Melbourne Airport Future Airfield Projects: Supporting Information for EPBC Act Referral

Application Number: 02243

18 JUNE 2024

Australia Pacific Airports (Melbourne) Pty Ltd

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Glossary

ABC	Airport Building Controller
AGL	Airfield ground lighting
Airports Act	Airports Act 1996 (Cth)
APAM	Australia Pacific Airports (Melbourne) Pty Ltd
BEC	Bajwa EnviroConsult Pty Ltd
CASA	Civil Aviation Safety Authority
DAWE	Department of Agriculture, Water and the Environment
DCCEEW	Department of Climate Change, Energy, the Environment and Water
DITRDCA	Department of Infrastructure, Transport, Regional Development, Communications and the Arts
DSEWPaC	Department of Sustainability, Environment, Water, Population and Communities
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999 (Cth)
EVC	Ecological Vegetation Class
FFG Act	Flora and Fauna Guarantee Act 1988 (Vic)
ICT	Information and communication technologies
M3R	Melbourne Airport's Third Runway
MAPMP 3.0	Melbourne Airport Pavement Maintenance Program 3.0
MDP	Major Development Plan
MOS	Manual of Standards
NTGVVP	Natural Temperate Grassland of the Victorian Volcanic Plain
OMP	Offset Management Plan
PAPI	Precision approach path indicator
PFAS	Per- and polyfluoroalkyl substances
PFAS NEMP	PFAS National Environmental Management Plan
TEC	Threatened ecological community
TSSC	Threatened Species Scientific Committee
VPP	Victoria Planning Provisions
VQA	Vegetation Quality Assessment

1. Introduction

Bajwa EnviroConsult Pty Ltd (BEC) has been engaged by Australia Pacific Airports (Melbourne) Pty Ltd (APAM) to collate supporting information in relation to the EPBC Act referral application for future airfield developments over the next 5-10 years which are expected to impact on matters of national environmental significance (MNES). These projects include:

- Project A – Airfield Renaming
- Project B – Melbourne Airport Pavement Maintenance Program 3 (MAPMP 3)
- Project C – Runway 09/27 overlay
- Project D – Hotel Apron and Whiskey/Sierra Apron Projects
- Project E – Staff Car Park Extension

BEC understands that the Department of Climate Change, Energy, the Environment and Water (DCCEEW) is supportive of a more strategic approach to EPBC Act referrals for developments at Melbourne Airport. With consideration to this, the above projects combined represent the proposed action which is subject of Application Number: 02243. There may be other airfield projects which arise in the next 5-10 years which also impact on MNES. In these instances APAM will liaise with DCCEEW with regard to the proposed approval approach.

This document provides further information relating to specific sections of the application form in the EPBC Act Business Portal, as outlined in Table 1 below.

Table 1 Summary of supporting information provided in this document

Portal section	Information required	Location in this document
1.2.1	Provide an overview of the proposed action, including all proposed activities.	Section 3 – Description of the action
1.2.6	What Commonwealth or state legislation, planning frameworks or policy documents are relevant to the proposed action, and how are they relevant?	Section 2 – Regulatory framework
3.2.1	Describe the flora and fauna within the affected area and attach any investigations of surveys if applicable.	Section 17 – Habitat assessments
3.2.2	Describe the vegetation (including the status of native vegetation and soil) within the project area.	Section 4.4 – Summary of targeted surveys for threatened ecological communities
4.1.4.2	Briefly describe why your action has a direct and/or indirect impact on these protected matters.	Section 5.1 – Nature, likelihood and severity of impacts
4.1.4.5	Describe why you consider this to be a Significant Impact.	Section 5.2 – Significance of impacts

Portal section	Information required	Location in this document
4.1.4.10	Please describe any avoidance or mitigation measures proposed for this action and attach any supporting documentation for these avoidance and mitigation measures.	Section 8 – Avoidance, mitigation and management measures
4.1.4.11	Please describe any proposed offsets and attach any supporting documentation relevant to these measures.	Section 9 – Offsets
4.1.10.6	Describe why you do not consider this to be a Significant Impact.	Section 6 – Impacts to the environment of Commonwealth land

2. Regulatory framework

Melbourne Airport is located on Commonwealth land and as such is subject to Commonwealth legislation, primarily the *Airports Act 1996* (Airports Act) and the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

The relevant regulatory requirements, planning frameworks and policy documents for the proposed action are outlined below.

2.1. Airports Act

The Airports Act is administered by the Department of Infrastructure, Transport, Regional Development, Communications and the Arts (DITRDCA) and is the primary Commonwealth legislation applicable to Melbourne Airport.

Section 89(1) of the Airports Act classifies certain types of airport development as 'major airport developments' for which an airport lessee company is required to seek approval through a Major Development Plan (MDP). These developments include:

(m) a development of a kind that is likely to have significant environmental or ecological impact; or

(n) a development which affects an area identified as environmentally significant in the environment strategy;

Given that the projects involve maintenance of existing infrastructure, and do not constitute a development, an MDP is not required.

Section 98(1) of the Airports Act sets out certain building activities which must not be carried out unless an approval has been obtained under the *Airports (Building Control) Regulations 1996*. These activities include:

(c) undertaking, constructing or altering earthworks (whether or not in relation to buildings or other structures);

(d) undertaking, constructing or altering engineering works, electrical works or hydraulic works (whether or not in relation to buildings or other structures);

(e) demolishing, destroying, dismantling or removing:

(i) buildings or other structures; or

(ii) earthworks; or

(iii) engineering works; or

(iv) electrical works; or …

The relevant requirements of the *Airports (Building Control) Regulations 1996* are further discussed in Section 2.1.1.

2.1.1. Airports (Building Control) Regulations 1996

The proposed action is subject to airport lessee consent from APAM and a building approval from the appointed Airport Building Controller (ABC) as required under the *Airports (Building Control) Regulations 1996*.

The building approval cannot be issued by the ABC without written consent from APAM, confirming that the projects are consistent with:

- The Melbourne Airport Master Plan
- Airport Environment Strategy
- Planning objectives for the airport

2.1.2. Airports (Environment Protection) Regulations 1997

The *Airports (Environment Protection) Regulations 1997* cover the full range of airport environmental management matters. While an approval is not required for the proposed action under these regulations, they impose obligations relating to the management of the environment across the airport site and require assessment, monitoring and reporting in relation to biodiversity, heritage, air, water and soil pollution, and noise levels.

2.1.3. Melbourne Airport Master Plan

In line with the Airports Act, APAM must submit a draft master plan for approval by the infrastructure minister every 5 years. The purpose of the master plan is to provide detailed plans for the continued development of the airport over the next five years. These plans must align with the Master Plan's 20-year strategic direction for the airport that considers the changes needed to aviation facilities, ground transport, utilities infrastructure, non-aviation development and environmental measures.

The current Melbourne Airport Master Plan 2022 sets out land use requirements for the different precincts across the airport. In particular, for the Airside Operations Precinct (where the proposed action will take place), the following objectives are of relevance:

- To provide for safe, secure and efficient airfield activities including the landing, take-off, taxiing and parking of aircraft
- To accommodate the provision of aircraft navigation aids … and other facilities essential for safe and efficient aircraft operations.
- To provide for the safe and secure operation of the airport

The Melbourne Airport Master Plan 2022 also includes the current Airport Environment Strategy, which identifies environmental objectives and targets to be achieved alongside implementation of the airport development plan. These objectives and targets have been taken into account when conducting relevant environmental assessments for the proposed action and identifying suitable mitigation measures.

2.2. EPBC Act

The EPBC Act includes triggers for formal assessment associated with impacts to Matters of National Environmental Significance (MNES) and actions on, or impacting upon, Commonwealth land. On the basis of potential for significant impacts on MNES, the EPBC Act is likely to be triggered by the proposed action.

3. Description of the action

The projects which comprise the proposed action are planned to be undertaken over the next 5-10 years. A description of each project, including the reason and proposed activities associated with each project is provided below.

3.1. Reason for the proposed action

Project A - Airfield renaming

The current taxiway/taxi lane nomenclature will result in the airport exhausting single letter digits. Renaming of the taxiways/taxi lanes is required prior to the opening of the third runway to allow for clear identification of each taxiway/taxi lane as development progresses.

Project B - MAPMP 3

Ongoing long term major maintenance for end-of-life airfield pavement, including but not limited to replacement of existing drainage, pavement and apron areas.

To enable the delivery of this and other projects, new construction hardstands are required. The hardstands will be located north of the airfield to reduce travel distance for construction vehicles. The hardstands will accommodate site amenities, offices, staff parking, materials, and plant storage.

Project C - Runway 09/27 overlay

Based on the 2022 Annual Technical Inspection (ATI), the asphalt condition of Runway 09/27 is understood to be in a 'fair' to 'fair to good' condition, with the eastern portion of the runway displaying most of the defects whereas the western portion is in a better condition. The asphalt portion of the runway received an asphalt overlay in 2011 with an overlay design life of 10 to 12 years. As such, treatment of the flexible portion of Runway 09/27 is now warranted to extend the life of the existing asphalt pavement for the next 10 to 12 years.

In addition to the upgrades required for the asphalt, the Airfield Ground Lighting (AGL) along the runway will be upgraded from obsolete halogen fittings to LED lighting, to ensure continuity of supply of spares, installation of additional fittings to improve the lighting systems available for night-time arrivals, and the installation of new lights to meet updated standards.

The majority of these works will be completed on-pavement within the existing runway footprint, however AGL works will be required off-pavement.

Project D - Hotel Apron and Whiskey/Sierra Apron Projects

Recovery has occurred rapidly following COVID-19 with increasing demand for daytime operational stands and overnight parking of aircraft. Aircraft are also having longer layover periods resulting in increased demand for parking stands. The additional aircraft parking provided by this project will support the increased demand.

Project E – Staff Car Park Extension The current at-grade staff car park is nearing capacity and needs to be expanded to accommodate for the future growth projections for the airport. This location has been earmarked as one of the preferred sites due to proximity to the existing staff car park and ease of access from the landside road precinct.

3.2. Project location

The location of the proposed action is shown in Figure 1, which also shows existing ecological values within and adjacent to the project area.

The expected disturbance footprint (including for earthworks, site access and laydown) is estimated to be 60.65 hectares.

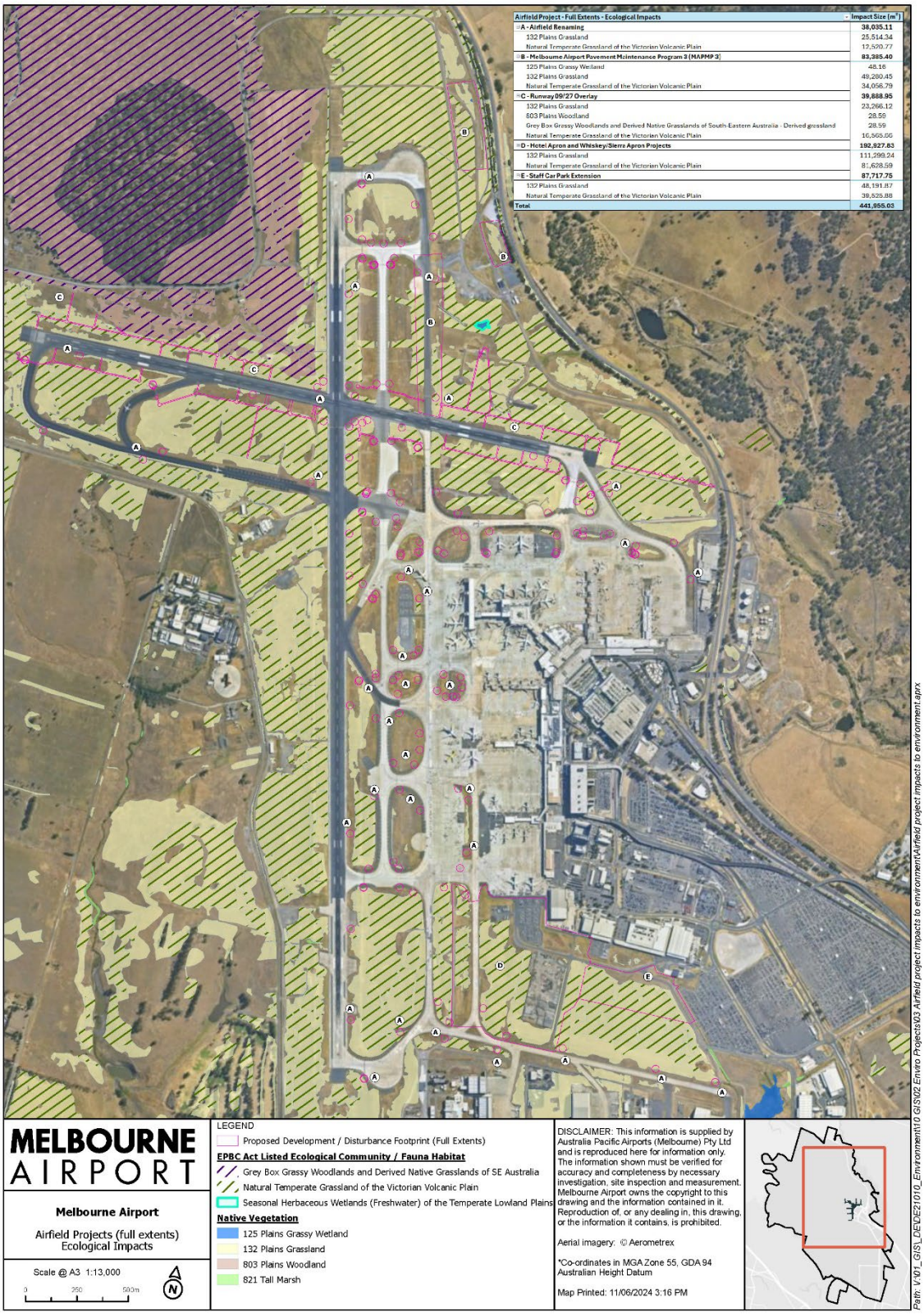

Figure 1 Location of proposed action

3.3. Project description

3.3.1. Pre-construction

Prior to each project, the selected contractors will look to establish their site compound and work laydown areas as part of their pre-construction activities.

3.3.2. Construction

Project A - Airfield renaming

The works will involve demolition of existing infrastructure (footings for taxiway and runway signs), localised earthworks grading and installation of new services/connection with existing services.

Access to and from the works area will be via the internal airport road network.

The following plant and equipment will be used during construction:

- 12 tonne to 30 tonne excavators to demolish existing pavement to subgrade level.
- Truck and trailers to remove waste material, deliver new material to site, and float heavy plant to site.
- Skid steers to maneuver in smaller areas between new and existing services.
- Trenchers for digging out new service conduits.
- Front end loaders, to be used if all excavators are in use.
- Concrete trucks to pour foundations.

Project B - MAPMP 3

The main works will involve demolition of existing infrastructure (pavements), earthworks grading to allow for sufficient drainage and construction of new high-strength pavement and trenching of services for stormwater drainage, airfield ground lighting infrastructure, and communications network.

Ancillary works for new construction hardstands will involve demolition of existing infrastructure (fences and pavements), earthworks grading and construction of new high-strength pavement and trenching of services.

The following plant and equipment will be used during construction:

- 12 tonne to 30 tonne excavators to demolish existing pavement to subgrade level.
- Truck and trailers to remove waste material or deliver new material to site.
- Trenchers for digging out new service conduits.
- Skid steers to maneuver in smaller areas between new and existing services.
- Large plant including graders, concrete trucks, asphalt pavers, watercarts, bulldozers.

Project C - Runway 09/27 overlay

The works will involve a combination of asphalt resurfacing, surface treatment and installation of additional airfield ground lighting (AGL) infrastructure for the existing Runway 09/27. The majority of

these works will be completed on-pavement within the existing runway footprint, however AGL works will be required off-pavement.

Off-pavement work will primarily consist of accessing existing pit and conduit infrastructure to install new cabling as part of the lighting replacement. Excavation work will be required for the installation of earthing pits to bring the system up to the same safety standard as the rest of the airfield; grading works around each of the precision approach path indicators (PAPIs) to make them compliant with the updated regulations; new conduits for the new Rapid Exit Taxiway indicator lights to match the system installed on Runway 16/34; and, installation of elevated stop bar lights to meet the updated regulations and match the systems installed around the rest of the runway/taxiway network.

The following plant and equipment will be used for off pavement works:

- Excavator
- Light truck
- Ute and trailer
- Portable light tower

Project D - Hotel Apron and Whiskey/Sierra Apron Projects

The works will involve demolition of existing infrastructure (buildings and pavements), earthworks grading and construction of new high-strength pavement and trenching of services.

The following plant and equipment will be used during construction:

- 12 tonne to 30 tonne excavators to demolish existing pavement to subgrade level.
- Truck and trailers to remove waste material or deliver new material to site.
- Trenchers for digging out new service conduits.
- Skid steers to maneuver in smaller areas between new and existing services.
- Large plant including graders, concrete trucks, asphalt pavers, watercarts, bulldozers.

Project E – Staff Car Park Extension

The works will involve construction of a new at grade car park, including civil and drainage works, car park lighting, electrical, security and information and communication technologies (ICT) related works.

Access to and from the works area will be via a new access road network from Francis Briggs Road.

The following plant and equipment will be used during construction:

- 12 tonne to 30 tonne excavators to demolish existing pavement to subgrade level.
- Truck and trailers to remove waste material or deliver new material to site.
- Trenchers for digging out new service conduits.
- Skid steers to maneuver in smaller areas between new and existing services.
- Large plant including graders, concrete trucks, asphalt pavers, watercarts, bulldozers.

3.3.3. Construction program

An indicative construction program is outlined in Table 2. The construction program for individual projects will be developed in more detail, however works are expected to commence from 2025 onwards.

Table 2 Indicative construction program

Project	Construction Start	Construction Complete
Project A – Airfield Renaming	Q1 2026	Q1 2027
Project B – MAPMP 3	Q3 2025	Q2 2030
Project D – Runway 09/27 overlay	Q4 2025	Q2 2026
Project E – Hotel Apron and Whiskey/Sierra Apron Projects	Q4 2025	Q4 2028
Project F – Staff Car Park Extension	Q1 2025	Q2 2026

4. Habitat assessments

4.1. Records of listed flora and fauna species

A review of the potential for listed threatened flora and fauna species to be within 10 km of the project area was completed to evaluate the likelihood and potential impacts associated with the proposed action. The review utilised the Protected Matters Search Tool (DCCEEW; accessed on 20 November 2023) and the Victorian Biodiversity Atlas (accessed on 20 November 2023).

Following the database searches, threatened species, TECs and listed migratory species were categorised as having a negligible, low, medium or high likelihood of occurring within the project area or, if the species was observed during field surveys, as having been recorded within the project area. These categorisations were determined with reference to surrounding records of the species, expert knowledge of the species ecology and knowledge of the habitat types present in the project area.

The review found a total of 62 flora species (21 flora species of National significance and 41 flora species of State significance), 80 fauna species (43 fauna species of National significance and 37 fauna species of State significance) and 26 migratory species potentially located within 10 km of the project footprint. The likelihood of occurrence within the project area for the majority of the species is rated as negligible to low.

A summary of the threatened flora and fauna species with a medium or high potential to occur within the project footprint, including rationale and the need for additional surveys is provided in Table 3 below. It is noted that extensive surveys for listed threatened species and ecological communities were conducted between 2019 and 2021 to inform the MDP for Melbourne Airport's Third Runway (M3R); these have been referred to when considering the need for targeted surveys.

The full list of threatened flora and fauna species, including details on the most recent records, habitat descriptions and likelihood rankings is provided in Appendix A.

Table 3 Summary of listed threatened flora and fauna species

Common name	Scientific name	Likely occurrence in project area	Habitat description	Rationale for likelihood ranking	Targeted survey needed
Potential threatened Flora Species – State Significance (FFG Act)					
Austral Crane's-bill	*Geranium solanderi* var. *solanderi s.s.*	Medium	Grasslands or grassy woodlands where hydrology is not a limiting factor.	Recent records nearby <20 yrs. Suitable habitat within the Melbourne Airport and can be present in disturbed grasslands and grassy woodlands.	No. Targeted surveys for FFG listed flora species was not considered necessary. The vegetation surveys undertaken for the project area were sufficient to detect these species if present. There is no further regulatory requirement to undertake targeted surveys for these species.
Large Flower Crane's Bill	*Geranium* sp. *1*	Medium	The habitat requirements of this species are poorly known.		
Pale-flower Crane's-bill	*Geranium* sp. *3*	Medium	Grasslands and dry woodlands.		
Potential threatened Fauna Species – National Significance (EPBC Act)					
Gang-gang Cockatoo	*Callocephalon fimbriatum*	Medium	Southern Vic to Eastern NSW. Forests and woodlands from coast to alpine areas. Autumn-winter dispersal from highlands to lower elevations. Forages in eucalypts, acacias and some exotic garden trees and shrubs.	Species likely to utilise the woodland patches north of the project area, which may result in flights over the project area at times.	No. The species was listed after field assessments were conducted and is assumed to be present within the Melbourne Airport estate. Targeted surveys for the species are unlikely to produce additional information to assist with current understanding of the species' use of the project area.
White-throated Needle Tail	*Hirundapus caudacutus*	High	An almost exclusively aerial species within Australia, occurring over most types of habitat, particularly wooded areas.	It is likely that the species utilises the airspace at Melbourne Airport with the woodland providing preferable habitat for the species. There is an incidental record of the species from 2010 (Birdlife Australia) over Sky Road in Melbourne Airport and other records surrounding the Airport.	No. The species is assumed present. Targeted surveys for the species are unlikely to produce additional information to assist with current understanding of the species' use of the Melbourne Airport estate.
Grey-headed flying fox	*Pteropus poliocephalus*	Recorded	Rainforest, wet and dry sclerophyll forest, woodland and urban areas.	Species likely to utilise flowing trees adjacent to the Melbourne Airport, which may result in flights over the project area at times.	No. The species is known to use habitat in the Melbourne Airport estate. Targeted surveys for the species are unlikely to produce additional information to assist with current understanding of the species' use of the project area.
Golden Sun Moth (GSM)	*Synemon plana*	Medium	Grassy habitats supporting suitable larval food plants including Spear Grasses, Wallaby Grasses and the introduced Chilean Needle-grass *Nassella neesiana* and potentially Serrated Tussock *Nassella trichotoma*.	The species has been recorded in two areas in the northern-most portion of Melbourne Airport only. Despite previous surveys not detecting the species within the project area, there is an area of GSM habitat between Sunbury Road and Moonee Ponds Creek, to the northwest of project area B.	No. Targeted surveys have been undertaken in suitable habitat within the Melbourne Airport estate (refer Section 4.3.1).
Potential threatened Fauna Species – State Significance (FFG Act)					
Little Eagle	*Hieraaetus morphnoides*	Medium	Woodland and open areas. Rabbits are a key component of their diet. Nesting occurs in mature trees in open woodland or riparian vegetation.	Suitable habitat present in the broader local area and the species may forage over the project area.	No. Targeted surveys for FFG Act listed fauna species was not considered necessary. The extensive targeted fauna and vegetation surveys undertaken for the M3R project were considered likely to identify many of these species if present. For example, 17 Tussock Skink individuals were recorded from tile grids within the M3R disturbance

Common name	Scientific name	Likely occurrence in project area	Habitat description	Rationale for likelihood ranking	Targeted survey needed
Black Falcon	*Falco subniger*	Medium	Woodlands, open country and around terrestrial wetlands areas, including rivers and creeks. Primarily occurs in arid and semi-arid zones in the north, north-west and west of Victoria.	Area adjacent to runways is highly managed to prevent prey (rabbits, rodents etc) and scare cannon guns are used to prevent bird activity in the area. However, suitable habitat present in the broader local area and the species may forage over the project area occasionally.	footprint. Other FFG Act listed fauna may utilise habitat present within the project area on occasions but are unlikely to be resident within the project footprint. There is no further regulatory requirement to undertake targeted surveys for these species.
Tussock Skink	*Pseudemoia pagenstecheri*	Recorded	On the ground in a range of grasslands or sparse grassy woodlands from alps to coast.	Tussock Skink have been recorded in the broader Melbourne Airport area as part of surveys undertaken for the M3R project. Suitable habitat for the Tussock Skink is present within grassland habitat throughout project areas A, B, C, D, E and F .	
Potential threatened Migratory Fauna Species					
Fork-Tailed Swift	*Fork-tailed Swift*	High	NA – Migratory Species	Project area is within core range for the species (DoE 2015). No records from within Melbourne Airport, however there are several from surrounding areas such as Sunbury, Greenvale and Yuroke from the past 10 years.	No. The species is assumed present. Targeted surveys for the species are unlikely to produce additional information to assist with current understanding of the species use of the project area and the project's impacts.
Latham's Snipe	*Gallinago hardwickii*	High	NA – Migratory Species	Species recorded along Maribyrnong River flats Ascot Vale 2007, and the nearby Jacana Wetlands regularly (Birdata, Birdlife Australia).	No. The species is assumed present. Targeted surveys for the species are unlikely to produce additional information to assist with current understanding of the species use of the project area and the project's impacts.
Rufous Fantail	*Rhipidura Rufifrons*	High	NA – Migratory Species	Project area is within core range for the species (DoE 2015). Species was recorded in the Grey Box Woodland in 2009.	No. The species is assumed present. Targeted surveys for the species are unlikely to produce additional information to assist with current understanding of the species use of the project area and the project's impacts.
Satin Flycatcher	*Myiaara cyanoleuca*	High	NA – Migratory Species	Project area is within core range for the species (DoE 2015). Species recorded in Woodlands Historic Park in 2007, 2013 and 2015 (Birddata, Birdlife Australia).	No. The species is assumed present. Targeted surveys for the species are unlikely to produce additional information to assist with current understanding of the species use of the project area or the project's impacts.
White-throated Needle Tail	See above under 'Potential threatened Fauna Species – National Significance (EPBC Act)'				

4.2. Landscape context

The Melbourne Airport estate is located in Melbourne's northern suburbs. Native vegetation has been cleared or become degraded on most land within 5 kilometres of the Airport estate, either due to agricultural activities (mostly livestock grazing) or industrial and residential development. Nearby waterways (Deep Creek, Jacksons Creek, Arundel Creek, Maribyrnong River and Moonee Ponds Creek) provide the most intact dispersal corridors for fauna. The largest and most intact areas of native vegetation outside the Airport estate but within the local area, are Woodlands Historic Park to the north-east and Organ Pipes National Park to the west.

4.3. Summary of habitat assessments and targeted surveys for threatened species

Several EPBC Act listed species were considered to have a medium to high likelihood of occurring within one or more of the project areas or have been previously recorded in the local area. EPBC Act listed species for which targeted surveys have been undertaken during previous assessments include:

- Golden Sun Moth (GSM)

The targeted surveys completed for the GSM were undertaken as part of the proposed M3R project. While these surveys were not completed specifically for the purpose of the proposed action, the scope of the targeted surveys and investigations included the footprint of projects A, B, C, D and E and are considered sufficient to determine whether these species were present within these project areas and, if so, the extent to which they use any habitat within the project areas.

Investigations completed for the proposed M3R project extend beyond the project area thereby including the local area, which provides a broader understanding of landscape context and captures areas adjacent to the project area that may have represented more suitable habitat for the species (thereby increasing the likelihood of detection).

Targeted surveys for other threatened species of national significance were not considered necessary, based on the following:

- **Gang-Gang Cockatoo:** The species was listed after field assessments were conducted and is assumed to be present within the project area. Targeted surveys for the species are unlikely to produce additional information to assist with current understanding of the species' use of the project area.
- **White-throated Needle Tail:** The species is assumed present. Targeted surveys for the species are unlikely to produce additional information to assist with current understanding of the species' use of the project area.
- **Grey-headed Flying Fox:** The species is known to use habitat in the project area. Targeted surveys for the species are unlikely to produce additional information to assist with current understanding of the species' use of the project area.

Targeted surveys for FFG Act listed fauna species were not considered necessary. The extensive targeted fauna and vegetation surveys undertaken as part of the proposed M3R project for EPBC Act listed threatened species and ecological communities were considered likely to identify many of these species if present. For example, 17 Tussock Skink individuals were recorded from tile grids during targeted surveys for SLL. The likelihood of occurrence for Tussock Skink was subsequently

changed from ‘medium’ or ‘high’ to ‘recorded’. Other FFG Act listed fauna may utilise habitat present within the project area on occasions but are unlikely to be resident within the project area. There is no further regulatory requirement to undertake targeted surveys for these species.

Targeted surveys for FFG Act listed flora species were not considered necessary. The vegetation surveys undertaken for the project were sufficient to detect these species if present. There is no further regulatory requirement to undertake targeted surveys for these species.

A summary of the habitat survey for the GSM is provided in Section 4.3.1 below. Detailed habitat survey assessment methods are provided in Appendix B.

4.3.1. Golden Sun Moth (GSM)

During ecological site assessments of Melbourne Airport between 2010 and 2019 it was determined that suitable habitat for GSM was present within the northern portion of the airport estate.

Previous surveys completed at Melbourne Airport include the following:

- GAGIN 2010: A selected area in the southern portion of Melbourne Airport was surveyed at least once during the GSM flight season. No GSM were recorded.
- Biosis 2013/14: Selected areas in the eastern, northern and western portions of Melbourne Airport were surveyed on four occasions during the GSM flight season. No GSM were recorded.
- Biosis 2018: Selected areas in the northern and southern portions of Melbourne Airport were surveyed at least once during the GSM flight season. While no GSM were recorded in the southern portion of the airport, GSM were recorded in the northern portion of the airport, in habitat located between Sunbury Road and Moonee Ponds Creek.

An overview of the location of previous GSM surveys is provided in Appendix C.

Previous surveys on Melbourne Airport land west of Sunbury Road failed to detect GSM, but due to the presence of suitable habitat and in response to feedback from the Commonwealth, targeted surveys for this species were completed for the proposed M3R project. Four surveys were conducted in December 2019 on days of appropriate weather conditions and were undertaken in accordance with the Commonwealth survey guidelines (DEWHA 2009a).

Targeted surveys for GSM in 2019 confirmed the presence of this species in the northern-most area of the M3R project footprint only, where the GSM habitat is bounded by Sunbury Road to the north, the Grey Box Woodland to the south and east and an existing access track to the west. The area west of the GSM habitat is bounded by a pasture improved paddock (Phalaris dominated).

Despite previous surveys not detecting the species within the project area, there are areas of potential suitable habitat located along Moonee Ponds Creek, to the northwest of project area B.

Based on survey results from the broader Melbourne Airport estate, and the history of disturbance and insecticide use, this species is considered unlikely to occur within the majority of the proposed project areas. However, given the proximity of project area B to GSM habitat located on the other side of Sunbury Road, along Moonee Ponds Creek, there is considered to be a medium likelihood of the species occurring in this project area.

4.4. Summary of targeted surveys for threatened ecological communities

Each project area was previously assessed by qualified ecologists to determine the presence and extent of native vegetation and threatened ecological communities within these areas. Due to the wide range of projects located in different areas across the Melbourne Airport estate, field surveys for each area were completed across multiple assessments conducted between 2016 and 2024, as follows:

- Assessment of Native Grasslands within Airfields of Melbourne Airport (WSP, 2024):
  - Project A - Airfield renaming
  - Project B - MAPMP 3
  - Project D - Hotel Apron South & Whiskey/Sierra Apron Projects
- Melbourne Airport's Third Runway (M3R) ecology technical report (Biosis, 2023):
  - Project A - Airfield renaming
  - Project B - MAPMP 3
  - Project C - Runway 09/27 Overlay
  - Project D - Hotel Apron South & Whiskey/Sierra Apron Projects
  - Project E - Staff Car Park Extension
- Taxiway Zulu Biodiversity Assessment (Biosis, 2016):
  - Project A – Airfield renaming
  - Project B - MAPMP 3

4.4.1. Desktop assessment

A desktop assessment was conducted which identified the following threatened ecological community (TEC) within the Melbourne Airport estate and the project area:

- Natural Temperate Grassland of the Victorian Volcanic Plain (NTGVVP).

Several field assessments of the extent and quality of the NTGVVP a have previously been undertaken, as detailed in Section 4.4.2.

4.4.2. Field assessment - NTGVVP

All field data for NTGVVP within the project area was collected during the following assessments:

- Biosis (2016): Surveys undertaken during May and August 2014 by qualified ecologists of Biosis as part of the Taxiway Zulu and Northern Compound Biodiversity assessment.
- Biosis (2023): Surveys undertaken during November and December 2019, January and February 2020 and October 2021 by qualified ecologists of Biosis as part of the M3R project.
- WSP (2024): Surveys undertaken during February and March 2024 by DEECA-accredited vegetation quality assessors of WSP as part of the future airfields development.

A field checklist (refer Appendix B) was used to identify the presence or absence of NTGVVP in areas mapped as suitable Ecological Vegetation Classes (EVCs), i.e. Heavier-soils Plains Grassland.

The checklist was based on the key diagnostic characteristics and condition thresholds outlined in the listing advice for the TEC (TSSC 2008). Where the listing advice was unclear, further clarity was sought from the NTGVVP Information Sheet (DSEWPaC 2011) and, if required, guidance provided by DCCEEW (and its predecessors).

The approach to completing the field checklist is outlined in Table 4. The percentage cover of native flora within each grassland patch was estimated by reference to predefined cover charts. Where cover estimates were close to the condition threshold, gridded one-by-one metre quadrats (square frames) were used to objectively sample plant cover within the grassland patch and confirm the veracity of cover estimates. For the purposes of assessing minimum contiguous size thresholds, the 'grassland patch' was taken to be the area of contiguous grassland that otherwise met all other key diagnostic characteristics and condition thresholds for the TEC – rather than the (generally larger) Heavier-soils Plains Grassland patch.

In addition, the 'native vegetation remnant' was taken to be the contiguous area of native vegetation, whether or not belonging to more than one EVC. DCCEEW (formally DAWE) has confirmed that this interpretation is correct and upholds the intention of the listing advice (J. Vranjic, DAWE, pers. comm., March 2020).

Table 4 Approach for identifying the NTGVVP community

Criteria	Condition Thresholds	Method used to test patch against threshold
Location	With limited exceptions, the grassland patch must be associated with Quaternary basalt soils within the Victorian Volcanic Plain bioregion.	The position of the grassland patch relative to modelled geological and bioregional boundaries was reviewed. Surface soil texture observations were made during vegetation mapping on site.
Perennial native flora cover	Native flora must make up ≥50% of total vegetation cover, excluding introduced annuals, within the grassland patch.	The percentage cover of native flora within each grassland patch was estimated with reference to cover charts and, if required, 1x1 m quadrats.
Dominant grass genera	Grasses in the genera *Themeda*, *Rytidosperma*, *Austrostipa* and/or *Poa* make up ≥50% of total native species cover.	The percentage cover of the four key native grass genera within each grassland patch was estimated with reference to cover charts and, if required, 1x1 m quadrats.
Weediness	For grassland patches where *Themeda*, *Rytidosperma*, *Austrostipa* and/or *Poa* are the dominant native genera, one of the following thresholds must be met: *Themeda*, *Rytidosperma*, *Austrostipa* and/or *Poa* must also make up ≥50% of total perennial tussock cover or	The percentage cover of the four key native grass genera and perennial non-grass weeds within each grassland patch was estimated with reference to cover charts and, if required, 1x1 m quadrats.

Criteria	Condition Thresholds	Method used to test patch against threshold
	Perennial non-grass weeds must be <30% of total vegetation cover.	
Native forb cover	For grassland patches where *Themeda*, *Rytidosperma*, *Austrostipa* and/or *Poa* are not the dominant native species, native forbs must make up ≥50% of total vegetation cover during spring-summer (September to February).	The percentage cover of native forbs within each grassland patch was estimated with reference to cover charts and, if required, 1x1 m quadrats.
Patch size	For a native vegetation remnant ≤1 ha, the grassland patch must be ≥0.05 ha and the crown cover of shrubs/ trees >1 m tall must be ≤5%. For a native vegetation remnant >1 ha, the grassland patch must be ≥0.5 ha and there must be <2 mature trees per ha.	Contiguous native vegetation remnants and grassland patches were mapped to determine size and areas. Minor physical barriers were aggregated based on ecological function (e.g. fauna movement prospects, seed/genetic dispersal, water and nutrient cycling, recruitment and regeneration). Mature trees were counted and the crown cover of shrubs/trees >1 m estimated with the assistance of recent aerial imagery (i.e. from the past 6 months), where required.

To determine and properly assess the impact on NTGVVP, the quality of native vegetation was assessed using the Vegetation Quality Assessment (VQA habitat hectare) method (DSE, 2004c).

DCCEEW has previously endorsed the 'habitat hectare' method as appropriate for assessing the condition of TECs such as NTGVVP. This method is further explained in Appendix B.

4.4.3. Outcomes

One EPBC Act listed TEC was recorded in the project area and will be impacted by the project. A summary of the survey findings is presented below.

General observations

The projects cover a total area of approximately 60.65 hectares which contains approximately 25.76 hectares of EVC 132 Plains Grassland and small amounts of 125 Plains Grassy Wetland (0.0048 hectares) and 803 Plains Woodland (0.0029 hectares). The remaining vegetated areas support predominantly introduced vegetation, with the main species being Chilean Needle Grass *Nassella neesiana* and Serrated Tussock *Nassella trichotoma*.

Plains Grassland is synonymous with the Western (Basalt) Plains Grasslands Community, which is listed as threatened under the FFG Act. The Western (Basalt) Plains Grasslands Community is therefore present in all areas mapped as Plains Grassland.

Some areas of Plains Grassland within the project area meet the diagnostic criteria and condition thresholds for NTGVVP, an ecological community listed as critically endangered under the EPBC Act. These areas tend to have lower perennial weed covers and a higher proportion of native grasses that are characteristic of NTGVVP, including the following species:

- Bristly Wallaby-grass *Rytidosperma setaceum*

- Common Wallaby-grass Rytidosperma caespitosum
- Brown-back Wallaby-grass *Rytidosperma duttonianum*
- Leafy Wallaby-grass *Rytidosperma bipartitum* s.s.

In total, the project area supports 18.43 hectares of NTGVVP (a portion of which is assumed to be NTGVVP based upon adjacent patches, as certain parts of the airfield could not be accessed to conduct detailed condition surveys).

Other native grasses that are present (but not necessarily characteristic of NTGVVP) include Windmill Grass *Chlorruncateata* and Silky Blue-grass *Dichanthium sericeum* subsp. *sericeum*. Scattered herbs and shrubs also persist, including Common Woodruff *Asperula conferta*, Berry Saltbush *Atriplex semibaccata* and Small Loosestrife *Lythrum hyssopifolia*. Weed covers within NTGVVP range from 30% to 40% and are dominated by high threat weeds such Chilean Needle Grass, Serrated Tussock, Toowoomba Canary-grass Phalaris aquatica and Cocksfoot Dactylis glomerata. Herbaceous weed species include Hairy Hawkbit *Leontodon saxatilis* subsp. *saxatilis*, Buck's-horn Plantain *Plantago coronopus*, Artichoke Thistle *Cynara cardunculus* subsp. *flavescens* and Clovers *Trifolium* spp.

Habitat zones

A summary of the habitat zones that were surveyed and identified as NTGVVP within the project area is provided in Table 5 below.

Table 5 Summary of habitat zones identified as NTGVVP within the project area

Project ID	Habitat Zone	Survey Date	Ecological Vegetation Class	Threatened Ecological Community (State)	EPBC listed community present
A	7b	October 2021	132 Plains Grassland	Western (Basalt) Plains Grasslands Community	NTGVVP
	8a		132 Plains Grassland		
	9b		132 Plains Grassland		
	18b		132 Plains Grassland		
	41a		132 Plains Grassland		
	41d		132 Plains Grassland		
	77a		132 Plains Grassland		

Project ID	Habitat Zone	Survey Date	Ecological Vegetation Class	Threatened Ecological Community (State)	EPBC listed community present
	79a		132 Plains Grassland		
	81a		132 Plains Grassland		
	97a		132 Plains Grassland		
	188a		132 Plains Grassland		
	194a		132 Plains Grassland		
	202a		132 Plains Grassland		
	1038a		132 Plains Grassland		
	250a		132 Plains Grassland		
	HZ1	February/March 2024	132 Plains Grassland		
	HZ2		132 Plains Grassland		
	HZ3		132 Plains Grassland		
B	18b	October 2021	132 Plains Grassland	Western (Basalt) Plains Grasslands Community	NTGVVP
	HZ2	February/March 2024	132 Plains Grassland		
	HZ3		132 Plains Grassland		
	HZ4		132 Plains Grassland		
C	8a	October 2021	132 Plains Grassland	Western (Basalt) Plains Grasslands Community	NTGVVP

Project ID	Habitat Zone	Survey Date	Ecological Vegetation Class	Threatened Ecological Community (State)	EPBC listed community present
	18b		132 Plains Grassland		
	41a		132 Plains Grassland		
	77a		132 Plains Grassland		
D	206a	February 2022	132 Plains Grassland	Western (Basalt) Plains Grasslands Community	NTGVVP
	212a		132 Plains Grassland		
	214a		132 Plains Grassland		
	216a		132 Plains Grassland		
	HZ1	February/March 2024	132 Plains Grassland		
E	216a	February 2022	132 Plains Grassland	Western (Basalt) Plains Grasslands Community	NTGVVP

Condition of TECs

The VQA data captured for the habitat zones that qualify as NTGVVP within the project area is presented in Table 6.

Table 6 VQA scores for NTGVVP habitat zones within the project areas

Site and Habitat Zone ID			7b	8a	9b	18b	41a	41d	77a	79a	81a	97a	188A	194a	202a	206a	250a	212a	214a	216a	HZ1	HZ2	HZ3	HZ4
EVC #: Name			EVC 132 - Plains Grassland																					
Max Score			Score																					
Site Condition	Large Old Trees	10	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Canopy Cover	5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Lack of Weeds	15	4	7	4	4	7	7	4	7	7	4	4	0	4	0	7	4	4	4	2	2	4	4
	Understorey	25	15	10	10	20	15	10	15	10	10	15	5	15	10	10	15	5	10	15	5	5	5	5
	Recruitment	10	3	3	6	10	10	3	6	6	6	3	6	3	6	3	6	3	3	6	3	3	6	9
	Organic Matter	5	4	4	4	5	5	5	5	5	5	4	4	4	4	4	5	4	4	4	3	2	5	5
	Logs	5	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Total Site Score		26	24	24	39	37	25	30	28	28	26	19	22	24	17	33	16	21	29	13	12	20	23
	EVC standardiser (x 75/55)		2.36	2.36	2.36	2.36	2.36	2.36	2.36	2.36	2.36	2.36	2.36	2.36	2.36	2.36	2.36	2.36	2.36	2.36	1.36	1.36	1.36	1.36
	Habitat points (=#/100)		0.45	0.45	0.40	0.68	0.66	0.50	0.52	0.44	0.45	0.51	0.37	0.46	0.39	0.28	0.55	0.26	0.38	0.51	0.22	0.20	0.31	0.35
Landscape value	**Adjusted Site Score**		**35.35**	**32.73**	**32.73**	**53.18**	**50.45**	**34.09**	**40.91**	**38.18**	**38.18**	**35.45**	**25.91**	**32.73**	**32.73**	**23.18**	**45**	**21.82**	**28.64**	**39.55**	**17.68**	**16.32**	**27.2**	**31.28**
	Patch size		4	4	4	8	8	8	4	1	1	8	6	8	2	1	4	1	4	6	1	1	1	1
	Neighbourhood		3	5	2	4	5	5	4	2	3	5	4	5	3	3	3	2	4	4	2	2	2	2
	Distance to Core		3	3	1	3	3	3	3	3	3	3	1	3	1	1	3	1	1	1	1	1	1	1
	Total landscape score		**10**	**12**	**7**	**15**	**16**	**16**	**11**	**6**	**7**	**16**	**11**	**16**	**6**	**5**	**12**	**4**	**9**	**11**	**4**	**4**	**4**	**4**
HABITAT SCORE			45.45	44.73	39.73	68.18	66.45	50.09	51.91	44.18	45.18	51.45	36.91	46.00	38.73	28.18	55	25.82	37.64	50.55	21.68	20.3	31.2	5.28

4.5. Review of adequacy of surveys

In general, the survey methods adopted for the M3R flora and fauna assessments which were used to identify and quantify threatened species and ecological communities within the project area were considered sufficient to ensure all species with a medium to high potential to occur within the project area were surveyed and registered.

For vegetation surveys, native vegetation was identified and mapped utilising the EVC classification system. These areas were then reviewed to confirm whether they satisfy the criteria for a TEC under the EPBC Act. In order to assess the presence and quality of the NTGVVP TEC checklists were developed that relied on the diagnostic characteristics and condition thresholds outlined in the relevant listing advice. Where the listing advice was unclear, further clarity was sought from the Natural Temperate Grassland Information Sheet (DSEWPaC 2011) and, if required, from guidance provided by DCCEEW (and its predecessors).

The vegetation survey checklist and survey methods were developed and undertaken with consideration to the following guidelines:

- DELWP 2016. The Victorian wetland classification framework 2014, Victorian Government Department of Environment, Land, Water and Planning, East Melbourne.
- DELWP 2020. NatureKit. Victorian Government Department of Environment, Land, Water and Planning, Melbourne.
- DoE 2013. Matter of National Environmental Significance: Significant Impact Guidelines 1.1. Environment Protection and Biodiversity Conservation Act 1999. Australian Government Department of the Environment, Canberra
- DSE 2004a. EVC/Bioregion Benchmark for Vegetation Quality Assessment: Central Victorian Uplands Bioregion. Victorian Government Department of Sustainability and Environment, Melbourne.
- DSE 2004b. EVC/Bioregion Benchmark for Vegetation Quality Assessment: Victorian Volcanic Plain Bioregion. Victorian Government Department of Sustainability and Environment, Melbourne.
- DSE 2004c. Native Vegetation: Sustaining a living landscape. Vegetation Quality Assessment Manual – Guidelines for applying the Habitat hectares scoring method. Version 1.3, Victorian Government Department of Sustainability and Environment. Melbourne, Victoria.
- DSEWPaC 2011a. Nationally Threatened Ecological Communities of the Victorian Volcanic Plain: Natural Temperate Grassland & Grassy Eucalypt Woodland A guide to the identification, assessment and management of nationally threatened ecological communities. Australian Government Department of Sustainability, Environment, Water, Population & Communities, Canberra.
- DSEWPaC 2012b. Environment Protection and Biodiversity Conservation Act 1999 Environmental Offsets Policy. October 2012. Australian Government Department of Sustainability, Environment, Water, Population and Communities. Canberra.
- Victorian Government 2004. Native Vegetation: Sustaining a living landscape. Vegetation Quality Assessment Manual – Guidelines for applying the Habitat hectares scoring method.

Version 1.3, Victorian Government Department of Sustainability and Environment. Melbourne, Victoria.

- TSSC 2008. Commonwealth Listing Advice on Natural Temperate Grassland of the Victorian Volcanic Plain. Threatened Species Scientific Committee, Australian Government Department of the Environment, Water, Heritage and the Arts. Canberra. Available from: http://www.environment.gov.au/biodiversity/threatened/communities/pubs/42-listing-advice.pdf. In effect under the EPBC Act from 21-Jun-2008.
- Victorian Government 2017. Guidelines for the removal, destruction or lopping of native vegetation. Department of Environment, Land, Water, and Planning. East Melbourne, Victoria. https://www.environment.vic.gov.au/__data/assets/pdf_file/0021/91146/Guidelines-for-the-removal,-destruction-or-lopping-of-native-vegetation,-2017.pdf.

Targeted fauna surveys completed for M3R were developed taking into account previous assessments completed at the airport and in the local area. The aim was to determine the adequacy of the previous surveys completed and whether additional data was required. Where additional surveys were determined to be warranted to inform the M3R MDP, consideration was then given to the species in question, to ensure surveys were completed in the correct potential habitat areas at the correct time of year and during times of the day where the species was considered to be most active. The targeted fauna surveys for M3R were developed and undertaken with consideration to the following guidelines:

- DEWHA 2009a. Significant impact guidelines for the critically endangered golden sun moth (Synemon plana). Australian Government Department of the Environment, Water, Heritage and the Arts. Canberra.

5. Impacts to listed threatened species and communities

5.1. Nature, likelihood and severity of impacts

Impacts associated with the proposed action have been determined based on the project scope and construction details provided in Section 3 and shown in Figure 4 below.

Impacts to listed threatened species and communities within areas which overlap with other EPBC Act approval applications have not been considered as part of this application, where approval has already been granted, or is expected to be granted prior to the proposed action taking place. A summary of other approval applications and the timing of those projects is provided in Table 7.

Table 7 Summary of other EPBC approvals relevant to the project area

Project	Approval Reference	Status	Project timing
Taxiway Zulu and Northern Access Route	EPBC 2016/7837	Approved	2018 to 2026
Melbourne Airport Pavement Maintenance Program 2 (MAPMP 2)	EPBC 2023/09257	Approved	Aug 2024 to Dec 2025
Runway 16-34 Overlay Project	EPBC 2022/01371	Approved	May 2023 to June 2024
Melbourne Airport's Third Runway (M3R)	EPBC 2021/8886	In assessment	July 2024 to July 2032

Direct and indirect impacts to listed threatened species and ecological communities are discussed below. There are no unknown or unpredictable impacts associated with the proposed action.

5.1.1. Direct impacts

Threatened species

No direct impacts to threatened species are expected, as there is no suitable habitat within the project area.

Ecological communities

The proposed action will result in the direct, permanent removal of 12.72 hectares of NTGVVP with a weighted average habitat score of 40.38 out of 100, which is based on the habitat scores, impact areas and total project area of all projects included in this referral (refer to Section 4.4.2 for further details of NTGVVP quality assessment). For areas which were inaccessible and assumed to be NTGVVP (based upon adjacent patches), the weighted average habitat score across the remainder of the project area was applied. The areas of NTGVVP which will be impacted are shown for each project area in Appendix D.

Permanent impacts are associated with the removal of native vegetation for the purpose of construction, in particular bulk earthworks, access routes, stockpiling and laydown areas and excavation of trenches for services.

As a conservative measure, it is assumed that all NTGVVP present within the project footprints will be permanently impacted.

5.1.2. Indirect impacts

Threatened species

The Gang-gang Cockatoo *Callocephalon fimbriatum*, White-throated Needletail *Hirundapus caudacutus*, Golden Sun Moth *Synemon plana*, and Grey-headed Flying-fox *Pteropus poliocephalus* are likely to utilise woodland patches north of the project areas, which may result in flights over the project areas at times. Indirect impacts to these species associated with the project may include noise from excavation activities during construction only, although it is noted that construction noise will be less than aircraft noise from existing operations. Indirect impacts are possible, but not expected for this project.

GSM have been recorded in two areas in the northern-most portion of Melbourne Airport only (refer Section 4.3.1). Despite previous surveys not detecting the species within the project area, there is an area of GSM habitat between Sunbury Road and Moonee Ponds Creek, to the northwest of project area B. No indirect impacts to identified GSM habitat to the northwest of the project area are expected. Whilst it was considered that there may be a medium likelihood of GSM occurring in project area B (refer Section 4.3.1), this area is unlikely to be re-populated by GSM due to airside operational requirements (slashing, herbicide and insecticide spraying) and the species limited dispersal ability.

Ecological communities

The proposed works will physically isolate several small areas of identified NTGVVP from adjoining broader patches (shown in yellow in Figure 2), which will be less than the threshold size for NTGVVP of 0.05 hectares. As such the total of these areas (being 0.094 hectares) is considered an indirect loss. Other remaining patches of NTGVVP are all greater than 0.05 hectares in size.

No facilitated impacts to NTGVVP are expected.

Figure 2 Indirect impacts to NTGVVP associated with the project

5.2. Significance of impacts

The likelihood of the proposed action having a significant impact on listed threatened species and ecological communities has been assessed in accordance with:

- Matters of National Environmental Significance: *Significant impact guidelines 1.1*, EPBC Act 1999 (Commonwealth of Australia 2013a).

MNES relevant to the project are summarised in Table 8. A detailed assessment against the significant impact guidelines for NTGVVP is provided in Table 9 below.

Overall, it is considered possible that the proposed action will result in a significant impact on NTGVVP.

Table 8 Assessment of relevant MNES

MNES	Project specifics	Assessment against significant impact guidelines
EPBC Act listed species	21 flora species and 43 fauna species listed under the EPBC Act have been recorded or have the potential to occur within 10 km of the project areas. The likelihood of these species occurring in the project area is assessed in Appendix A and summarised in Section 4.1.	Threatened flora species predicted to occur within the project areas are considered to have a negligible to low likelihood of occurrence. The proposed action is therefore considered unlikely to constitute a significant impact on these species. For fauna species with a medium or higher likelihood of occurrence, an assessment of potential for significant impact is outlined below: • Despite previous surveys not detecting the species within the project area, there is an area of GSM habitat between Sunbury Road and Moonee Ponds Creek, to the northwest of project area B. Whilst it was considered that there may be a medium likelihood of GSM occurring in project area B (refer Section 4.3.1), this area is unlikely to be re-populated by GSM due to airside operational requirements (slashing, herbicide and insecticide spraying) and the species limited dispersal ability. Therefore, the project is considered unlikely to constitute a significant impact on this species.

MNES	Project specifics	Assessment against significant impact guidelines
		• The Gang-gang Cockatoo *Callocephalon fimbriatum*, White-throated Needletail *Hirundapus caudacutus* and the Grey-headed Flying-fox *Pteropus poliocephalus* are likely to utilise woodland patches north of the project areas, which may result in flights over the project area at times. However, as no suitable habitat occurs within any of the project areas, the project is considered unlikely to constitute a significant impact on these species.
EPBC Act listed ecological communities	The following EPBC Act listed ecological communities are present within the project areas: • Natural Temperate Grassland of the Victorian Volcanic Plain (NTGVVP). • Grey Box Grassy Woodlands and Derived Native Grasslands of South-eastern Australia (Grey Box Woodlands).	The project will result in the direct, permanent removal of 12.72 hectares of NTGVVP and indirect loss of 0.094 hectares of NTGVVP. No additional facilitated impacts to NTGVVP are expected. Detailed assessment against the *Significant impact guidelines 1.1* for NTGVVP is presented in Table 9.

Table 9 Significant impact assessment for NTGVVP

Significant impact criteria (critically endangered / endangered community)	Likelihood of significant impact	Justification
Reduce the extent of an ecological community	**Possible**	It is inherently difficult to estimate the extent of treeless threatened ecological communities (TECs) at landscape scales. Nevertheless, it is generally accepted that NTGVVP has declined in extent by more than 98% since European arrival in Victoria (TSSC, 2008). In the early 2000s, it was estimated that 5,000 hectares of NTGVVP remained (Barlow and Ross, 2002). If anything, the extent of this TEC is likely to be less now. Removal of an approximate total of 12.81 hectares of NTGVVP from the project area (including direct removal of 12.72 hectares of and indirect loss of 0.094 hectares) amounts to removal of approximately 0.26% of the estimated

Significant impact criteria (critically endangered / endangered community)	Likelihood of significant impact	Justification
		remaining extent of this TEC, near the eastern limit of the TEC's distribution. In the context of the historical decline in NTGVVP, this impact could be considered significant.
Fragment or increase fragmentation of an ecological community	**Possible**	It is estimated that more than 95% of known patches of NTGVVP are less than 10 ha in size, as a result of fragmentation by clearing and modification of the TEC over time (TSSC 2008). The proposed action would impact the margins of a number of patches of NTGVVP generally associated with broader areas of grassland greater than 10 ha in size. It is considered possible that the proposed action could cause fragmentation or increase fragmentation of the NTGVVP TEC.
Adversely affect habitat critical to the survival of an ecological community	**Unlikely**	No Recovery Plan has been prepared or adopted for this TEC and no critical habitats have been formerly identified by the Australian Government. However, given that less than 2% of the TEC is estimated to still exist, most areas that continue to support the TEC are likely to be considered critical habitat, particularly if those areas support moderate to high quality examples of the TEC. Melbourne Airport supports a broader area of grassland covering approximately 270 hectares. The projects would result in permanent removal of a combined 12.81 hectares of this grassland and therefore adversely affect about 4.7% of NTGVVP within the airport estate. Given the broader context, this is considered unlikely to have a significant impact on the ability of this TEC to persist in the airport or in the broader context.
Modify or destroy abiotic factors necessary for an ecological community's survival, including reduction of groundwater levels, or substantial alteration of surface water drainage patterns	**Unlikely**	Project construction activities are unlikely to result in long term disturbance to soil, topography and hydrology necessary for persistence of the TEC across most of the project areas.
Cause a substantial change in the species composition of an	**Unlikely**	Decline of NTGVVP typically involves the sequential loss of the following functionally

Significant impact criteria (critically endangered / endangered community)	Likelihood of significant impact	Justification
occurrence of an ecological community, including a decline or loss of functionally important species, for example through regular burning or flora and fauna harvesting		important species or floristic groups: loss of warm-season grasses (e.g. Kangaroo Grass), followed by decline in native forb diversity, followed by loss of cool-season grasses (e.g. Tussock Grass, Wallaby Grass and Spear Grass). Permanent removal of 12.81 hectares of NTGVVP within the project area would be unlikely to result in loss of functionally important species from the broader occurrence of the TEC. Any NTGVVP that persists or regenerates within the project areas has a reduced species richness and is subject to the same intensive management regimes (e.g. mowing) post-construction, thereby resulting in a similar reduced flora and fauna assemblages as to any other existing areas of NTGVVP within the airport grounds.
Cause a substantial reduction in the quality or integrity of an occurrence of an ecological community, including but not limited to: • Assisting invasive species establishment • Causing regular mobilisation of fertilisers, herbicides or other chemicals or pollutants into the ecological community which kill or inhibit the growth of species in the ecological community.	Possible but less likely with proposed mitigation	Construction of each project will result in opportunities for the invasion of highly invasive weeds. However, the disturbed topsoil is proposed to be reinstated as topsoil and this is expected to mitigate the potential for weed invasion by maximising the opportunity for native grasses to re-establish. In addition, while project-specific CEMPs are yet to be developed, each CEMP will incorporate measures for weed control, erosion control and surface water management to ensure the native vegetation surrounding the impact area is protected from indirect and consequential impacts. The CEMPs will meet minimum requirements of the Melbourne Airport EMP and Melbourne Airport PFAS Management Framework.
Interfere with the recovery of an ecological community	Unlikely	No Recovery Plan has been prepared or adopted for this TEC and therefore recovery priorities (actions and locations) have not been formerly articulated by the Australian Government. However, the action of clearing 4.7% of the estimated remaining area of this TEC within the airport ground and 0.26% more broadly, even at the eastern edge of the TEC's distribution, is not considered likely to interfere with the TEC's recovery.

Significant impact criteria (critically endangered / endangered community)	Likelihood of significant impact	Justification
		Note that current and ongoing management of NTGVVP within airport grounds is unlikely to contribute to the recovery of this TEC in general.

6. Impacts to the environment of Commonwealth land

For actions on or adjacent to Commonwealth land, impacts to the whole of environment must be considered, regardless of whether any MNES are present. This section assessed the likelihood of the proposed action having a significant impact on the environment on Commonwealth land and has been assessed in accordance with:

- Actions on, or impacting upon, Commonwealth land, and actions by commonwealth agencies: *Significant impact guidelines 1.2*, EPBC Act 1999 (Commonwealth of Australia 2013b)

Overall, it is considered that the proposed action would not result in a significant impact on Commonwealth land, the key reasons being:

- The proposed action is located fully within the operational airside boundary of Melbourne Airport which is a highly modified environment which has undergone extensive landscape alteration in the past. The proposed works are adjacent to existing runway and taxiway infrastructure and therefore will not substantially alter natural landscape features.
- Soils in the project area are likely to contain contaminants in varying concentrations, including per-and poly-fluoroalkyl substances (PFAS) in the ranges of PFAS Management Levels 1, 2 or Level 3. However the scale, intensity and duration of excavation works is not considered to be significant. In addition, all impacted spoil will be managed in accordance with the Melbourne Airport EMP and Melbourne Airport PFAS Management Framework.
- It is unlikely that the expected impact on native vegetation would result in medium to large scale clearing of native vegetation that would constitute a significant impact to the environment as a whole on Commonwealth land.
- There are no known cultural heritage values located within the project area.

6.1. Impacts on landscapes and soils

Table 10 provides an assessment against the relevant criteria for impacts on landscape and soils.

Table 10 Assessment of impacts on landscapes and soils

Criteria	Assessment
Is there a real chance or possibility that the actions will:	
Substantially alter natural landscape features	No. The proposed action is located fully within the operational airside boundary of Melbourne Airport, being a highly modified environment which has undergone extensive landscape alteration in the past. The proposed action will not substantially alter natural landscape features.
Cause subsidence, instability or substantial erosion, or	No. The proposed action is located on flat ground surrounded by existing infrastructure, it is unlikely to cause subsidence, instability or substantial erosion.

Criteria	Assessment
Involve medium or large-scale excavation of soil or mineral?	No. Although some excavation will be required for the works, no excavation considered as medium or large-scale would be required.

6.2. Impact on coastal landscapes and soils

Table 11 provides an assessment against the relevant criteria for impacts on coastal landscapes and process.

Table 11 Assessment of impacts on coastal landscapes and process

Criteria	Assessment
Is there a real chance or possibility that the actions will:	
Alter coastal processes, including wave action, sediment movement or accretion, or water circulation patterns	No. The proposed action is not located within the vicinity of coastal environments and no works within aquatic environments are proposed.
Permanently alter tidal patterns, water flows or water quality in estuaries	
Reduce biological diversity or change species composition in estuaries, or	
Extract large volumes of sand or substantially destabilise sand dunes?	

6.3. Impacts on ocean forms, ocean processes and ocean life

Table 12 provides an assessment against the relevant criteria for impacts on ocean forms, ocean processes and ocean life.

Table 12 Assessment of impacts on ocean forms, ocean processes and ocean life

Criteria	Assessment
Is there a real chance or possibility that the action will:	
Reduce biological diversity or change species composition on reefs, seamounts or in other sensitive marine environments	No. The proposed action is not located within the vicinity of coastal (i.e. marine) environments and no works within aquatic environments are proposed.
Alter water circulation patterns by modification of existing landforms or the addition of artificial reefs or the other large structures	
Substantially damage or modify large areas of the seafloor or ocean habitat, such as sea grass	

Criteria	Assessment
Release oil, fuel or other toxic substances into the marine environment in sufficient quantity to kill larger marine animals or alter ecosystem processes, or	
Release large quantities of sewage or other waste into the marine environment?	

6.4. Impacts on water resources

Table 13 provides an assessment against the relevant criteria for impacts on water resources.

Table 13 Assessment of impacts on water resources

Criteria	Assessment
Is there a real chance or possibility that the action will:	
Measurably reduce the quantity, quality or availability of surface or ground water	No. It is highly unlikely that any change to surface or ground water would occur as a result of the proposed action.
Channelise, divert or impound rivers or creeks or substantially alter drainage patterns, or measurably alter water table levels?	No. The proposed action is highly unlikely to have any impact to rivers, creeks, drainage patterns or water table levels.

6.5. Pollutants, chemicals, and toxic substances

Table 14 provides an assessment against the relevant criteria for impacts from pollutants, chemicals and toxic substances.

Table 14 Assessment of impacts from pollutants, chemicals and toxic substances

Criteria	Assessment
Is there a real chance or possibility that the action will:	
Generate smoke, fumes, chemicals, nutrients, or other pollutants which will substantially reduce local air quality or water quality	No. Fumes from vehicles and machinery will not exceed normal background levels and will therefore not substantially reduce local air, soil or water quality.
Result in the release, leakage, spillage or explosion of flammable, explosive, toxic, radioactive, carcinogenic, or mutagenic substances, through use, storage, transport, or disposal	No. No pollutants or chemicals will be used during construction. Refuelling of vehicles and equipment will occur off-site where possible. The project-specific CEMPs will outline protocols for refuelling and include contingencies in the event of an accidental release of fuel from construction vehicles and equipment while operating (i.e. spill response

Criteria	Assessment
	procedures). Each CEMP will meet minimum requirements of the Melbourne Airport EMP.
Increase atmospheric concentrations of gases which will contribute to the greenhouse effect or ozone damage, or substantially disturb contaminated or acid-sulphate soils?	No. While concentrations of contaminants including PFAS were reported at levels ranging from PFAS Management Level 1 to PFAS Management Level 3, the scale, intensity and duration of excavation works is not considered to be significant. In addition, spoil management procedures, including specific requirements for the management of PFAS-impacted soils, will be included in the CEMPs prepared for each project. The CEMPs will meet minimum requirements of the Melbourne Airport EMP and Melbourne Airport PFAS Management Framework.

6.6. Impacts on plants

Table 15 provides an assessment against the relevant criteria for impacts on plants.

Table 15 Assessment of impacts on plants

Criteria	Assessment
Is there a real chance or possibility that the action will:	
Involve medium or large-scale native vegetation clearance	No. Commonwealth land at Melbourne Airport is approximately 2,665 hectares in size of which 650 hectares contains native vegetation of varying qualities, patch sizes and EVCs. Approximately 410 hectares of this native vegetation is Plains Grassland EVC of which approximately 270 hectares is comprised of the NTGVVP ecological community. The proposed action will result in permanent removal of: • 0.0048 hectares of Plains Grassy Wetland (EVC 125) • 17.96 hectares of Plains Grassland (EVC 132) of which 12.72 hectares is NTGVVP. Further, there will be an indirect loss of 0.094 hectares of Plains Grassland which is also NTGVVP. This amounts to approximately 2.8% of the total native vegetation within Melbourne Airport. This is considered to be small-scale vegetation clearance across all eight projects. In addition to the clearing and disturbance being considered small-scale it is also important to consider the location and quality of the vegetation to be impacted. The native vegetation is located adjacent to taxiways and existing buildings and onsite infrastructure. It is subject to regular mowing and impacts from the existing infrastructure and associated land uses. The vegetation proposed for removal and disturbance has previously been

Criteria	Assessment
	removed or impacted from the original installation of the taxiways and the construction of other airfield infrastructure and has since recolonised the project area. It is unlikely that the clearing of native vegetation as described above would result in medium to large scale clearing of native vegetation that would result in a significant impact to the environment as a whole on Commonwealth land.
Involve any clearance of any vegetation containing a listed threatened species which is likely to result in a long-term decline in a population or which threatens the viability of the species	No. The vegetation clearance required will not result in the long-term decline in a population of a threatened species or threaten the viability of the species. There are no known listed threatened species within the study area.
Introduce potentially invasive species	No. The potential introduction of invasive species will be addressed by adopting a vehicle and machinery hygiene procedure, to ensure all vehicles and machinery that arrive within the project areas are free of soil and other material that may contain weed propagules
Involve the use of chemicals which substantially stunt the growth of native vegetation or	No. There will be no use of chemicals which will impact plants.
Involve large-scale controlled burning or any controlled burning in sensitive areas, including areas which contain listed threatened species?	No. The proposed action does not include burning.

6.7. Impacts on animals

Table 16 provides an assessment against the relevant criteria for impacts on animals.

Table 16 Assessment of impacts on animals

Criteria	Assessment
Is there a real chance or possibility that the action will:	
Cause a long-term decrease in, or threaten the viability of, a native animal population or populations, through death, injury or other harm to individuals	No. The proposed action will only have a low-negligible impact on native species through disturbance during construction. The proposed action will not fragment or substantially reduce habitat for native species within the Melbourne Airport.
Displace or substantially limit the movement or dispersal of native animal populations	

Criteria	Assessment
Substantially reduce or fragment available habitat for native species	EPBC Act listed fauna species with a medium or higher likelihood of occurrence within the project area, including the Gang-gang Cockatoo *Callocephalon fimbriatum*, White-throated Needletail *Hirundapus caudacutus,* Golden Sun Moth *Synemon plana* and Grey-headed Flying-fox *Pteropus poliocephalus* are unlikely to utilise the habitat within the proposed project areas.
Reduce or fragment available habitat for listed threatened species, which is likely to displace a population, result in a long-term decline in a population, or threaten the viability of the species	
Introduce exotic species which will substantially reduce habitat or resources for native species, or	No. The proposed works will not result in the introduction of exotic fauna species.
Undertake large-scale controlled burning or any controlled burning in areas containing listed threatened species?	No. The proposed impact does not include burning.

6.8. Impacts on people and communities

Table 17 provides an assessment against the relevant criteria for impacts on people and communities.

Table 17 Assessment of impacts on people and communities

Criteria	Assessment
Is there a real chance or possibility that the action will:	
Substantially increase demand for, or reduce the availability of, community services or infrastructure which have direct or indirect impacts on the environment, including water supply, power supply, roads, waste disposal, and housing	No. There are no people or communities that will be adversely affected by the proposed projects.
Affect the health, safety, welfare, or quality of life of the members of a community, through factors such as noise, odours, fumes, smoke, or other pollutants	
Cause physical dislocation of individuals or communities, or	
Substantially change or diminish cultural identity, social organisation, or community resources?	

6.9. Impacts on heritage

Table 18 provides an assessment against the relevant criteria for impacts on heritage.

Table 18 Assessment of impacts on heritage

Criteria	Assessment
Is there a real chance or possibility that the action will:	
Permanently destroy, remove or alter the fabric of a heritage place?	No. There are no known cultural heritage values located within the project areas. Mitigation measures under relevant approved Cultural Heritage Management Plans (CHMPs) will be followed including: • CHMP 12774 • CHMP 16792 Figure 3 shows the project areas which overlap with the relevant CHMPs. Where project areas are not covered by existing CHMPs, these areas have been identified during previous cultural heritage assessments as being previously disturbed with a low likelihood of heritage values and therefore no CHMP is required.
Involve extension, renovation, or substantial alteration of a heritage place in a manner which is inconsistent with the heritage values of the place?	No. The works do not involve extensions or renovations. No heritage structures will be impacted by the proposed works for each project.
Involve the erection of buildings or other structures adjacent to, or within important site lines of a heritage place which are inconsistent with the heritage values of the place?	No. The proposed works are not expected to further alter the already modified landscape surrounding each project.
Substantially diminish the heritage value of a heritage place for a community or group for which it is significant?	No. The works will not substantially diminish the heritage values of places in the project areas.
Substantially alter the setting of a heritage place in a manner which is inconsistent with the heritage values of the place?	No. The proposed works will not substantially alter the setting of any heritage places.
Substantially restrict or inhibit the existing use of a heritage place as a cultural or ceremonial site?	No. The works will not restrict or inhibit access to any Aboriginal or historical cultural heritage values used as a cultural or ceremonial site.

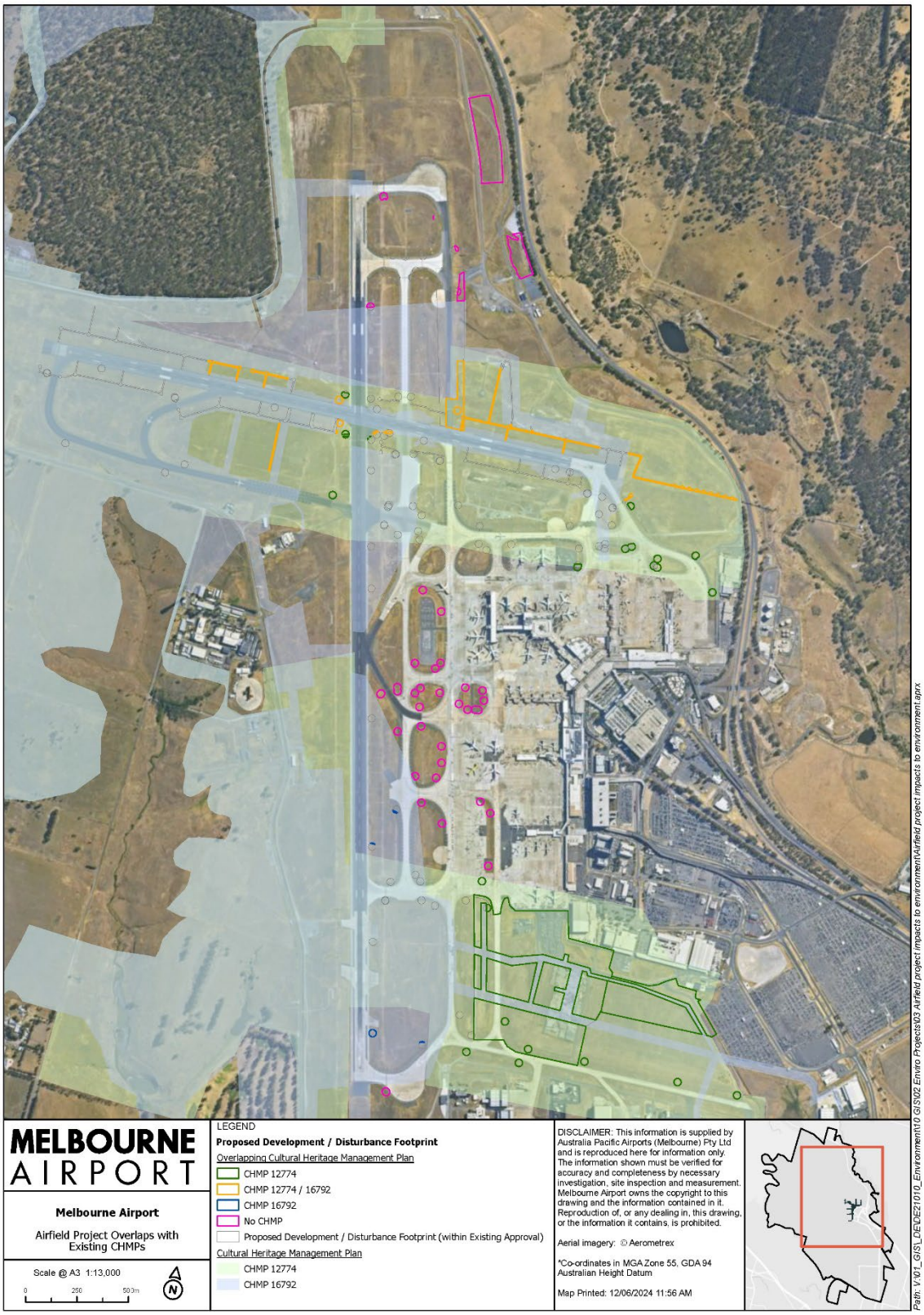

Figure 3 Overlap of proposed action with existing approved CHMPs

6.10. Site contamination

Previous investigations completed at various locations across Melbourne Airport have provided data on the contamination status of soil within each of the project areas. Per- and polyfluoroalkyl substances (PFAS) are the key contaminants of concern which will drive the management options for any soil which is excavated. A plan showing the inferred levels of PFAS contamination in soil across the airport and within each of the project areas is provided in Figure 4 below.

As shown in Figure 4, PFAS concentrations in soil across the project areas are expected to range from <0.01 mg/kg to 1 mg/kg. All soils excavated during project construction works will be managed in accordance with requirements outlined in the Melbourne Airport PFAS Management Framework as follows:

- **PFAS Management Level 1**: Requires leachable concentrations <0.4 µg/L. Reuse within same concentration areas with surface stabilisation improvements (e.g. hydromulch). If this soil is removed from the project area it will be stored at the Gate 11 facility and treated for stabilisation to minimise dust generation and surface water runoff using hydromulch or similar stabilisation product.
- **PFAS Management Level 2:** Requires leachable concentrations >0.4 to 0.7. Reuse within same concentration areas beneath a separation layer to further mitigate potential leaching and mobilisation of PFAS into surface water run-off (i.e., hardstand, clean soil or Level 1 PFAS impacted soil with surface stabilisation). If this soil is removed from the project area it will be stored at the Gate 11 facility and treated for stabilisation to minimise dust generation and surface water runoff using hydromulch or similar stabilisation product.
- **PFAS Management Level 3:** Leachable concentrations >0.7 mg/L. Reuse subject to specific risk assessment in accordance with the PFAS National Environmental Management Plan (NEMP) (HEPA 2020), and subject to approval by the APAM Environment and Sustainability Team. If this soil is removed from the project area it will be stored at the Gate 11 facility with temporary and final stockpiles covered with an impermeable barrier to prevent infiltration to, and leaching from, stockpile (e.g. LDPE with maintenance; or impermeable geocomposite; or similar material).

The Melbourne Airport PFAS Management Framework was developed to deliver consistent environmental management practices for potential environmental risks posed by PFAS impacted material on construction and maintenance projects at Melbourne Airport. The framework has been reviewed by DITRDC and is being applied to current construction and maintenance projects across the Melbourne Airport estate.

Figure 4 PFAS concentrations in soil – Project footprint overlay

7. Cumulative impacts

7.1. Residual impacts of the proposed action

As outlined in Section 3, the proposed action comprises a range of upgrade and maintenance works required to ensure operations at the Melbourne Airport are able to continue under safe and effective conditions and to allow for increased demand in parking and flights. As such, the proposed action cannot be avoided.

Residual significant impacts on MNES associated with the proposed action are discussed in Section 9.1. Residual impacts will be offset in accordance with the EPBC Act Environmental Offsets Policy (DSEWPaC, 2012b), as per the proposed offset strategy outlined in Section 9.2.

As discussed in Section 5.1, there is some overlap with the proposed action and other EPBC Act approval applications, the most notable being M3R. The M3R MDP is currently in assessment, and approval is expected to be issued by the Minister for Infrastructure, Transport and Regional Development in 2024.

7.2. Potential for cumulative impacts

The proposed action is not expected to result in any cumulative impacts on the resilience of threatened species and ecological communities in the airport, and on overall habitat quality and availability.

It is noted that most grassland within the airfield is highly modified and species-poor, having recolonised land that has previously been subject to earthworks as part of the original construction of the airport in the 1960s. Once construction works associated with the proposed action are complete, disturbed areas will be reinstated and re-vegetated, and routine maintenance within the airfield will continue as per current operations (i.e. regular mowing, management of weeds and pest animals).

7.3. Potential for existing pressures and threats to be exacerbated

The proposed action is not likely to exacerbate existing pressures and threats to threatened species and ecological communities in the airport. Once all projects are complete, there will be no change to existing airfield operations.

8. Avoidance, mitigation and management measures

8.1. Avoidance measures

The key measure for reducing impacts on ecological values associated with the proposed action is to minimise the removal of native vegetation wherever possible (given the location and scale of the projects, complete avoidance of impacts to ecological values is not possible).

The construction buffers and access roads have been reduced in size so far as reasonably practicable to reduce the impact to ecological areas. The opportunity to re-use existing pit and duct infrastructure has also been realised in many areas to reduce the need for additional trenching.

8.2. Construction phase management and mitigation measures

A Construction Environment Management Plan (CEMP) will be developed for each project, to outline the appropriate environmental goals and objectives. It will ensure the environmental management procedures included for each project are consistent with the *Environmental Management Plan Guidelines* (DoE, 2014), the Melbourne Airport Environmental Management Plan (APAM 2021), and the Melbourne Airport PFAS Management Framework (APAM 2022).

Each CEMP will capture all stages of the relevant project and ensure adequate environmental controls are in place to address all potential risks and impacts that may arise during the project works.

The CEMP will document all processes and management strategies to minimise and/or prevent impacts on ecological values during construction. Implementation of the CEMP will limit impacts to the project area, and all downstream impacts will be considered negligible. The CEMP documents will include detail on the following mitigation and management strategies:

- Protection of EPBC Act listed communities (i.e. NTGVVP and Grey Box Woodland) and other areas of native vegetation that are to be retained adjacent to each project area. Exclusion fencing will be erected to protect these areas and identified with appropriate signage such as 'Environmental Protection Area' or 'No-go zone' at regular intervals along the fence line. Access to and from each project area will be restricted to designated access roads and traversing native and introduced grasslands outside of each projects development footprint will be strictly prohibited. In addition, sufficient buffers have been allowed for, to ensure that all construction works can be conducted within the development footprint, without encroaching on established 'No-go zones'. This approach has been adopted most recently for the Taxiway Zulu and northern compound project at Melbourne Airport (EPBC 2016/7837) and was successfully implemented. Refer to Figure 5 which provides examples of exclusion fencing and signage.
- Designating areas for all material stockpiles, vehicle parking and machinery storage within the project footprint, and not in areas of retained native vegetation.
- Ensuring that all employees and contractors involved in each project complete environmental inductions prior to undertaking works within a project area.
- Implementation of strict hygiene protocols that reduce the risk of establishment of novel and/or high threat weeds or disease. It is noted that high threat weeds are already established at one or more locations within each project area. The establishment of new high threat weeds,

introduction of disease or spread of existing weeds from or around each project area will be mitigated through vehicle washdown procedures incorporated into each CEMP.

- Measures to be implemented to prevent and manage potential mobilisation of contaminants, such appropriate sediment fencing downslope of stockpile and stabilisation of temporary stockpiles.
- Measures to be implemented in managing the offsite disposal (if unexpected contamination is unearthed) of soil excavated during excavation and construction works for each project, including sampling requirements, likely areas of contaminated soil and disposal requirements.
- Requirements for vehicle and onsite personal hygiene regarding minimising the potential for transportation of PFAS and other potential contaminants offsite.
- Sediment and erosion control procedures.
- Refuelling and spill response procedures.
- Requirement to comply with the conditions of relevant CHMPs (12774 and/or 16792).

Figure 5 Examples of exclusion fencing and signage

8.3. Post-construction rehabilitation and adaptive management

Post-construction rehabilitation of the project area will focus on establishing an erosion resistant ground condition. This will require a program of revegetation, erosion control, and targeted weed management.

8.4. Summary of avoidance, mitigation and management measures

A summary of the proposed avoidance, mitigation and management measures is presented in Table 19.

Table 19 Summary of avoidance, mitigation and management measures

Measure	Objectives	Responsibility	Timing	Ongoing management and monitoring	Framework
Development and implementation of CEMP	Avoid and/or minimise construction-related risks to environmental values	Contractor	APAM Environment and Sustainability team to approve and reviewed by Airport Environment Officer prior to the commencement of each project	As defined in the CEMP	• Environmental Management Plan Guidelines (DoE, 2014) • Melbourne Airport Environmental Management Plan (APAM 2021) • Melbourne Airport PFAS Management Framework (APAM 2022).
Post-construction rehabilitation	Management of weeds, sediment and erosion	Contractor	Until disturbance area has been stabilised in accordance with APAM EMP and project design requirements.	As per Section 8.3	• Environmental Management Plan Guidelines (DoE, 2014) • Melbourne Airport Environmental Management Plan (APAM 2021)

9. Offsets

9.1. Likelihood of residual significant impacts on MNES

The significant impact assessments presented in Section 5.2 and Section 6 detail the extent of impacts to threatened species, ecological communities, listed migratory species and relevant ecological features on Commonwealth land resulting from the proposed action.

With reference to the significant impact assessments:

- it is considered possible that the proposed action will result in a significant impact to the NTGVVP TEC, and
- it is considered that the proposed action would not result in a significant impact on Commonwealth land.

Residual significant impacts have been identified as the permanent removal of NTGVVP within project area.

9.2. Proposed offset strategy

APAM is committed to securing a direct offset to compensate for the permanent removal of 12.81 hectares of NTGVVP within the project area, in accordance with the EPBC Act *Environmental Offsets Policy* (DSEWPaC 2012a).

APAM is currently in the process of working to secure a suitable offset site to address the removal of NTGVVP associated with the proposed action and will provide offset site details once the site is procured and assessed.

While offset site is yet to be finalised, the Offsets Assessment Guide (refer Appendix C) has been completed based upon a number of assumptions. Justification for the inputs to the calculator provided below.

9.2.1. Habitat quality scoring system for NTGVVP

As detailed in Section 4.4.3, VQA data was collected for all patches of NTGVVP in the project area.

The assessment used was the Victorian Department of Energy, Environment and Climate Action (DEECA) VQA method, underpinning the ‘habitat hectares’ concept (DSE 2004c). Native vegetation was defined in accordance with the 'Guidelines for the removal, destruction or lopping of native vegetation’ (DELWP 2017).

‘Habitat hectares’ is Victoria’s standard metric to quantify native vegetation losses and gains for regulatory approvals and biodiversity offsets. It gives habitats a score out of 100: a site condition score out of 75 plus a landscape context score out of 25. When expressed as a decimal (i.e. divided by 100 for a score out of 1), the VQA score can then be multiplied by the area of the vegetation (in hectares) to calculate the number of habitat hectares in a patch of vegetation.

This method is a good surrogate for habitat quality because it considers important structural and functional elements. These include the density of large trees, understorey complexity, plant species richness, weediness, plant recruitment and coarse woody debris. It also considers the physical connectivity of native vegetation in the landscape (e.g. patch size, configuration and continuity).

VQA scores are readily converted to habitat scores out of 10 for use in the Offsets Assessment Guide (Table 20).

A total weighted average VQA score (out of 100) was determined for NTGVVP within the project area. The weighting was based on the area that each patch contributed to the total area of the TEC within the project area.

The weighted-average VQA score was then divided by 10 (for a score out of 10), and the score was rounded to the nearest whole number for entry in the Offsets Assessment Guide (Table 21). Rounding was completed as the final step, after a VQA score out of 100 had been determined.

Table 20 Habitat quality scoring system for NTGVVP

Parameter[1]	Scoring system
Site condition (max. 7.5 points)	• Lack of weed cover and proportion of weed cover due to high threat weeds contribute up to 20.45/100 to the VQA score (2/10 to the habitat quality score). • Percentage cover of recruitment area (i.e. recruitment opportunity, scaled according to herb species diversity, contributes up to 13.64/100 to the VQA score (1.4/10 to the habitat quality score). • Cover of organic litter, scaled to dominant litter type (native/non-native) and relative to the EVC benchmark, contributes up to 6.82/100 to the VQA score (0.7/10 to the habitat quality score). • Number of species and the cover and diversity of plant lifeforms, relative to the relevant EVC benchmark, contribute up to 34.09/100 to the VQA score (3.4/10 to the habitat quality score).
Site context (max. 2.5 points)	• Size of the patch of native vegetation within which the TEC is located contributes up to 10/100 to the VQA score (1/10 to the habitat quality score). • Amount and configuration of native vegetation within the neighbourhood, within a radius of up to 5 km, contributes up to 10/100 to the VQA score (1/10 to the habitat quality score). • Distance to the nearest core area of native vegetation (areas of native vegetation >50 ha) contributes up to 5/100 to the VQA score (0.5/10 to the habitat quality score).

[1] Through prior consultation with DCCEEW for the M3R project, species stocking rate does not contribute to the habitat quality for TECs. It is therefore not allocated a weighting within this scoring system.

Table 21 Conversion of VQA scores to habitat quality score for the Offsets Assessment Guide

Vegetation Quality Assessment score (/100)	Raw score for Offsets Assessment Guide (/10)	Rounded Score for Offsets Assessment Guide (/10)
0 to <5	0 to <0.5	0
≥5 to <15	≥0.5 to <1.5	1
≥15 to <25	≥1.5 to <2.5	2
≥25 to <35	≥2.5 to <3.5	3
≥35 to <45	≥3.5 to <4.5	4
≥45 to <55	≥4.5 to <5.5	5
≥55 to <65	≥5.5 to <6.5	6
≥65 to <75	≥6.5 to <7.5	7
≥75 to <85	≥7.5 to <8.5	8
≥85 to <95	≥8.5 to <9.5	9

9.2.2. Impact area

The impact area includes 12.81 hectares of NTGVVP with a weighted average VQA score of 40.38/100 (habitat quality score of 4/10). The impact calculator inputs into the Offsets Assessment Guide are shown in Table 22.

Table 22 Impact calculator inputs into the Offsets Assessment Guide

Parameter	Input	Justification for input
Annual probability of extinction	6.8%	The annual probability of extinction for NTGVVP, a critically endangered ecological community, is 6.8% based on IUCN category definitions. This % is set by DCCEEW guidance.
Area of habitat	12.81 hectares	The project will result in the direct, permanent removal of 12.72 hectares of NTGVVP and indirect loss of 0.094 hectares of NTGVVP (refer Section 5.1).
Quality	4/10	All field data for NTGVVP within the project area was collected by qualified ecologists across a number of assessments (refer Section 4.4.2). The weighted average VQA score of all NTGVVP within the project area is 40.38/100, which converts to a habitat quality score of 4/10.
Total quantum of impact	5.12 adjusted hectares	This value is set by the Offsets Assessment Guide and represents the value of the NTGVVP within the impact area, expressed in adjusted hectares. The absolute area (in hectares) has been adjusted to account for the quality of the NTGVVP.

9.2.1. Offset site

The offset calculator inputs into the Offsets Assessment Guide are shown in Table 23.

Table 23 Offset assessment guide inputs for offset site

Parameter	Input	Justification for input
Risk-related time horizon	20 years	The offset site(s) will require active conservation management (and improvements) for the first 10 years, after which the offset area is to be managed and maintained as a conservation area in perpetuity. However, 20 years is the maximum value that can be entered into the Offsets Assessment Guide.
Start area	55	Offset size required to meet 100% of direct offset requirement for the project, based upon the assumptions made regarding the start and future quality of the offset site.
Risk of loss (%) without offset	0%	As advised by DCCEEW with reference to *Guidance for deriving 'Risk of Loss' estimates when evaluating biodiversity offset proposals under the EPBC Act* (Maseyk et al. 2017).
Risk of loss (%) with offset	0%	As above for risk of loss without offset.
Confidence in result – risk of loss	90%	A 90% confidence reflects that there is a high degree of confidence that there is no (0%) risk of loss of the NTGVVP at the offset site, with or without an offset in place.
Time until ecological benefit	10 years	This timeframe is set at 10 years to allow time for management actions to be implemented and for a measurable improvement in habitat quality to be achieved.
Start quality (/10)	6	Assumed start quality (based upon NTGVVP offsets APAM is in the process of securing for other projects).
Future quality without offset (/10)	5	Assumed future quality without offset (based upon NTGVVP offsets APAM is in the process of securing for other projects).
Future quality with offset (/10)	7	Assumed future quality with offset (based upon NTGVVP offsets APAM is in the process of securing for other projects).
Confidence in result – raw gain	90%	An 90% confidence in the result reflects that there is a high level of confidence that the landowner will be able to bring about moderate improvements in quality over a 10-year period.

10. Ecologically sustainability development (ESD)

Section 3(1)(b) of the EPBC Act states that an object of the Act is 'to promote ecologically sustainable development through the conservation and ecologically sustainable use of natural resources'. Section 3A of the EPBC Act sets out the principles of ESD. Table 24 lists these principles, and outlined how they have been considered and addressed in relation to the proposed action.

More broadly, APAM has an Environment, Social and Governance Strategy (ESG Strategy) which includes a commitment to driving initiatives such as reducing carbon emissions and waste, and sustainable procurement. These initiatives have been embedded in the action plans within the Airport Environment Strategy, and progress is tracked annually.

With regard to ESD, The Melbourne Airport Planning and Urban Design Strategy (2015) provides a framework to encourage the adoption of ESD principles and initiatives in Melbourne Airport projects. The incorporation of ESD principles into asset management and operational practices at the airport drives efficiencies in resource use, minimises environmental impacts, and maximises commercial returns.

APAM recognises the need to achieve a balance between future development and its environmental impacts. The mitigation of environmental impacts will be addressed by the integration of ESD principles into design guidelines, construction management, and the operation and maintenance of buildings and infrastructure.

APAM has developed several initiatives and design principles aimed at mitigating environmental impacts and improving the efficiency of resources in development projects. For example, the *Contractor Guide to Working at Melbourne Airport* provides direction for incorporating ESD principles into the design and fit-out of Melbourne Airport developments. The guide recognises the importance of environmentally sensitive design and construction practices to achieve high-performance operations that are efficient and effective, and fit for purpose. This includes the use of environmentally sustainable materials, and improved energy and water efficiency.

Table 24 How the principles of ESD have been addressed

ESD principle	Project details
Decision-making processes should effectively integrate both long-term and short-term economic, environmental, social and equitable considerations	Considerations relating to impact on the environment are discussed in Sections 5 to 7. Economic and social aspects are discussed in Section 11. Other than management of offsets for the residual significant impact to NTGVVP which are yet to be finalised, there are not expected to be any long-term economic, environmental, social and equitable considerations in relation to the proposed action.
If there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation	N/A - There are not considered to be any areas where lack of full scientific certainty has prevented the assessment of impacts and development of avoidance, mitigation and management measures for the project.

ESD principle	Project details
The principle of inter-generational equity – that the present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations	As discussed in Section 7.1, the proposed action involves maintenance and upgrade of existing infrastructure across various locations at the Melbourne Airport, which is required to comply with CASA standards and to allow for the airport to continue to operate in a safe and efficient manner to meet modern demands. As such, the proposed action cannot be avoided. Residual significant impacts will be offset in accordance with the EPBC Act Environmental Offsets Policy (DSEWPaC, 2012b). While an offset site(s) is yet to be finalised, Section 9.2 outlines relevant parameters that inform the proposed offset strategy. APAM has a broader approach to the conservation of biological diversity and ecological integrity across the airport as a whole, as outlined in the Airport's Environment Strategy. The Environment Strategy is detailed in the Melbourne Airport Master Plan 2022, and implementation of the strategy is reviewed regularly by the AEO.
The conservation of biological diversity and ecological integrity should be a fundamental consideration in decision making	
Improved valuation, pricing and incentive mechanisms should be promoted.	One of the most common underlying goals or concepts of sustainability is economic efficiency, including improved valuation of the environment. Consideration is given to environmental factors in the valuation of assets and services associated with Melbourne Airport projects. Sustainable initiatives such as the use of recycled material and a reduction in carbon emissions during in construction and operation are incentivised, as well as encouraging additional solutions from contractors to provide their own responses to potential environmental problems. These principles reflect the idea that if the real value of natural resources is incorporated into the cost of using those resources during construction and development, it is more likely that resources will be used in a sustainable manner adequately managed and not wasted.

11. Economic and social matters

11.1. Public consultation

Generally, the use and development of the designated project areas for airfield activities is outlined in the Melbourne Airport Master Plan 2022, which was subject to public exhibition for 70 business days. During this time, APAM engaged the community with a program including the following activities:

- An online platform enabling the community to engage with the project team, seek information and provide feedback
- Community drop-in events, information sessions and listening posts
- Digital engagement, media, editorial and social media.

It is noted that each of the projects discussed in Section 3 are required for the upgrade or replacement of existing and aging infrastructure within the Melbourne Airport estate, which is in accordance with the Melbourne Airport Master Plan. Further details of APAM's broader community engagement process can be found in Part A3, Section 3.3, pp 51-54 of the Melbourne Airport Master Plan 2022 (APAM 2022b).

11.2. Consultation with Indigenous stakeholders

The project areas overlap with existing approved CHMPs as follows:

- CHMP 12774: Projects A, B, C, D and E
- CHMP 16792: Projects A, B and C

CHMPs 12774 and 16792 were developed for the Melbourne Airport Runway Development Program and M3R respectively, and were subsequently approved by the Wurundjeri Woiwurrung Cultural Heritage Aboriginal Corporation, the Registered Aboriginal Party (RAP) for the area. Consultation with the RAP was undertaken as part of the development of the CHMPs, and requirements for future consultation and engagement with the RAP are identified in each plan. Due to the sensitive nature of information included in the CHMPs, copies of these documents will not be made publicly available.

Copies of CHMP 12774 and CHMP 16792 are included in Appendix D.

11.3. Projected economic costs, benefits and employment opportunities

As part of Melbourne Airport's ESG Strategy, the project will require all tenderers to adhere to a new 'Local Employment Target' (LET). The LET demonstrates Melbourne Airport's commitment to local industry and employment opportunities with its contractors and service providers and will require all companies to have a local employment target of 5% in Victoria throughout the total estimated labour hours to deliver the project.

The project will create employment opportunities in excess of 100people split across various fields including: engineering design, consulting, quantity surveying, legal, administration, operations and maintenance, and construction/contracting.

12. Environmental record of the person proposing to take the action

12.1. History of responsible environmental management

APAM has a satisfactory record of responsible environment management. There is no history of proceedings against APAM with regard to protection of the environment or the conservation and sustainable use of natural resources.

All projects will be undertaken in accordance with APAM's Environmental Management Framework, as described in Section 12.2 below.

12.2. Environmental Management Framework

APAM has an Environmental Management Framework designed to ensure that processes for continuous improvement and ongoing monitoring of compliance are embedded in the way it works. The airport's Environment Strategy is part of the Environmental Management Framework and one of the key mechanisms for ensuring commitments made in Melbourne Airport's Environment and Sustainability Policy are met (refer Appendix E).

More generally, Melbourne Airport operates within a framework of corporate governance, goals and values. These are reflected in the environmental management principles outlined in the Environment and Sustainability Policy. The Environmental Management Framework enables Melbourne Airport to effectively manage and adapt to environmental risks, and continually improve environmental management practices and performance.

Under the framework, environmental compliance is internally monitored and reviewed on an ongoing basis. Compliance is also externally (and annually) formally reviewed by the Airport Environment Officer (AEO), on behalf of DITRDCA.

Central to the framework is Melbourne Airport's Environmental Management System (EMS) which has been in operation since 2004 and is certified against the current EMS standard (ISO14001:2015). The EMS consists of the policies, plans, procedures and activities that together form a system to manage the environmental aspects of the airport and enable compliance with environmental legislation. Internal and external audits of the EMS are undertaken regularly to assess the compliance of operational systems.

The proposed action will be undertaken in line with APAM's existing Environment and Sustainability Policy and Environmental Management Framework as described above.

More details on APAM's Environmental Management Framework can be found in Section 14.3, pages 228-232 of the Melbourne Airport Master Plan 2022 (APAM 2022b).

13. Conclusions

The projects which comprise the proposed action are planned to be undertaken over the next 5-10 years as part of future airfield developments at Melbourne Airport. The projects include:

- Project A – Airfield Renaming
- Project B – Melbourne Airport Pavement Maintenance Program 3 (MAPMP 3)
- Project C – Runway 09/27 overlay
- Project D – Hotel Apron and Whiskey/Sierra Apron Projects
- Project E – Staff Car Park Extension

The project area contains 25.76 hectares of EVC 132 Plains Grassland of which 18.43 hectares meets the diagnostic criteria and condition thresholds to be considered Natural Temperate Grassland of the Victorian Volcanic Plain (NTGVVP). It also contains small amounts of 125 Plains Grassy Wetland (0.0048 hectares) and 803 Plains Woodland (0.0029 hectares). The remaining vegetated area of the project supports predominantly introduced vegetation.

A review of the potential for listed threatened flora and fauna species to be within 10 km of the project area was completed to evaluate the likelihood and potential impacts associated with the proposed action. Based on this review, several EPBC Act listed species were considered to have a medium to high likelihood of occurring within the project area, specifically:

- Gang-gang Cockatoo *Callocephalon fimbriatum*
- White-throated Needletail *Hirundapus caudacutus*
- Grey-headed Flying-fox *Pteropus poliocephalus*
- Golden Sun Moth *Synemon plana*

The review also identified FFG Act listed threatened species that are known or likely to be affected by the project.

The likelihood of the proposed action having a significant impact on listed threatened species and ecological communities and/or the environment on Commonwealth land was assessed in accordance with:

- Matters of National Environmental Significance: *Significant impact guidelines 1.1*, EPBC Act 1999 (DoE 2013).
- Actions on, or impacting upon, Commonwealth land, and actions by commonwealth agencies: *Significant impact guidelines 1.2*, EPBC Act 1999 (DSEWPaC 2013)

Taking the outcomes of the above assessments into account, the project was considered environmentally acceptable to be undertaken for the purpose of satisfying APAM's planning, maintenance and regulatory obligations based on the following:

- Threatened flora species predicted to occur within the project area are considered to have a negligible to low likelihood of occurrence. The project is therefore unlikely to constitute a significant impact on these species. For fauna species with a medium or higher likelihood of occurrence (Gang-gang Cockatoo *Callocephalon fimbriatum*, White-throated Needletail *Hirundapus*

caudacutus, Grey-headed Flying-fox *Pteropus poliocephalus* and Golden Sun Moth ***Synemon plana***), no suitable habitat occurs within the project area, therefore the project is unlikely to constitute a significant impact on these species.

- The Melbourne Airport estate supports a broader area of grassland covering approximately 270 hectares. The project would result in permanent removal of 12.72 hectares of this grassland and therefore adversely affect about 4.7% of NTGVVP within the airport estate.
- Indirect impacts to threatened species were considered to be limited to noise from excavation activities during construction only, which will be less than aircraft noise from operations.
- The proposed works will physically isolate several small areas of identified NTGVVP from adjoining broader patches, which will be less than the threshold size for NTGVVP of 0.05 hectares. As such the total of these areas (being 0.094 hectares) is considered an indirect loss.
- Based upon the removal of 12.81 hectares of NTGVVP from the project area (including direct removal of 12.72 hectares of and indirect loss of 0.094 hectares), it is considered possible that the proposed action will result in a significant impact to the NTGVVP TEC.
- The proposed action would not result in a significant impact on Commonwealth land, the key reasons being:
  - The proposed action is located fully within the operational airside boundary of Melbourne Airport which is a highly modified environment that has undergone extensive landscape alteration in the past. The proposed works are adjacent to existing runway and taxiway infrastructure and therefore will not substantially alter natural landscape features.
  - While soils in the project area are likely to contain low levels of contaminants including per-and poly-fluoroalkyl substances (PFAS), the scale, intensity and duration of excavation works is not considered to be significant.
  - It is unlikely that the expected impact on native vegetation would result in medium to large scale clearing of native vegetation that would constitute a significant impact to the environment as a whole on Commonwealth land.
  - There are no known cultural heritage values located within the project area.
- A Construction Environment Management Plan (CEMP) will be developed to outline the appropriate environmental goals and objectives with respect to the project. The CEMP will document all processes and management strategies to minimise and/or prevent impacts on ecological values. Implementation of the CEMP will limit impacts to the project area, and all downstream impacts will be considered negligible.
- APAM is committed to securing a direct offset to compensate for the permanent removal of 12.81 hectares of NTGVVP within the project area, in accordance with the EPBC Act Environmental Offsets Policy (DSEWPaC 2012a). APAM is currently in the process of working to secure a suitable offset site to address the removal of NTGVVP associated with the proposed action and will provide offset site details once the site is procured and assessed.

With regard to Ecologically Sustainable Development, APAM has a broader approach to the conservation of biological diversity and ecological integrity across the airport as a whole, as outlined in the Airport's Environment Strategy. Specifically, APAM has developed several initiatives

and design principles aimed at mitigating environmental impacts and improving the efficiency of resources in development projects. APAM will ensure the actions associated with the project are undertaken with consideration of the key principles associated with the promotion of Ecologically Sustainable Development as follows:

- Long-term economic, environmental, social and equitable considerations will comprise the establishment and ongoing management of offsets designed to mitigate the residual impacts of NTGVVP loss associated with the project. The offset site will be managed in accordance with the EPBC Act Environmental Offsets Policy (DSEWPaC, 2012b).
- While significant efforts have been made to minimise impacts associated with the project, APAM also has a broader approach to the conservation of biological diversity and ecological integrity across the airport as a whole, as outlined in the Airport's Environment Strategy. This project will be undertaken in accordance with the broader airport approach and Environmental Strategy.
- Sustainable initiatives such as the use of recycled material and a reduction in carbon emissions during in construction and operation will be incentivised as part of this project, as well as encouraging additional solutions from contractors to provide their own responses to potential environmental problems. These principles are designed to reflect the idea that if the real value of natural resources is incorporated into the cost of using those resources during construction and development, it is more likely that resources will be used in a sustainable manner adequately managed and not wasted.

Based on the information summarised above, the historical record of APAM with regard to environmentally responsible initiatives and Ecologically Sustainable Development and the fact that the proposed action is unable to be avoided due to APAMs regulatory obligations, the project is considered suitable to be approved for development.

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15. Limitations

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Appendices

Appendix A

Review of listed flora and fauna

The following abbreviations and symbols are relevant to this Appendix:

Code	Meaning	Reference
National Listings (EPBC Act)		
EX	Extinct	Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)
CR	Critically endangered	
EN	Endangered	
VU	Vulnerable	
PMST	Protected Matters Search Tool	
State Listings (FFG Act)		
X	Extinct	Victorian *Flora and Fauna Guarantee Act 1988* (FFG Act)
Cr	Critically endangered	
E	Endangered	
V	Vulnerable	
T	Threatened	
P	Protected (public land only)	
Weed status (CaLP Act)		
SP	State prohibited species	Victorian *Catchment and Land Protection Act 1994* (CaLP Act)
RP	Regionally prohibited species	
RC	Regionally controlled species	
R	Restricted species	
Pest animal status (CaLP Act and Fisheries Act)		
PS	Declared pest animal	Victorian *Catchment and Land Protection Act 1994* (CaLP Act)
Other		
*	Introduced species	Victorian Biodiversity Atlas (VBA)
#	Native species outside its natural range	

The following table includes the listed flora species that have potential to occur within the project area. The list of species is sourced from the Protected Matters Search Tool and the Victorian Biodiversity Atlas.

Table 1 Listed flora species recorded / predicted to occur within 10 km of the project area

Common name	Scientific name	Conservation status		Most recent database record	Other record	Likely occurrence in project area	Habitat description	Rationale for likelihood ranking
		EPBC	FFG					
Potential threatened Flora Species – National Significance (EPBC Act)								
Adamson's Blown-grass	*Lachnagrostis adamsonii*	EN	e		PMST	Low	Low-lying, seasonally wet or swampy areas of plains communities, often in slightly saline conditions.	Suitable habitat with moist saline soils is not present or very limited in the project area and, if present, is dominated by introduced grasses. Most records of this species are from south-west Victoria with only a few occurrences near Craigieburn north of Melbourne.
Austral Toad-flax	*Thesium australe*	VU	e	1904		Negligible	Most commonly in damp grassland and woodland, including subalpine grassy heathlands.	There is no suitable habitat located within the project area and no recent records from the local area.
Basalt Peppercress	*Lepidium hyssopifolium* s.s.	EN	e	2018		Negligible	Basalt plains grassland and woodland communities.	There are limited records within the local area and the most recent record is >20 years old. Habitat within the project area is marginal and unlikely to support this species. Most grassland within the project area is species-poor, having been highly modified by grazing, sown pastures, earthworks and/or rock removal.
Button Wrinklewort	*Rutidosis leptorhynchoides*	EN	e	2015	PMST	Negligible	Higher quality Plains Grassland and Grassy Woodland in Western Victoria, particularly those with fertile soil and light timber cover.	While there are recent records (<20 years old) from the local area, the project area is unlikely to support the species due to the high levels of land modification and continued land management

Common name	Scientific name	Conservation status		Most recent database record	Other record	Likely occurrence in project area	Habitat description	Rationale for likelihood ranking
		EPBC	FFG					
								practices (e.g. grazing), which have led to relatively species-poor grassland being present. The species is generally only known from relatively undisturbed native grassland remnants.
Buxton Gum	*Eucalyptus crenulata*	EN	e	2017		Negligible	Alluvial soils in seasonally inundated depressions along river flats; records away from Buxton and Yering in the northeast are likely to be introductions.	The project area is outside the natural range for this species. Any specimens in the local area are likely to be from cultivation.
Clover Glycine	*Glycine latrobeana*	VU	v	1995	PMST	Low	Grasslands and grassy woodlands, particularly those dominated by Kangaroo Grass.	There are limited records within the local area and the most recent is old >20 years old. Potential habitat within the project area is marginal and unlikely to support the species. Most grassland within the project area is species-poor, having been highly modified by grazing, sown pastures, earthworks and/or rock removal.
Fragrant Leek-orchid	*Prasophyllum suaveolens*	EN	cr	1962		Negligible	Open, species rich grasslands dominated by Themeda triandra on poorly draining red- brown soils in western Victoria.	There are limited records of this species within the local area and the closest record is >20 years old. The project area is also highly modified and likely to be unsuitable.
Green-striped Greenhood	*Pterostylis chlorogramma*	VU	e		PMST	Negligible	Heathy woodland; more specific habitat requirements are poorly known.	Suitable habitat is not present in the project area.

Common name	Scientific name	Conservation status		Most recent database record	Other record	Likely occurrence in project area	Habitat description	Rationale for likelihood ranking
		EPBC	FFG					
Large-headed Fireweed	*Senecio macrocarpus*	VU	cr	2021	PMST	Low	Grassland, shrubland and woodland habitats on heavy soils subject to waterlogging and/or drought conditions in summer.	While there are recent records (<20 years old) from the local area, the project area is unlikely to support the species due to the high levels of land modification and continued land management practices (e.g. grazing), which have led to relatively species-poor grassland being present. This large and conspicuous herb is likely to have been detected during the past decade of vegetation surveys if a population were present.
Leafy Greenhood	*Pterostylis cucullata*	VU			PMST	Negligible	Protected areas of stabilised coastal sand dunes within scrub communities with an open ground layer; occasionally in Coastal Manna Gum woodland.	Suitable habitat is not present in the project area as this subspecies is known mostly from coastal scrub habitats.
Matted Flax-lily	*Dianella amoena*	EN	cr	2021	PMST	Low	Lowland grassland and grassy woodland, on well-drained to seasonally waterlogged fertile sandy loam soils to heavy cracking clays.	Most grassland within the project area is species-poor, having been highly modified by grazing, sown pastures, earthworks and/or rock removal. Historical land uses and disturbances mean that this species is unlikely to be present. The extent and coverage of vegetation surveys over the past decade is likely to have detected an important population if one existing in the project area. Other more common members of this genus which otherwise also occupy this type of habitat are also absent.

Common name	Scientific name	Conservation status		Most recent database record	Other record	Likely occurrence in project area	Habitat description	Rationale for likelihood ranking
		EPBC	FFG					
River Swamp Wallaby-grass	*Amphibromus fluitans*	VU			PMST	Negligible	Swampy areas, mainly along the Murray River between Wodonga and Echuca with scattered records from southern Victoria.	No suitable habitat within the project area.
Slender Plum-orchid	*Thelymitra orientalis*	CR	cr		PMST	Negligible	Occur on white sands and sandy loams in heathland and in damper heaths.	There is no suitable habitat located within the project area and no recent records from the local area.
Small Golden Moths	*Diuris basaltica*	EN	cr	1962	PMST	Negligible	Plains Grassland dominated by tussock- forming perennial grasses (including Kangaroo Grass); often with embedded surface basalt.	No recent records from the local area. Most grassland within the project area is species-poor, having been highly modified by grazing, sown pastures, earthworks and/or rock removal.
Spiny Peppercress	*Lepidium aschersonii*	VU	e		PMST	Low	Heavy clay soils near salt lakes on the volcanic plains; disjunct records near Lake Omeo.	Suitable habitat with moist saline soils is not present or very limited in the project area and, if present, is dominated by introduced grasses. Most records of this species are from south-west Victoria with only a few occurrences near Craigieburn north of Melbourne.
Spiny Rice-flower	*Pimelea spinescens* subsp. *spinescens*	CR	cr	2020	PMST	Low	Primarily grasslands featuring a moderate diversity of other native species and inter- tussock spaces, although also recorded in grassland dominated by introduced perennial grasses.	While potentially suitable habitat is present within the project area and there are recent records of the species from the local area, the project area is unlikely to currently support the species due to the high levels of past landscape modification and current land management practices. The extent and coverage of vegetation surveys over the past

Common name	Scientific name	Conservation status		Most recent database record	Other record	Likely occurrence in project area	Habitat description	Rationale for likelihood ranking
		EPBC	FFG					
								decade is likely to have detected a population if one existed in the project area.
Sunshine Diuris	*Diuris fragrantissima*	EN	cr	1974	PMST	Negligible	Grassland dominated by Themeda trianda, on plains with heavy basalt soils and embedded boulders; only known naturally occurring population is in Sunshine.	No recent records from the local area. Most grassland within the project area is species-poor, having been highly modified by grazing, sown pastures, earthworks and/or rock removal. Only known extant population is approximately 12 km south of the project area.
Swamp Everlasting	*Xerochrysum palustre*	VU	cr		PMST	Low	Sedge-swamps and shallow freshwater marshes and swamps in lowlands, on black cracking clay soils.	While there are recent records (<20 years old) from the local area, there is no suitable habitat within the project area.
Swamp Fireweed	*Senecio psilocarpus*	VU			PMST	Negligible	Seasonally inundated herb-rich swamps, growing on peaty soils or volcanic clays.	There is no suitable habitat located within the project area and the species is not known to be present in the local area.
Trailing Hop-bush	*Dodonaea procumbens*	VU			PMST	Negligible	Sandy or clay soils in low-lying, winter-wet areas in grasslands, woodlands, and low- open forest.	No suitable habitat exists within the project area and the species has never been recorded from the local area or during detailed vegetation surveys within the project area over the past decade. The project area is outside the known distribution for the species, the nearest record being approximately 45 km west.

Common name	Scientific name	Conservation status		Most recent database record	Other record	Likely occurrence in project area	Habitat description	Rationale for likelihood ranking
		EPBC	FFG					
White Sunray	*Leucochrysum albicans* subsp. *tricolor*	EN	e		PMST	Low	Grasslands of the Victorian Volcanic Plains, primarily on acidic clay soils derived from basalt, with occasional occurrences on adjacent sedimentary, sandy-clay soils.	Potential grassland habitat in the project area is modified and species poor. This species is generally known from intact species-rich basalt plains grasslands in south-west Victoria. This species is likely to have been detected during the past decade of vegetation surveys, if it were present.
Potential threatened Flora Species – State Significance (FFG Act)								
Arching Flax-lily	*Dianella* sp. aff. *longifolia (Benambra)*		t	2021		Low	The habitat requirements of this species are poorly known.	Most grassland within the project area is species-poor, having been highly modified by grazing, sown pastures, earthworks and/or rock removal. Historical land uses and disturbances mean that this species is unlikely to be present.
Austral Crane's-bill	*Geranium solanderi var. solanderi s.s.*		e	2019		Medium	Grasslands or grassy woodlands where hydrology is not a limiting factor.	There are recent records from the local area and suitable habitat within the project area. The species is known to recolonise modified or disturbed grassland.
Austral Moonwort	*Botrychium australe*		cr	1983		Negligible	Lowland forest and scrubland to subalpine grasslands, lightly wooded plains, at the base of granitic hills, alongside subalpine streams, and in some disturbed environments.	There are limited records of the species within the local area and the closest record is >20 years old. There is no suitable habitat within the project area

Common name	Scientific name	Conservation status		Most recent database record	Other record	Likely occurrence in project area	Habitat description	Rationale for likelihood ranking
		EPBC	FFG					
Austral Tobacco	*Nicotiana suaveolens*		e	2021		Low	Areas of sandy or gravelly soil typically associated with streams, gullies and other drainage lines; also grasslands and escarpment shrublands.	While there are recent records of the species within the local area, grassland within the project area is highly modified and unlikely to still be suitable habitat. This large and conspicuous herb is likely to have been detected during the past decade of vegetation surveys if a population were present.
Bacchus Marsh Wattle	*Acacia rostriformis*		v	2020		Negligible	Occurs in low hilly areas in Eucalyptus woodland.	There is no suitable habitat located within the project area. This large and conspicuous shrub is likely to have been detected during the past decade of vegetation surveys if a population were present.
Basalt Podolepis	*Podolepis linearifolia*		e	2016		Low	Grasslands and grassy woodlands.	While there are recent records of the species within the local area, grassland within the project area is highly modified and unlikely to still be suitable habitat. This large and conspicuous herb is likely to have been detected during the past decade of vegetation surveys if a population were present.
Basalt Sun-orchid	*Thelymitra gregaria*		e	2016		Negligible	Open, species-rich grassland dominated by Themeda triandra on poorly draining soils of the volcanic plains.	There are no recent (<20 years old) records of the species from the local area and the highly modified grassland within the project area is unlikely to be suitable habitat for the species.

Common name	Scientific name	Conservation status		Most recent database record	Other record	Likely occurrence in project area	Habitat description	Rationale for likelihood ranking
		EPBC	FFG					
Branching Groundsel	*Senecio cunninghamii var. cunninghamii*		cr	1953		Negligible	Heavy soils that are sometimes winter-wet, or dry rocky soils; often on embankments or escarpments.	There are few records from the local area and all are >20 years old. The species is more commonly known from northern Victoria. This large and conspicuous herb is likely to have been detected during the past decade of vegetation surveys if an important population was present.
Brittle Greenhood	*Pterostylis truncata*		cr	1931		Negligible	Grassland and grassy woodland habitats, largely to the west of Melbourne.	There are no recent (<20 years old) records of the species from the local area and the highly modified grassland within the project area is unlikely to be suitable habitat for the species.
Broad-lip Diuris	*Diuris X palachila*		e	1904		Negligible	Heathlands, grasslands, open woodlands and dry open forests.	There is no suitably unmodified grassland habitat within the project area and no recent (<20 years old) records from the local area.
Buloke	*Allocasuarina luehmannii*		cr	1996		Low	Non-calcareous soils in drier areas on slopes and plains; often in woodlands associated with Grey Box.	While there are recent records (<20 years old) from the local area, there is no suitable habitat present within the project area.
Flat Spike-sedge	*Eleocharis plana*		cr	1986		Negligible	Shallow freshwater pools and the margins of lakes and rivers.	There is no suitably unmodified wetland habitat within the project area and no recent (<20 years old) records from the local area.
Fragrant Saltbush	*Rhagodia parabolica*		v	2021		Low	Plains and escarpment grassland, shrubland and woodland.	While there are recent records of the species within the local area, many of these records are likely to be planted specimens. This large and conspicuous shrub is likely to have been detected

Common name	Scientific name	Conservation status		Most recent database record	Other record	Likely occurrence in project area	Habitat description	Rationale for likelihood ranking
		EPBC	FFG					
								during the past decade of vegetation surveys if a population were present.
Giant Honey-myrtle	*Melaleuca armillaris* subsp. *armillaris*		e	2021		Negligible	Near coastal heath/scrub, rocky coast and foothill outcrops.	No suitable habitat present within the project area and outside natural range for this species. Nearby records are likely to be planted.
Glaucous Flax-lily	*Dianella longifolia* var. *grandis s.l.*		cr	2018		Low	Grassland, grassy woodland and rocky outcrops of the Victorian Volcanic Plain and Victorian Riverina.	Most grassland within the project area is species-poor, having been highly modified by grazing, sown pastures, earthworks and/or rock removal. Historical land uses and disturbances mean that this species is unlikely to be present. The extent and coverage of vegetation surveys over the past decade is likely to have detected an important population if one existing in the project area.
Large- flower Crane's-bill	*Geranium* sp. *1*		cr	2021		Medium	The habitat requirements of this species are poorly known.	There are recent records from the local area and suitable habitat within the project area. The species is known to recolonise modified or disturbed grassland.
Large-fruit Yellow-gum	*Eucalyptus leucoxylon* subsp. *megalocarpa*		cr	2018		Negligible	Coastal, near Nelson.	The project area is outside the natural range for this species. Any specimens in the local area are likely to be from cultivation.
Leafy Greenhood	*Pterostylis cucullate* subsp. *cucullata*		e	1770		Negligible	Protected areas of stabilised coastal sand dunes within scrub communities with an open ground layer; occasionally in Coastal Manna Gum woodland.	Species is not known to be present in the local area.

Common name	Scientific name	Conservation status		Most recent database record	Other record	Likely occurrence in project area	Habitat description	Rationale for likelihood ranking
		EPBC	FFG					
Leafy Twig-sedge	*Cladium procerum*		e	2018		Negligible	Waterlogged soils, often along slow-flowing streams and lake margins.	There are recent (<20 years old) records within the local area but vegetation in wetlands and along drainage lines is highly modified within the project area. This distinctive species is likely to have been detected during the past decade of vegetation surveys if a population were present.
Melbourne Yellow-gum	*Eucalyptus leucoxylon* subsp. *connata*		e	2017		Negligible	Well-drained slopes in a restricted area around Melbourne and Geelong.	There are recent records of this species in the local area (e.g. at Bulla). However, this is a large and conspicuous species that would have been identified during previous survey efforts.
Mugga	*Eucalyptus sideroxylon* subsp. *sideroxylon*		e	2021		Negligible	Typically found on poor, shallow soils, including sands, gravels, ironstones and clays.	No suitable habitat present within the project area.
Pale Plover-daisy	Leiocarpa leptolepis		e	1912		Negligible	Grasslands and grassy woodlands, often in disturbed areas. In Victoria, confined to one known population approximately 4km east of Mildura.	There are no recent (<20 years old) records of this species from the local area and the species is currently only known from north-west Victoria.
Pale Swamp Everlasting	*Coronidium gunnianum*		cr	2017		Low	Widespread and sometimes locally common, particularly in high-rainfall areas of Victoria; often in moist sites in open forests and woodlands.	While there are recent (<20 years old) records within the local area, wetland and regularly inundated grassland habitat within the project area is highly modified and unlikely to support the species.

Common name	Scientific name	Conservation status		Most recent database record	Other record	Likely occurrence in project area	Habitat description	Rationale for likelihood ranking
		EPBC	FFG					
Pale-flower Crane's-bill	*Geranium* sp. *3*		e	2016		Medium	Grasslands and dry woodlands.	There are recent records from the local area and suitable habitat within the project area. The species is known to recolonise modified or disturbed grassland.
Plump Windmill Grass	*Chloris ventricosa*		e	2011		Low	Woodlands. Mainly found on clay soils, sometimes in winter-wet depressions.	While there are recent records (<20 years old) in the local area, grassland within the project area is highly modified.
Purple Blown-grass	*Lachnagrostis semibarbata* var. *semibarbata*		e	2001		Low	Wet marshes and slightly saline swamps and depressions in plains communities.	Suitable habitat with moist saline soils is not present or very limited in the project area and, if present, is dominated by introduced grasses.
Purple Diuris	*Diuris punctata* var. *punctata*		e	1982		Negligible	Fertile, loamy soils and periodically wet areas in lowland grasslands, grassy woodlands, heathy woodlands and open heathlands.	There is no suitably unmodified grassland habitat within the project area and no recent (<20 years old) records from the local area.
Rough-grain Love-grass	*Eragrostis trachycarpa*		e	1996		Low	Moist grassland or grassy woodland sites.	While there is potentially suitable habitat present within the project area, records from the local area are not recent and are thought to have been an accidental introduction.
Rye Beetle-grass	*Tripogonella loliiformis*		cr	1953		Low	Dry sites in association with escarpments and rocky outcrops.	While there are recent (<20 years old) records from the local area and the species may have gone undetected during past surveys (due to its nature as a resurrection plant), most grassland within the project area is species-poor, having been modified

Common name	Scientific name	Conservation status		Most recent database record	Other record	Likely occurrence in project area	Habitat description	Rationale for likelihood ranking
		EPBC	FFG					
								by grazing, sown pastures, earthworks and/or rock removal.
Small Milkwort	*Comesperma polygaloides*		cr	2014		Low	Grasslands on the western basalt plains; less commonly in grassy woodlands between Bendigo and the Wimmera.	While there is potentially suitable (albeit highly modified) grassland habitat present within the project area, there are not recent (<20 years old) records from the local area. The species is relatively conspicuous when flowering and is likely to have been detected during the past decade of vegetation surveys if a population were present.
Small Scurf-pea	*Cullen parvum*		e	1986		Low	Lowland grasslands, including pastures and occasionally in otherwise disturbed grassy areas.	While there are limited recent records within the local area, grassland within the project area is highly modified and unlikely to support a population of this species.
Snowy Mint-bush	*Prostanthera nivea* var. *nivea*		v	2014		Low	Largely confined to shrubland and open woodland associated with granite outcrops.	No suitable habitat within the project area.
Southern Blue-gum	*Eucalyptus globulus* subsp. *globulus*		e	2020		Negligible	Damp forest communities. Restricted to South Gippsland and the Otway Ranges.	The project area is outside the natural range for this species. Any specimens in the local area are likely to be planted.
Spotted Emu-bush	*Eremophila maculate* subsp. *maculata*		cr	2021		Negligible	Mainly in Black Box forests or woodlands on heavy clay soils.	No suitable habitat present within the project area.

Common name	Scientific name	Conservation status		Most recent database record	Other record	Likely occurrence in project area	Habitat description	Rationale for likelihood ranking
		EPBC	FFG					
Spotted Gum	*Corymbia maculata*		v	2021		Negligible	In Victoria, naturally confined to a small population near Mt Tara in the east of the state.	The project area is outside the natural range for this species. Any specimens in the local area are likely to be planted.
Sticky Wattle	*Acacia howittii*		v	2016		Negligible	Moist forest. Natural occurrences are confined to South Gippsland and Central Highlands.	No suitable habitat present within the project area.
Swamp Diuris	*Diuris palustris*		e	1979		Negligible	Grasslands and open woodlands, often in swampy depressions; confined to the west of the State.	There is no suitably unmodified grassland habitat within the project area and no recent (<20 years old) records from the local area.
Tough Scurf-pea	*Cullen tenax*		e	2021		Low	Lowland grasslands, including pastures and occasionally in otherwise disturbed grassy areas.	While there are limited recent records within the local area, grassland within the project area is highly modified and unlikely to support a population of this species.
Truncate Leionema	*Leionema bilobum* subsp. *bilobum*		v	2006		Negligible	Endemic to heathland and heathy woodland, in the Grampians and mostly in the north and east (e.g. Mt Difficult, Mt William, Wonderland and Serra Ranges), but with isolated occurrences at Mt Zero and Wallaby Rocks. Usually in rocky, elevated sites.	There is no suitable habitat within project area and the project area is outside of the natural range for this species. The species is a relatively conspicuous shrub and is likely to have been detected during the past decade of vegetation surveys.
Western Golden-tip	*Goodia medicaginea*		e	2021		Negligible	Drier sites within wet or dry sclerophyll forests.	While there are recent records from the local area, the species is a conspicuous shrub and is likely to have been detected during the past decade of

Common name	Scientific name	Conservation status		Most recent database record	Other record	Likely occurrence in project area	Habitat description	Rationale for likelihood ranking
		EPBC	FFG					
								vegetation surveys if a population were present within the project area.
Yellow Burr-daisy	*Calotis lappulacea*		v	2014		Low	Dry rocky country, open woodland, and fertile, loam or clay soils.	While there are recent records (<20 years old) from the local area, there is no suitable habitat present within the project area. Vegetation within the project area is relatively species-poor.

The following table includes the listed fauna species that have potential to occur within the project area. The list of species is sourced from the Protected Matters Search Tool and the Victorian Biodiversity Atlas.

Table 2 Listed fauna species recorded / predicted to occur within 10 km of the project area

Common name	Scientific name	Conservation status		Most recent database record	Other record	Likely occurrence in project area	Habitat description	Rationale for likelihood ranking
		EPBC	FFG					
Potential threatened Fauna Species – National Significance (EPBC Act)								
Australasian Bittern	*Botaurus poiciloptilus*	EN	cr	1950	PMST	Negligible	Shallow freshwater and brackish wetlands with abundant emergent aquatic vegetation.	No suitable habitat within the project area.
Australian Fairy Tern	*Sternula nereis nereis*	VU			PMST	Negligible	Fairy Terns inhabit coastal environments including intertidal mudflats, sand flats and beaches.	No suitable habitat for this species in the project area.

Common name	Scientific name	Conservation status		Most recent database record	Other record	Likely occurrence in project area	Habitat description	Rationale for likelihood ranking
		EPBC	FFG					
							Nests above high- water mark on sandy shell-grit beaches.	
Australian Grayling	*Prototroctes maraena*	VU	e	2015	PMST	Low	Adults inhabit cool, clear, freshwater streams.	No suitable habitat within the project area.
Australian Painted-snipe	*Rostratula australis*	EN	cr		PMST	Negligible	Shallows of well- vegetated freshwater wetlands.	No suitable habitat within the project area.
Bar-tailed Godwit	*Limosa lapponica*	VU	v	1977		Negligible	Bar-tailed Godwits inhabit estuarine mudflats, beaches and mangroves. They are common in coastal areas around Australia. They are social birds and are often seen in large flocks and in the company of other waders.	No suitable habitat for this species in the project area.
Blue- winged Parrot	*Neophema chrysostoma*	VU		2009	PMST	Low	A range of coastal, sub-coastal and semi-arid regions throughout south-eastern Australia. Nests in tree hollows in coastal eucalypt forests and woodlands. Feeds on seeds of a range of native grasses and herbs.	Suitable habitat located within the woodland, however there is no suitable habitat within this project area and the species may only fly over.
Brown Treecreeper	*Climacteris picumnus*	VU		1991	PMST	Negligible	Open eucalypt forests, woodlands and Mallee, often where there are stands of dead trees.	No suitable habitat for this species in the project area.

Common name	Scientific name	Conservation status		Most recent database record	Other record	Likely occurrence in project area	Habitat description	Rationale for likelihood ranking
		EPBC	FFG					
Curlew Sandpiper	*Calidris ferruginea*	CR	cr	1977	PMST	Negligible	Large intertidal sandflats, banks, mudflats, estuaries, inlets, sewage farms, saltworks, harbours, coastal lagoons and bays.	No suitable habitat for this species in the project area.
Diamond Firetail	*Stagonopleura guttata*	VU	v	1990	PMST	Negligible	Open forests and woodlands with a grassy ground layer.	No suitable habitat for this species in the project area.
Eastern Barred Bandicoot	*Perameles gunnii*	EN	e	2021		Negligible	Natural temperate grasslands and grassy woodlands.	Although the species historically would have occurred within the open plains grassland and woodland at Melbourne Airport the species is now extinct in the wild in Victoria.
Eastern Barred Bandicoot (Mainland)	*Perameles gunnii Victorian subspecies*	EN			PMST	Negligible	Natural temperate grasslands and grassy woodlands.	No suitable habitat for this species in the project area.
Eastern Curlew	*Numenius madagascariensis*	CR	cr	1977	PMST	Negligible	Large intertidal sandflats, banks, mudflats, estuaries, inlets, coastal lagoons and bays.	No suitable habitat for this species in the project area.
Eltham Copper Butterfly	*Paralucia pyrodiscus lucida*	EN	e	1922		Negligible	Drier sclerophyll forests and woodlands supporting Sweet Bursaria Bursaria spinosa, especially along ridgelines. State significance	Project area is outside accepted range of the species, and no suitable habitat present.

Common name	Scientific name	Conservation status		Most recent database record	Other record	Likely occurrence in project area	Habitat description	Rationale for likelihood ranking
		EPBC	FFG					
Fairy Tern	*Sternula nereis*	VU	cr	1977		Negligible	Fairy Terns inhabit coastal environments including intertidal mudflats, sand flats and beaches. Nests above high- water mark on sandy shell-grit beaches.	No suitable habitat for this species in the project area.
Gang-gang Cockatoo	*Callocephalon fimbriatum*	EN	e	2002	PMST	Medium	S Vic to E NSW. Forests and woodlands from coast to alpine areas. Autumn- winter dispersal from highlands to lower elevations. Forages in eucalypts, acacias and some exotic garden trees and shrubs.	Species likely to utilise the adjacent woodland patches north of the project area, which may result in flights over the project area at times.
Golden Sun Moth	*Synemon plana*	VU	v	2020	PMST	Medium	Natural temperate grassland, grassy woodland and pasture supporting spear grasses and wallaby grasses and exotic grassland dominated by Chilean needle grass.	The species has been recorded in two areas in the northern-most portion of Melbourne Airport only. Despite previous surveys not detecting the species within the project area, there is an area of GSM habitat between Sunbury Road and Moonee Ponds Creek, to the northwest of project area B.
Grassland Earless Dragon	*Tympanocryptis pinguicolla*	CR	cr	1884	PMST	Negligible	Natural temperate grassland.	Considered to be locally extinct.
Greater Sand Plover	*Charadrius leschenaultii*	VU	v		PMST	Negligible	Intertidal mudflats and sandbanks of sheltered bays and estuaries.	No suitable habitat for this species in the project area.

Common name	Scientific name	Conservation status		Most recent database record	Other record	Likely occurrence in project area	Habitat description	Rationale for likelihood ranking
		EPBC	FFG					
Grey Falcon	*Falco hypoleucos*	VU	v		PMST	Low	Lightly timbered plains and Acacia scrub.	May fly over the project area, but would be a rare visitor to the area. No previous records from the local area.
Grey- headed Flying-fox	*Pteropus poliocephalus*	VU	v	2021	PMST	Medium	Rainforest, wet and dry sclerophyll forest, woodland and urban areas.	Species likely to utilise flowing trees adjacent to the project area, which may result in flights over the project area at times.
Growling Grass Frog (GGF)	*Litoria raniformis*					Low	Still or slow-flowing waterbodies and surrounding terrestrial vegetation.	Growling Grass Frog has been recorded in Arundel Creek and Moonee Ponds Creek within the Melbourne Airport, and Deep Creek and the Maribyrnong River adjacent to the Melbourne Airport. No potential habitat for the species was observed to be present in the project areas.
Hooded Robin	*Melanodryas cucullata*	EN	v	1846	PMST	Low	Woodlands of eucalypt, Mallee, semi-cleared farmland.	Suitable habitat located within the woodland, however there is no suitable habitat within this project area and the species may only fly over.
Lesser Sand Plover	*Charadrius mongolus*	EN	e	1978		Negligible	Intertidal mudflats and sandbanks of sheltered bays and estuaries.	No suitable habitat for this species in the project area.
Macquarie Perch	*Macquaria australasica*	EN	e	1970		Low	Streams with clear water and deep, rocky holes with abundant cover.	Project area is outside accepted range of the species. Historic records represent failed translocations.
Murray Cod	*Maccullochella peelii*	VU	e	1981	PMST	Low	A diverse range of stream habitats in the Murray- Darling basin; principally the main channels of rivers and their major tributaries.	Project area is outside accepted range of the species. Historic records represent failed translocations.

Common name	Scientific name	Conservation status		Most recent database record	Other record	Likely occurrence in project area	Habitat description	Rationale for likelihood ranking
		EPBC	FFG					
New Holland Mouse	*Pseudomys novaehollandiae*	VU	e		PMST	Negligible	Coastal heathland, heathy woodland and dry sclerophyll forest.	No suitable habitat for this species in the project area.
Painted Honeyeater	*Grantiella picta*	VU	v		PMST	Negligible	Dry open woodlands and forests. Typically forages for fruit and nectar in mistletoes and in tree canopies.	Species rarely recorded south of the Great dividing range and not recorded regularly within 50km of Melbourne Airport. No suitable woodland habitat is present within the project area.
Pink-tailed Worm- Lizard	*Aprasia parapulchella*	VU	e		PMST	Negligible	Woodland and grassland with partially buried rocks.	Suitable grassland habitat for this species within the project area, however the species has only been recorded around the Bendigo area.
Plains-wanderer	*Pedionomus torquatus*	CR	cr	1949	PMST	Negligible	Native grassland with a sparse, open structure	Historically the open plains grassland at Melbourne Airport would have provided suitable habitat for this species but the area has since been heavily utilised for agriculture and the development of infrastructure such that suitable habitat is no longer present. The species is rarely recorded around Melbourne, a few recent records from the past 10 years occur around Ravenhall, Melton /Eynesbury and Balliang.
Red Knot	*Calidris canutus*	EN	e		PMST	Negligible	Large intertidal sandflats, banks, mudflats, estuaries, inlets, sewage farms, saltworks, harbours, coastal lagoons and bays.	No suitable habitat for this species in the project area.

Common name	Scientific name	Conservation status		Most recent database record	Other record	Likely occurrence in project area	Habitat description	Rationale for likelihood ranking
		EPBC	FFG					
Red-tailed Black-Cockatoo	*Calyptorhynchus banksia graptogyne*	EN	e	1846		Negligible	Desert Stringybark, Brown Stringybark and Buloke woodlands.	Victorian population does not extend east of the Grampians. This species does not occur within the project area.
Regent Honeyeater	*Anthochaera phrygia*	CR	cr	1846	PMST	Negligible	A range of dry woodlands and forests dominated by nectar- producing tree species.	Although on occasion the odd individual of this species turns up in the local area Melbourne is considered outside of the species current range and no suitable woodland habitat is present within the project area.
Silver Perch	*Bidyanus bidyanus*	CR	e	1981		Negligible	Lowland streams within the Murray-Darling Basin.	No suitable habitat within the project area
Southern Whiteface	*Aphelocephala leucopsis*	VU		1995	PMST	Low	Occurs in a wide range of open woodlands and shrublands, favouring sparsely treed areas with an herbaceous understorey containing grasses and/or shrubs.	Suitable habitat located within the woodland, however there is no suitable habitat within this project area and the species may only fly over.
Spot-tailed Quoll	*Dasyurus maculatus maculatus (SE mainland population)*	EN	e		PMST	Negligible	Rainforest and wet and dry sclerophyll forests and woodlands.	No suitable habitat for this species in the project area.
Striped Legless Lizard	*Delma impar*	VU	e	2019	PMST	Low	Natural temperate grassland, grassy woodland and exotic grassland.	Extensive targeted surveys have been previously undertaken at Melbourne Airport, and the species was not detected. Based on the results of previous surveys undertaken more broadly, and the modified nature of habitat present, this species is considered to have a low likelihood of occurrence.

Common name	Scientific name	Conservation status		Most recent database record	Other record	Likely occurrence in project area	Habitat description	Rationale for likelihood ranking
		EPBC	FFG					
Superb Parrot	*Polytelis swainsonii*	VU	e	1846		Low	Red-gum and box- dominated forests and woodlands.	Project area is outside of the species known range. This species does not occur within the project area.
Swamp Skink	*Lissolepis coventryi*	EN	e		PMST	Low	Densely vegetated swamps and associated watercourses, and adjacent wet heaths, sedgelands and saltmarshes.	No suitable habitat for this species in the project area.
Swift Parrot	*Lathamus discolor*	CR	cr	2000	PMST	Low	A range of forests and woodlands, especially those supporting nectar-producing tree species. Also well-treed urban areas	The species has been recorded from the woodland located to the north of the project area in 2010, however there is no suitable habitat within this project area and the species may only fly over.
Trout Cod	*Maccullochella macquariensis*	EN	e	1908		Low	Streams characterised by a high abundance of large woody debris.	Project area is outside accepted range of the species. Historic records represent failed translocations.
White-throated Needletail	*Hirundapus caudacutus*	VU	v	2019	PMST	High	An almost exclusively aerial species within Australia, occurring over most types of habitat, particularly wooded areas.	It is likely that the species utilises the airspace at Melbourne Airport with the woodland providing preferable habitat for the species. There is an incidental record of the species from 2010 (Birdlife Australia) over Sky Road in Melbourne Airport and other records surrounding the Airport.
Yarra Pygmy Perch	*Nannoperca obscura*	VU	v		PMST	Negligible	Lakes, pools and slow-flowing streams with abundant aquatic vegetation.	No suitable habitat within the project area

Common name	Scientific name	Conservation status		Most recent database record	Other record	Likely occurrence in project area	Habitat description	Rationale for likelihood ranking
		EPBC	FFG					
Yellow-bellied Glider	*Petaurus australis*	VU	v		PMST	Negligible	Sclerophyll forest with large hollow-bearing trees, prefers mature eucalypt dominated forest and woodland. Distributed along South-eastern Australia.	No suitable habitat for this species in the project area.
Potential threatened Fauna Species – State Significance (FFG Act)								
Amethyst Hairstreak Butterfly	*Jalmenus icilius*		e	1921		Low	Occurs in open woodland, grassland and arid woodland in all mainland states. Adults feed on flowers and are generally seen in or near patches of suitable larval food plants. In Victoria, the larvae feed mainly on acacias. The larvae are attended by the ant species Iridomyrmex rufoniger. This species was considered to be extinct in the Melbourne region until it was rediscovered in the Amber fields Grassland Reserve in Craigieburn in 2015.	One recorded from similar habitat within 10km of the project area. Records of this species in the Melbourne area are very uncommon and the species has not been observed during other various ecological surveys at Melbourne Airport to date.
Australasian Shoveler	*Spatula rhynchotis*		v	2019		Low	Variety of wetlands, with a preference for large, permanent, freshwater lakes/swamps with dense fringing vegetation.	No suitable habitat within the project area.
Australian Bustard	*Ardeotis australis*		cr	1846		Negligible	Grassland, open dry woodlands of Mallee and mulga, arid heathland saltbush and bluebush.	Locally extinct.

Common name	Scientific name	Conservation status		Most recent database record	Other record	Likely occurrence in project area	Habitat description	Rationale for likelihood ranking
		EPBC	FFG					
Australian Little Bittern	*Ixobrychus dubius*		e	1980		Negligible	Freshwater swamps, lakes and rivers with dense reedbeds, saltmarsh and coastal lagoons.	No suitable habitat within the project area.
Australian Mudfish	*Neochanna cleaveri*		e	2008		Low	Freshwater habitats with abundant aquatic vegetation such as streams, backwaters, billabongs and floodplain wetlands.	No suitable habitat within the project area.
Bearded Dragon	*Pogona barbata*		v	1988		Low	Woodlands, forests and heathlands with abundant cover of course woody debris.	No suitable habitat within the project area, outside current accepted range for the species.
Black Falcon	*Falco subniger*		cr	2018		Medium	Woodlands, open country and around terrestrial wetlands areas, including rivers and creeks. Primarily occurs in arid and semi-arid zones in the north, north-west and west of Victoria.	Area adjacent to runways is highly managed to prevent prey (rabbits, rodents etc) and scare cannon guns are used to prevent bird activity in the area. However, suitable habitat present in the broader local area and the species may forage over the project area occasionally.
Blue-billed Duck	*Oxyura australis*		v	2019		Low	Open or densely vegetated wetlands.	No suitable habitat within the project area.
Brown Toadlet	*Pseudophryne bibronii*		e	1994		Low	A wide variety of woodland, forest and grassland habitats, where it shelters under leaf litter and other debris in moist soaks and depressions. Breeds in swamps and inundated habitats, and along creek lines.	Suitable habitat present for the species in wooded areas near the project area, however no suitable habitat within the project area.

Common name	Scientific name	Conservation status		Most recent database record	Other record	Likely occurrence in project area	Habitat description	Rationale for likelihood ranking
		EPBC	FFG					
Brush-tailed Phascogale	*Phascogale tapoatafa*		v	2017		Negligible	Drier sclerophyll forests and woodlands.	No woodland habitat within the project area.
Bush Stone-curlew	*Burhinus grallarius*		cr	1846		Negligible	Open woodland, treed farmland.	Lack of suitable habitat. Site is outside accepted range of the species.
Caspian Tern	*Hydroprogne caspia*		v	2007		Low	Estuaries, inlets, bays, lagoons, inland lakes, flooded pasture, sewage ponds.	No suitable habitat within the project area.
Common Greenshank	*Tringa nebularia*		e		PMST	Negligible	A variety of ephemeral and permanent inland wetlands and sheltered coastal wetlands.	No suitable habitat within the project area.
Common Sandpiper	*Actitis hypoleucos*		v	1981	PMST	Negligible	Migrates to Australia from Eurasia in August where it inhabits a wide variety of coastal and inland wetlands with muddy margins before departing north in March.	No suitable habitat within the project area.
Diamond Dove	*Geopelia cuneata*		v	1999		Low	Drier woodlands and scrub, spinifex and mulga.	No suitable habitat within the project area.
Eastern Bent-winged Bat	*Miniopterus orianae oceanensis*		cr	2013		Low	A variety of treed and treeless habitats. Roosts in caves and man-made structures.	May fly over the project area, however no suitable roosting habitat within the project area.
Eastern Great Egret	*Ardea alba modesta*		v	2021		Low	Flooded crops, pasture, swamps, lagoons, saltmarsh, sewage ponds, estuaries, dams, roadside ditches. Breeds in trees standing in water.	No suitable habitat within the project area.

Common name	Scientific name	Conservation status		Most recent database record	Other record	Likely occurrence in project area	Habitat description	Rationale for likelihood ranking
		EPBC	FFG					
Fat-tailed Dunnart	*Sminthopsis crassicaudata*		v	1990		Low	Inhabits sparse grasslands and open shrubland habitats, usually where there is a significant component of bare ground and suitable refuge sites such as surface rocks or logs where it constructs nests of grass or other dried plant material.	Low quality habitat within the project area, lacking suitable habitat components such as logs and rocks. The species has not been recorded within the local area (<10 kms) within the last 20 years.
Freckled Duck	*Stictonetta naevosa*		e	2007		Low	Large freshwater wetlands, generally with dense vegetation.	No suitable habitat within the project area.
Grey-crowned Babbler	*Pomatostomus temporalis*		v	1846		Negligible	Open forests and woodlands.	Site is outside current accepted range of the species.
Grey Goshawk	*Accipiter novaehollandiae*		e	2018		Low	Rainforest, gallery forest, tall wet forest and woodland. Also partially cleared agricultural land.	No suitable habitat within the project area.
Hardhead	*Aythya australis*		v	2020		Low	Deep freshwater swamps and wetlands, with abundant aquatic and terrestrial vegetation for roosting. Can occur in sheltered estuaries.	No suitable habitat within the project area.
Lewin's Rail	*Lewinia pectoralis*		v	1991		Low	Swamps, dense riparian vegetation and saltmarsh.	Confined to vicinity of watercourses and dams however there is limited suitable habitat present in the project area for this species.

Common name	Scientific name	Conservation status		Most recent database record	Other record	Likely occurrence in project area	Habitat description	Rationale for likelihood ranking
		EPBC	FFG					
Little Eagle	*Hieraaetus morphnoides*		v	2017		Medium	Woodland and open areas. Rabbits are a key component of their diet. Nesting occurs in mature trees in open woodland or riparian vegetation.	Suitable habitat present in the broader local area and the species may forage over the project area.
Little Egret	*Egretta garzetta*		e	2019		Low	Swamps, billabongs, floodplain pools, mudflats, mangroves and channels; breeds in trees standing in water.	No suitable habitat within the project area.
Magpie Goose	*Anseranas semipalmata*		v	2016		Negligible	Swamps, lakes, sewage ponds, flooded pasture, dams	No suitable habitat within the project area.
Marsh Sandpiper	*Tringa stagnatilis*		e	2018		Negligible	Permanent or ephemeral wetlands, mudflats and saltmarshes in coastal and inland environments.	No suitable habitat within the project area.
Murray River Turtle	*Emydura macquarii*		cr	2017		Low	A medium sized freshwater turtle that inhabits inland river systems including the Murray- Darling catchment.	Introduced to waterways in the local area, but considered unlikely to be present within the project area.
Musk Duck	*Biziura lobata*		v	2019		Low	Deep, permanent freshwater wetlands with areas of open water and patches of dense aquatic vegetation.	No suitable habitat within the project area.
Platypus	*Ornithorhynchus anatinus*		v	1999		Low	A variety of freshwater waterbodies, particularly those with stable banks suitable for burrows, and shallow waters for foraging.	No suitable habitat within the project area, and no downstream records of the species within the last 20 years.

Common name	Scientific name	Conservation status		Most recent database record	Other record	Likely occurrence in project area	Habitat description	Rationale for likelihood ranking
		EPBC	FFG					
Plumed Egret	*Ardea intermedia plumifera*		cr	1980		Low	Densely-vegetated freshwater wetlands including lakes, swamps and billabongs. Breeds in trees standing in water.	No suitable habitat within the project area.
Southern Toadlet	*Pseudophryne semimarmorata*		e	1961		Low	A wide variety of woodland, forest and grassland habitats, where it shelters under leaf litter and other debris in moist soaks and depressions. Breeds in swamps and inundated habitats, and along creek lines.	Very few records from the broader local area, as the project area is outside current accepted range.
Speckled Warbler	*Pyrrholaemus sagittatus*		e	2018		Low	Eucalypt woodland with rocky gullies, ridges, tussock grasses and a sparse shrub understorey.	Confined to woodland areas and therefore unlikely to occur within the project area.
Turquoise Parrot	*Neophema pulchella*		v	2000		Low	Woodlands and associated grasslands.	No recent records in the local area. Some suitable habitat nearby but is likely only to be a rare visitor.
Tussock Skink	*Pseudemoia pagenstecheri*		e	2020		High	On the ground in a range of grasslands or sparse grassy woodlands from alps to coast.	Seventeen Tussock Skink were recorded during the targeted SLL tile surveys. Suitable habitat is present within grassland habitat throughout Melbourne Airport and project areas A, B, C, D, E and F and was recorded from tile grids both landside and airside.

Common name	Scientific name	Conservation status		Most recent database record	Other record	Likely occurrence in project area	Habitat description	Rationale for likelihood ranking
		EPBC	FFG					
White-bellied Sea-Eagle	*Haliaeetus leucogaster*		e	2019		Low	Coastal areas such as beaches and estuaries, inland wetlands and major inland streams.	May visit waterways and dams in the broader local area but unlikely to make significant use of the project area.
Yellow-bellied Sheathtail Bat	*Saccolaimus flaviventris*		v	1932		Low	A variety of habitats, ranging from wet forests to desert.	May occasionally fly over the project area, however no suitable roosting habitat within the project area.

Table 3 Migratory fauna species recorded or predicted to occur within 10 km of the project area

Scientific name	Common name	Most recent record
Migratory species		
Gallinago hardwickii	Latham's Snipe	2019
Plegadis falcinellus	Glossy Ibis	2006
Hirundapus caudacutus	White-throated Needletail	2019
Apus pacificus	Fork-tailed Swift	2006
Pandion haliaetus	Osprey	PMST
Ardenna tenuirostris	Short-tailed Shearwater	2008
Sterna hirundo	Common Tern	2006
Hydroprogne caspia	Caspian Tern	2007
Thalasseus bergii	Crested Tern	2021
Charadrius mongolus	Lesser Sand Plover	1978
Charadrius bicinctus	Double-banded Plover	2004
Charadrius leschenaultii	Greater Sand Plover	PMST
Numenius madagascariensis	Eastern Curlew	1977
Limosa lapponica	Bar-tailed Godwit	1977
Actitis hypoleucos	Common Sandpiper	1981
Tringa nebularia	Common Greenshank	PMST
Tringa stagnatilis	Marsh Sandpiper	2018
Calidris ferruginea	Curlew Sandpiper	1977
Calidris acuminata	Sharp-tailed Sandpiper	2009
Calidris canutus	Red Knot	PMST
Calidris alba	Sanderling	1977
Calidris melanotos	Pectoral Sandpiper	PMST
Motacilla flava	Yellow Wagtail	PMST
Rhipidura rufifrons	Rufous Fantail	2021
Myiagra cyanoleuca	Satin Flycatcher	1979
Monarcha melanopsis	Black-faced Monarch	PMST

Appendix B

Detailed survey methods

1. Overview

This appendix describes the:

- Detailed native vegetation survey methods
- Detailed threatened ecological community assessment methods
- Detailed targeted fauna survey methods for:
  - Golden Sun Moth

2. Detailed native vegetation survey methods

Vegetation assessments followed a three-step approach:

1. Identifying and mapping all native vegetation using the Victorian EVC classification system
2. Identifying and mapping all areas of native vegetation that satisfy the criteria for a TEC listed under the EPBC Act
3. Assessing the quality of all TECs present.

Native vegetation patches were identified and mapped using the ArcGIS Collector app on a GPS-enabled tablet. This mapping relied on definitions provided in the Victoria Planning Provisions (VPP), NatureKit (DELWP 2020) and Guidelines for the Removal, Destruction or Lopping of Native Vegetation (DELWP 2017). Key definitions are outlined in Table B1.

Patches of native vegetation were assigned to appropriate EVCs with reference to EVC benchmarks for the appropriate bioregion (DSE 2004a, DSE 2004b), NatureKit's EVC modelling (DELWP 2020), maps dating back to 1840 (Kemp 1840, DoL c. 1849, Hoddle 1850, DoD 1915, DoD 1938, DCLS 1946), geological mapping (Mines Department 1970, Mines Department 1973, DNRE 1997, Senversa 2020 (unpublished)) and previous studies (McDougall 1987, Biosis 2015, Biosis 2019).

Vegetation patches were mapped at a scale of 10 square metres (0.001 hectares) for the following reasons:

- The EPBC Act Offset Assessment Guide (DSEWPaC 2012b) requires a scale of at least 0.01 hectares for quantifying impacts on threatened ecological communities. Melbourne Airport's mapping, on a 0.001-hectare scale (i.e. one order of magnitude finer resolution), allows for accurate addition and rounding of impacts
- A scale of 0.001 hectares is the scale required to map 0.001 habitat hectares (assuming a perfect vegetation condition score) which is the scale required by DELWP's Native Vegetation Offset Register for securing offset sites in Victoria
- A scale of 10 square metres was approximately within the resolution of the error of the GPS-enabled tablet.

Table B1 Key definitions used for identifying and mapping native vegetation at Melbourne Airport

Term	Definition	Reference
Native vegetation	Plants that are indigenous to Victoria, including trees, shrubs, herbs, and grasses.	VPP, cl. 73.01
Patch of native vegetation	An area of vegetation where at least 25% of total perennial understorey plant cover is native or any area with three or more native canopy trees where the drip line of each tree touches the drip line of at least one other tree, forming a continuous canopy (Note that the Current Wetlands Map has been excluded from this definition).	DELWP 2017, p.6
Scattered tree	A native canopy tree that does not form part of a patch.	DELWP 2017, p.6
Canopy tree	A mature tree (i.e. it is able to flower) greater than 3 metres in height and normally found in the upper layer of the relevant vegetation type (EVC).	DELWP 2017, p.35
Ecological Vegetation Class (EVC)	A native vegetation type classified on the basis of a combination of its floristics, lifeforms and ecological characteristics.	DELWP 2017, p.35

3. Detailed Threatened Ecological Communities (TEC) assessment methods

Vegetation corresponding to a TEC listed under the EPBC Act was identified and mapped using ArcGIS Collector on a GPS-enabled tablet. EVC mapping helped identify the potential presence of TECs. The following TEC was identified and mapped within the project area:

- Natural Temperate Grassland of the Victorian Volcanic Plain (critically endangered).

When mapping this TEC, the following considerations applied:

- Only naturalised flora species were considered. Planted vegetation was not considered as contributing to total vegetation cover
- Vegetation boundaries were mapped as they appeared on the ground at the time of the assessment. For example, the presence and cover of introduced annuals is not considered when mapping NTGVVP. When introduced species that may have annual or perennial life histories (e.g. Ox-tongue *Helminthotheca echioides*) were encountered, only the life history traits that the plants appeared to be exhibiting at the time of the assessment were considered. Therefore, if plants appeared to be one year old and persisting in favourable conditions (e.g. high-nutrient drainage lines) they were considered perennial. When there was doubt, it was assumed the plants were annual.

A field checklist was devised for determining the presence of the NTGVVP TEC (Table B2), which relies upon the diagnostic characteristics and condition thresholds outlined in the listing advice (TSSC 2008). Where the listing advice was unclear, further clarity was sought from the NTGVVP Information Sheet (DSEWPaC 2011) and, if required, guidance provided by DCCEEW (and its predecessors).

The field checklist was used to identify the presence or absence of NTGVVP in areas mapped as suitable EVCs (e.g. Heavier-soils Plains Grassland). The checklist was also used in areas of predominantly introduced vegetation previously mapped as NTGVVP to confirm they no longer satisfied the key diagnostic characteristics and condition thresholds of the TEC.

The field checklist relies on accurate plant-cover estimates being obtained. To ensure that assessments were consistent and standardised, cover estimates were made with reference to predefined cover charts.

Where cover estimates were close to a condition threshold, gridded 1x1 metre quadrats were used to objectively sample plant covers within the grassland patch and confirm the veracity of the cover estimates.

The 1x1 metre quadrats were gridded with 10 horizontal and 10 vertical string lines, resulting in 100 intersection points at which flora species were recorded (allowing for an objective estimate of the percentage cover of each plant species across the square metre). Where the gridded 1x1 metre quadrats were used, patches were randomly sampled to avoid sampling bias.

The listing advice includes minimum contiguous size thresholds for a grassland patch to qualify as NTGVVP. It uses terms such as 'native vegetation remnant' and 'grassland patch' (TSSC 2008, p.3).

For the purpose of assessing size thresholds, the 'grassland patch' was taken to be the NTGVVP patch rather than the (generally larger) Heavier-soils Plains Grassland patch. In addition, the 'native vegetation remnant' was taken to be the contiguous 'patch of native vegetation' as defined in Table B1 rather than a contiguous area of one or more TECs. DAWE confirmed that this was an appropriate interpretation of the listing advice (J. Vranjic, DAWE, pers. comm., March 2020).

This literal interpretation of the NTGVVP listing advice size thresholds had the following implications for grassland patches that otherwise met all other key diagnostic characteristics and condition thresholds for NTGVVP:

- The grassland patch was not considered to be NTGVVP if the grassland patch was less than 0.05 hectares even if all other key diagnostic characteristics and condition thresholds were met
- Where the grassland patch was contiguous with other native vegetation that did not satisfy key diagnostic characteristics or condition thresholds for NTGVVP, together forming a native vegetation remnant of one hectare or less, the grassland patch was considered to be NTGVVP only if the grassland patch was at least 0.05 hectares
- Where the grassland patch was contiguous with other native vegetation that did not satisfy key diagnostic characteristics or condition thresholds for NTGVVP, together forming a native vegetation remnant of more than one hectare, the grassland patch was considered to be NTGVVP only if the grassland patch was at least 0.5 hectares.

This literal interpretation results in an anomaly whereby small patches of grassland (at least 0.05 hectares but less than 0.5 hectares) are considered to be NTGVVP when they are part of small native vegetation remnants (one hectare or less) but not when they form part of larger vegetation remnants (greater than one hectare). In effect, small patches of grassland with greater connectivity with surrounding native vegetation are less likely to meet the minimum size thresholds for NTGVVP. DAWE has confirmed that this anomaly is nevertheless the correct interpretation of the listing advice (J. Vranjic, DAWE, pers. comm., 19 March 2020).

Table B2 NTGVVP Field Checklist

Habitat zone:		**Date:**		**Recorder:**	
1.	Time since mowing/grazing/burning:	Days	Weeks	Months	
2.	Do native flora make up ≥50% of total vegetation cover, ex. introduced annuals?				Y / N
	% cover of all native flora (incl. native annuals):				
	% cover perennial weeds:				
3.1	Do *Themeda*, *Rytidosperma*, *Austrostipa* and/or *Poa* (circle genera that are present) make up ≥50% native cover AND ≥50% of total perennial tussock cover?				Y / N
	% cover of *Themeda*/*Rytidosperma*/*Austrostipa*/*Poa*:				
	% cover of all perennial tussocks (native and introduced):				
3.2	If total perennial tussock cover represented by *Themeda*, *Rytidosperma*, *Austrostipa* and/or *Poa* is <50%, then is ground cover of native forbs (wildflowers) ≥50% of total vegetation cover during spring-summer (September to February)?				Y / N
	% cover of all vegetation (native and introduced, ex. moss, lichen and introduced annuals):				
	% cover of native forbs:				
3.3	Do *Themeda*, *Rytidosperma*, *Austrostipa* and/or *Poa* (circle genera that are present) make up ≥50% native cover AND is cover of perennial non-grass weeds <30% of total vegetation cover at any time of the year?				Y / N
	% cover of all vegetation (native and introduced, ex. moss, lichen and introduced annuals):				
	% cover of perennial non-grass weeds:				
4.1	For native vegetation remnant of ≤1ha: is contiguous grassland patch ≥0.05ha AND do shrubs/trees >1m tall have % crown cover of ≤5%?				Y / N
	Area (ha) of contiguous grassland patch:				
	% crown cover of shrubs and trees >1m tall:				
4.2	For native vegetation remnant of >1ha: is contiguous grassland patch ≥0.5ha AND are there <2 mature (*not defined) trees/ha?				Y / N
	Area (ha) of contiguous grassland patch:				
	# mature trees within patch:				
5.	Is NTGVVP present (i.e. responded Y to 2, 3 and 4)? If Y, proceed to VQA.				Y / N

4. Quality assessments

The quality of native vegetation corresponding to a TEC was assessed using the habitat hectare (vegetation quality assessment) methodology (DSE 2004c).

DCCEEW has previously endorsed the 'habitat hectare' method as appropriate for assessing the condition of TECs such as NTGVVP in Victoria.

The habitat hectare score comprised the following:

- A condition score (out of 75) incorporating values for understorey, lack of weeds, recruitment, organic litter and, where relevant, large trees, canopy cover and logs. The following qualifications should be noted:

- Condition scores were determined with reference to relevant EVC benchmarks maintained by DELWP
- Where components of the score were not relevant (e.g. values for large trees, canopy cover and logs are not part of the benchmark for Heavier- soils Plains Grassland) the condition score was standardised to provide a score out of 75
- The condition score considered only the condition of native vegetation corresponding to the TEC. The condition of any contiguous vegetation of the same EVC was not considered. For example, where a patch of NTGVVP formed part of a broader patch of Heavier-soils Plains Grassland EVC, the condition score only considered what was present within the smaller NTGVVP patch
- In accordance with the habitat hectare methodology, vegetative life forms in the understorey were 'assessed according to their current appearance and height, not according to their predicted mature expression' (DSE 2004c, p.18) with reference to the life-form category definitions provided in Appendix 6 of the Vegetation Quality Assessment Manual (DSE, 2004 p.58). As a result, if a grass species (e.g. Spear Grass *Austrostipa* spp.) that would normally have an inflorescence more than one metre in height had been slashed to a height of 20 centimetres, it was recorded as a medium tufted graminoid rather than a large tufted graminoid. Similarly, if both woody and non-woody individuals of a species (e.g. Berry Saltbush *Atriplex semibaccata* or Ruby Saltbush *Enchylaena tomentosa* var. *tomentosa*) were observed, they were recorded in both shrub (woody) and herb (non-woody) life-form categories.

- A landscape score (out of 25), incorporating values for patch size, percentage of native vegetation in the surrounding area (neighbourhood) and distance to core area. The following qualifications should be noted:
  - Patch size was taken to be the size of the entire contiguous patch of native vegetation (as defined in Table B1) rather than the size of the TEC that may have been a subset of the broader patch of native vegetation. For example, where a patch of NTGVVP was part of a larger patch of contiguous Heavier-soils Plains Grassland EVC patch, patch size was taken to be the size of the broader Heavier-soils Plains Grassland patch. This means that TECs, buffered by areas of native vegetation that did not meet the criteria of the threatened ecological community, nevertheless received slightly higher patch-size values than TECs with no native vegetation buffers
  - Percentage of native vegetation in the neighbourhood was determined with reference to contemporary native vegetation mapping that had been completed in the surrounding area as part of the same project and, where areas of the neighbourhood had not been assessed, DELWP's 2005 EVC modelling via NatureKit.

5. Detailed targeted fauna survey methods for Golden Sun Moth (GSM)

5.1. Previous survey effort

A desktop review was undertaken of all previous GSM survey reports at Melbourne Airport. These reports include:

- GAGIN 2008. Habitat Assessment and Presence of *Synemon plana* (Golden Sun Moth), Melbourne Airport, Tullamarine. Report prepared for Australia Pacific Airports Melbourne

- GAGIN 2009. Second Report Presence of the Golden Sun Moth *Synemon plana* Melbourne Airport 2008. Report prepared for Australia Pacific Airports Melbourne.
- GAGIN 2010. Survey for the Presence of Golden Sun Moth *Synemon plana* Melbourne Airport, Tullamarine 2009. Report prepared for Australia Pacific Airports Melbourne.
- Biosis 2015. Flora and fauna assessment of the Runway Development Program, Melbourne Airport: Existing conditions and impact assessment report. Authors: Kay K, Smales I & Byrne A, Biosis Pty Ltd, Melbourne.
- Biosis 2019. Melbourne Airport Golden Sun Moth habitat survey. Letter report to Australia Pacific Airports Melbourne. Author: Campbell, K, Biosis Pty Ltd, Melbourne.

This information was then used to determine whether adequate survey effort existed for the species and if not what the level of additional survey was to be.

It was determined that there were no surveys undertaken within the Melbourne Airport Third Runway (M3R) project area in the last three years and as such an updated assessment for the entire project area was to occur.

5.2. Habitat assessment

Prior to the GSM flight season between October–November the entire M3R project area was traversed by one zoologist experienced in GSM habitat surveys to determine the project area habitat values.

The project area was subsequently classified as:

- Not habitat:
  - Pasture improved paddocks
  - Paddocks with no food plants
  - Degraded areas covered in fill with no food plants
  - Areas of infrastructure, roads, stockpiles etc.
- Potential habitat
  - Any areas where there was cover of known food plants.

All areas of potential habitat located within and immediately adjacent to the M3R project area were subject to targeted surveys.

The areas of potential habitat were divided into five survey areas. Each survey area was assessed four times during the targeted surveys. A summary of the survey areas and habitat descriptions are provided in Table B3 below.

Table B3 M3R Project Golden Sun Moth survey sites and details

GSM survey site	Site size (hectares)	Transect	No of surveyors	Distance between transects	Site characteristics
GSM survey site Northern area	62.88	Walk	3	Approx. 100 meters	North of the woodland Open Grey Box woodland with mixed understory of Chilean Needle Grass *Nassella neesiana*, Blanket Weed *Galenia pubescens*, Serrated Tussock *Nassella trichotoma*, scattered wallaby grass *Rytidosperma* sp. and Spear Grass *Austrostipa* sp. there are also some larger expanses of open Chilean Needle Grass patches throughout. Area up the hill from Deep CreeK tributary. Characterised by Serrated Tussock and Chilean Needle Grass. Thistles and Blanket weed. Sub-optimal habitat but scattered Wallaby Grass present. Sunbury Road Paddock. A mix of Phalaris *Phalaris aquatica*, brassicas and scattered occurrence of Chilean Needle Grass and Wallaby Grass. HIAL disturbed ground story.
GSM survey site Mcnabs Road West	178.81	All areas of native grassland walked. In some degraded areas transects were driven	2	Approx. 100 meters	Broad area that includes habitat ranging from high cover of wallaby grass and optimal habitat to degraded areas with scattered occurrence of wallaby grass and paddocks dominated by Chilean Needle Grass, Rye *Lolium* Sp., Oat *Avena* sp., Phalaris and grazed by cattle in areas.
GSM survey site Arundel Creek	71.32	Walked/ driven were possible	2	Approx. 100 meters	Predominantly Phalaris, Oat, Blanket Weed, one square patch of Chilean Needle Grass. Includes some areas dominated by Wallaby Grass.
GSM survey site Southern area	50.66	Walk	2	Approx. 100 Meters	Areas of native grassland dominated by Wallaby Grass and other areas dominated by Phalaris with scattered occurrences of Chilean Needle Grass, *Brassica* Sp., Oat and Wallaby Grass.
GSM survey site Airside	172	Walk	2	Approx. 100 meters	Dominated by Wallaby Grass and Spear Grass throughout with scattered areas of Chilean Needle Grass and Serrated Tussock.

5.3. Targeted surveys

Targeted surveys were conducted on 8, 17, 23, 24 and 29 December 2019. All four surveys were conducted on days of appropriate weather conditions as set out in the survey guidelines within the *Significant impact guidelines for the critically endangered golden sun moth (Synemon plana)* (DEWHA 2009a).

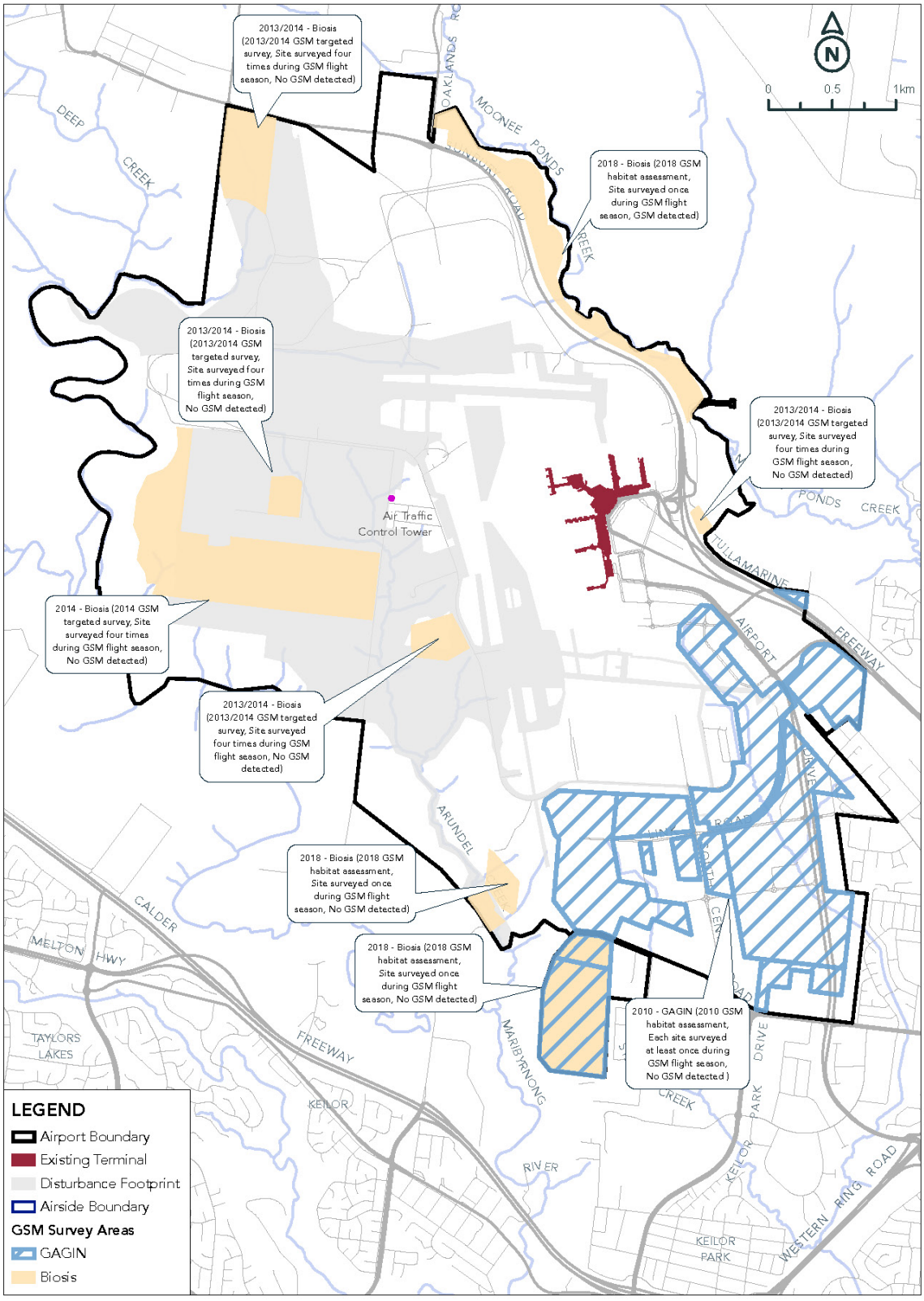
Adults of the species, especially males, can be observed during their diurnal flights. However, their flights are generally restricted to sunny days with little wind and when temperatures are above 20°C by 10 am. Hence, capacity to detect the species is limited to active searching when conditions are precisely appropriate.

To detect any GSM within the site, two or three ecologists experienced in GSM identification walked transects approximately 100 metres apart. Where possible transects were driven across the survey sites.

Appendix C

Overview of previous surveys for GSM

Previous survey effort for GSM at Melbourne Airport



Appendix D

Direct impacts on NTGVVP

MELBOURNE AIRPORT

Melbourne Airport

A - Airfield Renaming

- Ecological Impacts -

Scale @ A3 1:11,700

0 225 450m

N

LEGEND

Proposed Development / Disturbance Footprint

Existing and Pending Approvals

EPBC Act Listed Ecological Community / Fauna Habitat

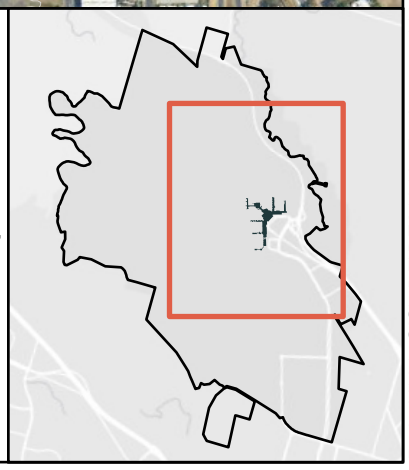
Natural Temperate Grassland of the Victorian Volcanic Plain

Native Vegetation

132 Plains Grassland

*Co-ordinates in MGA Zone 55, GDA 94 Australian Height Datum

Map Printed: 11/06/2024 3:29 PM



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MELBOURNE AIRPORT

Melbourne Airport

B - Melbourne Airport Pavement Maintenance Program 3 (MAPMP 3)

- Ecological Impacts -

Scale @ A3 1:4,400

0 80 160m

N

LEGEND

Proposed Development / Disturbance Footprint

Existing and Pending Approvals

EPBC Act Listed Ecological Community / Fauna Habitat

Natural Temperate Grassland of the Victorian Volcanic Plain

Native Vegetation

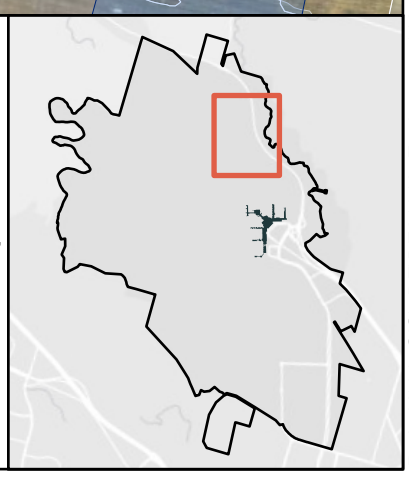
125 Plains Grassy Wetland

132 Plains Grassland

Aerial imagery: © Aerometrex

*Co-ordinates in MGA Zone 55, GDA 94 Australian Height Datum

Map Printed: 11/06/2024 3:29 PM



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MELBOURNE AIRPORT

Melbourne Airport

C - Runway 09/27 Overlay

- Ecological Impacts -

Scale @ A3 1:8,400

0 160 320m

N

LEGEND

Proposed Development / Disturbance Footprint

Existing and Pending Approvals

EPBC Act Listed Ecological Community / Fauna Habitat

Natural Temperate Grassland of the Victorian Volcanic Plain

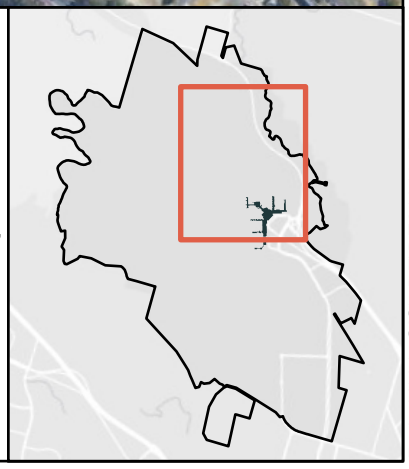
Native Vegetation

132 Plains Grassland

Aerial imagery: © Aerometrex

*Co-ordinates in MGA Zone 55, GDA 94 Australian Height Datum

Map Printed: 11/06/2024 3:29 PM



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MELBOURNE AIRPORT

Melbourne Airport

D - Hotel Apron and Whiskey/Sierra Apron Projects

- Ecological Impacts -

Scale @ A3 1:2,300

0 40 80m

N

LEGEND

Proposed Development / Disturbance Footprint

Existing and Pending Approvals

EPBC Act Listed Ecological Community / Fauna Habitat

Natural Temperate Grassland of the Victorian Volcanic Plain

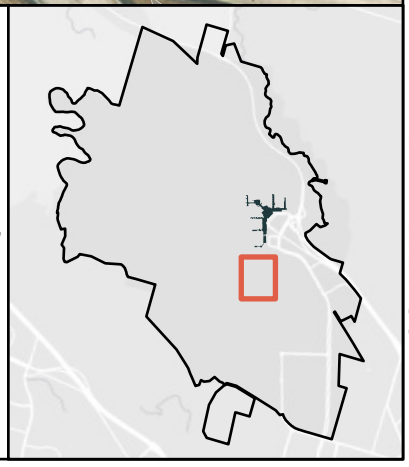
Native Vegetation

132 Plains Grassland

Aerial imagery: © Aerometrex

*Co-ordinates in MGA Zone 55, GDA 94 Australian Height Datum

Map Printed: 11/06/2024 3:29 PM



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MELBOURNE AIRPORT

Melbourne Airport

E - Staff Car Park Extension

- Ecological Impacts -

Scale @ A3 1:1,900

0 30 60m

N

LEGEND

Proposed Development / Disturbance Footprint

Existing and Pending Approvals

EPBC Act Listed Ecological Community / Fauna Habitat

Natural Temperate Grassland of the Victorian Volcanic Plain

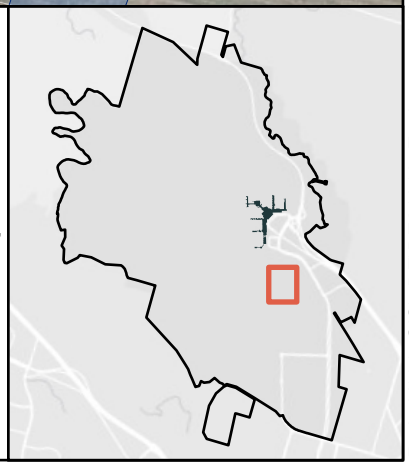
Native Vegetation

132 Plains Grassland

Aerial imagery: © Aerometrex

*Co-ordinates in MGA Zone 55, GDA 94 Australian Height Datum

Map Printed: 11/06/2024 3:29 PM



Path: V:\01_GIS_DE\DE21010_Environment\10 GIS\02 Enviro Projects\03 Airfield project impacts to environment\Airfield project impacts to environment.aprx

Appendix E

Offsets assessment guide

Offsets Assessment Guide

For use in determining offsets under the *Environment Protection and Biodiversity Conservation Act 1999*
2 October 2012

This guide relies on Macros being enabled in your browser.

Matter of National Environmental Significance	
Name	NTGVVP
EPBC Act status	Critically Endangered
Annual probability of extinction Based on IUCN category definitions	**6.8%**

Key to Cell Colours
User input required
Drop-down list
Calculated output
Not applicable to attribute

Impact calculator

Protected matter attributes	Attribute relevant to case?	Description	Quantum of impact		Units	Information source
Ecological communities						
Area of community	Yes	Impact area: 12.81 ha of NTGVVP with weighted average quality score of 40.38/100.	**Area**	12.81	Hectares	
			Quality	**4**	Scale 0-10	
			Total quantum of impact	5.12	Adjusted hectares	
Threatened species habitat						
Area of habitat	No		**Area**			
			Quality			
			Total quantum of impact	0.00		
Protected matter attributes	**Attribute relevant to case?**	**Description**	**Quantum of impact**		**Units**	**Information source**
Number of features e.g. Nest hollows, habitat trees	No					
Condition of habitat Change in habitat condition, but no change in extent	No					
Threatened species						
Birth rate e.g. Change in nest success	No					
Mortality rate e.g Change in number of road kills per year	No					
Number of individuals e.g. Individual plants/animals	No					

Offset calculator

Protected matter attributes	Attribute relevant to case?	Total quantum of impact	Units	Proposed offset	Time horizon (years)		Start area and quality		Future area and quality without offset		Future area and quality with offset		Raw gain	Confidence in result (%)	Adjusted gain	Net present value (adjusted hectares)	% of impact offset	Minimum (90%) direct offset requirement met?	Cost ($ total)	Information source
Ecological Communities																				
Area of community	Yes	5.12	Adjusted hectares	Offset site: hypothetical offset to meet offset requirements for NTGVVP.	**Risk-related time horizon (max. 20 years)**	20	**Start area (hectares)**	55	**Risk of loss (%) without offset**	0%	**Risk of loss (%) with offset**	0%	0.00	90%	0.00	0.00	5.13	100.07%	Yes		
									Future area without offset (adjusted hectares)	55.0	**Future area with offset (adjusted hectares)**	55.0								
					Time until ecological benefit	10	**Start quality (scale of 0-10)**	**6**	**Future quality without offset (scale of 0-10)**	**5**	**Future quality with offset (scale of 0-10)**	**7**	2.00	90%	1.80	0.93				
Threatened species habitat																				
Area of habitat	No				**Time over which loss is averted (max. 20 years)**		**Start area (hectares)**		**Risk of loss (%) without offset**		**Risk of loss (%) with offset**									
									Future area without offset (adjusted hectares)	0.0	**Future area with offset (adjusted hectares)**	0.0								
					Time until ecological benefit		**Start quality (scale of 0-10)**		**Future quality without offset (scale of 0-10)**		**Future quality with offset (scale of 0-10)**									
Protected matter attributes	**Attribute relevant to case?**	**Total quantum of impact**	**Units**	**Proposed offset**	**Time horizon (years)**		**Start value**		**Future value without offset**		**Future value with offset**		**Raw gain**	**Confidence in result (%)**	**Adjusted gain**	**Net present value**	**% of impact offset**	**Minimum (90%) direct offset requirement met?**	**Cost ($ total)**	**Information source**
Number of features e.g. Nest hollows, habitat trees	No																			
Condition of habitat Change in habitat condition, but no change in extent	No																			
Threatened species																				
Birth rate e.g. Change in nest success	No																			
Mortality rate e.g Change in number of road kills per year	No																			
Number of individuals e.g. Individual plants/animals	No																			

Appendix F

Cultural Heritage Management Plans

PROVIDED SEPARATELY

Appendix G

Environment and Sustainability Policy

MELBOURNE AIRPORT
Environment and Sustainability Policy

Purpose
The purpose of this policy is to set the direction for our business and incorporate environment, social and governance (ESG) strategies into our decision making, investments and operations.

As a vital piece of strategic infrastructure that benefits the national economy, Melbourne Airport facilitates tourism, freight and trade, and connects people and businesses to the global marketplace. We are committed to reducing our environmental impact and continuing to operate sustainably.

Our goal and commitments
Our goal is to be an environment and sustainability leader for transport and logistics in the Asia-Pacific.

Working proactively with airlines, business partners, tenants, contractors and other stakeholders, the Australia Pacific Airports (Melbourne) (APAM) Board and Executive Leadership Team is committed to provide the necessary focus and resources for our organisation to:

- adopt measures to conserve natural resources and adapt to climate change
- make a material reduction in energy consumption and operational carbon emissions under our direct control and under our influence
- be responsible for and protect the environment directly and indirectly impacted by Melbourne Airport's operations
- significantly reduce our waste to landfill both in terminals and across our estate, and implement circular economy principles across construction projects, re-using resources where possible
- manage our land to protect and enhance First Nations and European heritage and ecology, while ensuring aircraft safety
- make best use of our existing facilities and design, construct and operate new facilities in support of our environmental and sustainability goals
- work with our employees, tenants, business partners, First Nations, regulators, and local and regional communities to develop new strategies to continually improve environmental and sustainability performance and protect heritage and the environment
- comply with all relevant heritage, environmental and energy laws, policies, procedures and other compliance obligations and, where appropriate, exceed these requirements
- prevent, limit and reduce pollution
- continually improve our environmental performance through our certified Environmental Management System.

Accountabilities and responsibilities
This policy applies to all activities related to the management and operation of Melbourne Airport. This includes the activities of employees, tenants, retailers, airline and ground transport partners, and contractors.

All parties are required to comply with this policy and to consider this policy during decision making.

Lyell Strambi
Chief Executive Officer
Australia Pacific Airports (Melbourne)
March 2022

www.beconsult.com.au