eucalyptus viminalis* tree. | |
| **HISTORY OF NEST USE**: **known breeding attempts? results?**<br>Unsure. | |
| **NEST DISTURBANCE: forestry, recreation, roading, building, etc.?**<br>Proposed transmission line. | |
| **WHAT WAS SEEN? eggs, birds, droppings, nest material, prey, etc.?**<br>The nest had brown leaves and sticks and flat top. A juvenile White-bellied Sea Eagle was seen flushing from a nearby tree.<br>See Plate 4a and 4b: Nest 3147. | |

# Raptor nest location form – nest 3148

| **Nest number and name (Office use only):** |
|---|

| | |
|---|---|
| **SPECIES:** Undetermined | |
| **OBSERVER: name, address, phone/fax**<br>Erin Harris, Adam Hardy, Laura Cardona<br>North Barker Ecosystem Services Pty Ltd, 313 Macquarie Street, Hobart.<br>(03) 6231 9788 | |
| **DATE OF THIS REPORT:**<br>**17/03/2023** | **WHEN WAS THE NEST FOUND?**<br>17/02/2023 |
| **HOW WAS THE NEST FOUND? e.g. during pre-logging search, during forestry operation, etc.**<br>During aerial eagle nest search of selected area. | |
| **HAD THE AREA BEEN PREVIOUSLY SEARCHED**? give detail<br>Yes, during aerial eagle nest searches in 2022. | |
| **LOCATION OF NEST:**<br>490 m SW of Barren Hill and 2.7 km SE of Lower Barrington.<br>**Coordinates**: 442409E 5426702N **Datum (GDA/AGD):** GDA 94 MGA 55 **GPSed:** Yes<br>**Accuracy (m):** 10 m | |
| **NEST SITUATION**: **was it in a tree (species?), on a cliff, or on the ground?**<br>Nest is approximately 30 m up a 36 m tall dead *Eucalyptus sp.* tree. | |
| **HISTORY OF NEST USE**: **known breeding attempts? results?**<br>Unsure. | |
| **NEST DISTURBANCE: forestry, recreation, roading, building, etc.?**<br>Proposed transmission line. | |
| **WHAT WAS SEEN? eggs, birds, droppings, nest material, prey, etc.?**<br>The nest had large amounts of bark lining a nest bowl although the nest does not appear to have been used. See Plate 5a and 5b: Nest 3148. | |

# Raptor nest location form – nest 3149

| **Nest number and name (Office use only):** |
|---|

| | |
|---|---|
| **SPECIES:** Undetermined | |
| **OBSERVER: name, address, phone/fax**<br>Erin Harris, Karen Dick, Adam Hardy<br>North Barker Ecosystem Services Pty Ltd, 313 Macquarie Street, Hobart.<br>(03) 6231 9788 | |
| **DATE OF THIS REPORT:**<br>**17/03/2023** | **WHEN WAS THE NEST FOUND?**<br>20/02/2023 |
| **HOW WAS THE NEST FOUND? eg. during pre-logging search, during forestry operation, etc.**<br>During aerial eagle nest search of selected area. | |
| **HAD THE AREA BEEN PREVIOUSLY SEARCHED**? give detail<br>Yes, during aerial eagle nest searches in 2022. | |
| **LOCATION OF NEST:**<br>1.7 km NW of Kimberley.<br>**Coordinates**: 456528E 5417067N **Datum (GDA/AGD):** GDA 94 MGA 55 **GPSed:** Yes<br>**Accuracy (m):** 10 m | |
| **NEST SITUATION**: **was it in a tree (species?), on a cliff, or on the ground?**<br>Nest is approximately 41 m up a 45 m tall dead *Eucalyptus* tree. | |
| **HISTORY OF NEST USE**: **known breeding attempts? results?**<br>Unsure. | |
| **NEST DISTURBANCE: forestry, recreation, roading, building, etc.?**<br>Proposed transmission line. | |
| **WHAT WAS SEEN? eggs, birds, droppings, nest material, prey, etc.?**<br>The nest was bleached with loose stickson top and a slight bowl.<br>See Plate 6a and 6b: Nest 3149. | |

# Raptor nest location form – nest 3150

| **Nest number and name (Office use only):** |
|---|

| | |
|---|---|
| **SPECIES:** Undetermined | |
| **OBSERVER: name, address, phone/fax**<br>Erin Harris, Karen Dick, Adam Hardy<br>North Barker Ecosystem Services Pty Ltd, 313 Macquarie Street, Hobart.<br>(03) 6231 9788 | |
| **DATE OF THIS REPORT:**<br>**17/03/2023** | **WHEN WAS THE NEST FOUND?**<br>21/02/2023 |
| **HOW WAS THE NEST FOUND? e.g. during pre-logging search, during forestry operation, etc.**<br>During aerial eagle nest search of selected area. | |
| **HAD THE AREA BEEN PREVIOUSLY SEARCHED**? give detail<br>Yes, during aerial eagle nest searches in 2022. | |
| **LOCATION OF NEST:**<br>1.4 km SE of Elizabeth Town (near Ribucon River).<br>**Coordinates**: 464078E 5408092N **Datum (GDA/AGD):** GDA 94 MGA 55 **GPSed:** Yes<br>**Accuracy (m):** 10 m | |
| **NEST SITUATION**: **was it in a tree (species?), on a cliff, or on the ground?**<br>Nest is approximately 32 m up a 33 m tall *Eucalyptus obliqua* tree. | |
| **HISTORY OF NEST USE**: **known breeding attempts? results?**<br>Unsure. | |
| **NEST DISTURBANCE: forestry, recreation, roading, building, etc.?**<br>Proposed transmission line. | |
| **WHAT WAS SEEN? eggs, birds, droppings, nest material, prey, etc.?**<br>A large, exposed nest with loose sticks on top and bleaching and a deep nest bowl.<br>See Plate 7a and 7b: Nest 3150. | |

# Raptor nest location form – nest 3151

| **Nest number and name (Office use only):** |
|---|

| | |
|---|---|
| **SPECIES:** Undetermined | |
| **OBSERVER: name, address, phone/fax**<br>Erin Harris, Karen Dick, Adam Hardy<br>North Barker Ecosystem Services Pty Ltd, 313 Macquarie Street, Hobart.<br>(03) 6231 9788 | |
| **DATE OF THIS REPORT:**<br>**17/03/2023** | **WHEN WAS THE NEST FOUND?**<br>21/02/2023 |
| **HOW WAS THE NEST FOUND? e.g. during pre-logging search, during forestry operation, etc.**<br>During aerial eagle nest search of selected area. | |
| **HAD THE AREA BEEN PREVIOUSLY SEARCHED**? give detail<br>Yes, during aerial eagle nest searches in 2022. | |
| **LOCATION OF NEST:**<br>4.5 NE of Deloraine along Meander River.<br>**Coordinates**: 475219E 5404715N **Datum (GDA/AGD):** GDA 94 MGA 55 **GPSed:** Yes<br>**Accuracy (m):** 10 m | |
| **NEST SITUATION**: **was it in a tree (species?), on a cliff, or on the ground?**<br>Nest is approximately 28 m up a 35 m tall dead *Eucalyptus* tree. | |
| **HISTORY OF NEST USE**: **known breeding attempts? results?**<br>Unsure. | |
| **NEST DISTURBANCE: forestry, recreation, roading, building, etc.?**<br>Proposed transmission line. | |
| **WHAT WAS SEEN? eggs, birds, droppings, nest material, prey, etc.?**<br>A large nest with small pieces of down feathers present around a nest bowl.<br>See Plate 8a and 8b: Nest 3151. | |

# Raptor nest location form – nest 3152

| **Nest number and name (Office use only):** |
|---|

| | |
|---|---|
| **SPECIES:** Undetermined | |
| **OBSERVER: name, address, phone/fax**<br>Erin Harris, Karen Dick, Adam Hardy<br>North Barker Ecosystem Services Pty Ltd, 313 Macquarie Street, Hobart.<br>(03) 6231 9788 | |
| **DATE OF THIS REPORT:**<br>**17/03/2023** | **WHEN WAS THE NEST FOUND?**<br>21/02/2023 |
| **HOW WAS THE NEST FOUND? e.g. during pre-logging search, during forestry operation, etc.**<br>During aerial eagle nest search of selected area. | |
| **HAD THE AREA BEEN PREVIOUSLY SEARCHED**? give detail<br>Yes, during aerial eagle nest searches in 2022. | |
| **LOCATION OF NEST:**<br>8.5 km SW of Westbury.<br>**Coordinates**: 483427E 5394802N **Datum (GDA/AGD):** GDA 94 MGA 55 **GPSed:** Yes<br>**Accuracy (m):** 10 m | |
| **NEST SITUATION**: **was it in a tree (species?), on a cliff, or on the ground?**<br>Nest is approximately 45 m up a 55 m tall *Eucalyptus viminalis* tree. | |
| **HISTORY OF NEST USE**: **known breeding attempts? results?**<br>Unsure. | |
| **NEST DISTURBANCE: forestry, recreation, roading, building, etc.?**<br>Proposed transmission line. | |
| **WHAT WAS SEEN? eggs, birds, droppings, nest material, prey, etc.?**<br>An atypical cluster of nesting material in the tree with sticks large enough for an eagle but no nest shape<br>See Plate 9: Nest 3152. | |

# Raptor nest location form – nest 3153

| **Nest number and name (Office use only):** |
|---|

| | |
|---|---|
| **SPECIES:** Undetermined | |
| **OBSERVER: name, address, phone/fax**<br>Erin Harris, Karen Dick, Adam Hardy<br>North Barker Ecosystem Services Pty Ltd, 313 Macquarie Street, Hobart.<br>(03) 6231 9788 | |
| **DATE OF THIS REPORT:**<br>**17/03/2023** | **WHEN WAS THE NEST FOUND?**<br>21/02/2023 |
| **HOW WAS THE NEST FOUND? e.g. during pre-logging search, during forestry operation, etc.**<br>During aerial eagle nest search of selected area. | |
| **HAD THE AREA BEEN PREVIOUSLY SEARCHED**? give detail<br>Yes, during aerial eagle nest searches in 2022. | |
| **LOCATION OF NEST:**<br>4.2 km NW of McRaes Hills.<br>**Coordinates**: 496087E 5383187N **Datum (GDA/AGD):** GDA 94 MGA 55 **GPSed:** Yes<br>**Accuracy (m):** 10 m | |
| **NEST SITUATION**: **was it in a tree (species?), on a cliff, or on the ground?**<br>Nest is approximately 20 m up a 30 m tall *Eucalyptus amygdalina* tree. | |
| **HISTORY OF NEST USE**: **known breeding attempts? results?**<br>Unsure. | |
| **NEST DISTURBANCE: forestry, recreation, roading, building, etc.?**<br>Proposed transmission line. | |
| **WHAT WAS SEEN? eggs, birds, droppings, nest material, prey, etc.?**<br>A small nest with loose, bleached materials and brown leaves, as well as a slight nest bowl.<br>See Plate 10a and 10b: Nest 3153. | |

# Raptor nest location form – nest 3154

| **Nest number and name (Office use only):** |
|---|

| | |
|---|---|
| **SPECIES:** White-bellied Sea Eagle | |
| **OBSERVER: name, address, phone/fax**<br>Erin Harris, Karen Dick, Adam Hardy<br>North Barker Ecosystem Services Pty Ltd, 313 Macquarie Street, Hobart.<br>(03) 6231 9788 | |
| **DATE OF THIS REPORT:**<br>**17/03/2023** | **WHEN WAS THE NEST FOUND?**<br>22/02/2023 |
| **HOW WAS THE NEST FOUND? e.g. during pre-logging search, during forestry operation, etc.**<br>During aerial eagle nest search of selected area. | |
| **HAD THE AREA BEEN PREVIOUSLY SEARCHED**? give detail<br>Yes, during aerial eagle nest searches in 2022. | |
| **LOCATION OF NEST:**<br>Along Brumbys Creek 1.2 km South of McRaes Hills.<br>**Coordinates**: 497647E 5378353N **Datum (GDA/AGD):** GDA 94 MGA 55 **GPSed:** Yes<br>**Accuracy (m):** 10 m | |
| **NEST SITUATION**: **was it in a tree (species?), on a cliff, or on the ground?**<br>Nest is approximately 35 m up a 45 m tall *Eucalyptus viminalis* tree. | |
| **HISTORY OF NEST USE**: **known breeding attempts? results?**<br>Unsure. | |
| **NEST DISTURBANCE: forestry, recreation, roading, building, etc.?**<br>Proposed transmission line. | |
| **WHAT WAS SEEN? eggs, birds, droppings, nest material, prey, etc.?**<br>A small, newly-built nest approximately 160 m northeast of fallen nest #2960; likely to be the same pair of birds, trying to rebuild. Nest has lots of new, loose material.<br>See Plate 11a and 11b: Nest 3154. | |

## APPENDIX D. Absent nests

Nest details of previously reported nests that could not be found or could not be searched for within the 2023 survey. WTE = Wedge-tailed Eagle; WBSE = White-bellied Sea Eagle; GG = Grey Goshawk.

| Date surveyed | NVA nest ID | Easting | Northing | Classification | Position accuracy (m) | Likely species | Comments |
|---|---|---|---|---|---|---|---|
| 14/03/2023 | 1323 | 412243 | 5453102 | N/A | 30 | WBSE | This nest could not be found during this survey, nor in 2022 and was not searched for in 2021, 2020 and 2019. This nest was last recorded on the NVA in 2006. |
| 14/02/2023 | 2677 | 400969 | 5448750 | N/A | 10 | Indeterminate | No nest sticks remaining, the site is barely recognisable as a previous location of a nest. The only evidence of a past nest is a small algal smear near the fork of the tree where the nest would likely have been. Nest site is roughly 15 m up a 30 m *E. obliqua*. |
| 15/02/2023 | 2771 | 413160 | 5450129 | N/A | 10 | Indeterminate | This nest has completely degraded, and nothing remains. |
| 17/02/2023 | 3022 | 437290 | 5427552 | N/A | 10 | WBSE | This nest appears to have fallen based on the nest still standing. It is near nest #3021. |
| 20/02/2023 | 2681 | 438744 | 5429507 | N/A | 10 | Indeterminate | This nest could not be found, it is likely the nest along with the tree has fallen as a few broken tree branches were evident in the area. |

| Date surveyed | NVA nest ID | Easting | Northing | Classification | Position accuracy (m) | Likely species | Comments |
|---|---|---|---|---|---|---|---|
| 22/02/2023 | 2960 | 497793 | 5378281 | N/A | 10 | WBSE | This nest was a large prime nest at the end of a strip of trees that follows a small creek, however it has now fallen. It appears that the tree branch snapped. A new nest is being constructed approximately 160 m to the NW of this fallen nest location. |
| 22/02/2023 | 675 | 491743 | 5385209 | N/A | 20 | WTE | This nest was not found. The last record of this nest was from 2017. It was considered degraded at the time. This nest has been surveyed regularly since 2003, with no activity witnessed; over time the nest has become bleached and slumped with no nesting material ever being added. This nest location is right next to a plantation and has likely completely degraded or is at a stage where it is a remnant and hard to spot. |

# E Recently proposed Tasmanian development projects near Marinus Link landfall

Table E.1: Tasmanian development projects with potential impacts relevant to the project.

| | Proposal / proponent | Description | Location | Timing |
|---|---|---|---|---|
| 1 | Guilford Wind Farm / Epuron Pty Ltd | Wind farm in Guildford with up to 80 wind turbines Generation of up to 450 megawatts (MW) of wind energy Estimated capital: $50 million | 7 km northeast of Waratah and 15 km south of Hampshire | Notice of intent submitted September 2020 Deemed a controlled action by DAWE in September 2021 Construction to commence: 2024 |
| 2 | Robbins Island Renewable Energy Park / UPC Robbins Island Pty Ltd | Wind farm on Robbins Island with up to 122 wind turbines Generation of up to 900 MW of wind energy Estimated construction value: $1.2 billion Construction workforce: 250 personnel | Robbins Island, northwest coast of Tasmania | Approved by the Commonwealth Government and assessment by the EPA underway Construction to commence: 2023-2025 |
| 3 | Jim's Plain Renewable Energy Park / UPC Robbins Island Pty Ltd | Wind farm in Jim's Plain with up to 31 wind turbines and possible solar generation of up to 200 MW of wind energy and up to 40 MW of solar energy Capital investment: $350 million. Construction workforce: over 150 personnel | 23 km west of Smithton | Approved by the Council and State and Commonwealth governments in 2020 Construction to commence: 2023 |
| 4 | Robbins Island Road to Hampshire Transmission Line / UPC Robbins Island Pty Ltd | A new 220 kV overhead transmission line (OHTL) spanning 115 km, estimated to have 245 towers. Connects Jim's Plain and Robbins Island Renewable Energy Parks transmission infrastructure to Tasmanian transmission network. Construction workforce: up to 100 personnel over 24 months | Between Robbins Island Rd at West Montagu and Hampshire | Detailed planning/environmental approvals phase underway. Commonwealth Government determined the project to be a controlled action under the EPBC Act in September 2020. Construction to commence: 2023 |
| 5 | Bass Highway, targeted upgrades between Deloraine and Devonport / | Targeted highway upgrades between Deloraine and Devonport. Roads of strategic importance Estimated project cost: $50 million | Targeted areas along Bass Highway between Deloraine and Devonport | In planning; Construction expected to commence: late 2023<br>Expected completion: 2027 |

| | | | | |
|---|---|---|---|---|
| | Department of State Growth | | | |
| 6 | Staverton to Hampshire Hills Transmission Line / TasNetworks | A component of the North West Transmission Developments, comprising a new 60-km-long new 220 kV OHTL between a new switching station at Staverton and Hampshire Hills Supports new and existing renewable energy developments in North West Tasmania, including the project. Estimated project cost: $220 million | Between Staverton and Hampshire Hills | Planning and approvals phase in progress Construction expected to commence: 2024 |
| 7 | Hellyer Wind Farm / Epuron Pty Ltd | Wind farm with up to 48 wind turbines Generation of up to 300 MW of wind energy | 8.5 km southwest of Hampshire | Design phase. Notice of intent issued. Tasmanian EPA -EIS Guidelines issued in November 2022 |
| 8 | Western Plains / Epuron Pty Ltd | Wind farm with up to 12 wind turbines Generation of up to 50.4 MW of wind energy | 4 to 5 km northwest of Stanley | Work on the Development Proposal and Environmental Management Plan (DPEMP) is continuing. The DPEMP has been drafted in accordance with the project Specific Guidelines issued for the project by the Environment Protection Authority (EPA Tasmania). The EPA Tasmania recently extended the timeframe for submission to enable completion of the required documentation |
| 9 | Table Cape Luxury Resort / Table Cape Enterprises | Proposed accommodation | Table Cape, 4.5 km north of Wynyard, Ransleys Road | Approved by Waratah-Wynyard Council |
| 10 | Lake Cethana Pumped Hydro / Hydro Tasmania | Storage and underground pumped hydro power station with associated infrastructure, with up to 600 MW capacity Estimated construction cost: $900 million | 19 km southwest of Sheffield | Hydro Tasmania will progress with the final feasibility stage Construction likely to commence: 2027 |

| | | | | |
|---|---|---|---|---|
| 11 | Youngmans Road Quarry / Railton Agricultural Lime Pty Ltd | Limestone quarry development on old quarry site Average annual production of 72,000 tonnes of limestone | 2.5 km northwest of Railton | EPA approved the development in February 2021. Kentish Council is reviewing the land permit for the proposed development |
| 12 | Port Latta Wind Farm / Nekon Pty Ltd's | Wind farm with up to 7 wind turbines Generation of up to 25 MW of wind energy Construction workforce: 15 people over six months Estimated capital: $50 million | Mawbanna Plain, 2 km southwest of Cowrie Point | Environmental Assessment Report and EPA decision issued October 2018 Website states intent to start construction late 2020, no further updates available |
| 13 | Port of Burnie Shiploader Upgrade / TasRail | Minerals shiploader and storage expansion at TasRail's existing Bulk Minerals Export Facility Estimated cost: $64 million Design and construction workforce: 140 personnel | Port of Burnie | Onsite works and detailed design (commenced in April 2022). Commissioning expected to commence: 2023 |
| 14 | Bass Highway – Cooee to Wynyard / Department of State Growth | Priority works upgrade along the Bass Highway between Cooee and Wynyard to realign and upgrade approximately 3.2 km of road Estimated cost: $50 million | Bass Highway from the intersection of Brickport Road in Cooee, across the Cam River Bridge, to the intersection of the Old Bass Highway at Doctors Rocks near Wynyard | Construction (commenced late 2021) Expected completion:2025 |
| 15 | Sheffield to Staverton Upgrades / TasNetworks | A component of the North West Transmission Developments, comprising modifications to two 18.5 km-long sections of existing 220 kV OHTLs between Staverton and Sheffield. Supports new and existing renewable energy developments in North West Tasmania, including the project. | Between Staverton and Sheffield | Planning and approvals phase Construction expected to commence: 2025 |

| | | | | |
|---|---|---|---|---|
| 16 | QuayLink - Devonport East Redevelopment / TasPorts | Port terminal upgrade project to support TasPorts in increasing capacity of both freight and passenger ferry services across Bass Strait. Estimated cost: $240 million Design and construction workforce: 1060 direct and indirect jobs in North West Tasmania, and a further 655 broader Tasmanian jobs during construction. | Port of Devonport | Early works/construction (commenced 2022); approvals phase ongoing. Expected completion: 2027 |

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Appendix B.2

# Terrestrial Ecology Impact Assessment Addendum

MARINUS LINK

29 August 2024

Marinus Link Pty Ltd.

1-7 Maria Street, Lenah Valley TAS 7008

**Addendum to the Marinus Link Heybridge Converter Station Terrestrial Ecology Baseline and Impact Assessment**

To whom it may concern,

In May 2024, Entura provided the Heybridge Converter Station Terrestrial Ecology Baseline and Impact assessment report to support the Project's Environmental Impact Statement (EIS) documentation (Technical Appendix B of the Marinus Link Shore Crossing EIS; Technical Appendix F of the Marinus Link Heybridge Converter Station EIS). The purpose of this letter is to clarify the results and implication of the assessment following receipt of comments and queries from the Tasmanian Environment Protection Authority.

**Database search area**

The "database search area," included in Figure 5-2 refers to the databases outlined in section 5.2 of the Terrestrial Ecology Baseline and Impact assessment report: the Tasmanian Natural Values Atlas (NVA), the EPBC Act Protected Matters Search Tool (PMST), TasVeg4.0 mapping, the Threatened Native Vegetation Communities (TNVC 2020) mapping (DPIPWE 2021, derived from TASVEG 3, TASVEG 4 and previous TNVC 2014 maps), the Tasmanian Geoconservation database, and publicly available aerial imagery including current and historical images from Google Earth™ and from the Environmental Systems Research Institute (ESRI).

**Declared weeds**

The following declared weeds that occur at the Shore Crossing site listed in section 6.8.1 of the Terrestrial Ecology Baseline and Impact assessment report are also weeds of national significance: *Chrysanthemoides monilifera* subsp. *monilifera* (boneseed), *Rubus fruticosus* aggregate (blackberry), and *Ulex europaeus* (gorse). The significance of the risk of introducing weeds, pests and diseases to the vegetation communities present in the survey area has been assessed as low, based on the context of the site being already highly degraded and weed-infested.

**Native vegetation**

No proposed construction works associated with the Converter Station or Shore Crossing will require the removal of the *Eucalyptus amygdalina* coastal forest and woodland (TasVeg4.0 code DAC), which is not listed as threatened under the Tasmanian *Nature Conservation Act 2002* (NC Act)[1], nor of the *Eucalyptus viminalis - Eucalyptus globulus* coastal forest and woodland (TasVeg4.0 code DVC), which is listed as threatened by the NC Act (see Section 6.1 of the Ecology Baseline and Impact assessment report). No removal of "extant vegetation" at the proposed Converter Station site, i.e., the patch of

[1] The Tasmanian *Nature Conservation Act 2002* (NC Act) lists threatened vegetation communities. The Tasmanian *Threatened Species Protection Act 1995* (TSP Act) lists threatened species. The Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) protects Matters of Environmental Significance, which include threatened ecological communities and threatened species.



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*Eucalyptus amygdalina* coastal forest and woodland (DAC), will occur. Therefore, the increased risk of "erosivity and instability" described in the Terrestrial Geomorphology and Soils Assessment report (ESG, 2023) is not relevant to the construction nor operation of the proposed Heybridge Converter Station. Both mapped vegetation communities were verified on the ground during field surveys. Entura's verified vegetation community mapping is periodically provided to Natural Resources and Environment Tasmania to help to inform TASVEG (the Tasmanian Vegetation Map).

**Native fauna species**

Fauna species that are listed by both the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) and the Tasmanian *Threatened Species Protection Act 1995* (TSP Act) that are relevant to this project are the Tasmanian devil (*Sarcophilus harrisii*), the Tasmanian population of the spotted-tailed quoll (*Dasyurus maculatus maculatus*), and Tasmanian wedge-tailed eagle (*Aquila audax fleayi*, a Tasmanian subspecies).

***Nocturnal fauna***

There is existing night-time anthropogenic lighting associated with the Bass Highway and with nearby residences. As such, additional night-time lighting to facilitate the 24-hour operation of the HDD works are not likely to result in increased risk of disorientation nor collisions by nocturnal fauna. Nonetheless, the following measures outlined in the Commonwealth *National Light Pollution Guidelines for Wildlife* Appendix A (Best Practice Lighting Design) are recommended:

1. night-time lighting required for the 24-hour operation of the HDD works will be minimised to the greatest extent practicable

2. red light will be used at night where possible.

***Devils and quolls***

The extant population of devils and quolls was assessed as relatively small based on the NVA database's records as well as the landscape context and on-ground surveys. Similarly, the absence of suitable devil and quoll denning habitat in the vicinity of the Projects is based on the lack of denning features (rocky outcrops, large hollow logs, old wombat burrows, etc.) observed during field surveys as well as the NVA database's records and the landscape context.

***White-throated needletail***

The white-throated needletail (*Hirundapus caudacutus*) is listed as a vulnerable, marine, and migratory species under the EPBC Act and is not listed under the Tasmanian TSP Act. This species is unlikely to be impacted by the Projects, given the absence of suitable dense foliage and hollows for white-throated needletail roosting and given the minimal vegetation clearance required.

***Little penguin***

The little penguin (*Eudyptula minor*) is listed as a marine species[3] under the EPBC Act; it is not listed under the Tasmanian TSP Act. Disorientation due to night-time light pollution is a known threat to little penguins; however, no penguin burrows nor individuals have been recorded as occurring at the Heybridge Shore Crossing site despite targeted surveys.

***White-bellied sea-eagle***

The white-bellied sea-eagle (*Haliaeetus leucogaster*) is not listed as threatened under the EPBC Act but is listed as vulnerable under the TSP Act. The white-bellied sea-eagle is listed as a marine species[2] under the EPBC Act.

***Tasmanian wedge-tailed eagle***

Eagle nesting habitat has been identified in the *Tasmanian Eagles Recovery Plan* (Threatened Species Section 2006) as important to the survival of both eagle species. Eagle nest activity checks are a highly specialised activity that is only to be undertaken by a suitably qualified and experienced species expert. Eagle nest activity checks are conducted during the eagle breeding season, and as such pose a risk of disturbing a breeding pair and potentially causing nest abandonment.

Eagle nest checks are not recommended for the Marinus Link Heybridge Converter Station and Shore Crossing, given the lack of known eagle nests within 1 km of either site. The nearest known nest, nest #1323, is 1.6 km away from the project site; three consecutive aerial searches have failed to find this nest despite targeted search effort.

Aerial eagle nest searches are required within 12 months prior to the commencement of construction, and annually throughout the duration of construction works at the Heybridge Converter Station and Shore Crossing sites. Eagle nest searches are to be undertaken outside the eagle management constraint period of July to January. Any newly constructed eagle nests near the Heybridge Project Areas will be detected and managed in accordance with the Tasmanian EPA's *Guide to Eagle Nest Searches and Activity Checks* (EPA 2023), the Tasmanian Forest Practice Authority's *Fauna Technical Note No. 1: Eagle nest searching, activity checking and nest management* (Forest Practices Authority 2023), and the Commonwealth's *Survey Guidelines for Australia's Threatened Birds* (Department of the Environment, Water, Heritage and the Arts, now DCCEEW, 2010).

If a new eagle nest were to be discovered within 500 m or 1 km line-of-sight of proposed works, then the eagle constraint management period would apply and potentially disturbing activities would be prohibited during this period of the year, unless a suitably qualified species expert were to conduct an activity check during the breeding season and confirmed that the nest was inactive for that breeding season. Whilst an eagle nest within 500 m or 1 km line-of-sight is active, the management constraints would be applied; an inactive nest status would have to be confirmed each year for works to proceed during the July to January inclusive (or July to February inclusive, in late seasons) breeding period.

**Traffic movements and vehicle strikes**

Increases in night-time traffic have the potential to increase the risk of vehicle strikes to devils and quolls, the carcasses of which have been recorded on both the Bass Highway and Minna Road in recent years (see Appendix A). Initial calculations of the expected percent increase in night-time traffic associated with the Converter Station construction were based on the initial assumption of a 6-day working week and 7:00AM to 4:00PM working day. However, permissible hours for works are expected to be as follows: 7:00AM to 6:00PM Mondays through Fridays, 8:00AM to 6:00PM

[2] The listing of species as Marine under the EPBC Act applies to those species where they occur in a Commonwealth marine area that is not in State waters (Department of Sustainability, Environment, Water Populations and Communities 2013; DAWE 2022).

Saturdays, and 10:00AM to 6:00PM Sundays. After updating the calculations based on these nominated permissible working hours, the increased night-time traffic on the Bass Highway caused by construction traffic for both components of the Project will still not exceed the 10% threshold at which the risk to Tasmanian devils and spotted-tailed quolls is considered to be substantially increased, according to the 2023 *Survey Guidelines and Management Advice for Development Proposals that may impact the Tasmanian Devil* [3].
For the Converter Station construction, the initial estimate of increases in night-time traffic to and from site were 3.2% for the Bass Highway and 165% for Minna Road. With the changes in working times above, the revised estimated increases in night-time traffic for the converter station construction are 4.0% for the Bass Highway and 204% for Minna Road.

For the HDD works, the working times and shift changes utilised to estimate changes in night-time traffic remain unchanged from those indicated in our initial assessment. However, here we add the estimated increases in night-time traffic based on the proposed traffic movements for the HDD works. These increases are 0.2% for the Bass Highway and 10.8% for Minna Road. For the HDD works, the *Technical Report – Traffic & Transport* (Stantec 2023) specified that the works will involve six light vehicles, one franna crane, three twinsteer rigid trucks (22-26 tonne), one 30-36 tonne excavator, two large drill rigs, a light truck, which will be on site at all times during the works.

The measures to reduce impacts to Tasmanian devils and spotted-tailed quolls on Minna Road presented in section 8.1.3.1 of the Terrestrial Ecology Baseline and Impact assessment report are requirements to manage the risk of vehicle strikes on Tasmanian devils and spotted-tailed quolls.

The risk of vehicle strikes to Tasmanian devils and spotted-tailed quolls within the Converter Station site has been assessed as negligible, given that internal site traffic speeds at night will be less than 15 kilometres per hour; additionally, it is expected that the vast majority of internal site traffic will occur during the day throughout the operational lifetime of the Project.

**Duration of HDD works**

Subsequent to the initial submission of the terrestrial ecology baseline and impact assessment report in May 2024, the planned duration of the horizontal directional drilling (HDD) works at the Shore Crossing have changed from 12 months to 6 months. There is no change in the ecological impact assessment associated with this shortening of the duration of HDD works from 12 months to 6 months.

Based on the information above, the terrestrial ecology assessment has confirmed that there are no residual impacts to terrestrial ecological values expected at the highly disturbed, ex-industrial site proposed for the Converter Station, nor at the Shore Crossing site.

Yours sincerely,

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[3] Environment Strategic Business Unit (2023) *Survey Guidelines and Management Advice for Development Proposals that may impact the Tasmanian Devil (Sarcophilus harrisii).* Department of Natural Resources and Environment, Tasmania.

**Appendix A.** Map of Tasmanian devil and spotted-tailed quoll roadkill carcass NVA records near Heybridge.