EPBC 2017/8096 Robbins Island Wind

Tasmanian Devil Offset Strategy

ACEN Australia Pty Ltd

07 August 2024

→ **The Power of Commitment**

Project name		Robbins Island - Post Approvals Support					
Document title		EPBC 2017/8096 Robbins Island Wind | Tasmanian Devil Offset Strategy					
Project number		12614699					
File name		12614699_RobbinsIslandDevilOffset_Offset Strategy_Rev4_Clean.docx					
Status Code	Revision	Author	Reviewer		Approved for issue		
			Name	Signature	Name	Signature	Date
S4	0	L. McCallion E. Odner V. Crepin	S. Chirgwin		S. Lukies		25/09/2023
S4	1	V. Crepin	L. McCallion	Saved on file	S. Lukies		3/11/2023
S4	2	V. Crepin	L. McCallion	Saved on file	S. Lukies	Saved on file	01/03/2024
S4	3	L. McCallion	L. McCallion	Saved on file	S. Lukies	Saved on file	09/07/2024
S4	4	L. McCallion	L. McCallion	Saved on file	S. Lukies	Saved on file	07/08/2024

GHD Pty Ltd | ABN 39 008 488 373
145 Ann Street, Level 9
Brisbane, Queensland 4000, Australia
T +61 7 3316 3000 | **F** +61 7 3319 6038 | **E** bnemail@ghd.com | **ghd.com**

Executive summary

Background

The Robbins Island Wind Project (EPBC 2017/8096) was referred to the Department of Climate Change, Energy, the Environment, and Water (DCCEEW) in 2017 and the Project has been assessed through a Development Proposal and Environmental Management Plan (DPEMP). The initial environmental assessments determined that a significant impact for the Tasmanian devil was unlikely. However, DCCEEW provided a Request for Information (RFI) to ACEN in relation to the Project, indicating that an offset would be required under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), due to impacts to habitat for the Tasmanian devil (*Sarcophilus harrisii*). This Offset Strategy (the Strategy) has been developed in response to the RFI and in accordance with the *EPBC Act Environmental Offset Policy 2012* (the Policy). The Strategy outlines ACEN's proposed approach to offsetting possible significant residual impacts to the Tasmanian devil.

The Strategy includes a revised impact assessment using the *EPBC Act significant impact guidelines 2013*, revised as a result of the RFI being received. This revised assessment resulted in a significant residual impact of 182.9 ha to devil habitat, specifically potential optimal and suboptimal breeding habitat, requiring an offset under the Policy.

Tasmanian devil

Devil's exhibit broad habitat requirements and broad diets, occurring in almost all habitat types and consuming a variety of available prey resources. They are known to adapt to some human modifications of habitat, often taking advantage of increased food resources in agricultural environments. Despite their apparent adaptability to some common threats, Devil Facial Tumour Disease (DFTD) has substantially reduced devil densities across Tasmania. The devil is listed as endangered under the EPBC Act due to DFTD, which is the key threat to the species survival, along with vehicle strike.

DFTD has not been detected on Robbins Island to date; however, it is likely to occur in the island at some point in the future. This is due to Robbins Island being an inshore island; connected to mainland Tasmania at low tide. Project modelling indicates that Robbins Passage may be able to be traversed approximately 50% of the time, with availability influenced by the tide, and devils have been observed crossing the passage. DFTD has been progressively moving west across the Tasmanian mainland and has recently been detected at Woolnorth, close to Robbins Island.

The Project has considered both DFTD and vehicle strike in-depth, as part of ecological assessments and the development of appropriate mitigation measures. The Project is considered unlikely to result in any increased risk of DFTD, which is likely to occur irrespective of the Project, and mitigation measures are in place to avoid and reduce impacts from vehicle strike. These topics are covered extensively in the DPEMP and are not the focus of this document.

Habitat

Due to the devil's generalist nature, most areas represent suitable habitat for the species. The only areas that do not support suitable habitat are those areas that are largely inaccessible to devils. On Robbins Island, this includes areas of grazing pasture that are fenced by macropod proof fencing. All remaining areas provide potential foraging and dispersal habitat for devils, including native vegetation communities and human environments and structures. Some areas on the island are unsuitable for breeding, primarily due to inundation and/or unsuitable soils; however, potential breeding habitat does occur commonly across the island. There are pockets of modelled optimal breeding habitat, associated with dry forests, buildings, and optimal soil types. However, the majority of breeding habitat is considered suboptimal, as these areas support wet forest or have poor drainage.

Habitat modelling and mapping of inaccessible areas indicates there is approximately 8,186 ha of potential habitat for the Tasmanian devil on Robbins Island, consisting of:

– 649.97 ha of optimal breeding habitat (also supports foraging and dispersal)
– 5322 ha of suboptimal breeding habitat (also supports foraging and dispersal)

– 2,214.56 ha of general foraging and dispersal habitat (unsuitable for breeding)

Project impacts

As devil habitat is widespread across Robbins Island, impacts cannot be completely avoided. However, there has been targeted effort throughout project development to apply the mitigation hierarchy and avoid, minimise and mitigate impacts to devil habitat, prior to consideration of offsetting:

– **Avoidance**:
  - 20 turbines and associated infrastructure are planned in areas of grazing pasture that are inaccessible to devils. This accounts for 55.137 ha of impact area and 20% of the planned turbines.
  - Woodland habitats on the east of the island have been avoided, this area represent a mosaic of habitat types and more complex habitat when compared to the grazing land and expansive coastal heath.
  - Early design was informed by a wind turbine exclusion zone, developed to avoid sensitive environmental areas.
– **Minimisation**:
  - Through design refinement, the initial disturbance area of 366.2 ha has been reduced to 335.8 ha, a reduction of 30.4 hectares.
  - The number of wind turbines has been reduced from the original planned 122 to a 100, a reduction of 18%.
  - Impacts to optimal breeding habitat have been reduced to 5.95 ha of permanent impact, less than 1% of available optimal breeding habitat on the island.
  - All temporary disturbance has been placed outside of optimal breeding habitat. This includes 0.225 ha of temporary disturbance shown indicatively as being within optimal breeding habitat, as this will be microsited outside of optimal breeding habitat.
  - Total habitat impacts represent 3.3% of available habitat on the island.
– **Mitigation**:
  - 56.326 ha of temporary disturbance (~0.7% of available habitat) will be rehabilitated. These areas are small and/or linear in nature, being along access tracks and turbine foundations. Both clearing and rehabilitation will be undertaken progressively (estimated over 48 months), meaning this habitat will not be lost all at once and some areas would have reestablished prior to clearing of others. These temporary disturbance areas are likely to continue to be utilised by devils, despite the disturbance to vegetation, as the function for devils will be maintained.
  - Additional mitigation measures are outlined in the DPEMP and will be implemented through the Tasmanian Devil Conservation Management Plan (TDCMP) and Roadkill Monitoring and Adaptive Management Plan (RMAMP).

SRI and offset area

The final, permanent impact to Tasmanian devil habitat is 215.247 ha. Of this, 31.863 ha is general foraging and dispersal habitat only, unsuitable for breeding due to regular inundation. As the Tasmanian devil is a scavenger that opportunistically utilises vegetation edges for foraging and dispersal, it is likely these areas will continue to be utilised by the species. While the vegetation may be lost, the function for devils (foraging and dispersal) will be maintained.

However, 5.95 ha of optimal breeding habitat and 177.434 ha of suboptimal breeding habitat will be permanently lost (183.384 ha combined). This represents 3% of available breeding habitat on the Island (optimal and suboptimal). Despite this small percentage and the mitigation measures designed to avoid impacts to devil dens, this is considered to be a significant residual impact and an offset is proposed.

The proposed offset includes a 100% direct, land-based offset to offset an area of 183.384 ha of potential breeding habitat with an area of 1,164 ha on Robbins Island. The proposed offset is outlined in this Offset Strategy, which is supported by an offset area management plan.

Contents

Table index

Figure index

Appendices

This report: has been prepared by GHD for ACEN Australia Pty Ltd and may only be used and relied on by ACEN Australia Pty Ltd for the purpose agreed between GHD and ACEN Australia Pty Ltd as set out in section 1.2 of this report.

GHD otherwise disclaims responsibility to any person other than ACEN Australia Pty Ltd arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described in this report. GHD disclaims liability arising from any of the assumptions being incorrect.

If this report is required to be accessible in any other format, this can be provided by GHD upon request and at an additional cost if necessary.

GHD has prepared this report on the basis of information provided by ACEN Australia Pty Ltd and others who provided information to GHD (including Government authorities)], which GHD has not independently verified or checked beyond the agreed scope of work. GHD does not accept liability in connection with such unverified information, including errors and omissions in the report which were caused by errors or omissions in that information.

1. Introduction

1.1 Background

ACEN proposes to develop a wind farm on Robbins Island, off north-west Tasmania, to generate electricity for sale into the National Electricity Market (NEM). The Project will have a capacity of up to 900 MW and includes the construction and operation of up to 100 wind turbines. The Project includes supporting electrical infrastructure, including underground 220kV electrical cables and substations, ancillary transport infrastructure including a road network around the island, a bridge for vehicle access across Robbins Passage (which separates Robbins Island from mainland Tasmania), a wharf for vessel deliveries, and a Maintenance and Services facility (MAS).

The Project (EPBC 2017/8096) was referred under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) to the Commonwealth Department of Climate Change, Energy, the Environment and Water (DCCEEW). On 19th December 2017, it was deemed a controlled action to be assessed under the bilateral agreement with the Tasmanian Environmental Protection Agency (EPA). The Project was assessed as a class 2C assessment by the Tasmanian EPA under the *Environmental Management and Pollution Control Act 1994* (EMPC Act). The Project was approved by the EPA on 8th December 2022 without an offset requirement. Preliminary assessment of the environmental impacts of the Project by DCCEEW determined that it is likely to result in a Significant Residual Impact (SRI) to habitat for the Tasmanian devil (*Sarcophilus harrisii*), and that an offset to compensate for this loss may be required under the EPBC Act.

1.2 Aims and objectives

This Offset Strategy presents ACEN's proposed approach to offsetting Project impacts to Tasmanian devil habitat and supports the approval of an offset package, developed in accordance with the EPBC Act Environmental Offsets policy (the Policy, DSEWPaC 2012). The offset package consists of this Offset Strategy and an Offset Area Management Plan (OAMP), which will be developed subsequent to this plan and outline key commitments and management actions for delivering and implementing the proposed offset.

This Offsets Strategy will:

– Outline the regulatory framework guiding the development of the offsets package
– Describe the Project impacts to Tasmanian devil habitat
– Demonstrate alignment with the relevant offset principles
– Describe the proposed offset and how it will provide an appropriate benefit to compensate for the predicted SRI to Tasmanian devils
– Demonstrate suitability and feasibility of offsetting the Tasmanian devil SRI and outline the conservation gain achieved
– Demonstrate complete acquittal of the calculated offset requirement, based on the maximum SRI from the Project
– Consider the risks associated with achieving the offset and provide a detailed risk assessment

This Offset Strategy has been prepared in accordance with EPBC Act requirements, giving consideration to the Policy and requirements outlined by DCCEEW in a Request for Information (RFI) received on 18 April 2023.

The development of this Strategy has also considered offset requirements and recommendations outlined by the Tasmanian government from the Department of Natural Resources and Environment (NRE) in the *Survey guidelines and management advice for development proposals that may impact the Tasmanian Devil* (*Sarcophilus harrisii)* (NRE 2023).

1.4 Document structure

This Offset Strategy includes the following sections:

- **Section 2: Regulatory framework** – This section includes the environmental offset policy framework, including the offset principles, Tasmanian legislation guidelines, and other information regarding the requirements for offsetting Tasmanian devil habitat.
- **Section 3: Existing environment** – establishes the existing environment including the nature of habitat on Robbins Island for Tasmanian devils and the status quo.
- **Section 4: Project impacts** – describes the anticipated impacts to the Tasmanian devil from the Project and outlines how the mitigation hierarchy has been applied. Includes an impact assessment and determination of the SRI.
- **Section 5: Offsets package** – This section details the proposed offset package with justification to support the proposed approach. It includes offset area calculations, an approach to habitat quality, and demonstrates the conservation gain that will be achieved by the offset.
- **Section 7: Risk assessment** – includes a risk assessment that outlines risks and controls related to delivery of the proposed offset package.

1.5 Key reference terms

The key reference terms used throughout this document are presented below and are consistent with terms and definitions supplied in all documentation for this project. A list of key acronyms and definitions is provided in Table 1.

- The **Study area** is the area that has been assessed for the Project, including for both Project footprint and offset areas, and represent the extent of ecological investigations. For the purposes of this Project, the Study area is the full extent of Robbins Island.
- The **Project footprint** is the full extent of the area required for the Project, including both temporary and permanent disturbance.
- The **Impact area** is the maximum extent of the permanent impact to habitat for the Tasmanian Devil from the Project.
- The **Offset area(s)** is the extent of the potential offset site(s) located on Robbins Island.

Table 1 Acronyms and definitions

Acronym	Definition
DCCEEW	Department of Climate Change, Energy, the Environment and Water
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999
EPA	Environment Protection Authority (Tasmania)
ha	Hectare(s)
HCSS	Habitat Critical to the Survival of the Species
HQ	Habitat Quality
LGA	Local Government Area
LH	Landholder
MW	Megawatt
MAS	Maintenance and Services facility
NBES	North Barker Ecosystem Services
NEM	National Energy Market
NRE	Department of Natural Resources and Environment, Tasmania
OAMP	Offset Area Management Plan

Acronym	Definition
OAG	Offset Assessment Guide
ODP	Offset Delivery Plan
OMS	Offset Management Strategy
ROL	Risk of Loss
SIA	Significant Impact Assessment
SRI	Significant Residual Impact
STDP	Save the Tasmanian Devil Program
TASVEG	The Digital Vegetation Map of Tasmania
TCC	The Carnivore Conservancy
TSP Act	Threatened Species Protection Act 1995
UPC	UPC Robbins Island Pty Ltd
WTG	Wind Turbine Generator

2. Regulatory framework

2.1 Environmental Protection and Biodiversity Conservation Act 1999

The EPBC Act *Environmental Offsets Policy* outlines the Commonwealth's approach to the use of environmental offsets and the requirements for a suitable offset package (DSEWPaC 2012). The offset package can include a combination of direct (land-based) offsets and other compensatory measures. Direct offsets are those actions that provide a measurable *conservation gain* for an impacted protected matter. They typically require the identification of an area of land that is protected under a legally binding mechanism and the implementation of measurable improvements to the quality of the area through offset management activities. Under the Policy, conservation gains as part of a direct offset may be achieved by:

– Improving existing habitat;
– Creating new habitat;
– Reducing threats;
– Increasing the value of a heritage place; and/or
– Averting loss.

Other compensatory measures are measures that do not directly offset the impact but are related to, and anticipated to lead to benefits for, the impacted matter. They typically include funding for research or educational programs. Other compensatory measures were initially included as a component of the offsets package; however, have subsequently been removed after consultation with DCCEEW. As the impacts relate to disturbance to habitat the offset focuses on a direct, land-based offset.

The following key documents have guided the development of this Offset Strategy, in accordance with the EPBC Act:

– **Environmental Offsets Policy** (the Policy, DSEWPaC 2012): The Policy outlines the Commonwealth's approach to the use of offsets. It includes offset principles, guidance and outlines how offsets must be delivered.
– **Offsets Assessment Guide** (OAG, DCCEEW 2023b): The OAG uses a balance sheet approach to determine offset requirements and is a key decision support tool for the regulator assessing offset proposals. The tool can be used to inform proponents on likely offset requirements and demonstrates when 100% acquittal has been achieved by an offset. The tool relies on several site-specific inputs that must be supported with evidence.
– **How to use the Offsets assessment guide** (the Guide, DCCEEW 2023c): This document provides additional support on how to use the OAG, providing further clarification and examples on the specific inputs into the OAG. It is a key document utilised by the regulator when assessing OAG inputs and offset proposals.
– **DCCEEW Approved Conservation Advice for *Sarcophilus harrisii* (Tasmanian Devil)** (DCCEEW 2023): The conservation advice guides recovery planning and identifies actions required for conservation and recovery of the species. It assists in identifying appropriate offset activities.

The Policy identifies eight policy principles that must be achieved by offsets proposed under the EPBC Act (DSEWPaC 2012). These principles are identified in Table 2, along with an explanation of how this Offset Strategy aligns with each principle.

Table 2 Achievement of EPBC Offsets Policy Principles

Policy Principle	Alignment
1. Suitable offsets must deliver an overall conservation outcome that improves or maintains the viability of the protected matter.	The proposed offset includes a direct, land-based offset on Robbins Island, as detailed in Section 5. The land-based offset is like-for-like, comprising of breeding habitat for the Tasmanian devil, commensurate with the habitat impacted. The land-based offset will protect habitat for the devils on Robbins Island through a conservation covenant and will be

Policy Principle	Alignment
	managed to maintain and improve habitat and the viability of devils on the Island.
2. Suitable offsets must be built around direct offsets but may include other compensatory measures.	The proposed offsets is a 100% direct, land-based offset.
3. Suitable offsets must be in proportion to the level of statutory protection that applies to the protected matter.	The Tasmanian devil is listed as Endangered under the EPBC Act. In determining the offset area requirements, the Endangered status has been used to calculate the annual probability of extinction in the OAG. As such, the proposed offset is in proportion to the level of statutory protection of the species.
4. Suitable offsets must be of a size and scale proportionate to the residual impacts on the protected matter.	The offset strategy has used the OAG to determine the size of offset required and is based on the SRI anticipated to occur due to Project activities. The Project implementation of the mitigation hierarchy and the anticipated SRI are provided in Section 4. These impacts will be fully acquitted by the proposed offset as outlined in Section 5.
5. Suitable offsets must effectively account for and manage the risks of the offset not succeeding.	This Offset Strategy includes a risk assessment to account for and manage the risks that could cause the offset to not succeed. The risk assessment is discussed in Section 6 and provided in Appendix A.
6. Suitable offsets must be additional to what is already required, determined by law or planning regulations or agreed to under other schemes or programs.	The offset has been developed due to anticipated Project impacts and are additional to what is already required by law. The land-based offset will be legally secured and protect habitat for the Tasmanian devil. Offset management will be species-specific and appropriate to achieve positive outcomes for the species.
7. Suitable offsets must be efficient, effective, timely, transparent, scientifically robust and reasonable.	The offset will be governed by this Offset Strategy and the supporting OAMP, which will be assessed by DCCEEW. The OMP will include a monitoring and reporting program and the offset documents provide transparency around offset delivery. The offset is being developed as far as possible ahead of EPBC approval, and the Project will not commence until the Offset Strategy and OMP are approved. This provides for timely commencement of offset activities. Therefore, the offset proposal is considered to be efficient, effective, timely, transparent, scientifically robust and reasonable.
8. Suitable offsets must have transparent governance arrangements including being able to be readily measured, monitored, audited and enforced.	The proposed offset will be governed by this Offset Strategy and an OAMP. Each of these documents will be submitted to DCCEEW for approval. The OAMP will include measurable offset activities, and a monitoring and auditing schedule.

2.2 Threatened Species Protection Act 1995

The Tasmanian devil offset is an anticipated requirement under the EPBC Act and must achieve alignment with the Policy in the first instance. While an offset for the Tasmanian devil is not a requirement under State legislation, State guidance has been considered in the development of the offset approach, with the aim of seeking alignment with State requirements, regional priorities and approaches where possible (ESBU 2023). Approval of this offset strategy from the Tasmanian Environmental Protection Agency (EPA) is not required.

The Tasmanian '*Guidelines for Natural Values Surveys – Terrestrial Development Proposal – Appendix 4'* (NCH 2015) provide general offset principles, which include:

- **Mitigation hierarchy:** Offsets can act as a form of mitigation for the residual impacts of a development proposal on natural values. Alternatives and options to avoid, minimise and remedy the impacts of the proposal must be adequately addressed prior to the consideration of offsets;
- **Staged developments:** For staged developments, such as a staged subdivision proposal, proponents should provide details of the whole proposal early in the process to allow for single assessment wherever possible. This will normally provide better conservation outcomes and greater certainty for the proponent. Any offsets that are required can be implemented either up-front, or in a staged manner in accordance with approvals for each stage of the development;

– **Conservation outcomes:** Proposed offsets should aim to maintain or improve conservation outcomes. Offsets should generally be for the same species, native vegetation community (in comparable condition), or other natural value that is to be adversely impacted by the proposal (NCH 2015).

The above principles generally align with the Commonwealth approach to offsets and additional consideration of these principles is not deemed necessary. In addition to the above, offset principles and offset options have been developed for the Tasmanian devil by the Department of Natural Resources and Environment Tasmania (NRE 2023). The principles and options have informed this Offset Strategy and are presented in Table 3 and Table 4, along with how this offset strategy aligns with each principle.

Table 3 Tasmanian devil offset principles

Policy Principle	Alignment
The mitigation hierarchy should always be applied. Offsets should only be considered as a last resort after all other options (avoidance, mitigation) have been exhausted.	The potential Project impacts have been reduced wherever possible through the iterative design and environmental assessment processes. Section 4 provides information on the application of the mitigation hierarchy to date.
Offsets should aim to improve (or at least maintain) the population status and extent of the targeted species, with additional consideration of habitat quality.	The proposed land-based offset aims to protect and enhance devil habitat within the offset area, it will include the collection and processing of habitat quality data as outlined in section 5.3.4.
Offsets should be implemented as close to the impact site as possible and where likely to benefit the species that is being impacted.	The offset package includes a land-based offset on Robbins Island, being close to the proposed impact, and will select areas most likely to benefit the species. The approach to site selection is outlined in Section 5.3.3.
There should be minimal time lag between the impact on a threatened species and delivery of the offset.	This Offset Strategy has been developed ahead of EPBC approval. The OAMP and the EPBC approval will inform timeframes for offset implementation, and the OAMP will be implemented within a reasonable period once approval has been obtained. Additionally, the OAMP will detail specific timing in relation to offset activities. This Offset Strategy and a draft Offset Area Management Plan (OAMP) will be submitted as part of the project Preliminary Documentation (e.g. prior to approval) and implemented in line with the conditions of approval.
Offsets should be secured via a formal mechanism where relevant (e.g., inclusion in the reserve estate, conservation covenant, management plan, or as required by a permit condition).	The land-based offset will be legally secured through a Conservation Covenant under the *Nature Conservation Act 2002* (NC Act). The Conservation Covenant is legally binding and will exist for the life of the EPBC Act approval, it will provide long-term protection of the offset area.
For staged developments - the full proposal and potential impacts should be considered up front as opposed to considering different offset proposals at each stage.	While the Project has two distinct phases (as per the supplementary volume), for the purposes of offsets it is not proposed as a staged development and considers the full anticipated impacts and offset requirements from the Project up front.

Table 4 Tasmanian devil offset options

Offset options	Alignment
The devil has relatively specific habitat requirements for den sites. Therefore, protecting areas of the development project site/s outside the Project footprint that contain additional known dens, and/or creating artificial denning opportunities may be able to be used to offset the damage or destruction of a den site within the area of a proposed development or activity.	The incorporation of optimal denning habitat is a key priority for the selection of the offset area (Section 5.3.3). Additionally, Project impacts to optimal denning habitat are minimal and aim to avoid impacts to dens as far as possible. Section 4.1 describes the implementation of the mitigation hierarchy and Project commitments are further detailed in the DPEMP.
Where an individual den site is proposed to be retained, additional protection of the surrounding habitat must also be included in order to provide the mother and young adequate access to foraging and other habitat within the devil's home range.	The final offset area will incorporate breeding habitat. Section 5.3.3 details the breeding habitat that will be considered in the selection of the offset area. Refer to the DPEMP and supporting documents for management of den sites during Project activities
Where an adjacent or neighbouring area of suitable denning habitat is vulnerable/at risk of clearing/development, a	The land-based offset will be legally secured through a Conservation Covenant under the *Nature Conservation Act*

Offset options	Alignment
perpetual conservation covenant to protect this area can provide some security for the local population.	*2002* (NC Act). The Conservation Covenant is legally binding and will exist in perpetuity, it will provide long-term protection of the offset area.
Where those direct measures are unsuitable, indirect offsets may be considered for unavoidable impacts that remain after avoidance and mitigation measures have been put in place:	
A monetary or in-kind contribution to an existing conservation program targeting or including the devil (this could include targeted conservation research or a high priority recovery plan action).	The offset is a 100% land-based offset.
A dedicated program for research and monitoring on the impacts of a specified activity such as clearance of native habitat or potential denning habitat (note that monitoring may also form part of a mitigation strategy for the protection of devil habitat within a proposed development or activity area or form part of the requirements for approval or permitting of a proposed development or activity).	The offset is a 100% land-based offset.
Under certain circumstances enhancement of devil habitat may be considered.	The direct, land-based offset includes moderate habitat quality improvements and may include enhancement of devil habitat through the provision of denning features. This will be further detailed in the OAMP.

2.3 Timing

The development of an offsets package is inherently iterative with ongoing updates as the relevant inputs are developed and endorsed. This is due to the interdependencies of information developed throughout the assessment and approval process, the need to develop offsets as early as possible in project development to support information requirements at the assessment stage, and the need for approval before subsequent stages of offset development can be completed. The Policy requires that proponents provide sufficient information to demonstrate that any required offsets are suitable and that offsets to compensate for the anticipated SRI are feasible (DSEWPaC 2012). Additionally, an RFI received by DCCEEW on 18 April 2023 requires the submission of an Offset Strategy and an OAMP to support the EIS for the Project. The proposed stages and timing of offset deliverables is outlined in Table 5.

Table 5 Offset timing

Stage	Timing	Aim	Limitations
Offset Strategy (this document)	Submitted as part of the EIS	– Outlines the overarching offset proposal – Demonstrates that offsets are suitable and feasible	– Is the initial framing document – Endorsement by the department needed before offsets can be progressed
Draft OAMP	Submitted as part of the EIS	– Provides further detail on the proposed offset area and specific management strategies	– Usually requires endorsement of Strategy to provide certainty that approach is acceptable
Final OAMP	Submitted post-EPBC approval	– Provides final offset area ensures all gaps and conditions of the EPBC approval are addressed	– Endorsement of approach to HQ – Collection of HQ data and processing of scores
Implementation of OAMP	Post-OAMP approval	– Commencement of delivery of the offset in accordance with	– Cannot be implemented until approval of OAMP is obtained

Stage	Timing	Aim	Limitations
		requirements and approved documents	
Conservation Covenant	Submitted post-EPBC approval	– To legally secure the offset area	– Requires final offset area – Application is supported by the final, approved OAMP
Offset completion	Ongoing until Project completion	– Achievement of offset objectives	

3. Existing environment

3.1 Habitat

Tasmanian devils have broad habitat requirements, occurring in almost all habitat types including disturbed environments (DCCEEW 2023). They also have a broad diet, being non-selective scavengers (DCCEEW 2023). They prefer dry forests and woodlands, but will utilise shrublands, heathlands, grasslands, and agricultural areas (DCCEEW 2023). In addition, devils are known to den in highly modified areas, as demonstrated by the den discovered under a house on Robbins Island (Daniels 2023).

Devil habitat on Robbins Island is comprised largely of coastal heath (52%) and cleared grazing paddocks (23%), with smaller areas of heathland, forest, woodlands, and scrub, including an additional 20 vegetation types (TASVEG units) (NBES 2021) (Figure 1). Devils thrive in areas where there is a mosaic of woodlands and cleared agricultural fields (DNRE 2023). The central-eastern half of the island has a greater complexity of habitat types, including areas of cleared grazing land and a mixture of native, woody vegetation communities. This area which presents a mosaic of habitat types has been avoided by the Project, to reduce the impacts to Tasmanian devils.

The central-western part of the island is dominated by an expansive coastal heath area, which offers suitable habitat, but less habitat complexity. Most areas on the island comprise general foraging and dispersal habitat; however, there are two vegetation types on the island that may represent marginal or unsuitable habitat, being:

– cleared areas greater than 100m from vegetation edges, particularly where these paddocks are fenced with macropod proof fencing (the majority of pastured areas have already been fenced in this way), as this precludes the use of these areas by devils; and
– dense, wet habitats that are permanently or seasonally inundated.

Open grazing paddocks represent marginal or inaccessible habitat for devils. The vast majority of these areas are fenced with macropod-proof fencing, designed to reduce the need for culling of macropods. Fencing has been rolled out since 2017, as outlined in Section 2.3.2 of the DPEMP supplementary volume.

Denning habitat requirements are more discreet than foraging and dispersal habitat, particularly natal dens used for breeding. Optimal and suboptimal denning habitat has been modelled across Robbins Island and the adjacent Walker Island using geological and vegetation associations (NBES 2023, Figure 2). Seasonally or permanently inundated areas, cleared land, and areas with unsuitable geology are unsuitable for denning (NBES 2021). Based on the model, ~37.4% of habitat areas are unsuitable for denning and around two-thirds of the island (~62.6%) is potentially suitable for denning purposes (NBES 2021). Within the potential denning habitat across the island, an area of ~696 ha or ~6.6% of available habitat is considered optimal denning habitat. These areas have optimal soil and vegetation types to support den development. The remaining area is considered sub-optimal denning habitat (~56%) (NBES 2023).

In summary, potential habitat across Robbins and Walker Island consists of:

– 649.97 ha of optimal denning habitat
– 5322 ha of suboptimal denning habitat
– 2,214.56 ha of general dispersal and foraging habitat

320000E 322500E 325000E 327500E 330000E 332500E 335000E

5505000N 5502500N 5500000N 5497500N 5495000N 5492500N 5490000N 5487500N 5485000N 5482500N

Bird Point
Mosquito Inlet
Ransonnet Bay
Knot Point
Back Banks
Five Islets
Little Bluff
Guyton Point
Big Bluff
Reids Point
Robbins Passage

Legend

Project Site
Project footprint

Vegetation

(ARS) Saline sedgeland / rushland
(ASF) Fresh water aquatic sedgeland and rushland
(ASS) Succulent saline herbland
(AUS) Saltmarsh (undifferentiated)
(AWU) Wetland (undifferentiated)
(DNI) Eucalyptus nitida dry forest and woodland
(DOB) Eucalyptus obliqua dry forest
(DOV) Eucalyptus ovata forest and woodland
(DVC) Eucalyptus viminalis - Eucalyptus globulus coastal forest and woodland
(FAG) Agricultural land
(FMG) Marram grassland
(FPE) Permanent easements
(FPF) Pteridium esculentum fernland
(FPH) Plantations for silviculture - hardwood
(FPS) Plantations for silviculture - softwood
(FPU) Unverified plantations for silviculture
(FRG) Regenerating cleared land
(FUM) Extra-urban miscellaneous
(FWU) Weed infestation
(GHC) Coastal grass and herbfield
(NAF) Acacia melanoxylon swamp forest
(NAR) Acacia melanoxylon forest on rises
(NLM) Leptospermum lanigerum - Melaleuca squarrosa swamp forest
(NME) Melaleuca ericifolia swamp forest
(OAQ) Water, sea
(ORO) Lichen lithosere
(OSM) Sand, mud
(SAL) Acacia longifolia coastal scrub
(SCA) Coastal scrub on alkaline sands
(SCH) Coastal heathland
(SHW) Wet heathland
(SLG) Leptospermum glaucescens heathland and scrub
(SMR) Melaleuca squarrosa scrub
(SSC) Coastal scrub
(SWW) Western wet scrub
(WBR) Eucalyptus brookeriana wet forest
(WNL) Eucalyptus nitida forest over Leptospermum
(WNU) Eucalyptus nitida wet forest (undifferentiated)
(WOB) Eucalyptus obliqua forest with broad-leaf shrubs
(WOL) Eucalyptus obliqua forest over Leptospermum
(WOU) Eucalyptus obliqua wet forest (undifferentiated)

Paper Size ISO A3

0 1 2 3

Kilometres

N

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

GHD

ACEN RENEWABLES
ROBBINS ISLAND
POST-APPROVALS SUPPORT

Project No. 12614699
Revision No. C
Date 1/23/2024

VEGETATION COMMUNITIES

FIGURE 1

\\ghdnet\ghd\AU\hobart\Projects\32\12614699\GIS\Maps\Working\12614699_Robbins_Island_WindFarm.aprx - 12614699_001_Vegetation_Communities_A3P_RevC
Print date: 23 Jan 2024 - 13:14

Data source: GHD (2023); ACEN (2023); Imagery: World Imagery: Maxar. Created by: sblades

320000E 322500E 325000E 327500E 330000E 332500E 335000E 337500E

5505000N 5502500N 5500000N 5497500N 5495000N 5492500N 5490000N 5487500N 5485000N

Legend
- Project Site
- Project footprint
- Macropod proof fencing

Devil habitat suitability
- Foraging and Dispersal Habitat
- Optimal Denning Habitat
- Suboptimal Denning Habitat

Bird Point
Mosquito Inlet
Ransonnet Bay
Knot Point
Back Banks
Five Islets
Little Bluff
Guyton Point
Big Bluff
Reids Point
Robbins Passage

Paper Size ISO A3

0 1 2

Kilometres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

N

GHD

ACEN RENEWABLES
ROBBINS ISLAND
POST-APPROVALS SUPPORT

DEVIL HABITAT

Project No. **12614699**
Revision No. **D**
Date **11/07/2024**

FIGURE 2

\\ghdnet\ghd\AU\hobart\Projects\32\12614699\GIS\Maps\Working\12614699_Robbins_Island_WindFarm.aprx - 12614699_002_Devil_Habitat_A3P_RevD
Print date: 11 Jul 2024 - 14:34

Data source: GHD, 2024; ACEN, 2024; Imagery: World Imagery: Earthstar Geographics. Created by: jhiggins

3.2 Devil presence and density

Tasmanian devils have been confirmed on Robbins Island and they occur there naturally, due to the island being linked to mainland Tasmania at low tide (DPIPWE 2010). Trapping surveys have estimated that there are approximately 186 individuals on Robbins Island (NBES 2022). The Island is approximately 99 km^2 and the relative density is, therefore, estimated at 1.88 devils per km^2 (NBES 2022). This is classed as one of the highest devil densities in Tasmania (NBES 2022). Typical devil densities in unmodified habitats range from 0.3 - 0.7 devils per km^2 (DCCEEW 2023). This indicates that the density may be more than double what would typically be expected, with the island naturally supporting approximately 30 – 70 devils. Increased devil densities are likely a result of past and current land management practices, as outlined below in Section 3.4, and increases risks to the population (as outlined in Section 3.5).

Devils are known to move between Robbins Island and the Tasmanian mainland, across Robbins Passage, and genetic studies have determined that the devils on Robbins Island are not a genetically isolated population (TCC 2018).

Trapping surveys have confirmed successful devil breeding on the island (NBES 2022). Of the fifty-three (53) female devils captured in 2022, nineteen (19) were carrying pouch young, these were trapped primarily along ecotones between pasture and native vegetation (NBES 2022). Trap 35 on the eastern side of the Island captured the highest number of breeding females and could indicate preferred denning habitat on the eastern side of the island (NBES 2022).

There are indications that devils are not evenly distributed across the island and that they preference certain areas. Trapping undertaken in 2018 shows a statistically significant difference in devil captures between the central-west to the central-north parts of the island (TCC 2018). The central-west, an area of expansive coastal heath, regularly yielded lower captures, with several traps not capturing any devils (TCC 2018). Conversely, traps on the central north had a far higher success rate. This part of the island includes transitional areas between coastal heath and grazing land, as well as greater habitat complexity (TCC 2018). This was consistent with trapping in 2022; however, this may be a result of trapping effort in the 2022 trapping survey (NBES 2022). This supports our understanding that devils prefer areas with a mosaic of habitat types, these areas are largely avoided by the Project, with impacts largely confined to the expansive coastal heath and existing cleared areas.

3.3 Devil facial tumour disease

The devils on Robbins Island appear to be free from DFTD, although this is not completely confirmed (TCC 2018). Four devils with facial lesions were captured during trapping surveys and laboratory analysis to confirm or eliminate DFTD was not undertaken (TCC 2018). However, visual analysis concluded the lesions were unlikely to be DFTD (TCC 2018). Robbins Island is classed as an ‘inshore’ island and is linked to mainland Tasmania at low tide (DPIPWE 2010). This is why devils naturally occur on Robbins Island, as opposed to offshore islands where they either don’t occur or have been introduced (DPIPWE 2010). There have been confirmed sightings of devils travelling between Robbins Island and the Tasmanian mainland across Robbins Passage at low tide. In addition, a devil was trapped on Robbins Island that had been previously tagged at Woolnorth on mainland Tasmania (TCC 2018). The movement of devils across Robbins Passage is supported by genetic studies, which determined that the devils on Robbins Island are not genetically isolated (TCC 2018). Tidal modelling undertaken for the Project indicates that devils may be able to move to and from the Island across Robbins Passage approximately 50% of the time (GHD 2024). DFTD has recently been confirmed in devils at Woolnorth, in close proximity to Robbins Island (ABC 2023). This is a demonstration of the spread of the disease to the west of Tasmania, in areas where it had not previously been recorded (ABC 2023). While the Robbins Island devils may be free from DFTD (as at 2022), it is likely that the disease will reach the island at some point in the future. This is due to DFTD being transmissible between devils and the known dispersal of individuals across Robbins Passage, between the island and the Tasmanian mainland.

3.4 Land management

The devil density on Robbins Island has been inadvertently inflated due to farming and land management practices. Western agriculture has occurred on the Island in some form since before 1850. Agricultural practices have created ideal foraging habitat for macropods through clearing for grazing pastures and soil improvements to

enhance grass production, meaning the grazing areas (within 100m of native vegetation) support higher prey availability than would naturally occur on the island. This is something that is commonly seen in agricultural areas across Tasmania (Wiggins and Bowman 2011).

Additionally, the devils on the island are heavily supported by macropod culling, historically undertaken by the landholders. Approximately 8,000 – 12,000 macropods are culled per year, with culling often happening on a fortnightly basis (pers. com. 2023). This provides a significant and reliable food resource for devils, and a food preference. Devil populations are known to fluctuate in response to food resource availability (Brüniche-Olsen et al, 2014). Similar patterns associated with human activities and food resource availability have been recorded on the Tasmanian mainland (Owen & Pemberton 2005). Scat analysis demonstrated that Tasmanian pademelons (*Thylogale billardierii*) make up a significant component of the diet of devils on Robbins Island, being present in 93% of samples and the only species present in 53% of samples. Only 3.6% of scat samples had no pademelon present. Additionally, 2% of scats contained rabbit (NBES, 2022), and there are no known populations of rabbits on the island, this further demonstrates the movement of devils across Robbins Passage.

The macropod culling is undertaken as part of farming operations; however, the landholders are shifting to more sustainable farming practices. Some grazing paddocks are fenced with macropod proof fencing, and the landholders have a fencing strategy to install additional macropod proof fencing as part of general maintenance and planned sustainability improvement for the farming practices (pers. com. 2023). The fencing aims to remove the need for ongoing culling of macropods, reducing the requirement for consistent manual intervention by the landholders for normal operation of farming practices. This will reduce the currently inflated macropod population size as well as the human-induced availability of wallaby carcasses for devils. The population will likely reduce, reflective of a natural population of macropods on Robbins Island prior to vegetation clearing for the farm, which artificially inflated the food availability for the macropods historically. There is a lot of uncertainty around these dynamics and how this will influence devil numbers on the island; however, it seems highly likely that the devil numbers will reduce as a result. It is anticipated that, due to these changes, the devil numbers will eventually reflect a more natural, balanced density on the island. While higher devil densities may appear to be positive at face value, research has indicated that increased densities and human modification to habitat result in greater transmission of DFTD (Cunningham et al., 2021, Lewis et al., 2023), further discussed below.

3.5 Status quo

In developing a suitable offset for Tasmanian devils on Robbins Island, the status quo must be considered. The Policy states:

'Offsets must directly contribute to the ongoing viability of the protected matter impacted by the proposed action and deliver an overall conservation outcome that improves or maintains the viability of the protected matter as compared to what is likely to have occurred under the status quo, that is if neither the action nor the offset had taken place.'

As outlined in the preceding sections, there are several factors influencing habitat for, and viability of, the Tasmanian devil on Robbins Island, which will occur irrespective of the Project. This includes:

– A significant reduction in food resource availability and associated reduction in devil density; and
– The arrival of DFTD through transfer from devils crossing Robbins Passage and the associated impacts to devil density.

The anticipated fluctuations in devil densities on Robbins Island due to the above factors is not associated with the Project. As per the Policy, the offset should aim to improve or maintain the viability of the Tasmanian devil compared to what is likely to have occurred under the status quo, irrespective of the Project (DSEWPaC 2012). This necessitates predictions on the likely impacts to devils from external factors to support the development of appropriate offset outcomes.

It is anticipated that, due to food resource changes, devil density will reduce to a more natural level, as seen in other areas in Tasmania (typically ranging from 0.3 - 0.7 devils per hectare) (DCCEEW 2023). It is also likely that densities will further decline due to the arrival of DFTD (Cunningham et al., 2021). The timing of the arrival of DFTD is unknown and there is high uncertainty around the likely rate of transmission and severity of DFTD. However, there will likely be an interplay between DFTD arriving, devil densities on the island and the land management practices.

Research has indicated that both inflated devil densities and human modifications of habitat result in greater transmission of DFTD (Cunningham et al., 2021, Lewis et al., 2023). This relates to movement patterns, frequency of interactions, and food availability and preferences within a devil population. In human modified environments devils tend to develop similar and narrow food preferences resulting in increased interactions around preferred food items (Lewis et al., 2023). This is relevant to Robbins Island where the scat analysis has demonstrated a clear bias toward pademelons (TCC 2018), due to availability and apparent preference. Additionally, where devil densities are higher, both movement rate and interactions increase in response to increased competition, leading to increased potential for DFTD transmission (Cunningham et al., 2021). Movement patterns are influenced by devil densities and food resource availability, and increased movement over larger distances increases the risk of DFTD transmission. Evidently, there are complex relationships between habitat modification, food resource availability, land management practices, devil densities, DFTD transmission and the spread of DFTD. It appears that the inflated devil densities and clear food preferences on Robbins Island will likely result in increased interactions between devils and increases rated of DFTD transmission.

There is further uncertainty around the cumulative impact of these two primary threats (reduced food resources and DFTD) with the other threats that occur on the island and more broadly in the north-west of Tasmania. These complex interactions and the culmination of a number of threats are likely to lead to substantial declines in the number of devils on Robbins Island. As a result, measures of species stocking rate to establish habitat quality and measure offset success must account for these eventualities.

4. Project impacts

4.1 Mitigation hierarchy

As per the Policy, offsets are only considered once all avoidance and mitigation options have been considered and applied to the greatest extent possible. ACEN have a commitment to sustainable development and recognise their role in conserving the environment and preventing the continued decline in biodiversity. They have integrated the mitigation hierarchy into their Environmental and Social Policy and Management System and how they assess and develop their projects.

Through project planning and the impact assessment process, ACEN have implemented all reasonable measures to avoid, minimise and mitigate impacts to the Tasmanian devil. Developing the concept design and assessing and mitigating impacts for the Robbins Island wind farm has been an iterative process requiring several phases of research and design. Table 6 provides an overview of relevant sections within reports to date that present findings in relation to potential impacts to Tasmanian devils on Robbins Island, and avoidance or mitigation measures.

Table 6 Relevant reports to date investigating impacts and mitigation measures for Tasmanian devils

Report Title	Relevant sections	Overview
DPEMP, December 2021	Section 6 - Existing Environment, Potential Effects and Management. 6.2 – Terrestrial Fauna. Section 7 - EPBC Act Assessment 7.2 Likelihood of species occurrence and impact, 7.3 Significant Impact Assessment Appendix C – Natural Values Assessment Appendix D – Tasmanian Devil Capture and Genetic Study Appendix F – Roadkill Survey	To inform the assessment, the DPEMP draws on: - diurnal searches for scats and tracks (NBES 2017) - camera survey (NBES 2017) - capture-mark-recapture survey (The Carnivore Conservancy, 2018) - genetics study (Australasian Wildlife Genomics Group, University of Sydney, 2018) - denning habitat assessment (NBES 2017 and NBES 2018) - roadkill survey (GHD, 2018). In the design process, optimal denning habitat was able to be largely avoided, with mitigation measures developed to reduce impacts on denning and foraging habitat.
DPEMP Supplementary Volume, July 2022	Section 2 – Matters of Environmental Significance – Tasmanian Devil	Presentation of results of surveys to date, current land use, current habitat and use, description of proposed action, proposed avoidance and mitigation measures, significant impact assessment, unknown unpredictable or irreversible impacts, residual impacts and mitigations.
Tasmanian Devil Trapping Survey, NBES, July 2022	All sections	Additional trapping survey to provide data for population estimate and the expected number of denning females in the breeding season. Scat analysis provided additional data on diet and the abundance of pademelon as a food source (through land management practices).
Statement of Evidence – Tasmanian Devil, Grant Daniels NBES, August 2023	All sections	Further analysis of previous assessment of impacts to devils, including disturbance, habitat loss, population fragmentation, DFTD transmission and roadkill mortality.

4.1.1 Avoidance

The conservation advice for the species states “(the Tasmanian devil) is known from a wide range of habitats, from sea level to all but the highest peaks of Tasmania as well as in forestry plantations and pastures.” Due to the devil’s generalist nature and its utilisation of all habitat types for dispersal and foraging, complete avoidance is not possible. The only areas that do not represent habitat for the species are those areas that are inaccessible due to macropod proof fencing, and these areas have been utilised as part of the Project footprint. However, the largest area on the island is the expansive coastal heath, with grazing paddocks being the second largest area. The primary focus has been to understand and avoid the most critical habitat areas. Avoidance of natal dens has been an important siting criterion during the early design phase and planning of the infrastructure layout.

While the species will utilise a variety of habitat types, the conservation advice states “Open forests and woodlands are preferred…” These preferred habitat types occur in limited areas on Robbins Island, as shown in Figure 1 below (indicated by green symbology types). As they are more discreet in their extent, greater avoidance can be achieved. The largest patches, in the north, west and central-east portions of the property have been avoided. Furthermore, the Project footprint has undergone several revisions, including the reduction of the number of wind turbines, to reduce the impact to various species, including the Tasmanian devil. Less turbines results in an overall lower area of impact and a smaller area of impact to devil habitat (especially considering that all areas constitute suitable habitat). The initial Project description included 122 wind turbines, and this has been reduced to 100. All the removed turbines and their supporting infrastructure were located in Tasmanian devil habitat, one of the removed turbines was in optimal denning habitat, seven were in suboptimal denning habitat and the remaining turbines were not in denning habitat. In the latest design iteration, the total temporary and permanent disturbance area has reduced from the initial 366.2 ha to 335.8 ha, a reduction of 30.4 hectares.

In the early design work, a wind turbine exclusion zone was established to protect a series of environmental constraints, including threatened vegetation communities, eagle nests, Aboriginal heritage, geoconservation sites, and threatened fauna habitat (including for the Tasmanian devil). Optimal denning sites were mapped as one of the constraint overlays, with over 99% of the optimal denning areas on the island able to be included in the exclusion zone to avoid impact (see Figure 2.8, page 38 in the DPEMP, December 2021).

Despite the above, impacts to optimal breeding habitat was unable to be completely avoided. The primary disturbance to optimal denning habitat is due to the wharf location (at Ransonnet Bay beach) and several options were considered for the wharf to avoid optimal denning habitat. However, the wharf requirements, geology of the area, the presence of other sensitive values and existing industries made avoidance impossible, the below are restrictions which prevented relocation of the wharf out of optimal denning habitat:

– Bathymetric studies demonstrated that the south and west coasts of the island, as well as in Mosquito Inlet, are too shallow for a wharf.
– There are Aboriginal heritage sites at Guyton Point, a rocky point on the east end of the island.
– There is a reef and associated squid breeding area southeast down the Ransonnet Bay beach, impacts at this location are unacceptable to the local fishers.
– Steep terrain further south of the reef and squid breeding area would prohibit turbine transport.
– The terrain north along Ransonnet Bay beach is low lying prone to inundation, dune cutting at this location would be deeper and result in greater disturbance.
– Oyster farming occurs near Cape Elie (a rocky point on the eastern most part of the island), a wharf at this location would require dredging which was incompatible with oyster farming.

The approach of avoidance of impact will continue through to the detailed design phase, with an ecologist to advise on micro-siting of infrastructure to minimise impacts wherever possible, particularly around natal dens. Additional survey work is proposed to locate natal dens and inform the micro-siting.

4.1.2 Minimisation

In addition to the initial design of buffer areas and the reduction of wind turbines outlined above, efforts have been made to site infrastructure in cleared grazing areas and in the expansive coastal heath. The grazing areas represent reduced habitat value and the expansive coastal heath has minimal optimal breeding habitat, these are the two most common vegetation types of the island. Locating infrastructure in these areas minimises impacts to devils by avoiding more complex areas of habitat to the east of the Island and modelled optimal denning habitat.

Impacts to modelled optimal denning habitat have been reduced to less than 0.01% of the total area of optimal denning habitat in Robbins Island (5.9 ha of the available 696 ha). Avoidance of critical habitat areas will continue to inform the wind farm design work. Details of the proposed disturbance areas, including the application of the mitigation hierarchy, are contained within the DPEMP and Supplementary Volume.

4.1.3 Mitigation

In addition to avoidance and minimisation measures, ACEN have committed to mitigation measures to reduce impacts to the Tasmanian devil, these are primarily captured in the Tasmanian Devil Conservation Management Plan (TDCMP), the Roadkill Monitoring and Adaptive Management Plan, and Construction Environmental Management Plan (CEMP). ACEN have committed to the reestablishment of temporary disturbance areas through rehabilitation. This is detailed in the DPEMP, particularly in Chapter 2 of the Supplementary Volume, *Matters of Environmental Significance – Tasmanian Devil.*

Rehabilitation is an appropriate mitigation measure in the context of Robbins Island and the Tasmanian devil for several reasons:

- The Tasmanian devil is adaptable and does not have discreet habitat requirements;
- The devil is likely to utilise all temporary construction areas and areas under rehabilitation, regardless of condition, as the function of these areas remains the same for devils;
- Rehabilitation areas are small and/or linear in nature, being along access tracks and turbine foundations, and do not include broadscale clearing and rehabilitation of large, static areas (Figure 3);
- The habitat type to be rehabilitated is coastal heath and low scrub, not wooded vegetation community types that take longer and have a higher chance of failure. It is noted that any temporary impacts to forest or woodland vegetation (DNI) are captured as permanent impacts;
- In order for rehabilitated areas to provide all functional habitat types and be utilised by devils, complete restoration of the original vegetation community is not strictly required, due to their generalist habitat requirements (although this is the goal of rehabilitation). It is noted that as per habitat modelling, low scrub vegetation, agricultural land and human infrastructure all support potential denning habitat.
- Impacts to active dens will be managed and mitigated through the TDCMP;
- Devils will readily utilise installed microhabitat features for denning (they are known to utilise human infrastructure for shelter and dens);
- There will be vast areas of devil habitat, including all functional habitat types, remaining on the island despite disturbance from the Project; and
- Construction and rehabilitation will be progressive, resulting in smaller impacts and rehabilitation over time.

Approximately 56.813 ha (~0.7% of available habitat) of temporary disturbance will be rehabilitated in accordance with the CEMP, this includes the following vegetation types:

– 54.241 ha of (SCH) Coastal heathland
– 0.935 ha of (SLG) Leptospermum glaucescens heathland and scrub
– 0.837 ha of (SMR) Melaleuca squarrosa scrub
– 0.487 ha of (DNI) Eucalyptus nitida dry forest and woodland (captured as a permanent impact due to forest / woodland designation)
– 0.283 ha of (FAG) Agricultural land
– 0.029 ha of (SWW) Western wet scrub

These temporary disturbance areas are likely to continue to be utilised by devils, despite the disturbance to vegetation. The Tasmanian devil is a habitat generalist and frequently occurs in modified habitat, land rehabilitated during construction will contribute to the available habitat on Robbins Island even accounting for the time lag between clearance and rehabilitation (Daniels 2023). The adaptability of the species is demonstrated by the

sightings of devils at the Savage River Mine, including in the north pit and centre pit, as well as in the south deposit tailings storage facility (Grange Resources 2023).

Rehabilitation is possible due to the type of habitat that is being rehabilitated, being coastal heath and low scrub communities and agricultural land (99.1% of rehabilitated areas). The agricultural land can be returned to the pre-construction state within 12 months, and for those areas accessible to devils, habitat will be available. The coastal heath vegetation is likely to be returned to its original condition within five years; however, will be accessible and usable for devils in the interim. With careful monitoring and oversight of rehabilitation efforts, there is a high likelihood of success for returning the areas to the pre-construction state.

The only forest or woodland community being rehabilitated is 0.478 ha of DNI *Eucalyptus nitida* dry forest and woodland. This vegetation on Robbins Island is very similar to the coastal heath scrub, with occasional trees. The canopy is very open and the ground structure and habitat function is commensurate with the surrounding heath areas. However, applying a precautionary approach, the temporary impacts to this community are treated as permanent as woodlands and forests are not a readily rehabilitated as low scrub communities.

Both clearing and rehabilitation will be undertaken progressively (an estimated 48 months). As construction works are completed at each turbine site, pre-existing conditions will be reinstated in laydown areas that are no longer required. This means habitat will not be lost all at once and some areas will be reestablished prior to clearing of others. Progressive rehabilitation will occur at laydown areas around turbine foundations, road verges, major and satellite laydown areas. Topsoil will be retained in stockpiles in appropriate laydown areas, along with vegetation. Prior to rehabilitation the final land use would be confirmed. Where the final land use is agricultural, the rehabilitation would be based on sowing seed consistent with the existing agricultural use. Where non-agricultural uses are applicable natural regeneration would be encouraged, with native seed or seedlings used as required.

During construction activities larger logs and boulders will be left adjacent to laydown areas, and will be re-used in the rehabilitation sites, enhancing the habitat for devils where appropriate. As sites are progressively rehabilitated, an ecologist will provide advice on rehabilitation measures to enhance the habitat for Tasmanian devils, particularly in areas where there is a high likelihood of devil utilisation. This may include the creation of artificial den sites, particularly in adjacent areas that may be under-utilised by devils. This is also relevant to instances of unavoidable den loss, where part of the de-commissioning protocol will consider the creation of high quality dens. Guidance on the construction of artificial dens recommends the use of several long lengths of tree trunks (larger than 50 cm diameter) pushed into piles that include topsoil, branches, bark and off-cuts, which have been found to provide a suitable basis for devils to create habitat in a short timeframe (Environment Strategic Business Unit, NRE Tas, 2023).

Additional management and mitigation measures will be implemented through the proposed Tasmanian Devil Conservation Management Plan (TDCMP) and the Roadkill Monitoring and Adaptive Management Plan (RMAMP). The TDCMP will be drafted after a survey, which will identify dens, key points of landscape barriers such as farm fencing, and provide a clear understanding of habitat utilisation. The TDCMP aims to implement a comprehensive conservation management approach across the island, including measures to protect and enhance denning habitat, create artificial dens where beneficial, improve habitat access and implement population and health monitoring programs to inform adaptive management practices. The goal is to work collaboratively with existing research efforts for the conservation of Tasmanian devils.

In an effort to minimise Tasmanian devil road fatalities, the RMAMP will implement a range of measures. This includes transport planning to reduce vehicle movements, measures to reduce traffic speed, installation of physical infrastructure such as virtual fencing, and design of the bridge to prevent devil access. Additionally, monitoring and adaptive management practices will be critical to outcomes.

Both documents will be developed in consultation with NRE Tas and Save the Devil Program, with approval from EPA and DCCEEW.

314000 316000 318000 320000 322000 324000 326000 328000 330000

5498000 5496000 5494000 5492000 5490000 5488000

Construction Element (Bridge / Wharf)
Macropod proof fenced area
Devil Habitat Disturbance
Existing
Permanent
Temporary

Mosquito Inlet
Bird Point
ROBBINS ISLAND
Little Creek
Big Creek
RIDGE
REMARKABLE BANKS
Teal Lagoon
WHITE ROCK
Eel Flat
Little
Wellard Islands
Brick Islands
Black Phils Point
Buckby Point
Howie Island
REMARKABLE BANKS

1:45,000 @ A3
0 325 650 975 1,300
Metres
Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

N

GHD

ACEN RENEWABLES
ROBBINS ISLAND POST-APPROVAL SUPPORT

ROBBINS ISLAND DEVIL HABITAT - DISTURBANCE

Project No. **12614699**
Revision No. **C**
Date **8/08/2024**

FIGURE 3

\\ghdnet\ghd\AU\hobart\Projects\32\12614699\GIS\Maps\Working\12614699_Robbins_Island_WindFarm.aprx - 12614699_015_Habitat_Disturbance_Rev
Print date: 08 Aug 2024 - 09:47

4.2 Habitat impacted

Despite implementation of the mitigation hierarchy and all reasonable efforts to reduce impacts to the Tasmanian devil, the Project will directly impact on habitat for the species. The final impact will continue to be refined through avoidance measures and is considered the maximum Project impact to devil habitat, post rehabilitation. The impacts to devil habitat are predominately in the vast coastal heathland area (SCH), which is suboptimal denning habitat, accounting for approximately 92% of impacted habitat (Figure 4). Cleared agriculture land (FAG), comprising foraging and dispersal habitat, accounts for the second largest component of habitat impacted. The majority of the FAG areas are fenced by macropod proof fencing and are inaccessible to devils, remaining areas will be fenced by the landholder within 12 months. The remaining 17% of impacted devil habitat is comprised of a combination of several different vegetation communities. For clarity, the total disturbance footprint of 335.8 ha and its interaction with devil habitat is provided below:

- 55.137 ha within areas outside of devil habitat:
  - 9.292 ha currently fenced by macropod proof fencing
  - 45.845 ha within areas within the active fencing program
  - Note: some of the above Project disturbance areas are temporary and will be rehabilitated
- 9.149 ha within areas of TASVEG communities OAQ (Water, sea) or OSM (Sand, mud), comprising occasionally available dispersal habitat only.
- 56.326 ha of temporary works within devil habitat comprising coastal scrub vegetation communities that will be rehabilitated.
- 0.487 ha of temporary works within devil habitat comprising TASVEG community DNI that will be rehabilitated.
- 214.761 ha of impact to devil habitat that will not be rehabilitated in the short term, comprising:
  - 5.95 ha of optimal breeding habitat
  - 177.434 of suboptimal breeding habitat
  - 31.863 of general foraging and dispersal habitat

Of the 214.761 ha of permanent impact, 31.863 comprises foraging and dispersal habitat only, i.e. areas that are not suitable for breeding due to inundation and poor drainage. While vegetation will be removed within these areas, the habitat function for devils (foraging and dispersal) will be maintained. This is due to the devil's known preference for and use of edges and linear clearings for both foraging and dispersal. These impacts do not include broadscale clearing and are associated access tracks and turbine pads, infrastructure that will not create areas greater than 100m of clearing form the edge of native vegetation (Figure 3).

The anticipated impact to Tasmanian devil habitat after mitigation measures are implemented and a breakdown of the functional habitat types is shown in Table 7 and Figure 5.

Table 7 Habitat in the Project footprint

Habitat type	Permanent impact area (ha)	Temporary impact area (ha)	Composition
Optimal denning habitat (also facilitates foraging and dispersal)	5.95	0	Small, scattered pockets with a mix of different vegetation communities, including Extra-urban miscellaneous (FUM, ~26%), Eucalyptus nitida dry forest and woodland (DNI, ~22%), and Eucalyptus viminalis - Eucalyptus globulus coastal forest and woodland (DVC, ~22%). Impacts to any active dens will be avoided and reduced through the TDCMP.
Sub-optimal denning habitat (also facilitates foraging and dispersal)	177.434 (incl 0.487 temporary impact to DNI)	42.459 (excl. 0.487 ha of impact to DNI)	Predominately coastal heathland (SCH ~90%). Impacts to any active dens will be avoided and reduced through the TDCMP.

Habitat type	Permanent impact area (ha)	Temporary impact area (ha)	Composition
Dispersal and foraging habitat (unsuitable for denning)	31.863	13.867	Primarily coastal heathland (~75%). The foraging and dispersal function for devils will be maintained despite vegetation clearance. This is due to the devil's utilisation of cleared areas, particularly edges, for both dispersal and foraging. Clearing in these areas will not be broadscale and will maintain less than 100m from the edge of vegetation, known to be a preference for devils.
Total habitat permanently impacted	215.247	56.326	– 84% (180.524 ha) coastal heathland (SCH) – 9.4% (19.982 ha)Leptospermum glaucescens heathland and scrub (SLG) – 3.9% (8.348 ha) cleared agricultural land (FAG),extra-urban miscellaneous (FUM), permanent easements (FPE), and regenerating cleared land (FRG) – 1% (2.384 ha) melaleuca scrub (SMR) – ~2.9% (6.298 ha) 11 other vegetation communities, each less than 1% of the disturbance area.

4.3 Significant impact assessment

4.3.1 Habitat critical to the survival of the species

There are no formalised definitions of Habitat Critical to the Survival of the Species (HCSS) for the Tasmanian devil. The Commonwealth Conservation Advice does not include guidance around HCSS (TSSC 2009). The conservation advice identifies that devils occur across a wide variety of habitats, including modified and human environments (TSSC 2009). It identifies DFTD and vehicle strike as the primary threats to the species (TSSC 2009). HCSS is defined in the draft *Recovery Plan for the Tasmanian devil (Sarcophilus harrisii)* (DPIPWE 2010). This document has not been endorsed by DCCEEW but is the only available published information that guides an assessment of HCSS specifically for devils.

It includes the following as HCSS:

– All disease-free areas within mainland Tasmania with suitable devil habitat;
– All areas of the pre-disease core habitat; and
– Areas that may be required under the recovery program for the future introduction of Tasmanian devils.

Robbins Island is identified as core habitat on the map included in the draft recovery plan (DPIPWE 2010). Core habitat is mapped by rainfall and devil densities only and does not consider habitat types. It is recognised in the draft recovery plan that core habitat includes roads and that roads are a source of carcasses for devils. This in turn represents a risk to devils from vehicle strike; however, these areas are included in core habitat, nonetheless. Therefore, all areas on Robbins Island would be considered HCSS under this definition, including existing roads, buildings, houses and other human infrastructure. The exception are areas deemed inaccessible due to macropod proof fencing.

4.3.2 Significant residual impact

An assessment of potential SRIs for the Project, undertaken by environment professionals, determined that there would be no SRI to the Tasmanian devil. Additionally, the Tasmanian EPA determined that the anticipated impact is unlikely to result in an SRI; however, DCCEEW indicated that they consider an SRI to be likely and that offsets are required due to loss of habitat. To establish the offset requirement, an updated Significant Impact Assessment (SIA) against the DCCEEW Significant Impact Assessment Guidelines (DoE 2013) for an Endangered species is provided in Table 8.

Table 8 Significant Impact Assessment – Tasmanian devil

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:	Assessment of Robbins Island Wind Project
1. lead to a long-term decrease in the size of a population	**Unlikely** The Project is unlikely to lead to a long-term decrease in the size of a population. The Project footprint will still constitute habitat for devils post-construction, due to the species broad habitat requirements and generalist foraging nature. The Project will not facilitate the spread of DFTD, the primary threat to the species. There are several external factors (see section 3.5) that may affect devil densities on Robbins Island; however, this will occur irrespective of the Project.
2. reduce the area of occupancy of the species	**Unlikely** As noted above, the Project footprint will still constitute habitat for devils post-construction and they will likely utilise these areas for foraging and dispersal. As such, the area of occupancy for the species will largely remain unchanged.
3. fragment an existing population into two or more populations	**Unlikely** The Project will not create any barriers to the movement of Tasmanian devils. Tasmanian devils are known to move across the island and from the island to the mainland of Tasmania, across Robbins Passage (DPIPWE 2010, TCC 2018). The development of wind turbines and access roads will not prevent or alter this movement of devils within or to/from Robbins Island. The devils on Robbins Island are not isolated from the Tasmanian mainland devils (DPIPWE 2010, TCC 2018) and this will not change as a result of the Project.
4. adversely affect habitat critical to the survival of a species	**Unlikely** As noted above, the whole of Robbins Island could be considered HCSS using the approach in the draft recovery plan (DPIPWE 2010). However, using the same definition, post-construction these areas will largely remain as HCSS. This is due to the broad nature of the definition in the draft recovery plan. The current nature of Robbins Island includes existing roads, buildings and other infrastructure, all of these areas constitute some form of habitat for devils, and they are known to breed under existing buildings on the Island. The habitat type or value is expected to change in some areas of permanent impact, particularly breeding habitat which will be converted to habitat that will no longer be suitable for breeding. However, low value foraging habitat will remain as such post-construction, as devils will likely disperse across access roads and use these areas and turbine pads for scavenging. Breeding is discussed further below.
5. disrupt the breeding cycle of a population	**Possible – 183.384 ha** Devils are known to breed successfully on the island and the population has a very high density (NBES 2022). Females with pouch young have been captured across the island (NBES 2022). While the Project will permanently impact on modelled optimal (6 ha) and suboptimal (176 ha) breeding habitat for the Tasmanian devil, the impact represents less than 3% of available breeding habitat in the Island (NBES 2022). Pouch young were recorded at a higher frequency on the east of the Island, in areas outside of the Project footprint. This area offers greater breeding opportunity due to the presence of woodlands and more suitable microhabitat features. This, coupled with the mitigation measures outlined in section 4.1 including confirmation of the location of natal dens, disruption of the breeding cycle is considered unlikely. However, taking a precautionary approach and as 183.384 ha of potential breeding habitat will be impacted, disruption of the breeding cycle in this area of 183.384 ha is considered possible. As such, a significant residual impact (SRI) within breeding habitat (183.384 ha) is considered possible.
6. modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	**Unlikely** Due to the species broad habitat requirements and ability to adapt to human environments, is it considered unlikely that the Project impacts to habitat would lead to a decline of the species. The EPBC Act Policy Statement (DEH 2006) highlights that the significance of an impact to the Tasmanian devil largely depends on the context of DFTD. In areas

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:	Assessment of Robbins Island Wind Project
	where the disease is present, a loss of even a few devils could be significant for the species (DEH 2006). It states: 'The EPBC Act is also unlikely to apply to minor new works that will only affect a small number of Tasmanian devils in areas that are disease-free. However, in areas affected by DFTD where only a few breeding females may remain, an action that will have or is likely to have an impact on even a small number of Tasmanian devils may be significant…' Considering that the island is currently free from DFTD, that devils thrive on the island despite human activities and infrastructure, that impacts comprise less than 3 % of available breeding habitat on the island, and due to the extent to which habitat will remain on the island, impacts to habitat leading to species decline is considered unlikely.
7. result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat	**Unlikely** Foxes are listed as a potential threat to Tasmanian devils; however, Tasmania and Robbins Island are essentially fox-free. The Project is not anticipated to result in foxes becoming established on Robbins Island. A Pest and Weed Management Plan will be developed for the Project in the unlikely instance foxes (or trace evidence) are sighted on Robbins Island.
8. introduce disease that may cause the species to decline, or	**Unlikely** The primary risk to the Tasmanian devil is DFTD and Robbins Island is suspected as being currently free from DFTD. As noted above in item 3, the Project will not alter the movement of devils nor the transmission of the disease. The Project includes a bridge from mainland Tasmania to Robbins Island; however, devils are already known to move across Robbins Passage. As such, DFTD is anticipated to arrive on the Island at some point in the future, irrespective of the Project. The bridge structure will include barriers to prevent devils from crossing the bridge; however, it is not possible to prevent movement of devils across Robbins Passage as this is a natural occurrence. The likelihood of the Project to introduce DFTD is no more likely than the risk from a natural occurrence.
9. interfere with the recovery of the species.	**Unlikely** There is no approved recovery plan for the Tasmanian devil and there are no recovery actions currently occurring, or planned to occur, on Robbins Island. The recovery of the devil is primarily facilitated through the Save the Tasmanian Devil Program. The Project will not interfere with any recovery actions being facilitated by the program nor actions identified in the draft recovery plan for the Tasmanian devil.
Summary	The greatest impact to devils on Robbins Island is likely to occur due to clearing of potential breeding habitat. While this will be managed to avoid impacts to active dens, using a precautionary approach, it is possible that these impacts could be considered significant. As the exact locations of natal dens are unknown, the entirety of proposed impacts to both optimal and suboptimal denning habitat are included as possibly being significantly impacted. Therefore, the project may result in a significant residual impact to Tasmanian devils, in the form of clearing of 183.384 ha of breeding habitat (optimal 5.95 ha and suboptimal 177.434 ha).

320000E 322500E 325000E 327500E 330000E 332500E 335000E

5505000N 5502500N 5500000N 5497500N 5495000N 5492500N 5490000N 5487500N 5485000N 5482500N

Legend

- Project Site
- Existing Infrastructure
- Proposed Vegetation Disturbance
- (ASS) Succulent saline herbland
- (DNI) Eucalyptus nitida dry forest and woodland
- (DOB) Eucalyptus obliqua dry forest
- (DVC) Eucalyptus viminalis - Eucalyptus globulus coastal forest and woodland
- (FAG) Agricultural land
- (FMG) Marram grassland
- (FPE) Permanent easements
- (FRG) Regenerating cleared land
- (FUM) Extra-urban miscellaneous
- (NME) Melaleuca ericifolia swamp forest
- (OAQ) Water, sea
- (OSM) Sand, mud
- (SCA) Coastal scrub on alkaline sands
- (SCH) Coastal heathland
- (SLG) Leptospermum glaucescens heathland and scrub
- (SMR) Melaleuca squarrosa scrub
- (SWW) Western wet scrub
- (WBR) Eucalyptus brookeriana wet forest
- (WNL) Eucalyptus nitida forest over Leptospermum

Bird Point
Mosquito Inlet
Ransonnet Bay
Knot Point
Back Banks
Five Islets
Little Bluff
Guyton Point
Big Bluff
Reids Point
Robbins Passage

Paper Size ISO A3

0 1 2 3

Kilometres

N

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

GHD

ACEN RENEWABLES
ROBBINS ISLAND
POST-APPROVALS SUPPORT

Project No. 12614699
Revision No. C
Date 1/23/2024

PROPOSED VEGETATION DISTURBANCE

FIGURE 4

\\ghdnet\ghd\AU\hobart\Projects\32\12614699\GIS\Maps\Working\12614699_Robbins_Island_WindFarm.aprx - 12614699_003_Proposed_Vegetation_Disturbance_Areas_A3P_RevC
Print date: 23 Jan 2024 - 13:18

Data source: GHD (2023); ACEN (2023); Imagery: World Imagery: Maxar. Created by: sblades

320000E 322500E 325000E 327500E 330000E 332500E 335000E 337500E

5505000N 5502500N 5500000N 5497500N 5495000N 5492500N 5490000N 5487500N 5485000N

Legend
- Project Site
- Existing Infrastructure
- Project footprint
- Macropod proof fencing

Devil habitat suitability
- Foraging and Dispersal Habitat
- Optimal Denning Habitat
- Suboptimal Denning Habitat

Bird Point
Mosquito Inlet
Ransonnet Bay
Knot Point
Back Banks
Five Islets
Little Bluff
Guyton Point
Big Bluff
Reids Point
Robbins Passage

Paper Size ISO A3

0 1 2

Kilometres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

N

GHD

ACEN RENEWABLES
ROBBINS ISLAND
POST-APPROVALS SUPPORT

PROPOSED DEVIL HABITAT DISTURBANCE

Project No. **12614699**
Revision No. **D**
Date **11/07/2024**

FIGURE 5

\\ghdnet\ghd\AU\hobart\Projects\32\12614699\GIS\Maps\Working\12614699_Robbins_Island_WindFarm.aprx – 12614699_004_Proposed_Disturbance_Devil_Habitat_A3P_RevD
Print date: 11 Jul 2024 - 14:35

Data source: GHD (2023), ACEN (2023); Imagery: World Imagery: Earthstar Geographics. Created by: jhiggins

5. Offsets package

5.1 Justification

An offsets package is a 100% direct, land-based offset.

The Tasmanian devil population has been declining since the 1990s, largely attributed to DFTD (DCCEEW 2023), which is a key threat to the species and the reason for its listing as endangered under the EPBC Act and the Tasmanian TSP Act (TSSC 2009, TSS 2023). Under the EPBC Act listing criteria, it was assessed as being eligible for listing under Criterion 1, due to severe population decline as a result of DFTD and Criterion 5, due to its probability of extinction, again due to DFTD (TSSC 2009). The other identified threats to the species include motor vehicle strike and culling by humans. Potential threats are listed as including foxes and habitat modification (TSSC 2009).

Tasmanian devils are habitat generalists, they utilise almost all habitat types, including agricultural areas and some human environments (DCCEEW 2023). While habitat loss and degradation may impact on devils, habitat clearing is not currently listed as an identified or key threat to the species in the conservation advice (TSSC 2009).

Habitat loss and degradation is particularly important when it is severe and related to land uses that preclude devils, without patches of suitable habitat remaining (DPIPWE 2010). This results in a culmination of threats and reduced habitat availability for the species (DPIPWE 2010). However, this is not anticipated to occur form the Proposed action. Additionally, disturbance to maternal dens is also noted as a threat, specifically where devil densities become very low in the face of other threats, such as DFTD (TSSC 2009). Devil densities are very high on Robbins Island; however, they are likely to decline in the face of DFTD and changes in land management practices.

Through Project consultation, DCCEEW have advised that the impacts to denning habitat is considered to be a Significant Residual Impact and, as such, a direct land based offset is most appropriate.

The offset approach aims to protect and maintain habitat for devils in the offset area on Robbins Island, including denning habitat.

5.2 Methodology

Robbins Island has been assessed to identify potential areas that may be suitable for a land-based offset, including consideration of data from desktop sources and field surveys. Sources of information considered in the assessment included:

– Field verified vegetation communities for the central and western areas of the island
– Government mapping of vegetation communities for the easternmost quarter of the island
– Devil denning habitat modelling across the island (NBES 2023)
– Data from two rounds of devil trapping surveys undertaken across the island
– The SPRAT profile, conservation advice and published information on the species requirements

Due to the interdependencies between offsets and the preceding impact assessment stages, it is not possible to identify a final offset area ahead of EPBC approval. A preliminary offset area will be outlined in a draft OAMP, provided to the department as part of the assessment process. The final offset area requirement is influenced by the outcomes of the assessment, including DCCEEWs assessment of the Significant Residual Impacts and processing of habitat quality calculations. The final offset area will be provided in the updated OAMP, post-EPBC approval. The methodology for selecting the most suitable offset area(s) will be driven by the considerations outlined in Section 5.4 as well as consultation with key stakeholders, including the landholder and DCCEEW.

There has been significant survey effort completed across Robbins Island to date. A summary of the survey effort on the island, which ash informed the assessment of potential offset areas, is provided in Table 9.

Table 9 Summary of survey effort

Provider	Timing	Survey type
North Barker Ecological Services (NBES)	2003	Windfarm ecological surveys and assessments.
NBES	2008	Windfarm ecological surveys and assessments.
NBES	2017	Vegetation survey and assessment (TASVEG assessment, timed meander, flora observations) Devil survey and assessment (Observations, scat analysis, acoustic surveys, and denning modelling).
The Carnivore Conservancy (TCC)	2018	Devil abundance/presence on Robbins Island surveys and assessment (devil trapping and DNA samples)
Australasian Wildlife Genomics Group (University of Sydney)	2018	Devil genetic surveys and assessment (DNA analysis).
NBES	2018	Vegetation survey and assessment (TASVEG assessment, timed meander, flora observations) Devil survey and assessment (Observations, scat analysis, acoustic surveys, and denning modelling).
NBES	2019	Vegetation survey and assessment (TASVEG assessment, timed meander, flora observations) Devil survey and assessment (Observations, scat analysis, acoustic surveys, and denning modelling).
NBES	2022	Devil survey and assessment (trapping and scat analysis)

5.3 Suitability and availability

There are large areas of land available on Robbins Island and the adjacent Walker Island for a direct, land-based offset, including areas of optimal denning habitat and suboptimal denning habitat. The entirety of Robbins Island is considered habitat for the species, it is approximately 9,900 ha and is held by a single owner (NBES 2021). Walker island is also likely to support the species and provide habitat and is owned and managed by the same landholders as Robbins Island. The landholders have been consulted throughout Project and offset development and the required area of land is available for offset delivery, on Robbins Island and/or Walker Island. Devil habitat on Robbins Island is comprised largely of coastal heath and cleared grazing paddocks, with smaller areas of heathland, forest, woodlands, and scrub (NBES 2021).

Proposed offsets must comprise the same functional habitat types as those impacted, e.g., where optimal breeding habitat is impacted it must be offset with optimal breeding habitat. By delivering a land-based offset on Robbins Island, the offset can incorporate habitat that is commensurate with the habitat being impacted, therefore providing a like-for-like offset.

Some areas on the island are unsuitable or unavailable for offset delivery, specifically:

– The Project footprint. This includes the construction and operational areas of the Project as well as temporary disturbance areas that will be re-established in the short-term; and
– Developed areas. This includes human infrastructure, such as houses, other buildings, roads, and areas actively used for cattle production. This are necessary to maintain the farming production on the island and represent only marginal devil habitat. While grazing areas are generally excluded, the edges between native vegetation and cleared land are important to connect breeding habitat to foraging areas and are included in potential offset areas. Areas beyond 100m from the edge of vegetation are considered to be dispersal only.

Spatial mapping of habitat has been completed for both islands and provides a consistent habitat model for the impact and offset areas (NBES 2023). The mapping shows the total area available for offsets and the habitat types and composition (directly comparable with the impact areas). Using this mapping, a spatial exercise has been completed to remove the above areas and determine the remaining areas available for offset delivery. Robbins Island is approximately 9,900 ha and Walker Island is approximately 700 ha. Accounting for the Project

disturbance area (temporary and permanent) and the areas of existing grazing land, the total area of habitat potentially available for offsets, is approximately 7,800 ha.

5.4 Site selection

This section provides the guiding principles for selection of the offset area on Robbins and/or Walker Islands. The final area will be selected through additional field survey and defined in the final OAMP, to be submitted to the department for approval. To the greatest extent possible, the selection of the final offset area will consider:

– Incorporation of optimal and suboptimal breeding habitat
– Prioritisation of optimal denning habitat and known den locations
– Areas of greater habitat complexity
– Incorporation of edges along native vegetation
– Locations that can facilitate connectivity

The offset areas will include optimal and suboptimal breeding habitat. This will provide like-for-like habitat that is commensurate with the impact areas. Offset site selection will target optimal denning habitat as a first preference, wherever possible. Areas of denning are vital to the species persistence and resilience against demographic pressures (TSSC 2009). Adult devils appear to use natal dens for life and disturbance to dens has the potential to destabilise the population, particularly if denning resources are limited and/or if devil densities are low (TSSC 2009, DCCEEW 2023). Devils on Robbins Island are expected to decline due to changes in land management and DFTD; therefore, maintaining denning habitat and avoiding disturbance to known natal dens is of particular importance. On Robbins Island, optimal denning habitat is modelled as occurring in discreet areas scattered throughout the study area.

Offset area selection will also target areas of greater habitat complexity. Utilising a habitat mosaic that incorporates different habitat types and vegetation structure may benefit devils and maximise offset outcomes. This includes the breeding functional habitat category, ecosystems that have greater structural complexity, and a broad range of different ecosystem types that make up the offset area. Devil habitat utilisation and preferences on the island has not been established. However, the devils preferred habitat on the island is likely to be dry eucalypt woodlands, coastal heath and grazing areas (edges) (DCCEEW 2023). There are some areas on the island that support wet habitats (seasonally or permanently inundated areas and wetlands), that may have reduced suitability for devils. The island does contain a variety of ecosystem types; however, the coastal heath is the largest habitat type, and is present as a very large contiguous area on the western half of the inland. While this area is suitable and contains pockets of optimal denning habitat, it is less complex that other areas and trapping surveys regularly caught less devils in this area (TCC 2018, NBES 2019).

The offset area will also incorporate edges to greater benefit the devils on Robbins Island (and this aligns with breeding habitat modelling). Macropods, the devil's preferred food resource, prefer transitional zones between native vegetation and grazing pastures. The devil also prefers edges for foraging and travel from their dens (Jones et al., 2023). This is generally accepted as being an area of 100m from the edge of native vegetation. The incorporation of edges can be achieved by establishing a buffer around the areas of native vegetation for inclusion in the offset area, through discussion and agreement with the landholder.

Offset areas will aim to incorporate strategic locations that can be used to maintain, enhance and facilitate devil dispersal across the island, with the exception of fenced grazing areas. A movement or connectivity study has not been undertaken. However, it can be assumed that devils travel across the whole island and that they preference areas optimal for denning and foraging, and areas where a mosaic of habitat types occurs. Key locations for maintaining devil dispersal will be discussed with the landholder and will be designed to ensure key movement pathways are kept open, while also maintaining fenced grazing areas.

5.5 Habitat quality methodology

5.5.1 Overview of approach

Habitat quality (HQ) measures how well a particular site supports a particular threatened species and contributes to its ongoing viability' (DSEWPaC 2012). HQ is scored out of 10 across three components that contribute to the

calculation of the overall score, being site condition, site context and species stocking rate. These are defined in the 'how to use the offsets assessment guide' (the Guide) document as (DSEWPaC 2012) (Figure 6):

– **Site condition** – This is the condition of a site in relation to the ecological requirements of a threatened species or ecological community. This includes considerations such as vegetation condition and structure, the diversity of habitat species present, and the number of relevant habitat features.

– **Site context** – This is the relative importance of a site in terms of its position in the landscape, considering the connectivity needs of a threatened species or ecological community. This includes considerations such as movement patterns of the species, the proximity of the site in relation to other areas of suitable habitat, and the role of the site in relation to the overall population or extent of a species or community.

– **Species stocking rate** – This is the usage and/or density of a species at a particular site. The principle acknowledges that a particular site may have a high value for a particular threatened species, despite appearing to have poor condition and/or context. It includes considerations such as survey data for a site of a particular species population or, in the case of a threatened ecological community this may be a number of different populations. It also includes consideration of the role of the site population in regard to the overall species population viability or community extent.

The significance to each component is dependent on the ecological requirements of the impacted species or ecological community. For example, for some threatened species the most important consideration is the location of a site in the landscape, whereas for others the presence of important habitat features on the site itself may be the most important influencing factor (DSEWPaC 2012).

There are no prescriptive guides for developing and measuring the habitat quality score and there are no Commonwealth species-specific guides to measuring habitat quality for a given species. Additionally, there is no State-based procedure for habitat quality in Tasmania, nor any species-specific habitat quality advice. Therefore, the species-specific approach to habitat quality for the Tasmanian devil, as well as the method for data collection and scoring, needs to be developed for the Project, in line with the EPBC policy.

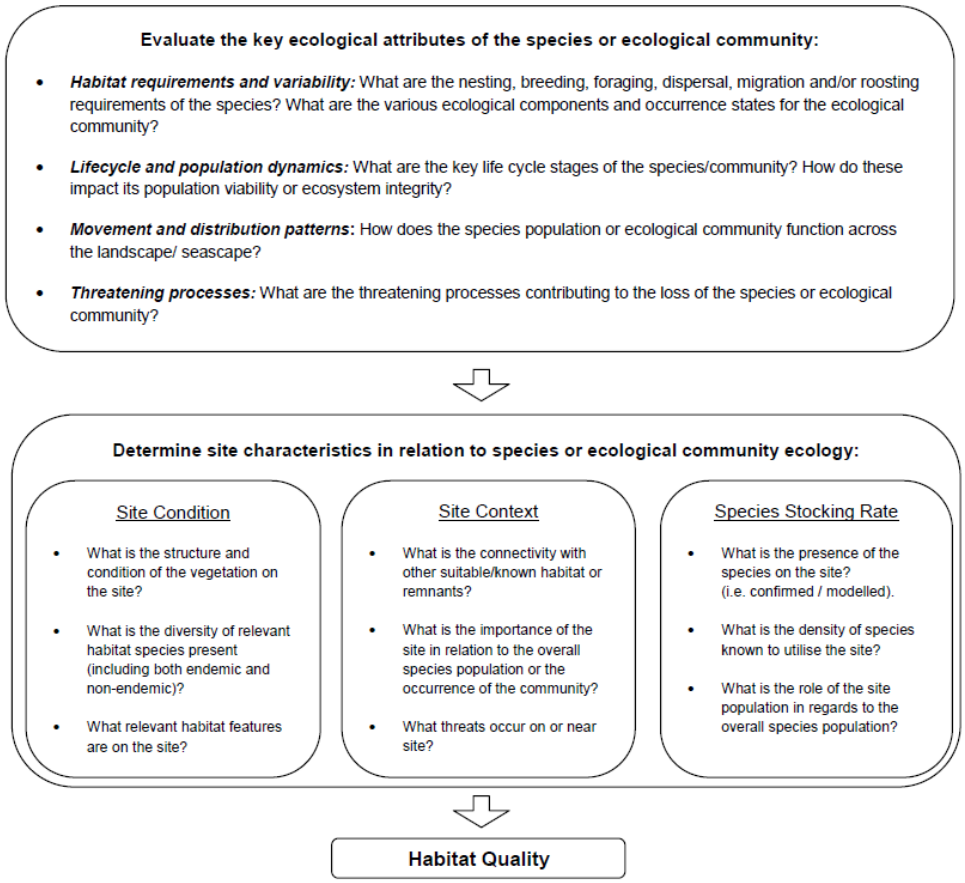

Figure 6 Habitat quality components (DSEWPaC 2012)

The development of an approach to HQ for the Tasmanian devil included a review of the requirements of the Guide, existing methods of measuring habitat quality, previous examples for other species, and of devil habitat requirements. This included the review and consideration of any published condition assessment methodologies in Tasmania and in other states and included the following sources:

– *How to use the Offsets Assessment Guide* (DSEWPaC 2012) (The Guide)
– *Environmental Offsets Policy* (DSEWPaC 2012) (the Policy)
– *Commonwealth Listing Advice on Sarcophilus harrisii* (Threatened Species Scientific Committee (TSSC) 2009).
– *Approved Conservation Advice for Sarcophilus harrisii (Tasmanian Devil)* (Department of the Environment, Water, Heritage and the Arts (DEWHA) 2009).
– *Guide to determining terrestrial habitat quality - Methods for assessing habitat quality under the Queensland Environmental Offsets Policy Version 1.3 February 2020* (Department of Environment and Science (DES) 2020).
– *TASVEG VCA Manual: A manual for assessing vegetation condition in Tasmania* (Version 2.0) (Michaels et al. 2020) (the Manual)
– *BioCondition Assessment Manual* (Version 2.2) (Eyre et al. 2015)
– Literature review of scientifically published journal articles

The Manual offers a detailed and verified methodology for assessing the condition of vegetation communities in Tasmania. As such, it was utilised as the primary resource for assessing the aligned components of HQ in the Guide. In particular, two subcomponents of site condition (vegetation structure and composition and habitat species diversity) and one component of site context (connectivity) were determined to align entirely with metrics provided in the Manual. This was verified by comparing the metrics in the Manual to the Queensland BioCondition Assessment Manual (Eyre et al. 2015) and the Queensland *Guide to determining terrestrial habitat quality - Methods for assessing habitat quality under the Queensland Environmental Offsets Policy Version 1.3* (DES 2020) as the metrics in these documents are known to adequately measure HQ for offsets under the EPBC Act.

The remaining HQ subcomponents including habitat features, site importance to the population, threats and all metrics in the species stocking rate subcomponent were developed in accordance with the Tasmanian devil habitat requirements from a literature review which included journal articles, Commonwealth Approved Conservation Advice (DEWHA 2009) and Listing Advice (TSSC 2009).

Some subcomponents (e.g., habitat features and connectivity) may be further refined and potentially divided into sub-categories after completion of the habitat and population surveys proposed with the development of the revised OAMP after Approval. These surveys will identify and further refine the specific microhabitat features required for den sites and habitat complexity, which can then be used to update components of HQ.

A summary of each of the HQ metrics and the relative weighting of the three HQ components that have be developed for the Project are provided in Table 10. A detailed description of the HQ metric development and scoring methodology are provided for each HQ component in Sections 5.5.2 (site condition), 5.5.3 (site context) and 5.5.4 (species stocking rate) with a detailed scoring table provided in Table 10.

Table 10 Summary of habitat quality scoring

HQ component & weighting	HQ subcomponent	HQ metric	Maximum score
Site condition 3/10	Vegetation structure and composition	**Forest** Large trees (%)	10
		Forest Tree canopy cover (%)	5
		Non-forest Dominant life form cover (%)	15
		Forest and non-forest Lack of weeds (%)	15

HQ component & weighting	HQ subcomponent	HQ metric	Maximum score
		Forest and non-forest Organic litter (%)	5
		Forest Logs (%)	5
	Habitat species diversity	**Forest and non-forest** Understorey life forms	25
		Non-forest Persistence potential	10
		Forest Recruitment	10
	Habitat features	**Forest and non-forest** Availability of suitable denning microhabitat features	25
	Forest subtotal		**/100**
	Forest total (converted to a score out of 3)		**/3**
	Non-forest subtotal		**/95**
	Non-forest total (converted to a score out of 3)		**/3**
Site context 3/10	Connectivity	Patch size (ha)	10
		Neighbourhood (%)	10
		Distance to core area (km)	5
		Proximity to edge habitat (km)	15
		Species mobility capacity on Robbins Island	25
	Site importance to the population or occurrence in the community	Functional habitat types	25
		Habitat complexity	25
	Threats		
		Motor vehicles	25
		Foxes (*Vulpes vulpes*)	25
		Habitat modification	25
	Subtotal		**190**
	Total (converted to a score out of 3)		**/3**
Species stocking rate 4/10	Species presence	Relative location to limit of species range	15
		Role in maintaining genetic diversity	15
	Species density	Density (individuals per km^2)	15
	Role of the site population in the overall species population		
		Natal dens identified and protected (%)	20
	Subtotal		**/65**
	Total (converted to a score out of 4)		**/4**
Total			**/355**
Weighted total (converted to a score out of 10)			**/10**

5.5.2 Site condition

As per the Guide, site condition has three subcomponents: 'vegetation structure and composition', 'habitat species diversity' and 'habitat features'. The site condition HQ metrics and scoring were largely designed as per the Guide using the TasVeg VCA Manual (version 2.0) (the Manual) (Michaels et al. 2020). The scoring and metrics in the Manual were considered commensurate with the HQ subcomponents 'vegetation structure and composition' and 'habitat species diversity'. It provides a well-established method for measuring vegetation condition against relevant benchmarks. However, the Manual does not include metrics commensurate with the 'habitat features' subcomponent and this was developed based on known habitat requirements and ecology.

Site condition was weighted to contribute 30 % to the final habitat quality score. The subcomponents, simplified methodology and associated maximum scores that were taken from the Manual are summarised in Table 11 (Michaels et al. 2020). The subcomponent that was tailored as per the Guide for site condition was scored as per Table 11 and justified in the text below.

Table 11 Site condition subcomponent scoring for HQ

HQ component: Site condition						
HQ subcomponent: Habitat features						
Availability of suitable denning microhabitat features (hollow logs, large woody debris, log piles, shrubs, buildings)	Score	5	10	15	20	25
	Result	Absent	Rare	Occasional	Common	Abundant
Food availability (abundance and diversity of prey)	Score	5	10	15	20	25
	Result	Absent	Rare	Occasional	Common	Abundant
Maximum score: 25						

Habitat features

Devils have broad habitat requirements, occurring in almost all habitat types including disturbed environments (TSSC 2009 and DEWHA 2009). They also have a broad diet, being non-selective scavengers similar to foxes (*Vulpes vulpes)*, consuming primarily roadkill and cannibalism (TSSC 2009 and DEWHA 2009). Therefore, they are likely to utilise a broad suite of microhabitat features and will use areas that lack these features for foraging and dispersal. This behaviour makes measuring habitat features for foraging and dispersal challenging. However, the relative availability and diversity of food resources is a key component that may represent habitat quality for devils. Additionally, denning habitat requirements are more discreet and depend more heavily on microhabitat availability, particularly natal dens used for breeding. Devils breed and raise young in underground burrows, (TSSC 2009). and hollow logs, thick shrubs, and thick ground layers (TSSC 2009). Microhabitat features that contribute to the habitat complexity required to establish a den site include additional features such as large woody debris, log piles and leaf litter (TSSC 2009).

As such, the availability of the suitable microhabitat features that have the potential to be utilised for denning has been included as a metric of site condition. The purpose of this metric is to be able to score the value of a site to the Tasmanian devil independently of the vegetation condition score derived from the Manual. This is because some vegetation communities may naturally be low in microhabitat values for the Tasmanian devils (e.g. naturally lacking logs in communities that do not contain trees) and therefore may still score highly under vegetation structure and composition HQ sub-component. The suitable microhabitat features (hollow logs, large woody debris, log piles, shrubs, buildings) include all known microhabitat features that are known to have been utilised by Tasmanian devils for denning from the literature (TSSC 2009 and DEWHA 2009). This metric will be collected as a qualitative measure as part of the site condition assessment.

These metrics may be further refined and potentially divided into sub-categories after completion of the habitat and population surveys proposed with the development of the revised OAMP, post-approval. These surveys will identify and further refine the specific microhabitat features required for den sites, which can then be used to update components of HQ.

5.5.3 Site context

As per the Guide, site context has three subcomponents broadly summarised as ‘connectivity’, ‘site importance’ and ‘threats’. The site context HQ metrics and scoring were largely designed using the Manual (Michaels et al. 2020). The scoring and metrics in the Manual were considered commensurate with the ‘connectivity’ subcomponent. Other subcomponents of ‘connectivity’ as well as ‘site importance’ and ‘threats’ were tailored for the Tasmanian devil based on known habitat requirements and ecology as the Manual does not include metrics for these subcomponents.

Site context was weighted to contribute 30 % to the final habitat quality score. The subcomponents, simplified methodology and associated maximum scores that were taken from the Manual are summarised in Table 12 (Michaels et al. 2020). The nine subcomponents that were tailored as per the Guide for site context were scored as per Table 12 and justified in the text below.

Table 12 Site context subcomponent scoring for HQ

HQ component: Site context								
HQ subcomponent: Connectivity								
Proximity to vegetation edges	Score	0	2	5	10	15		
	Result	>3km	1 - 3km	1 km - 500 m	500m - 100m	<100m or adjacent		
Maximum score: 15								
Species mobility capacity	Score	<50	50 - 100	100 - 200	200 - 300	300 - 400	400 - 500	>500
	Result	0	2	5	10	15	20	25
Maximum score: 25								
HQ subcomponent: Site importance to the population or occurrence in the community								
Functional habitat types	Score	5	10	15	20	25		
	Result	Dispersal only	Sub-optimal foraging	Optimal foraging	Sub-optimal denning	Optimal denning		
Maximum score: 25								
Habitat complexity (diversity of habitat types within a 5 km radius)	Score	5	10	15	20	25		
	Result	Homogenous	2	3	4	5		
Maximum score: 25								
HQ subcomponent: Threats								
		–						
		–						
Motor vehicle strike likelihood	Score	As per the threats matrix (DES 2020)						
	Scope	– The amount of traffic – Presence of signage						
	Severity	– Spatial location and frequency of motor vehicle strike activity – Proximity of roads to dens – Gender and age of Tasmanian devils being struck by motor vehicles						
Maximum score: 25								
Foxes	Score	As per the threats matrix (DES 2020)						
	Scope	– Abundance of foxes that are utilising the area						

		– Extent of fox monitoring and management/culling
	Severity	– Availability of alternative food and habitat – Sensitivity to competition with foxes
Maximum score: 25		
Habitat modification	Score	As per the threats matrix (DES 2020)
	Scope	The level of statutory protection of an area as classified by Tasmanian state mapping
	Severity	The importance of an area to the species as classified via distribution and density mapping
Maximum score: 25		

Connectivity

The connectivity subcomponent was supplemented with two metrics, proximity to vegetation edges and species mobility capacity. Devils are known to preference edges for foraging, including roads and along the edges between vegetation patches and cleared paddocks (TSSC 2009, DEWHA 2009, NBES 2021 and NBES 2022). The 'proximity to vegetation edges' HQ subcomponent is designed to capture the presence of edge habitat to determine the abundance of foraging habitat opportunities. This metric will be measured in the field and using satellite imagery to calculated distances between the site and the edges of vegetation.

The 'species mobility capacity' subcomponent was developed to quantify the restriction of movement in a site once the macropod proof fencing is erected throughout Robbins Island as part of the landholder land management practices that are occurring up to 2025 irrespective of the Project. This metric will be measured as the proximity of a site to a fenceline (proposed or erected) that cannot be traversed by a Tasmanian devil. The closer the fenceline is to the site, the lower the score as it's considered unfavourable for a site to be near a fenceline as it restricts the movement of animals. Note that this metric will be further defined in the final OAMP after the input of the landholder fencing plans. It is expected that fences erected will be discrete paddocks rather than entire cross island fencing (e.g., the dingo proof fence) and therefore may have minimal or no impact to Tasmania devil mobility capacity across Robbins Island.

Site importance

Site importance include two metrics, functional habitat types and habitat complexity. There are indications that devils are not evenly distributed across the island and that they preference certain areas. Trapping shows a statistically significant difference in devil captures between the central-west to the central-north parts of the island (The Carnivore Conservancy (TCC) 2018). The central west, an area of expansive coastal heath, regularly yielded lower captures, with several traps not capturing devils (TCC 2018, NBES 2022). Conversely, traps on the central north had a far higher success rate. This part of the island includes transitional areas between coastal heath and grazing land, as well as greater habitat complexity in the north (TCC 2018). Devils appear to preference areas of greater complexity and areas with numerous functional habitat components. As such, the functional habitat types at the site and the complexity of habitat types within 5 km of a site will be assessed as a metric of the 'site importance to the population or occurrence in the community'. The 'functional habitat types' metric will be collected as a qualitative assessment based on the presence of microhabitat features that comprise of denning habitat and the presence of foraging resources and relative location of the site to edge habitat. The 'habitat complexity mosaic' will be collected through satellite imagery, vegetation and habitat type mapping to count the number of habitat types within a 5 km radius of the site. These metrics may be further refined after completion of the habitat and population surveys proposed with the development of the revised OAMP after Approval. These surveys should identify and further refine functional habitat type descriptions which can then be used to update components of HQ.

Threats

Five key threats have been identified from the DCCEEW literature for this species which include (TSSC 2009 and DEWHA 2009):

– Deliberate culling by humans
– DFTD
– Motor vehicles

– Foxes
– Habitat modification

Culling

Deliberate culling by humans is not currently considered a major threat to the species, unless the population is isolated or small (TSSC 2009). The impact and potential offset areas will be contained to Robbins Island. The island is owned by one landholder who have not report any historical culling of the Tasmanian devil and will be required to legally commit to the success of the offset for this Project. As such, it was considered that the threat of deliberate culling by humans is negligible for this Project and; therefore, the threat has not been considered further in the offsets.

The impact of the remaining four threats to the Tasmanian Devil will be quantified using the threat matrix as provided in the DES *Guide to determining terrestrial habitat quality - Methods for assessing habitat quality under the Queensland Environmental Offsets Policy* Version 1.3 February 2020, and the average score used (DES 2020) (Figure 7).

Threat Matrix (adapted from IUCN-CMP, 2007)			Severity				
			Very High	High	Medium	Low	Very Low
			1	2	3	4	5
Scope	Very High	1	1	2	3	4	5
	High	2	2	4	6	8	10
	Medium	3	3	6	9	12	15
	Low	4	4	8	12	16	20
	Very Low	5	5	10	15	20	25

Figure 7 Threat matrix (DES 2020)

DFTD

DFTD is the primary reason for the overall decline to the species and is recognised as the most significant threat to the species (TSSC 2009 and DEWHA 2009). DFTD has not been detected on Robbins Island to date; however, it is likely to occur in the island at some point in the future irrespective of the Project. The Project will result in clearing of habitat for devils and is unlikely to result in any increased risk of DFTD. As the arrival of DFTD is not attributable to the Project, it will not be considered further in the habitat quality methodology.

Motor vehicles

Strikes from motor vehicles is the next most prominent cause of fatalities and injuries to this species after DFTD (TSSC 2009 and DEWHA 2009). The threat of motor vehicle strikes will be measures through proxy metrics that include:

– Scope
  - Measuring the distance between a site and a trafficked road
  - Monitoring the degree of traffic on Robbins Island
  - Degree of establishment of fauna awareness signage
– Severity

- Considering the habitat type at the site (e.g., denning habitat) and increasing the degree of severity due to the potential presence of juveniles or young near the road
- Assessing car strike monitoring data to identify areas of high strike rate and increasing severity risk on sites in the proximity

Foxes

Foxes have been listed as a potential threat to Tasmanian devils under certain conditions (TSSC 2009). Foxes have the potential to outcompete Tasmanian devils for resources as both species are scavengers that occupy the same ecological niche with similar habitat requirements, including den sites (TSSC 2009). However, foxes are considered unlikely to threaten Tasmanian devils when the Tasmanian devil population is dominant and has not been impacted by DFTD. The Tasmanian devil has also been known to kill adult foxes and denned juveniles and therefore can slow or prevent fox population establishment (TSSC 2009).

Fox occurrence in Tasmania is a point of contention and debate, with unclear results on the distribution and population size across the state due to scat analysis errors, public perception bias and historical falsified data (Fisher et al. 2011, Paull 2011, Sare et al. 2013, Gonçalves et al. 2014, Marks et al. 2017). As the presence of the fox in Tasmania cannot be ruled out definitively, it will remain as a lower likelihood threat for the purposes of the habitat quality assessment. As such, this threat is unlikely to be a significant threat to the Tasmanian devil population on Robbins Island, particularly as foxes have never been recorded on Robbins Island.

The scope of the threat was scored according to the presence of foxes, the Tasmanian devil's susceptibility to predation as described in EPBC documentation and the extent and duration of management and monitoring actions relative to each monitoring site. The severity was measured based on the exposure of the Tasmanian devil to competition measured by the frequency and duration that the species is on the ground and expected presence of feral predators. Therefore, minimum scores resulted if no feral animal monitoring or management were in place, the species' is expected to be on the ground frequently and/or has the potential to be in competition with foxes.

Habitat modification

Habitat modification is considered a threat to the species (TSSC 2009). The scope was evaluated by the statutory protection currently in place over an area as indicated by the *Forest Practices Regulations 2017* and if the area is mapped as vulnerable land under this Regulation. It is assumed that areas not mapped as vulnerable land are more likely to be cleared than areas that don't meet this definition and/or are mapped as non-forest vegetation that are not mapped as a threated native vegetation community.

The severity score for the species was calculated based on the vegetation's habitat value including the ground-truthed vegetation condition and the habitat type class for the species e.g., breeding and denning habitat, foraging and dispersal habitat etc. In summary, high-value habitat areas such as breeding habitat that could be subject to clearing and/or mapped as non-forest vegetation that is not a threated native vegetation community/not vulnerable land scored the least for this threat.

5.5.4 Species stocking rate

Species stocking rate is the third component of HQ and is often the most difficult to measure. All of the species stocking rate subcomponents, including 'species density', 'species presence' and 'role of the site in the overall species population' were tailored for the Tasmanian devil based on known habitat requirements and ecology as the Manual does not include metrics for these subcomponents.

Species stocking rate was weighted to contribute 40 % to the final habitat quality score. The three subcomponents that were tailored as per the Guide for species stocking rate were scored as per Table 13 and justified in the text below.

Table 13 Species stocking rate subcomponent scoring for HQ

HQ component: Species stocking rate			
HQ subcomponent: Species presence			
Near the limit of the species range	Score	0	15
	Result	No	Yes

Maximum score: 15				
HQ subcomponent: Species density				
Approximate density on site (individuals per km^2)	Score	5	15	10
	Result	Below 0.3	Between 0.3 to 0.6	0.7 and above
Maximum score: 15				
HQ subcomponent: Role of the site population in the overall species population				
Necessary for maintaining genetic diversity	Score	0	15	
	Result	No	Yes/possibly	
Maximum score: 15				
		–	–	–
Natal dens identified and protected (% of natal dens)	Score	0	5	10	20
	Result	– None	– 25%	– 50%	– > 80 %
Maximum score: 20					

Species presence

It has been identified that the Tasmanian devil is potentially under threat from a lack of genetic diversity relative to other Australian marsupials and placental carnivores (DCCEEW 2023). While this has not been identified as a key threat to the species, it is still worth including in the role of SSR HQ. The 'near the limit of the species range' and 'necessary for maintaining genetic diversity' HQ metrics will be measured via a desktop assessment and a literature review. These metrics will assess the relative location of the Robbins Island devils to the mainland populations, as well as considering the role the subpopulation may have against loss of individuals from DFTD. It is acknowledged that the Robbins Island population is not isolated from mainland Tasmania via genetic studies and trapping surveys (TCC 2018) and visual observations. However, it must be acknowledged that due to the limited access to the island from the tides, this population is somewhat more protected from DFTD and other threats to the decline of the species, and therefore is likely more important to preserving genetic diversity than for example a mainland population in the east of Tasmania.

Species density

The typical density of Tasmanian devils in suitable unmodified habitats is 0.3 – 0.7 individuals per km^2 (DCCEEW 2023). This range has therefore been used as the optimal density range for the species on Robbins Island for this HQ subcomponent. The devil population on Robbins Island has a very high density and has been inadvertently inflated due to historic land management practices. Agricultural practices have created ideal foraging habitat for macropods through clearing for grazing pastures and soil improvements to enhance grass production, meaning the grazing areas support higher food availability than would naturally occur on the island. The landholders cull approximately 8,000 to 12,000 macropods per year, and this provides a significant and reliable food resource for devils.

It's considered that the artificially inflated population of Tasmanian devils on Robbins Island would not be sustainable without the intervention of the regular macropod culling that occurs yearly. The current population density of Tasmanian devils on Robbins Island is estimated to be 1.88 devils per km^2 (NBES 2022). Considering that the typical density of Tasmanian devils in suitable unmodified habitats is 0.3 – 0.7 individuals per km^2 (DCCEEW 2023), the Robbins Island population is clearly being artificially inflated by the anthropogenic culling

practices. Therefore, it's expected that the planned reduction of macropods from the additional fencing will result in increased competition for resources and exposure to DFTD, resulting in this current high-density population of devils to result in a lower HQ score for this subcomponent.

It's well understood in the literature that DFTD is a frequency-dependent disease and is transmitted more frequently during breeding season when sexual aggression increases leading to higher injury rates (McCallum et al. 2007, McCallum et al. 2008, TSSC 2009, Pye et al. 2016). It's also known that scavenger species will increase in competition if food resources reduce in an area where they cannot easily disperse to source more carrion, as is the case for Robbins Island (McCallum et al. 2008, TSSC 2009). The likely increase in competition for carrion as the macropod population decreases will likely result in more fighting and biting between individuals from squabbling over more limited food and increases the risk of injury and transmission of DFTD. As such, it's considered that an overinflated population above the typical natural level without a matching overinflated food resource is detrimental to the species. Additionally, following a period of increased competition for resources, a subsequent decrease in the species stocking rate as per the Lotka–Volterra equations (predator prey model) is likely to occur on Robbins Island. The Lotka–Volterra equations support that a decline in species stocking rate is a natural ecosystem process as the devil population adjusts to the reduced abundance of food sources. Therefore, the scoring for this sub-component has a higher score when the population is between 0.3 – 0.7 individuals per km², and is lower when above or below this density range.

Role of the site population in the overall species population

The role of the site to the overall species population HQ subcomponent was represented by the quantification and monitoring of natal dens

Identification and subsequent protection and monitoring of natal dens is an important factor to supporting population viability. The percentage of 'natal dens identified and protected' will be measured through the population surveys and targeted habitat surveys that are proposed with the OAMP will provide an updated estimate of abundance of natal dens whilst also identifying confirmed and potential denning sites. The results from these surveys will then be used to inform the HQ scoring. The greater the abundance of natal dens identified and recorded for monitoring, the higher the HQ score.

5.6 OAG calculations

The area required for the direct offset has been assessed using the OAG. The quantum of land required under a range of offset scenarios is available on the island and land availability is not considered a limiting factor for offset delivery. The total available area of habitat to utilise for an offset excluding the Project footprint and grazing paddocks is approximately 7,800 ha.

The calculation of the offset area, achieving 100 % of the required offset, is presented in Table 14. Supporting information for the development of each OAG input is also provided. The scenario accounts for the final, permanent impact of 183.384 ha to devil optimal and suboptimal breeding habitat on the island.

Table 14 Offset area scenario and justification.

OAG	Input	Justification
Impact area	183.384 ha	The final area of SRI to habitat for the Tasmanian devil that is required to be offset. This represents permanent impacts to optimal and suboptimal breeding habitat. – 5.95 ha of permanent impact to potential optimal breeding habitat – 176.947 ha of permanent impact to potential suboptimal breeding habitat – 0.487 ha of temporary impact to forest or woodland vegetation comprising suboptimal denning habitat In areas unsuitable for breeding, that support foraging and dispersal, the function for devils will be maintained despite vegetation clearance. This is due to the devil's utilisation of cleared areas, particularly edges, for both dispersal and foraging. Clearing in these areas will not be broadscale and will maintain less than 100m from the edge of vegetation, known to be a preference for devils.

OAG	Input	Justification
Impact quality	7	The predicted habitat quality of the impact area is seven (7). This figure is based on knowledge of the existing habitat from previous surveys conducted on Robbins Island to date (Table 9). This input will be verified and updated following endorsement of the habitat quality methodology by DCCEEW and after approval of the draft OAMP. After approval, proposed vegetation condition and devil population monitoring surveys will be conducted to establish a baseline and inform the final OAMP impact quality score.
Total quantum of impact	128.03 ha	Adjusted impact area as per the OAG
Time loss is averted	20 years	Duration of the risk mitigation actions to be taken, or 20 years, whichever is shorter
ROL without offset	0 %	ROL generally represents the percentage chance that the habitat in the proposed offset area would be completely lost (no longer hold any value for the protected matter) over 20 years as per the Guide.
ROL with offset	0 %	With the offset, the ROL is also nil (0)
Confidence in ROL	90 %	The confidence in this input reflects the active management and ongoing monitoring that is proposed as a part of the offset.
Time until benefit	20 years	The estimated time for habitat quality improvement outcomes. A conservative estimate of 20 years has been used, which is the maximum and most conservative. This captures both shorter-term and longer-term benefits likely to be realised through the offset delivery.
Start habitat quality	7	The predicted habitat quality of the proposed offset area is seven (7). This figure is based on knowledge of the existing habitat from previous vegetation community and Tasmanian devil population surveys conducted on Robbins Island to date (TCC 2018, NBES 2021, NBES 2022). This input will be updated following endorsement of the habitat quality methodology by DCCEEW and after approval of the draft OAMP. After approval, detailed surveys to measure habitat quality will be undertaken in the agreed offset area to inform the final OAMP offset starting habitat quality score.
Future habitat quality without offset	6 (-1)	Without the offset, future habitat quality for the Tasmanian devil is conservatively predicted to decline by 1-point. This decline is anticipated based on the combination of known and potential threats within the proposed offset areas, including: - Increased risk of DFTD transmission - Unmonitored population decline - Loss or degradation of habitat from clearing - Loss or degradation of habitat from fire and exclusion of devils **DFTD transmission and population decline** The ongoing fencing program occurring on Robbins Island will lead to a decline in the macropod population on the island as the yearly culling will reduce or completely stop as the exclusion fencing will prevent the establishment of large macropod populations. As a consequence, the Tasmanian devil population is expected to go through a period of increased competition for reduced food resources, which will likely result in more confrontations. These factors are likely to increase the risk of DFTD transmission as this disease is frequency-dependent for transmission and frequency of interaction is proposed to increase. It's acknowledged that this food source decline is occurring irrespective of the project, however without a monitoring program and an adverse management program for the devil population, there is an increased risk of an uncontrolled decline of the population further than what is already anticipated. This is considering a risk as Robbins Island is privately owned and the landholders have no obligation to monitor the devil population; therefore, creating the potential for decline with no means to prevent it. Given the above, increased risk of DFTD transmission from a reduction in food sources and a potential for an unmonitored or uncontrolled population decline is reasonably

OAG	Input	Justification
		anticipated to occur and contribute to a cumulative decline in habitat quality and associated risk of species stocking rate decline. **Habitat loss or degradation - clearing** The Tasmanian devil requires established microhabitat features such as shrub cover, groundcover, large woody debris, hollow logs and leaf litter for denning and protection from predators and other Tasmanian devils (TSSC 2009 and DEWHA) 2009). Vegetation clearing (selective or small-scale), as well as removal or loss of shrub cover and understorey complexity, decreases the availability of these microhabitat features and presents a risk of direct mortality and a loss of suitable denning habitat (TSSC 2009 and DEWHA) 2009). Additionally, the reduction of shelter (in the form of canopy cover and woody debris) increases exposure and susceptibility to predation and competition (TSSC 2009 and DEWHA) 2009). Given the above, selective logging or small-scale clearing of canopy trees, removal of ground-level vegetation, ongoing management of mapped non-forest vegetation that is not mapped as a threatened native vegetation community, is reasonably anticipated to continue and contribute to a cumulative decline in habitat quality and associated risk of species stocking rate decline. **Habitat loss or degradation and devil exclusion – fire** Fire or controlled burning is listed as a potential threat to the species on the Tasmanian Government Threatened Species Link website (Threatened Species Section (TSS) 2023). Considering that Tasmanian devils are denning species, fire can reduce site condition through destruction of den sites, particularly when denning in log piles or hollow logs. Fires can also reduce the microhabitat complexity of breeding habitat, making it unsuitable. In respect to species stocking rate, fires can displace or increase the risk of mortality or injury to breeding females and their denning young that may be trapped in burrows or fleeing the fire. The landholders of Robbins Island are aware controlled burning is a necessary requirement for land management, and currently have no provisions to burn vegetation with respect to Tasmanian devils. It's therefore reasonably anticipated that the risk of fire will remain and contribute to a cumulative decline in habitat quality and associated risk of species stocking rate decline. This input will be updated following endorsement of the habitat quality methodology by DCCEEW and after approval of the draft OAMP. After approval, proposed vegetation condition and devil population monitoring surveys will be conducted to inform the final OAMP impact quality score.
Future habitat quality with offset	8 (+1)	Future HQ is conservatively predicted to increase by 1-point across the proposed offset area. There are improvements in habitat quality are available across all three HQ components including: **Site condition:** - Addition of microhabitat features to increase denning opportunities such as large woody debris and hollow logs. - Development of a Fire Management Plan which will consider the Tasmanian devil and protection of microhabitat features **Site context:** - Protection of the offset area to prevent broadscale or selective clearing - Implementation of population monitoring to prevent fox establishment - Limitation of speeds on Robbins Island to 40km/h - Development of management plans to prevent, reduce and/or limit known and potential threatening processes - Increase in road network to increase movement corridors for the species **Species stocking rate:** - Implementation of population monitoring programs and adaptive species management plans to prevent loss of the population - Development of a Fire Management Plan which will consider the Tasmanian devil and burning at times of year outside of peak breeding season (July – January) This input will be updated following endorsement of the habitat quality methodology by DCCEEW and after approval of the draft OAMP. After approval, proposed habitat quality surveys will be conducted to inform the final OAMP offset habitat quality starting score.

OAG	Input	Justification
Confidence in habitat quality	70 %	A moderate confidence in the habitat quality result is predicted, noting that detailed habitat quality surveys and devil population surveys are proposed to occur in the proposed offset area. Additionally, the management actions required to secure and then manage the offset area are: - built on and improve largely existing habitat - well established measures - avoid approaches that would carry higher risk of delivery This input will be updated following endorsement of the habitat quality methodology by DCCEEW and after approval of the draft OAMP. After approval, proposed vegetation condition and devil population monitoring surveys will be conducted to inform the final OAMP impact quality score.
Area Required – 100 % land-based	1,164 ha	The total proposed offset area required to acquit 100 % of the land-based offset is 1,164 ha, with consideration of other metrics outlined in this OAG.

5.7 Conservation gain

The proposed approach to the direct, land-based offsets utilises options available for achieving a conservation gain under the Policy. Specifically, it focusses on

- minor to moderate improvements in the quality or condition of existing areas of habitat for the Tasmanian devil (improving existing habitat)
- reducing the occurrence and severity of threats posed to the species within the offset area (reducing threats)
- legal and enduring protection of areas of habitat for devils, preventing the loss of devils on Robbins Island (averted loss)

By using a combination of approaches to conservation gain the offset delivers an overall benefit to the species, offsetting the anticipated SRI, and balancing the risk associated with each approach.

6. Delivery

This Offset Strategy provides an overview of the overarching approach to offset delivery for the Project. To support delivery of the strategy, a draft OAMP will be developed and submitted to DCCEEW for approval. The OAMP will include:

- Description of the land-based offset area;
- Specific management actions and outcomes;
- A monitoring program;
- Description of roles and responsibilities, along with reporting and review requirements;
- Offset objectives and performance criteria;
- Corrective actions and adaptive management measures

The OAMP will be finalised post-EPBC approval and provided to DCCEEW for approval. The delivery of other compensatory measures will be through funding to the STDP provided by ACEN.

7. Risk assessment

As per principle five of the Policy, this Offset Strategy has considered the risks that may inhibit achieving the completion criteria for the offset site, including risks that may be wholly outside the approval holder's control.

As the final land-based offset and the other compensatory measures are further developed in an OAMP and research proposals, the relevant risks will be revisited and reassessed. The OAMP will include a revision to this risk assessment.

The risks have been assessed against the Risk Matrix in Table 15. The risk analysis:

– Identifies events and threats that will, may, or are likely to impact the attainment of the completion criteria.
– Assesses the likelihood and consequences of those events and threats eventuating, both before and after risk controls are applied, and assesses residual risk levels.
– Identifies levels of uncertainty in mitigating the risks, with appropriate corrective actions and associated trigger criteria should risks and threats eventuate.

Assessment of risks to the Tasmanian devil (*Sarcophilus harrisii*) with and without the Project are detailed in Table 16.

Table 15 Risk matrix

RISK MATRIX	
Likelihood (L): A qualitative measure of likelihood how likely is it that this event/circumstances will occur both before and after management activities are implemented	
Highly likely	Is expected to occur in most circumstances.
Likely	Will probably occur during the life of the Project.
Possible	Might occur during the life of the Project.
Unlikely	Could occur but considered unlikely or doubtful.
Rare	May occur in exceptional circumstances.
Consequence (C): Qualitative measure of what will be the consequence/result if the issue does occur	
Minor	Minor incident of environmental damage that can be reversed (*e.g. short-term delays to achieving strategy objectives, implementing low-cost, well-characterised corrective actions*).
Moderate	Isolated but substantial instances of environmental damage that could be reversed with intensive efforts (*e.g. short-term delays to achieving strategy objectives, implementing well-characterised, high cost/effort corrective actions*).
High	Substantial instances of environmental damage that could be reversed with intensive efforts (*e.g. medium-long term delays to achieving objectives, implementing uncertain, high-cost/effort corrective actions*).
Major	Major loss of environmental amenity and real danger of continuing (*e.g. strategy objectives are unlikely to be achieved, with significant legislative, technical, ecological and/or administrative barriers to attainment that have no evidenced mitigation strategies*).
Critical	Severe widespread loss of environmental amenity and irrecoverable environmental damage. (e.g. strategy objectives are unable to be achieved, with no evidenced mitigation strategies).

Final Risk Rating (R): A function of multiplying Likelihood (L) and Consequence (C)

		Consequences				
Likelihood		**Minor**	**Moderate**	**High**	**Major**	**Critical**
	Highly likely	Medium	High	High	Severe	Severe
	Likely	Low	Medium	High	High	Severe
	Possible	Low	Medium	Medium	High	Severe
	Unlikely	Low	Low	Medium	High	High
	Rare	Low	Low	Low	Medium	High

8. Conclusion

The proposed Offset Strategy includes a direct, land-based offset. The proposal will offset the 183.384 ha of impact to optimal and suboptimal breeding habitat. The approach has considered, and is in alignment with, the requirements of the Policy as well as any additional considerations under State offset guidance. As such, offsets are considered suitable for the species and feasible in light of the specific Project context.

There are several factors influencing habitat for, and viability of, the Tasmanian devil on Robbins Island, which will occur irrespective of the Project. This includes:

– A significant reduction in food resource availability and associated reduction in devil density; and
– The arrival of DFTD through transfer from devils crossing Robbins Passage and the associated impacts to devil density.

The Tasmanian devil population has been declining since the 1990s, largely attributed to DFTD (DCCEEW 2023), which is a key threat to the species and the reason for its listing as endangered under the EPBC Act and the Tasmanian TSP Act (TSSC 2009, TSS 2023). However, this threat is not relevant to the proposed action and, as per advice provided by DCCEEW, a direct, land-based offset is proposed.

9. References

Brüniche-Olsen Anna, Jones Menna E., Austin Jeremy J., Burridge Christopher P. and Holland Barbara R. (2014) Extensive population decline in the Tasmanian devil predates European settlement and devil facial tumour disease *Biology Letters,* 10: 20140619. https://doi.org/10.1098/rsbl.2014.0619

Cunningham, C.X., Comte, S., McCallum, H., Hamilton, D.G., Hamede, R., Storfer, A., Hollings, T., Ruiz-Aravena, M., Kerlin, D.H., Brook, B.W., Hocking, G. and Jones, M.E. (2021), Quantifying 25 years of disease-caused declines in Tasmanian devil populations: host density drives spatial pathogen spread. *Ecology Letters*, 24: 958-969. https://doi.org/10.1111/ele.13703

Daniels, G 2023, Statement of Evidence – Tasmanian Devil and Spotted-tailed Quoll, Tasmanian Civil and Administrate Tribunal Proceedings.

Department of Climate Change, Energy, the Environment and Water (DCCEEW), 2023, 'Species Profile and Threats Database *Sarcophilus harrisii* — Tasmanian Devil', Australian Government, Canberra, viewed 4 August 2023, <https://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=299>

Department of Climate Change, Energy, the Environment and Water (DCCEEW) 2023a, *Conservation covenants,* viewed 4 August 2023, <https://www.dcceew.gov.au/environment/biodiversity/conservation/covenants>

Department of Climate Change, Energy, Environment and Water (DCCEEW) 2023b, Offsets Assessment Guide, viewed 4 August 2023 <https://www.dcceew.gov.au/environment/epbc/publications/epbc-act-environmental-offsets-policy>.

Department of Climate Change, Energy, Environment and Water (DCCEEW) 2023c, *How to use the Offsets Assessment Guide*, viewed 4 August 2023 https://www.dcceew.gov.au/sites/default/files/documents/offsets-how-use.pdf.

Department of the Environment, Water, Heritage and the Arts (DEWHA), 2009, 'Approved Conservation Advice for Sarcophilus harrisii (Tasmanian Devil)', *Australian Government*, Canberra, viewed 6 August 2023, <http://www.environment.gov.au/biodiversity/threatened/species/pubs/299-conservation-advice.pdf>

Department of Primary Industries, Parks, Water and Environment (DPIPWE) Natural and Cultural Heritage Division, 2023, *Survey Guidelines for Development Assessments*, Tasmanian government, viewed 4 August 2023, <https://nre.tas.gov.au/conservation/development-planning-conservation-assessment/survey-guidelines-for-development-assessments>

Department of Primary Industries, Parks, Water and Environment (DPIPWE) Natural and Cultural Heritage Division, 2021, 'Guidelines for Natural Values Surveys - Terrestrial Development Proposals', Tasmanian Government, viewed 4 August 2023, <https://nre.tas.gov.au/Documents/Guidelines%20for%20Natural%20Values%20Surveys%20related%20to%20Development%20Proposals.pdf>

Department of Primary Industries, Parks, Water and Environment (DPIPWE) Natural and Cultural Heritage Division, 2015, 'Survey Guidelines and Management Advice for Development Proposals that may impact on the Tasmanian Devil (Sarcophilus harrisii)', Tasmanian Government, viewed 4 August 2023, <https://nre.tas.gov.au/Documents/Devil%20Survey%20Guidelines%20and%20Advice.pdf>

Department of Primary Industries, Parks, Water and Environment (DPIPWE) Natural and Cultural Heritage Division, 2010, 'DRAFT Recovery Plan for the Tasmanian devil (Sarcophilus harrisii)', Tasmanian Government, viewed 13 August 2023, < https://nre.tas.gov.au/Documents/Draft-Tasmanian-Devil-Recovery-Plan.pdf>

Department of Sustainability, Environment, Water, Population and Community (DSEWPaC) 2012, Environment Protection and Biodiversity Conservation Act 1999 Environmental Offsets Policy, viewed 29 June 2023 <https://www.dcceew.gov.au/environment/epbc/publications/epbc-act-environmental-offsets-policy>.

Department of the Environment (2013) *Significant Impact Guidelines 1.1 - Matters of National Environmental Significance.* Australian Government.

Department of Natural Resources and Environment (DNRE) 2023, Species Management Profile Sarcophilus harrisii Tasmanian Devil, Threatened Species Link, Tasmanian Government, Hobart, viewed 4 August 2023, <https://www.threatenedspecieslink.tas.gov.au/Pages/Tasmanian-Devil.aspx>

Eyre, T.J., Kelly, A.L, Neldner, V.J., Wilson, B.A., Ferguson, D.J., Laidlaw, M.J. and Franks, A.J 2015, *BioCondition: A Condition Assessment Framework for Terrestrial Biodiversity in Queensland. Assessment Manual. Version 2.2,* Queensland Herbarium, Department of Science, Information Technology, Innovation and Arts, Brisbane.

Fisher, N., Lee, A., Cribb, J., Haynes, G., 2011, Public perceptions of foxes and fox eradication in Tasmania. *Australian Zoologist*; 35 (3): 576–589, available from https://doi.org/10.7882/AZ.2011.010

GHD 2021a, *Robbins Island Renewable Energy Park - Development Proposal and Management Plan*, UPC Robbins Island Pty Ltd*,* Tasmania.

GHD 2021b, *Robbins Island Renewable Energy Park - Development Proposal and Management Plan*, UPC Robbins Island Pty Ltd*,* Tasmania.

GHD 2024, *Technical memorandum: Available tidal window at Robbins Passage*, UPC Robbins Island Pty Ltd*,* Tasmania.

Gonçalves, J., Marks, C.A., Obendorf, D., Amorim, A. and Pereira, F. 2014. The risks of using “species-specific” PCR assays in wildlife research: The case of red fox (Vulpes vulpes) identification in Tasmania, *Forensic Science* International: Genetics, Volume 11, Pages e9-e11, ISSN 1872-4973, **https://doi.org/10.1016/j.fsigen.2014.03.009**.

Grange Resources 2023, EPBC Protected Species Register Savage River Mine https://grange.blob.core.windows.net/public/d1b4ebf1-86f4-404d-8f0e-d97fc6d39176.pdf

Grueber, C.E, Peel, E, Wright, B, Hogg, C.J, Belov, K 2019, ‘A Tasmanian devil breeding 3 program to support wild recovery’, *Reproduction, Fertility and Development*, viewed 10 August 2023, <https://doi.org/10.1071/RD18152>

Jones, E, Koch, A, Pay, J, Mann, D, Jones, M, Hamede, R 2023, ‘Movements and habitat selection of a marsupial carnivore in a modified landscape’, University of Tasmania, biorxiv, https://www.biorxiv.org/content/10.1101/2023.03.05.531208v1

Lewis, A.C., Hughes, C. & Rogers, T.L. (2023) Living in human-modified landscapes narrows the dietary niche of a specialised mammalian scavenger. *Sci Rep* **13**, 3582. https://doi.org/10.1038/s41598-023-30490-6

Marks, C.A., Clark, M., Obendorf, D., Hall, G.P., Soares, I. and Pereira, F. 2017, Trends in anecdotal fox sightings in Tasmania accounted for by psychological factors. Conservation Biology, 31: 1450-1458. Available from https://doi.org/10.1111/cobi.12944

Maseyk, F, Evans, M, Maron, M 2017, ‘Guidance for deriving Risk of Loss estimates when evaluating biodiversity offset proposals under the EPBC Act’, Report to the National Environment Science Programme, Department of the Environment and Energy, Canberra.

McCallum, H., Tompkins, D.M., Jones, M., Lachish, S., Marvanek, S., Lazenby, B., Hocking, G., Wiersma, J. and Hawkins, C.E. 2007, ‘Distribution and impacts of Tasmanian devil facial tumor disease’, *EcoHealth*, 4, viewed 10 August 2023, <https://link.springer.com/article/10.1007/s10393-007-0118-0>

McCallum, H 2008, ‘Tasmanian devil facial tumour disease: lessons for conservation biology’, *Trends in ecology & evolution*, 23(11), pp.631-637, viewed 10 August 2023, <https://doi.org/10.1016/j.tree.2008.07.001>

Michaels, K., Panek, D., and Kitchener, A. Contributing Eds 2020, *TASVEG VCA Manual: A manual for assessing vegetation condition in Tasmania, Version 2.0*. Natural and Cultural Heritage, Department of Primary Industries, Parks, Water and Environment, Hobart.

North Barker Ecosystem Services 2021, *Natural Values Assessment – with Particular Reference to Flora and Non-avian Fauna Habitat,* Tasmania.

North Barker Ecosystem Services 2022, *Tasmanian Devil Trapping Survey*, Tasmania.

North Barker Ecosystem Services 2023, *Devil denning model*, Tasmania.

Owen, D and Pemberton, D 2011, 'Tasmanian devil: a unique and threatened animal', *Allen and Unwin*, second edn., Crows Nest, NSW.

Paull, J. 2011, Environmental Management in Tasmania: Better Off Dead?. In: Baldacchino, G., Niles, D. (eds) Island Futures. Global Environmental Studies. Springer, Tokyo. https://doi.org/10.1007/978-4-431-53989-6_12

Pye RJ, Woods GM, Kreiss A 2016, 'Devil Facial Tumor Disease', *Veterinary Pathology,* 53(4):726-736, viewed 10 August 2023, available from https://pubmed.ncbi.nlm.nih.gov/26657222/

Sarre, S.D., MacDonald, A.J., Barclay, C., Saunders, G.R. and Ramsey, D.S.L. 2013, Foxes are now widespread in Tasmania: DNA detection defines the distribution of this rare but invasive carnivore. J Appl Ecol, 50: 459-468, available from https://doi.org/10.1111/1365-2664.12011

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.

Tovar, C, Pye, R.J, Kreiss, A, Cheng, Y, Brown, G.K, Darby, J, Malley, R.C, Siddle, H.V.T, Skjodt, K, Kaufman, J, Silva, A, Morelli, A.B, Papenfuss, A.T, Corcoran, L.M, Murphy, J.M, Pearse, J.M, Belov, K, Lyons, A.B, & Woods, G.M 2017, 'Regression of devil facial tumour disease following immunotherapy in immunised Tasmanian devils' *Scientific Reports,* article no. 43827, viewed 10 August 2023, <https://www.nature.com/articles/srep43827#Abs1>

The Carnivore Conservancy (TCC) 2018, *Robbins Island Tasmanian Devil Survey,* Tasmania.

Threatened Species Scientific Committee (TSSC), 2009, 'Commonwealth Listing Advice on *Sarcophilus harrisii*. *Australian Government*, Canberra, viewed 29 June 2023, http://www.environment.gov.au/biodiversity/threatened/species/pubs/299-listing-advice.pdf

Threatened Species Section (TSS) (2023). Tasmanian Devil *(Sarcophilus harrisii): Species Management Profile for Tasmania's Threatened Species Link*. https://www.threatenedspecieslink.tas.gov.au/Pages/Tasmanian-Devil.aspx Department of Natural Resources and Environment Tasmania. Accessed on 20/9/2023.

University of Tasmania, *Grants and scholarships- saving the Tasmanian Devil,* University of Tasmania, Tasmania, viewed 13 August 2023, <https://www.utas.edu.au/community-and-partners/giving/the-tasmanian-devil-appeal/tabs/grants-and-scholarships#:~:text=Grants%20of%20up%20to%20%2425%20000%20are%20available,according%20to%20research%20priorities%20and%20as%20funding%20allows>

Wiggins, N & Bowman, D 2011, 'Macropod habitat use and response to management interventions in an agricultural–forest mosaic in north-eastern Tasmania as inferred by scat surveys', *Wildlife Research*, Vol. 38, No. 2, pp 103-113, https://doi.org/10.1071/WR10116

Wright, B, Morris, K, Grueber, C.E, Willet, C.E, Gooley, R, Hogg, C.J, O'meally, D, Hamede, R, Jones, M, Wade, C, & Belov, K 2015, 'Development of a SNP-based assay for measuring genetic diversity in the Tasmanian devil insurance population', *BMC Genomics,* vol. 16, no. 791, viewed 10 August 2023, <https://bmcgenomics.biomedcentral.com/articles/10.1186/s12864-015-2020-4#Abs1>

Appendix A

Risk assessment

Table 16 Risk assessment

Risk event	Risk description	Initial Risk Rating			Planned Management Measures	Residual Risk Rating		
		Likelihood	Consequence	Risk		Likelihood	Consequence	Risk
Stochastic events								
Climate change	Rising sea levels is as a result of climate change.	Possible	Major	High	Implementation of flood modelling to select offset areas that are less likely to be impacted by sea level rising.	Unlikely	Moderate	Low
Climate change	Increased fire frequency and severity leading to habitat loss or degradation.	Possible	High	Medium	Implementation of a fire management strategy will reduce the likelihood and severity of fire events.	Possible	Moderate	Medium
Climate change	Increased risk of extreme events and associated damage to habitat.	Possible	High	Medium	No management actions are likely to prevent impact.	Possible	High	Medium
Cyclones/ Severe tropical lows / flooding	Catastrophic damaging storm event resulting in physical damage of habitat in the offset area.	Likely	Moderate	Medium	No management actions are likely to prevent impact.	Likely	Moderate	Medium
Wildfire	Extensive, unplanned bushfire event destroying the offset area.	Possible	Major	Severe	Implementation of an appropriate fire management strategy across the offset will reduce the extent and severity of unplanned fires.	Unlikely	High	Medium
Offset risks								
The offset failing (regardless of cause)		Unlikely	Critical	High	ACEN will commit to finding an alternative offset in the unlikely event the offset fails due to unforeseen reasons.	Rare	Major	Medium
Offset funding shortfall		Unlikely	Critical	High	Offset funding will be estimated and allocated prior to commencement.	Rare	Major	Medium
Offset threats								
Devil vehicle strikes within offset area(s)	Possible injuries or deaths from uncontrolled/unregulated vehicle access to, from, and around the offset.	Possible	High	Medium	Operations limited to daylight hours where possible. Enforcement of 40 km/h speeds within the offset area. Deceased devils to be moved away to reduce attraction of other devils. The identification of potential roadkill hotspots will be integrated in the offset selection process mitigating areas that could increase the risk of vehicle strikes.	Unlikely	Moderate	Low
Foraging impacts from introduced foxes	Possible foxes being introduced in the offset area(s) resulting in a decrease of food availability for the devils.	Unlikely	Moderate	Low	Continual monitoring of the devils in the offset will occur. An action plan and corrective management measures will be implemented if foxes become present within the offset area(s).	Rare	Moderate	Low
Deliberate culling impacts within offset area(s)	Possible culling occurring within the offset area(s) causing injuries or deaths to the devils.	Unlikely	Moderate	Low	Signed landholder agreements to prevent any future culling of devils (noting landholders have reported never having culled them). Monitoring of the devils and the offsets area(s) will detect any culling that occurs within.	Rare	Moderate	Low

Risk event	Risk description	Initial Risk Rating			Planned Management Measures	Residual Risk Rating		
		Likelihood	Consequence	Risk		Likelihood	Consequence	Risk
Inadequate denning habitat within offset area(s)	Inadequate denning opportunities for devils in the offset area(s) impacting breeding.	Possible	High	Medium	Offset area(s) to be selected in accordance with locations with suitable devil denning opportunities. Offset are management will avoid the loss of existing dens and aim to increase denning opportunities.	Unlikely	Moderate	Low
Management of the offset area(s)								
Unauthorised clearing in the offset area	Additional disturbances occur to the offset area through other land uses or activities.	Possible	Moderate	Medium	ACEN will enter into a legal agreement with the landholder for use of the site for offsets and the OAMP will be developed in consultation with the landholder. The OAMP will consider the use of fencing and signage to provide additional awareness and protection of the offset area.	Unlikely	Minor	Low
Failure of weed management	Failure of weed management to effectively reduce the occurrence of weeds and remove weeds from the offset area, due to chronic source of ongoing disturbance.	Unlikely	Moderate	Low	The OAMP will include specific requirements around weed management, including performance criteria, monitoring, corrective actions, and adaptive management. Additionally, it will include a requirement for regular review and update of weed management protocols.	Rare	Minor	Low
Offset measure are ineffective measures to reduce the risk of bushfire	Mismanagement of fire hazards or inappropriate management measures allows an uncontrolled bushfire to occur (e.g., controlled burn becomes uncontrolled; increased fire hazard unaccounted for in planning).	Possible	Major	Severe	Undertake review of fire management efforts historically, known fire history, and fire management requirements for vegetation types and the regional/climatic conditions. Fire management strategy with controlled burns, fire breaks to reduce the likelihood and severity of unplanned fire events and reduce the risk of uncontrolled bushfire events, fire management lines, fuel hazard reduction, particularly around potential den sites, and ongoing monitoring and review of the strategy – applied across the whole property.	Unlikely	High	Medium

ghd.com

The Power of Commitment