Part 3: Assessment approach

NWGGA Strategic Assessment Report

Public re-exhibition version

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10 Introduction

This Strategic Assessment Report (SAR) has been developed to meet the Terms of Reference (ToR) and provide a robust, defendable, clear and transparent assessment of the potential impacts of the Classes of Actions (CoAs) on matters protected under the EPBC Act.

The ToR state that the report needs to:

- Assess the impacts of actions under the Plan on all relevant protected matters
- Address how those impacts will be avoided, mitigated, and offset (where necessary or appropriate) to ensure the long-term protection of protected matters
- Provide sufficient detail to enable an evaluation of the ability of the Plan to ensure the long-term protection and conservation of the relevant protected matters
- Use methods that are appropriate for assessment at a strategic scale, rely on the best available information and discuss uncertainty, including with reference to the data and information that is relied upon

Additional key themes from the ToR relevant to Part 3 include:

- The use and definition of methods that are justifiable and evidence based
- The need to identify and assess areas of uncertainty and risk
- The need to assess consistency with the key legislative requirements of the EPBC Act

This part (Part 3) of the SAR provides an overview of the assessment approach. The approach is structured around the following elements:

- Identifying the relevant potential impacts of development under the Plan (Chapter 11)
- Identifying the protected matters that may be affected by development under the Plan (Chapter 12)
- Using best available information to understand the occurrence and distribution of MNES values to enable an assessment of potential impacts on those values (Chapter 13)
- Using approaches that adequately identify and address uncertainty and risks (Chapter 14)

11 Identifying relevant potential impacts

This chapter:

- Summarises the types of development under the Plan in order to provide context about potential impacts
- Identifies, defines, and describes the impacts which have the potential to occur under the Plan and provides a high level description of the approach used to assess the impact types
- Identifies potentially relevant Key Threatening Processes (KTPs) and Threat Abatement Plans (TAPs)

It is noted that detailed assessments of potential impacts on the relevant protected matters are contained later in Part 4 of this Assessment Report.

The relevant items in the ToR relating to the identification of potential impacts and approach to assessing them are outlined in the following text box:

> *4.1. The Report must describe and assess the likely direct, indirect, and cumulative impacts of actions taken under the Plan on all relevant protected matters. This must include, but not necessarily be limited to, an assessment of impacts of clearing, disturbance, and fragmentation*
>
> *…*
>
> *4.6. The Report must consider the extent to which the impacts on relevant protected matters of actions proposed under the Plan would be consistent with the EPBC Act, including but not limited to:*
>
> *- how approving a class of actions to be taken in accordance with the Plan would not be inconsistent with recovery plans and threat abatement plans (section 146K(2) of the EPBC Act)*
>
> *- how regard has been and will be given to relevant information in conservation advices (section 146K(3) of the EPBC Act), threat abatement plans and recovery plans*

11.1 SUMMARY OF DEVELOPMENT UNDER THE PLAN

The relevant potential impacts of development under the Plan have been identified based on an understanding of the existing environmental context of the Strategic Assessment Area (SAA), as well an understanding of the scope and location of the Classes of Actions (CoAs) covered by the Plan.

11.1.1 LOCATION OF THE STRATEGIC ASSESSMENT AREA

The SAA defines the boundary within which development under the CoAs may occur. The majority of development will occur within the two Growth Areas (NGGA and WGGA), with some additional development occurring outside of the Growth Areas but within the SAA for external infrastructure development, conservation areas and avoidance areas.

The SAA is located in a region on the north-western outskirts of Geelong. Chapter 3 in Part 1 provides a detailed description of the SAA locality and the environment relevant to the Plan.

11.1.2 CLASSES OF ACTIONS UNDER THE PLAN

There are five CoAs that are included in the Plan. They are:

- Urban and commercial development
- Industrial development
- Rural development
- Supporting infrastructure and services
- Environmental management

Chapter 7 in Part 2 provides a description of each class of actions and where they can take place within the SAA.

11.2 DESCRIPTION OF IMPACT TYPES AND THE APPROACH TO ASSESSING THEM

The Plan has the potential to result in three types of impacts which are assessed in this report:

- Direct impacts – which occur from the direct loss of individuals and/or habitat for threatened species, TECs or other protected matters through land clearing
- Indirect impacts – which include secondary impacts to protected matters which can occur adjacent to or downstream of development from either construction or operational phases of development under the Plan
- Cumulative impacts – which considers the combined effects of impacts from development under the Plan, in addition to existing and proposed development that is reasonably foreseeable within the wider region

Each of these impact types is further defined and described below.

11.2.1 DIRECT IMPACTS

For the purposes of this SAR, direct impacts relate to the direct loss of relevant protected matters (such as threatened species and TECs) and their habitat due to land clearing which will occur under the Plan to facilitate development within the Growth Areas and the external infrastructure footprints. Land clearing is associated with the following CoAs under the Plan: urban and commercial development, industrial development, rural development, supporting infrastructure and services, and potentially environmental management.

Direct impacts may result in the mortality of individuals of protected species, loss of habitat for protected species, loss of areas of occurrence of TECs, or the fragmentation of habitat.

Direct impacts will occur:

- Within the areas subject to development within the NGGA and WGGA. The location of these areas is shown in Map 7-1. Note that this includes part of the Heales Road East precinct which is subject to process based development
- Within the external infrastructure footprints that occur outside of the Growth Areas and within the Strategic Assessment Area, as shown in Map 7-1
- Within Cowies Creek Conservation Area, Moorabool River corridor and Moorabool avoidance area within the avoided land in the WGGA, and the gully avoidance area within the avoided land in the NGGA, as shown in Map 7-1. Direct impacts within these areas will be limited as much as possible and only permitted when facilitating environmental management or undertaking limited activities under the supporting infrastructure and services class of actions (see Chapter 7 in Part 2)
- Within the Northern Conservation Area and Eastern Conservation Area, as shown in Map 7-1. Direct impacts in these areas will be limited as much as possible and only permitted when facilitating positive environmental management (see Chapter 7 in Part 2)

APPROACH TO ASSESSING DIRECT IMPACTS

For the purposes of the assessment, it is assumed that all MNES values will be lost within the areas subject to development within the NGGA and WGGA as a result of direct impacts under the Plan. In reality, some retention and enhancement of MNES values and functions within the areas subject to development is likely. The BCS provides the strategy and process for delivering biodiversity protection within these areas; largely by delivering biodiversity co-benefits in areas that are less intensively developed (for example, along landscape connections). However, the extent and outcomes of this will not be defined until the time of precinct planning. This assessment has applied a precautionary approach in assuming loss of all MNES values within these areas given the current lack of detail and certainty around the outcomes that will be delivered.

Direct impacts have been calculated based on an overlay of:

- The areas subject to development within the Growth Areas, and
- The baseline mapping of MNES values that has been developed for the relevant MNES that are assessed in detail in Part 4 of this report

For Heales Road East process based development, the assessment considers and reports on the potential direct impacts to MNES based on modelled habitat. However, the extent and location of these impacts will be confirmed as part of the future process based development for these areas. See Chapter 6 of the Plan for details.

The assessment also recognises that some direct impacts associated with clearing may affect protected matters within the external infrastructure footprints. However, direct impacts to protected matters will be avoided to the fullest extent possible within these footprints, as informed by targeted surveys and detailed infrastructure design. Commitment 19 under the Plan restricts the total scale of direct impacts based on a set of avoidance prescriptions within the external infrastructure footprints.

A detailed assessment of direct impacts under the Plan on protected matters is contained within Part 4 of this SAR. This detailed assessment includes the specific methods used to develop baseline mapping of values and assess direct impacts to each MNES, alongside an analysis of relevant avoidance, mitigation measures and offsets.

11.2.2 INDIRECT IMPACTS

For the purposes of this SAR, indirect impacts are any impacts that could adversely affect biodiversity values beyond the development land. Table 11-1 identifies the indirect impacts which have the potential to occur under the Plan, and the CoAs which are associated with them. A broad description of each indirect impact is also provided.

More detailed evaluation of each indirect impact (including duration, extent and likely severity) and consideration of how they may affect protected matters is included within Part 4 of this SAR. An evaluation of relevant mitigation measures under the Plan for each indirect impact is also contained within Part 4.

APPROACH TO ASSESSING INDIRECT IMPACTS

A largely qualitative approach has been taken to the assessment of indirect impacts. This included assessing indirect impacts from the following three perspectives:

- As part of the analysis of the CoAs. This involved determining how the different CoAs under the Plan may lead to specific types of indirect impacts (see Table 11-1), followed by considering how effectively these impacts will be mitigated under the Plan (see Chapter 17 of Part 4)
- As part of the identification of MNES relevant to the assessment. This involved considering any indirect impact pathways that might have the potential to affect the broad list of MNES that were determined to be potentially relevant to the assessment. The method used in identifying relevant MNES is described in Chapter 12, and the analysis and results are presented in Chapter 18 of Part 4
- As part of the detailed impact assessment for relevant MNES. This involved the identification of the range of threats to each MNES based on a review of key EPBC regulatory and policy documents, an assessment of whether development under the CoAs might indirectly introduce or exacerbate any of those threats, and the identification of the need for additional specific mitigation to address any risks posed. See the detailed assessments in Chapters 19 to 24 of Part 4

Table 11-1: Indirect impact types potentially associated with the Plan

Indirect impact type	Urban/ Comm.	Industrial	Rural	Infra.	Environ.	Description
Water flows and quality	✓	✓	✓	✓	✓	**Changes to surface water and groundwater flows** Development under the Plan may lead to changes to surface water and groundwater flows. This is primarily related to: • Disruption to natural flows and processes across land surfaces from buildings and infrastructure • Increase of hard surfaces leading to an increased volume of water entering downstream waterways • Diversion of surface water through flood mitigation works • Construction works involving large excavations **Reduction in surface water and groundwater quality** Development under the Plan may reduce surface water and groundwater quality. This is primarily related to: • Stormwater run-off associated with urban, industrial, and agricultural land-uses • Sedimentation from soil disturbance due to construction works and land clearing • Disturbance to contaminated soils due to construction works • Management of spoil during construction **Matters at risk of impacts** Changes to water flows and quality can impact several biodiversity values. Species and TECs that rely on aquatic environments such as waterways and wetlands, riparian corridors, estuarine environments, and groundwater dependent ecosystems are particularly at risk.
Spread of infection/disease	✓	✓	✓	✓	✓	Development under the Plan may increase the risk of the spread of infection/disease. This is primarily related to: • Soil transportation on contaminated footwear, vehicles, and machinery, and in residential garden establishment • Earthworks and activities conducted during construction • Stormwater run-off associated with urban, industrial, and agricultural land-uses Spread of infection/disease can affect species and have associated impacts on TECs.

Indirect impact type	Urban/ Comm.	Industrial	Rural	Infra.	Environ.	Description
Spread of weeds	✓	✓	✓	✓	✓	Development under the Plan has the potential to increase the spread of weeds. This is primarily related to: • Clearing which changes environmental conditions at the edges of habitat that favours weeds • Accidental dispersal of weed seeds/plant material into natural areas during construction or increased human access • Use of inappropriate species in landscaping and revegetation • Altered fire regimes Species are most susceptible to this threat where development occurs adjacent to known populations or habitat. Weeds can reduce the viability of adjacent habitat or vegetation for listed species and TECs and can reduce the health of important habitat features.
Predation/ competition by pest/domestic fauna	✓	✓	✓	✓	✓	Development under the Plan has the potential to increase the spread of pest fauna and/or access to natural areas by domestic fauna such as cats, dogs, and rabbits. This is primarily caused by: • Clearing which changes environmental conditions at the edges of habitat that favours pest fauna • Clearing that creates new movement pathways that can be used by pest fauna to expand their range • Increased presence of domestic fauna (such as cats and dogs) associated with urban development Increased presence of pest/domestic fauna can result in increased predation of native fauna, increased competition with native fauna, and increased habitat disturbance and disease transmission by pest fauna.
Altered fire regimes	✓	✓	✓	✓	✓	Development under the Plan has the potential to alter fire regimes and increase fire risk. This is primarily related to: • Increased burns for hazard reduction to protect assets, particularly within Asset Protect Zones • Reduced burns in some areas due to the risk to urban areas • Arson or the accidental lighting of fires associated with increased urban populations Changed fire regimes can reduce habitat suitability for TECs and threatened species, affect foraging resources, and prey species, and cause direct mortality from heat and smoke.
Disturbance from increased public access to natural areas	✓	✓	✓	✓		Development under the Plan will increase human activity in the vicinity of the Growth Areas, which can impact natural areas including conservation areas protected under the Plan and existing reserves. This is primarily related to: • Trampling of flora species and disturbance to flora and fauna habitat • Track creation • Rock removal and disturbance • Rubbish dumping and disturbance from associated clean-up activities

Indirect impact type	Urban/ Comm.	Industrial	Rural	Infra.	Environ.	Description
						• Timber collection and removal of dead wood • Illegal collection of flora and fauna species • Dog walking • Recreational activities such as mountain-biking, four-wheel driving, and horse riding • Water-based recreational activities such as fishing, boating and jet skiing Species and TECs most at risk from this threat occur on land that is publicly accessible.
Fauna mortality and barriers to movement	✓	✓	✓	✓	✓	Development under the Plan may increase the likelihood of fauna mortality and may introduce barriers to fauna movement. This is primarily related to: • Direct mortality through vehicle strike or new structures, or secondary poisoning for pest control • Introduction of linear barriers such as fences, roads, and railways, which can affect fauna movement
Disturbance due to noise, dust, or light	✓	✓	✓	✓	✓	Development under the Plan may increase noise, dust, and light. This is primarily related to: • Construction activities, including use of heavy vehicles and machinery • Increased noise levels from traffic due to new roads or increased traffic on existing roads • Artificial light from urban areas Increased noise can impact fauna species that vocalise or rely on hearing for hunting or breeding. Artificial light can affect the behaviour of nocturnal and diurnal species and influence the abundance and behaviour of predators. Light can also disrupt flora species through interfering with plant growth signals. Dust has potential to increase exposure of fauna to contaminants and can impact flora through smothering of leaves and disrupting photosynthesis.
Inadvertent impacts on adjacent habitat or vegetation	✓	✓	✓	✓	✓	Development under the Plan may cause inadvertent impacts on adjacent habitat, vegetation, or important habitat features. This is primarily related to: • Impacts adjacent to construction sites • Maintenance activities associated with roads, easements, or Asset Protection Zones • High frequency land management such as mowing and slashing or weed control

11.2.3 CUMULATIVE IMPACTS

Cumulative impacts relate to the combined impact of a range of activities within a region. Assessing cumulative impacts recognises that the combined effects of multiple activities on protected matters may be greater than the impact of an individual activity.

A cumulative impact assessment (CIA) for the protected matters relevant to the assessment is presented in Chapter 25 of Part 4 of this report. The approach to the CIA involved the following key components:

- An understanding of the potential cumulative impacts and key threatening processes for relevant protected matters
- A quantitative assessment of cumulative direct impacts of the actions taken under the Plan and other projects in the Study Area on relevant protected matters
- A qualitative assessment of cumulative impacts to relevant protected matters in the Study Area which considers potential direct impacts of smaller-scale developments, in addition to potential indirect impacts associated with development more broadly
- An evaluation of the adequacy of the Plan's proposed avoidance, mitigation, and offset commitments in relation to cumulative impacts for relevant protected matters

11.3 IDENTIFICATION OF RELEVANT EPBC KEY THREATENING PROCESSES AND THREAT ABATEMENT PLANS

Relevant Key Threatening Processes (KTP) and Threat Abatement Plans (TAP) have been identified as follows:

- All of the possible impacts related to the implementation of the Plan have been considered to determine whether there is a corresponding KTP listed under the EPBC Act
- All of the identified KTPs have been considered to identify whether a corresponding TAP has been prepared

The results of this analysis are presented in Chapter 17.

12 Identifying the protected matters relevant to the assessment

12.1 INTRODUCTION

This Chapter describes the methods for identifying the protected matters that have the potential to be impacted by development under the Plan. These are known as the 'relevant protected matters'. The results of this process are presented in Chapter 18 of Part 4.

Matters on the Finalised Priority Assessment List (FPAL) for inclusion under the EPBC Act were also considered as part of this process.

Note that the other protected matters covered by the EPBC Act have not been considered here for the following reasons:

- Development under the Plan is not occurring within, or within the vicinity of, a Commonwealth marine area
- Development under the Plan is not occurring within, or within the vicinity of the Great Barrier Reef Marine Park
- Development under the Plan does not relate to nuclear actions (including uranium mines)
- Development under the Plan does not involve water resources that relate to coal seam gas development and large coal mining development

12.2 REQUIREMENTS FOR IDENTIFYING PROTECTED MATTERS

This Chapter addresses the following requirements outlined in the ToR:

> *3.2. The Report must identify and describe each protected matter that may be impacted directly, indirectly and/or cumulatively by actions proposed to be taken under the Plan (these are the 'relevant protected matters')…*
>
> *…*
>
> *4.3. The Report may also consider protected matters that are potentially eligible for listing as a result of inclusion in a final priority assessment listing held by the Commonwealth, or a recommendation to the Minister for listing by the Threatened Species Scientific Committee prior to the Report being submitted*

12.3 METHODS FOR IDENTIFYING THE RELEVANT PROTECTED MATTERS

Identification of the relevant protected matters was undertaken using different methods for each of the following groups:

- Commonwealth listed threatened species and species on FPAL
- Commonwealth listed threatened ecological communities (TECs) and communities on FPAL
- Commonwealth listed migratory species
- Wetlands of international importance (listed under the Ramsar Convention)
- Commonwealth land
- World heritage properties, national heritage properties

The methods are discussed below.

Matters that were considered relevant were assigned to 'Category 1' and assessed in detail in Part 4 of this report. Category 1 matters were those that were considered at risk of direct, indirect, or cumulative impacts due to implementation of the Plan.

Matters that were identified and examined, but determined not to be relevant were assigned to 'Category 2'. These matters are not at risk of direct, indirect, or cumulative impacts due to implementation of the Plan or are not reliant on or present within the Strategic Assessment Area. For these matters, no further assessment is required.

12.3.1 THREATENED SPECIES AND SPECIES ON FPAL LIST

The method for identifying the threatened species and species on the FPAL list requiring a detailed impact assessment involved three steps. These included:

- Step 1: Identify the full list of threatened species and FPAL species potentially relevant to the assessment
- Step 2: Apply an initial set of criteria to refine this list. The purpose of this step was to remove species where they will clearly not be impacted directly, indirectly, or cumulatively
- Step 3: Undertake a preliminary assessment of the remaining threatened species and FPAL species to determine which ones may be impacted directly, indirectly, or cumulatively and will therefore require further detailed assessment in the report

STEP 1: IDENTIFY THE FULL LIST OF POTENTIAL SPECIES

The method for identifying the full list of species is intentionally broad to ensure all protected matters potentially relevant to the assessment are considered in the report. The full list of species was determined using:

- A report for the Study Area generated through the Commonwealth's Protected Matters Search Tool (PMST)
- The Victorian Biodiversity Atlas (VBA) for known records of EPBC Act listed threatened species within the Study Area. The VBA records were downloaded in February 2025
- The list of species considered in the *Existing Ecological Conditions: Northern and Western Geelong Growth Areas* report (EHP, 2021) (the EHP report)
- A review of the current FPAL listings for species which are not currently listed under the EPBC Act, yet which are proposed to be listed as threatened

For the purposes of this method, the Study Area is taken to mean the area within a 20 km buffer of the Strategic Assessment Area (See Map 3-1).

STEP 2: REFINING THE LIST TO REMOVE MATTERS THAT WILL CLEARLY NOT BE IMPACTED

The following criteria were used to identify the threatened species that will clearly not be impacted directly, indirectly, or cumulatively by actions proposed to be taken under the Plan. Threatened species were excluded from any further assessment where they met all of these criteria:

1. The Study Area contains no known records or occurrences of the threatened species based on a search of the VBA and the results of field surveys undertaken by EHP (EHP, 2021)
2. The Study Area is outside the known or likely distribution of the threatened species, based on the Commonwealth's distribution mapping as provided through the PMST report
3. The threatened species has been identified as having a 'low' or 'unlikely' likelihood of occurrence in the Likelihood of Occurrence Assessment presented in the EHP report (EHP, 2021)

For FPAL species, an initial review of the FPAL list was undertaken to identify FPAL species which occur within Victoria. All FPAL species which do not occur within Victoria were excluded from further assessment.

Of the FPAL species which occur within Victoria, a review of species' records on the VBA was undertaken to determine whether species records occur within, or in proximity to, the Study Area. Where records did not occur within proximity to the Study Area, the FPAL species was not included for further assessment.

STEP 3: PRELIMINARY ASSESSMENT TO IDENTIFY MATTERS REQUIRING FURTHER DETAILED ASSESSMENT

A preliminary assessment was undertaken for each of the threatened species and FPAL species that remained following step 2. The purpose of the preliminary assessment was to determine which matters *may be* impacted directly, indirectly or cumulatively, where the definition for 'may be' has been adapted from the *EPBC Act Significant Impact Guidelines 1.1* (DoE, 2013) to be 'where there is a real or not remote chance or possibility' of an impact on the species.

The preliminary assessment identified the species at risk of potential direct impacts within the Growth Areas. These are the species that have been recorded or assumed present within the Growth Areas. The results of the EHP surveys (EHP, 2021), as well as other historical records, were used to identify these matters (see Chapter 13 for a brief overview of the EHP surveys and the use and interpretation of their findings in this assessment). These matters were automatically identified for further detailed assessment.

A range of additional factors were then considered for species that only occur outside of the Growth Areas to understand the potential for indirect or cumulative impacts, as well as the potential for further direct impacts where a species might occur within the external infrastructure footprints. These include:

- Whether there are any known indirect impact pathways associated with actions under the Plan that could affect the species
- The distance of known records from the Growth Areas
- The listing status of the species
- The number of known records for a species within the Study Area
- The relative importance of the Study Area compared with the broader distribution of the species, including factors such as endemism, edge-of-range, strongholds, important known sites, or habitats used for key life cycle stages

Where it is considered that there is 'a real or not remote chance or possibility' of direct, indirect, or cumulative impacts based on a review of these factors, the species was identified for further detailed assessment.

This approach to the preliminary assessment enabled an assessment of both the likelihood of a direct, indirect, or cumulative impact occurring, as well as the consequence to the species should an impact occur.

Overall, the species which were identified for further detailed assessment following application of the above methodology were assigned to Category 1. All species which were identified to not require further detailed assessment were assigned to Category 2.

12.3.2 THREATENED ECOLOGICAL COMMUNITIES AND COMMUNITIES ON FPAL LIST

THREATENED ECOLOGICAL COMMUNITIES

The method for identifying the threatened ecological communities (TECs) requiring a detailed impact assessment involved three steps. These included:

- Step 1: Identify the full list of threatened ecological communities potentially relevant to the assessment
- Step 2: Determine the likelihood of TECs occurring within the Strategic Assessment Area
- Step 3: Undertake a preliminary assessment of the remaining threatened ecological communities to determine which ones may be impacted directly, indirectly, or cumulatively and will therefore require further detailed assessment in the report

Step 1: Identify the full list of threatened ecological communities potentially relevant to the assessment

The method for identifying the full list of TECSs was based on the Commonwealth's PMST. A PMST report was produced for the extent of the Study Area to identify the TECs with a distribution that may occur within the Study Area.

Step 2: Determine the likelihood of TECs occurring within the Strategic Assessment Area

Key information sources used to determine the likelihood of a TEC identified in Step 1 occurring within the Strategic Assessment Area included:

- The results of targeted surveys including:
  - Surveys conducted by Ecology Heritage and Partners (EHP) within the Growth Areas (EHP, 2021) (see Section 13.2 of Chapter 13)
  - Additional survey data provided by the City
- Modelled Ecological Vegetation Classes (EVCs) (DELWP, 2005)
- Modelled wetlands (DELWP, 2022b)
- Expert opinion from senior flora ecologists within the consulting team

Step 3: Undertake a preliminary assessment of the remaining threatened ecological communities to determine which ones may be impacted directly, indirectly, or cumulatively and will therefore require further detailed assessment in the report

A preliminary assessment was undertaken for the TECs that remained following step 2. The purpose of the preliminary assessment was to determine which matters *may be* impacted directly, indirectly or cumulatively, where the definition for 'may be' has been adapted from the *EPBC Act Significant Impact Guidelines 1.1* (DoE, 2013) to be 'where there is a real or not remote chance or possibility' of an impact on the species.

The preliminary assessment identified areas known to, or with the potential to support TECS which may be at risk of potential impacts under the Plan. For the Growth Areas, this was informed by targeted surveys by (EHP, 2021)). For the Strategic Assessment Area and broader Study Area, the distribution and characteristics of TECs identified in Step 2 were considered to inform an assessment of the likelihood of a direct, indirect, or cumulative impact occurring.

The TECs which were identified for further detailed assessment following application of the above methodology were assigned to Category 1. All TECs which were identified to not require further detailed assessment were assigned to Category 2.

ECOLOGICAL COMMUNITIES ON THE FPAL LIST

For FPAL communities, an initial review of the FPAL list was undertaken to identify FPAL communities which occur within Victoria. All FPAL communities which do not occur within Victoria were excluded from further assessment.

FPAL communities were then reviewed with regards to their potential distribution, to determine whether the community could occur within the Study Area. Where the community could not occur within the Study Area, it was excluded from further assessment.

A preliminary assessment of FPAL communities which have potential to occur within the Study Area was then completed. Communities which had potential to be directly, indirectly or cumulatively impacted were assigned to Category 1 for further assessment. Where impacts were considered unlikely, the community was assigned to Category 2.

12.3.3 MIGRATORY SPECIES

DATA USED TO ASSESS SPECIES PRESENCE AND ABUNDANCE

Migratory species present within the Study Area were identified by:

- Running a protected matters search using the Protected Matters Search Tool (PMST) for the Strategic Assessment Area with a buffer of 20 km to generate a report that identifies migratory species which are known to be, or have the potential to be, present in the Study Area
- Conducting a search of the Victorian Biodiversity Atlas (VBA) for known records of migratory species within the Study Area

The VBA records for the Study Area were downloaded in February 2025.

CATEGORISATION METHOD FOR MIGRATORY SPECIES

The categorisation methodology for migratory species was applied in a series of broad steps:

1. Application of guidance from the EPBC Act Significant Impact Guidelines 1.1, which identify key concepts ('ecologically significant proportion' and 'important habitat') used in the categorisation of migratory species. To assess the presence of an ecologically significant proportion of a species' population, the entire Study Area was considered as a single location for each species
2. Where either an ecologically significant proportion of a species or important habitat may be available within the Study Area, conducting an assessment to determine whether the Plan has potential to impact upon the species or its habitat

3. Assigning the species to Category 1 for further assessment if:
    - The species is also listed as a threatened species and is assigned to Category 1 as part of the threatened species categorisation process, OR
    - The following apply:
        - An ecologically significant proportion of a population of the species, or important habitat for the species, IS present within the Study Area, AND
        - There is potential for the Plan to impact the species or its habitat, based on the species' occurrence within the Study Area and its ecological characteristics
4. Assigning the species to Category 2 (no further assessment required) if:
    - An ecologically significant proportion of a population of the species, or important habitat for the species, is NOT present, OR
    - An ecologically significant proportion of a population of the species, or important habitat for the species IS present within the Study Area, but there is NO potential for the Plan to substantially impact the species or its habitat, based on the species' occurrence within the Study Area and its ecological characteristics

Note that migratory species which are also threatened which are assigned to Category 1 based on the threatened species categorisation process are assessed as part of the threatened species assessment in Chapter 19.

OVERVIEW OF GUIDANCE PROVIDED BY THE EPBC SIGNIFICANT IMPACT GUIDELINES 1.1

All migratory species were assessed in accordance with guidance provided by the EPBC Significant Impact Guidelines 1.1 (DoE, 2013). These guidelines identify two key components for assessing potential impacts to migratory species:

- Whether an 'ecologically significant proportion' of the species has potential to be impacted
- Whether 'important habitat' for the species has potential to be impacted

'Ecologically significant proportion' is defined in the Significant Impact Guidelines 1.1 as follows:

> *"Listed migratory species cover a broad range of species with different life cycles and population sizes. Therefore, what is an 'ecologically significant proportion' of the population varies with the species (each circumstance will need to be evaluated). Some factors that should be considered include the species' population status, genetic distinctiveness and species specific behavioural patterns (for example, site fidelity and dispersal rates)."* (DoE, 2013)

'Important habitat' is defined within the Significant Impact Guidelines 1.1 as:

> *a) "habitat utilised by a migratory species occasionally or periodically within a region that supports an ecologically significant proportion of the population of the species, and/or*
> *b) habitat that is of critical importance to the species at particular life-cycle stages, and/or*
> *c) habitat utilised by a migratory species which is at the limit of the species range, and/or*
> *d) habitat within an area where the species is declining"* (DoE, 2013)

IDENTIFYING ECOLOGICALLY SIGNIFICANT PROPORTIONS AND IMPORTANT HABITAT FOR MIGRATORY BIRD SPECIES

There is a range of different guidance available for migratory bird species with regards to the identification of ecologically significant proportions of the species and important habitat. Broadly, migratory bird species listed under the EPBC Act can be divided into three sub-groups:

- Migratory shorebird species which are included within the *EPBC Act Policy Statement 3.21 - Industry guidelines for avoiding, assessing and mitigating impacts on EPBC Act listed migratory shorebird species* (DoE, 2017)
- Migratory bird species which are included within the *Draft referral guideline for 14 birds listed as migratory species under the EPBC Act* (Migratory Bird Referral Guidelines) (DoE, 2015)
- Other EPBC Act listed migratory bird species which are not included within EPBC policy documents

The approaches which have been used to identify ecologically significant proportions of a species' population and important habitat vary depending on which sub-group the listed migratory bird species belongs to. Each approach is outlined below.

Migratory shorebirds included within EPBC Act Policy Statement 3.21

Identification of an ecologically significant proportion of the species

The EPBC Act Policy Statement 3.21 states that wetland habitat is considered internationally important if it regularly supports 1 per cent of the individuals in a population of one species or subspecies of waterbird, and nationally important if it regularly supports 0.1 per cent of the flyway population of a single species of migratory shorebird (DoE, 2017).

A supporting document to the EPBC Act Policy Statement 3.21, *Revision of the East Asian-Australasian Flyway Population Estimates for 37 listed Migratory Shorebird Species,* provides the estimated total population, 1 per cent and 0.1 per cent thresholds for migratory shorebirds (Hansen *et al.*, 2016).

The policy statement also defines the term 'support' for permanent wetlands as follows: migratory shorebirds are recorded during surveys and/or known to have occurred within the area during the previous five years (DoE, 2017).

For the purposes of categorisation, a species included within the EPBC Act Policy Statement 3.21 was considered to meet the threshold of an ecologically significant proportion of the species if 0.1 per cent of the flyway population of a single species had been recorded within the Study Area during the previous five years (February 2020 – February 2025).

Identification of important habitat

Birdlife Australia has mapped all areas of important habitat for the 37 listed migratory shorebirds included in the EPBC Policy Statement 3.21 across Australia (Weller *et al.*, 2020).

These maps have been used to identify the locations of important habitat for migratory shorebird species within the Study Area.

Migratory birds included within the draft referral guidelines for 14 birds listed as migratory species under the EPBC Act

Identification of an ecologically significant proportion of the species

The Migratory Bird Referral Guidelines also defines 1 per cent of the total population of a migratory species to be an internationally important number of individuals, and 0.1 per cent of the total population of a species to be a nationally important number of individuals. The Referral Guidelines include the 1 per cent and 0.1 per cent thresholds for species covered by these guidelines (DoE, 2015).

The Migratory Bird Referral Guidelines do not provide guidance on the time frame over which species' records should be considered when determining whether an ecologically significant proportion of the species is present at a site (DoE, 2015).

For the purposes of categorisation, a species included within the Migratory Bird Referral Guidelines was considered to meet the threshold of an ecologically significant proportion of the species if 0.1 per cent of the population of a single species had been recorded within the Study Area. No date threshold was applied to records in this analysis.

Identification of important habitat

The Migratory Bird Referral Guidelines provide broad descriptions of habitat characteristics which have potential to constitute important habitat (DoE, 2015). However, the broad nature of these descriptions is such that mapping of important habitat based on these descriptions is not possible.

Therefore, for the purposes of this assessment, the presence of important habitat was identified through considering:

- Whether there are habitat characteristics within the Study Area which meet the broad descriptions of important habitat provided within the Migratory Bird Referral Guidelines
- Whether an ecologically significant proportion of the species has been recorded to occur within the Study Area

This method takes into consideration the broad important habitat descriptions provided in the Referral Guidelines, while providing context with species' records to determine whether the habitat within the Study Area is being used by the species.

Other migratory birds which do not have specific policy advice

Identification of an ecologically significant proportion of the species

There is a lack of guidance regarding the definition of an ecologically significant proportion of remaining bird species which do not have specific EPBC policy advice. However, it is noted that both the EPBC Act Policy Statement 3.21 and the Migratory Bird Referral Guidelines consider 0.1 per cent of the total population of a species to be a threshold of national importance (DoE, 2015, 2017).

Subsequently, for the purpose of categorisation, a species which does not have specific policy advice was considered to meet the threshold of an ecologically significant proportion of the species if 0.1 per cent of the population of a single species had been recorded within the Study Area. No date threshold was applied to records in this analysis.

Information regarding the estimated total population size for migratory birds within this category was sourced from Birdlife International's Datazone database (Birdlife International, 2022), the *National Recovery Plan for Albatrosses and Petrels* (DCCEEW, 2022), the *Wildlife Conservation plan for Seabirds* (Commonwealth of Australia, 2020), or from relevant species-specific information where available (such as Conservation Advices or Recovery Plans).

Identification of important habitat

While there is a lack of general guidance regarding the definition of important habitat for the remaining species without specific EPBC policy advice, there is a range of information available which has been used to identify and consider the characteristics of habitat which are likely to be important to these species.

For instance, a number of migratory species within this category are also listed as threatened under the EPBC Act. Where this was the case, other EPBC related resources (such as the species' SPRAT profile, Conservation Advice and/or Recovery Plan where relevant) were considered with regards to the identification of potentially important habitat features for the species. Otherwise, information regarding habitat use and potentially important habitat features for migratory species in this category was sourced from Birdlife International's Datazone database (Birdlife International, 2022).

For the purposes of this assessment, the presence of important habitat was identified through considering:

- Whether there are habitat characteristics within the Study Area which meet descriptions of potentially important habitat features identified through the methods described above
- Whether an ecologically significant proportion of the species has been recorded to occur within the Study Area

This method takes into consideration the presence of suitable habitat features, while providing context with species' records to determine whether the habitat within the Study Area is being used by the species.

IDENTIFYING ECOLOGICALLY SIGNIFICANT PROPORTIONS AND IMPORTANT HABITAT FOR OTHER MIGRATORY SPECIES

All other migratory species were considered on a species-by-species basis drawing on guidance from the Significant Impact Guidelines 1.1 (DoE, 2013) and relevant species information.

Identification of an ecologically significant proportion of the species

Relevant species information to determine ecologically significant proportions of a species' population was drawn from a range of sources. Examples include species' Recovery Plans, Conservation Advices, Marine Bioregional Plans, and the species' SPRAT profile.

Given the diversity of sources used, information available and ecological differences between species within this grouping (e.g., whales vs. turtles), no single threshold has been developed or applied to identify ecologically significant proportions of species within this category.

Instead, available records within the Study Area from the VBA were considered and assessed with regards to individual species' ecology to determine whether a species which occurs within the Study Area could be meeting an ecologically significant proportion of that species' population.

Identification of important habitat

Identification of important habitat for species within this category was also determined through individual consideration of available information regarding each species' ecology and habitat use.

For the purposes of this assessment, the presence of important habitat was identified through considering:

- Whether there is habitat within the Study Area which could constitute important habitat for the species
- Whether an ecologically significant proportion of the species has been recorded to occur within the Study Area

This method takes into consideration the presence of suitable habitat features, while providing context with species' records to determine whether the habitat within the Study Area is being used by the species.

12.3.4 RAMSAR WETLANDS

The identification of Ramsar wetlands potentially relevant to the Plan was identified by running a protected matters search using the Protected Matters Search Tool (PMST) for the Strategic Assessment Area with a buffer of 20 km to generate a report that identifies MNES, and other matters protected by the EPBC Act which are known to be, or have the potential to be, present in the Study Area.

The risk of impacts to Ramsar wetlands was considered based on the location of the wetland and its susceptibility to impacts. Where there was a risk of potential impacts, the matter was assigned to Category 1.

12.3.5 COMMONWEALTH LAND

Commonwealth land within the Study Area was identified using the Protected Matters Search Tool (PMST) for the Strategic Assessment Area with a buffer of 20 km. An assessment of the potential for development within the Growth Areas to adversely impact any sites was then undertaken to determine if they should be assigned to Category 1.

12.3.6 WORLD HERITAGE PROPERTIES, NATIONAL HERITAGE PROPERTIES

The identification of World Heritage properties and National Heritage places potentially relevant to the Plan was undertaken by running a protected matters search using the Protected Matters Search Tool (PMST) for the Strategic Assessment Area with a buffer of 20 km to generate a report that identifies MNES, and other matters protected by the EPBC Act which are known to be, or have the potential to be, present in the Study Area. An assessment of the potential for development within the Growth Areas to adversely impact any sites was then undertaken to determine if they should be assigned to Category 1.

13 Data used in the assessments for relevant protected matters

13.1 INTRODUCTION

This chapter provides an overview of the key data sources used in the detailed assessments for relevant protected matters, and the use and interpretation of these sources.

The relevant items in the ToR relating to the use of data in the assessment are outlined in the following text box:

4.2. The Report must describe and provide justification for the method used to assess likely impacts on all protected matters arising from actions proposed to be taken under the Plan. The method must:

a) be appropriate for assessment at a strategic scale

b) rely on the best available information

c) discuss uncertainty, including reference to the data and information relied upon

4.8. The Report must include justification for key methods used in the assessment

4.9. The Report must include or refer to data from ecological surveys

6.1. The Report must identify key uncertainties and risks associated with implementing the Plan, responses to these and proposed adaptations to changing circumstances. Key uncertainties may include:

a) knowledge gaps in scientific understanding and responding to new knowledge

e) differences in survey results relating to MNES and how to evaluate and resolve discrepancies

9.1. The Report must identify the sources of information and data relied upon including the reliability and currency of the data.

13.2 KEY DATA SOURCES

A number of data sources were used in the assessment, including:

- Ecological surveys by Ecology and Heritage Partners across large parts of the Growth Areas (EHP, 2021)
- Targeted surveys and habitat suitability assessment for Victorian Grassland Earless Dragon across parts of the Growth Areas (Biosis, 2024)
- Individual surveys undertaken by some landholders within the Growth Areas
- Site observations as part of the strategic assessment process
- Species records obtained largely through the Victorian Biodiversity Atlas (VBA) (DELWP, 2022a)
- DELWP habitat and vegetation modelling (DELWP, 2005, 2017)
- Key EPBC, State and local policy or regulatory documents
- Other information sources, including scientific literature and other spatial landscape data

An overview of these data sources is provided in Sections 13.2.1 to 13.2.8. Table 13-1 provides a summary of the spatial data sources used in the assessment.

13.2.1 ECOLOGICAL SURVEYS BY ECOLOGY AND HERITAGE PARTNERS

The City commissioned Ecology and Heritage Partners (EHP) to undertake detailed ecological surveys within the Growth Areas. The surveys aimed to identify and map the presence of State and Commonwealth listed threatened species, ecological communities, and native vegetation to inform the Part 10 Strategic Assessment for the Growth Areas.

Field surveys were undertaken between November 2019 and December 2020. The methods and results of these surveys are described in '*Existing Ecological Conditions: Northern and Western Geelong Growth Areas*' (refer to this link for the EHP report) (EHP, 2021).

Two-hundred-person days were spent surveying the Growth Areas. Surveys were limited to parcels/properties where access was permitted, which totalled an area of over 2,075.3 ha, or just over 72 percent of the Growth Areas. Around 33 per cent of the NGGA and 13.2 per cent of the WGGA were not subject to site surveys due to a lack of access (see Map 7-1).

Botanists (who were accredited by DELWP in the habitat hectare methodology) undertook detailed ecological assessments to quantify the extent and quality of native vegetation values in the growth areas (EHP, 2021).

Qualified flora and fauna ecologists undertook targeted surveys for the following Commonwealth listed threated flora and fauna species and threatened ecological communities (TECs) (EHP, 2021):

- *Delma impar* (Striped Legless Lizard)
- *Dianella amoena* (Mated Flax-lily)
- *Galaxiella toourtkoourt* (Little Galaxias)
- *Glycine latrobeana* (Clover Glycine)
- *Lachnagrostis adamsonii* (Adamson's Blown-grass)
- *Litoria raniformis* (Growling Grass Frog)
- *Pimelea spinescens* subsp. *spinescens* (Spiny Rice-flower)
- *Prototroctes maraena* (Australian Grayling)
- *Rutidosis leptorrhynchoides* (Button Wrinklewort)
- *Senecio macrocarpus* (Large-headed Fireweed)
- *Synemon plana* (Golden Sun Moth)
- Natural Temperate Grassland of the Victorian Volcanic Plain

Surveys were generally undertaken in accordance with the relevant State and Commonwealth guidelines for vegetation, TECs, and threatened species surveys (EHP, 2021). Any deviations from relevant guidelines, including an explanation and justification for the methods used, are detailed in the EHP (2021) report. The methods and report underwent a process of peer and regulator review as part of developing and finalising the findings.

13.2.2 TARGETED SURVEYS AND HABITAT SUITABILITY ASSESSMENT FOR VICTORIAN GRASSLAND EARLESS DRAGON

As discussed previously, the Victorian Grassland Earless Dragon (VGED) was thought to be extinct until its rediscovery (outside the NWGGA) in January 2023 (Zoos Victoria, 2024).

To understand the potential value of the NWGGA for VGED, the City commissioned Biosis to undertake targeted surveys and detailed habitat assessments between January and May of 2024 (Biosis, 2024). The survey method was prepared in consultation with Peter Robinson (species expert and member of the VGED recovery team).

The targeted surveys and habitat assessments involved three key steps:

1. Initial habitat assessment to determine an investigation area for VGED within the NWGGA and to exclude clearly unsuitable habitat
2. Targeted surveys and opportunistic searches within the investigation area to search for individuals of the species
3. Habitat suitability assessments within the investigation area to identify and map habitat attributes for the species

Targeted surveys were undertaken across 376 ha, or just under 60 per cent of the VGED investigation area in the NGGA. Targeted surveys were not undertaken in the WGGA.

Habitat suitability assessment was undertaken across 516 ha of the Growth Areas, or approximately 79 per cent of the VGED investigation area. The habitat suitability assessment was designed to complement the targeted surveys and understand the presence of a range of environmental factors which may be key habitat attributes for VGED. The purpose of this assessment was to provide data to help understand the potential value of areas of grassland within the NWGGA for VGED. An analysis of land not accessed for habitat suitability assessment found that overall, areas not able to be accessed in the NGGA have generally been cropped or disturbed, and are unlikely to retain good habitat values for VGED. This excludes the part of the NGGA Conservation Area which was not accessed, and will be set aside for conservation under the Strategic Assessment. In the WGGA, the areas not accessed are located within the floodplain and

escarpment east of the Moorabool River. These areas are located within the Moorabool River corridor and Moorabool avoidance area, and are not proposed for development under the Strategic Assessment (Biosis & Open Lines, 2024).

The Biosis report (Biosis, 2024) sets out the methods and results of the targeted surveys and habitat assessments (see Supporting Document A), and the results are discussed further in the impact assessment for VGED (see Section 19.5 of Part 4).

The data collected during the detailed habitat assessments was used to inform the VGED habitat attribute analysis (Biosis & Open Lines, 2024), which involved a range of analysis methods and scenarios to understand the potential value of the NGGA for VGED. The methods and results of this analysis are provided in Supporting Document B, and the results are discussed further in the impact assessment for VGED (see Section 19.5 of Part 4).

13.2.3 LANDHOLDER SURVEYS

In January 2022, the City provided an opportunity for landholders that had their properties surveyed during the period of the EHP surveys to provide additional information for consideration in the Strategic Assessment. The purpose of this process was to collect additional information where landholders had concerns with mapping inaccuracies and/or assumptions.

The additional information was reviewed against a set of criteria to help inform and guide decisions on appropriate changes to the dataset. Changes were considered appropriate where any of the following occurred:

- Landowner surveys addressed the relevant guidelines and were undertaken in the same survey season as EHP (EHP, 2021). This recognises that native grasslands are a dynamic system that display natural variation from season to season. It is noted EHP undertook Vegetation Quality Assessment (VQA) surveys between November 2019 and January 2020
- EHP acknowledged they were in error
- Small scale refinements were needed to address mapping anomalies and inaccuracies (e.g., mapped native grassland over buildings or driveways)

There was ongoing consultation with DELWP (now DEECA) on the submissions received, the criteria used and the type and nature of proposed changes to the EHP dataset.

Four separate surveys were commissioned by individual landholders within the NGGA as part of this process. Surveys mainly focused on the mapping of native vegetation. Together, these surveys covered an area of approximately 55 per cent (around 1,170 ha) of the NGGA. One survey was commissioned within the WGGA, covering an area of approximately 38 ha (or approximately 5 per cent). Refer to Map 13-2 for the area of the Growth Areas which was subject to landholder surveys.

All surveys were undertaken by DELWP accredited botanists according to relevant guidelines. Most of the submissions documented changes in site conditions (including increased weed cover, unsuitable/ incompatible species, and altered land management practices) and/or seasonal variability. However, none of the surveys were carried out during the same season as the EHP surveys. As a result, it was not possible to make a valid comparison of the native grassland extent and condition for the purposes of amending the EHP dataset on that basis. Instead, the survey information provides a useful and relevant indication of the changes in extent and condition of the grasslands for the purposes of understanding ecological trend as part of the Strategic Assessment.

The process did lead to a number of more minor changes to the extent of mapped native vegetation and species habitat where the other two criteria were met as follows:

- EHP have acknowledged and field verified native vegetation mapping errors on the property at 450 Elcho Road, Lovely Banks. The dataset was updated to include the corrected mapping from EHP for this property. This sees a reduction in the native vegetation (approximately 22 ha), the removal of areas of mapped Natural Temperate Grassland (14.2 ha) and a reduction in the potential habitat for the Striped Legless Lizard (10.5 ha)
- Small scale refinements for the EHP dataset for:
    - 35 Staceys Road, Lovely Banks - the driveway was excluded from the native vegetation habitat zone (0.1 ha) and the driveway, outbuildings and house were removed from the Golden Sun Moth habitat (1.1 ha)
    - 435 Elcho Road, Lovely Banks - the dam, house and driveway were removed from the Golden Sun Moth habitat (0.3 ha)
    - 480 - 530 Heales Road, Lovely Banks - treed area removed from Golden Sun Moth habitat (0.41ha)

- 460 Evans Road, Lovely Banks - house and treed area removed from Golden Sun Moth habitat (0.67ha)
- 350 Elcho Road, Lovely Banks - treed areas removed from Golden Sun Moth habitat (5.83ha)

These changes led to a revised EHP dataset, which is the final EHP dataset referred to in this report and used as part of the baseline information for the assessment of impacts to MNES.

Refer to this link for a summary of the Landholder Submission Review.

13.2.4 SITE OBSERVATIONS BY THE CONSULTING TEAM

The Consulting Team (being the consultants commissioned by the City to undertake the Strategic Assessment) have visited the Growth Areas on a number of occasions to help inform the assessment process. These visits have included:

- Initial site visits to the Growth Areas in November 2021
- Site observations of the NGGA to inform the Structured Decision Making (SDM) process in March 2022
- A visit to the NGGA/WGGA with DCCEEW in August 2022
- Site visits and further survey work for the Victorian Grassland Earless Dragon in 2024 (see Section 13.2.2)
- A visit to the Eastern Conservation Area to confirm the status of Natural Temperate Grassland in November 2024

Some of the key observations from these visits include:

- Areas of native vegetation identified by EHP (EHP, 2021) are typically areas characterised by a small number of indigenous perennial grasses and a low diversity of native herbs
- The NGGA is being influenced by the invasion of Chilean Needle-grass (*Nassella neesiana*). The apparent expansion in the dominance of Chilean Needle-grass has therefore permanently altered the landscape of parts of the NGGA (as local control measures are unlikely given the expense involved in removing this species)
- Areas previously identified as native vegetation in the NGGA, while naturally waning during the current wet climatic cycle at the time, appear to have been largely taken over by the invasion of Chilean Needle-grass
- Native vegetation is unlikely to be present within most, if not all of the unassessed areas due to the intensity of land use within these areas
- The patch of Natural Temperate Grassland mapped within the Eastern Conservation Area by EHP (EHP, 2021) still meets the condition thresholds for the TEC

13.2.5 SPECIES RECORDS

Existing records of threatened species were obtained from the Victorian Biodiversity Atlas (VBA). The VBA is a web based database which manages information about species found in Victoria. Data is supplied to the VBA by a range of contributors including DELWP biodiversity staff, government agencies and partner organisations, non-government organisations, ecological consultants, university students, and community wildlife survey groups (DELWP, 2022a).

Submitted data is reviewed and verified by DELWP and other key partners. New records submitted to the VBA are subject to verification by an appropriate expert to review. The expert review process occurs over approximately 4 months, after which new records and spatial data sets are released (DELWP, 2022a).

The VBA provides the most comprehensive source of species records in Victoria.

These records were used to supplement survey records within the Growth Areas, and to contribute to an understanding of presence within the unsurveyed areas of the Growth Areas and the broader Study Area.

13.2.6 DELWP MODELS

Modelling produced by DELWP was used in the assessment report. This includes:

- Habitat importance models (HIMs) (DELWP, 2017)
- Modelled Ecological Vegetation Classes (EVCs) (DELWP, 2005)

HABITAT IMPORTANCE MODELS

DELWP have developed HIMs for many of the threatened species that occur within Victoria. These models (DELWP, 2017):

- Collect and compare information on where a species has been recorded
- Relate that data to environmental variables to enable the potential distribution of a species' habitat to be estimated and mapped
- Identify the areas of habitat that may be relatively more important to the species persistence than others

HIMs provide a useful planning tool for understanding the potentially important areas of a species' habitat distribution across the landscape. The models indicate the relative importance of habitat areas from low through to high.

MODELLED ECOLOGICAL VEGETATION CLASSES

Modelled EVCs were used to inform the potential occurrence of native vegetation and TECs where survey data was unavailable. The Modelled 2005 Ecological Vegetation Classes data set combines the pre 1750 EVC modelling and the current version of modelled Native Vegetation Extent to assign EVCs and conservation status to the current native vegetation modelling (DELWP, 2005).

This data set is prepared and managed by DELWP. It is used for the implementation of the Native Vegetation Management Framework, preparation of Regional Vegetation Plans and a number of other biodiversity planning purposes (DELWP, 2005).

13.2.7 KEY EPBC, STATE AND LOCAL POLICY OR REGULATORY DOCS

The main EPBC, State and local policy or regulatory documents used to inform the assessment included:

- Commonwealth listed threatened species Recovery Plans and Conservation Advices
- Commonwealth Threat Abatement Plans
- Corangamite Regional Catchment Strategy 2021 – 2027 (CCMA, 2021)
- Corangamite Waterway Strategy 2014-2022 (CCMA, 2014)
- EPBC policy statements and guidelines
- State listed threatened species action statements
- State Wide Integrated Flora and Fauna Teams threatened species profiles (SWIFFT, 2022)
- The Northern And Western Geelong Growth Areas Framework Plan (The City of Greater Geelong, 2021)
- The Port Phillip Bay (Western Shoreline) & Bellarine Peninsula Ramsar Site Ecological Character Description (DELWP, 2020)
- The Port Phillip Bay (Western Shoreline) and Bellarine Peninsula Ramsar Information Sheet (RIS) (Parks Victoria, 1999)
- The Port Phillip Bay (Western Shoreline) and Bellarine Peninsula Ramsar Site Management Plan (DELWP, 2018)
- The Greater Geelong Planning Scheme (The City of Greater Geelong, 2022)

13.2.8 OTHER INFORMATION SOURCES

A number of additional information sources and data sets were used in the assessment report, including:

- Peer reviewed scientific literature
- Data sets on biodiversity values, including:
    - Land management data sets (Public land, CMA)
    - Hydrology data sets (Ramsar sites, hydrolines and waterbodies)
- Expert knowledge of ecological consultants

Table 13-1: Data sets used in the Assessment Report

Data set theme	Data set name	Date	Custodian	Details	Use on project
Drainage and water bodies	Ramsar Wetland Areas in Victoria at 1:25 000	2022	DELWP	Data layer which defines RAMSAR wetland areas in Victoria	Used to identify protected wetlands under the RAMSAR Convention in the Study Area
	CMA100 TAB	2022	DELWP	Data layer which defines the Catchment Management Authority boundaries	Used to identify catchments within the Study Area
	Catchments	2016	The City	Data layer which defines catchments within the LGA	Used to identify catchments within the Study Area
Protected lands and conservation planning	Collaborative Australian Protected Areas Database (CAPAD) 2020 - Terrestrial	2021	DCCEEW	The CAPAD database provides spatial and textual information about government, Indigenous and privately protected areas in marine and terrestrial environments	Used to identify protected areas within the Study Area
	Public Land Management (PLM25)	2022	DELWP	Data layer which describes public land management across VIC, including State forests, parks and reserved and unreserved Crown Land	Used to identify protected areas within the Study Area
Species sightings and habitat	Species site survey records and mapping	2020	Ecology and Heritage Partners	Mapped habitat and records for species subject to targeted surveys during site surveys	Used in the detailed impact assessments for species where data is available
	VGED survey program results	2024	Biosis	Mapped habitat attributes for VGED	Used in the detailed impact assessment for VGED (Section 19.5 of Part 4)
	VGED habitat attribute analysis	2024	Biosis & Open Lines	Analysis of the value of areas with potentially suitable habitat attributes for VGED	Used in the detailed impact assessment for VGED (Section 19.5 of Part 4)
	Victorian Biodiversity Atlas (VBA)	2025	Department of Environment, Land, Water and Planning (DELWP)	Fauna and flora sightings records stored in the Victorian Biodiversity Atlas	Used to: • Determine whether a species requires consideration in the categorisation process • Assess the impacts to species during detailed impact assessments

Data set theme	Data set name	Date	Custodian	Details	Use on project
	Habitat Importance Model's (HIM's)	2017	Department of Environment, Land, Water and Planning (DELWP)	These spatial layers estimate the relative importance of modelled species habitat	Used in the detailed impact assessments
Vegetation mapping	Vegetation and TEC site survey mapping	2020	Ecology and Heritage Partners	Vegetation and TEC mapping from site surveys	Used in the detailed impact assessment of TECs
	Modelled 2005 Ecological Vegetation Classes (with Bioregional Conservation Status	2005	DELWP	Data layer which presents the modelled EVCs occurring across Victoria	Used to inform potential occurrence of native vegetation and TECs in the absence of survey data

13.3 USE AND INTERPRETATION OF DATA

The sources of data and information outlined in Section 13.2 were used to inform the impact assessment at three levels:

- Within the surveyed areas of the Growth Areas
- Within the unsurveyed areas of the Growth Areas
- Within the Strategic Assessment Area and across the broader Study Area

Data has been used and interpreted differently for each of these areas. The suitability of the approach to using and interpretating the data for use in the assessment is influenced by the quality of the datasets (relating to factors such as accuracy, coverage, currency, and reliability) as well as the nature and intensity of potential impacts on protected matters.

The use of data at each of these levels is discussed below. This discussion provides:

- An overview of the general approach to the use and interpretation of data for the assessment. The focus here is on the key data sources used to understand and map the location, extent, importance and condition of habitat or occurrences of relevant protected matters. This forms the *baseline dataset* for the impact assessment on each protected matter
- Identification of any risks, uncertainties, or gaps in the data and how these are being addressed
- An evaluation of the appropriateness of the approach for assessment at a strategic scale

A detailed outline of the data and methods used to produce the specific baseline maps for each protected matter is provided in the respective impact assessment chapters in Part 4 of this report.

13.3.1 WITHIN THE SURVEYED AREAS OF THE GROWTH AREAS

As outlined above, EHP were able to survey approximately 66 per cent of land across the two Growth Areas. The baseline dataset used to assess potential impacts to MNES within these surveyed areas has been developed largely using:

- The results of the EHP surveys (EHP, 2021)
- The results of the Biosis VGED survey program (Biosis, 2024)
- Historical species records (DELWP, 2022a)
- The results of other landholder surveys
- Site observations made by the consulting team during the Strategic Assessment

USE AND INTERPRETATION OF EHP SURVEY RESULTS AND HISTORICAL RECORDS

The results of the EHP surveys, as well as other historical records, were used to identify the threatened species and communities that occur within the Growth Areas. The results of the surveys informed habitat mapping within the surveyed areas for threatened species and threatened ecological communities that were recorded within the Growth Areas. The targeted surveys also identified the absence of a number of MNES within potential habitat areas of the Growth Areas.

EHP's survey results and description of the environmental condition and habitat characteristics across the Growth Areas were used to identify the key attributes relevant to the EPBC assessments, including the presence of habitat critical to survival or important populations.

USE AND INTERPRETATION OF THE VGED SURVEY PROGRAM RESULTS

As discussed, the VGED survey program involved two key elements:

- Targeted surveys
- Habitat suitability assessment

VGED was not recorded during targeted or opportunistic searches.

The data collected through the habitat suitability assessment was used to inform a VGED habitat attribute analysis (Biosis & Open Lines, 2024) to understand the potential value of areas of the NGGA to VGED (see Supporting Document B). The WGGA was not included in this analysis. Only one property in the WGGA was able to be accessed for habitat suitability assessment. This property is highly unlikely to offer any potential habitat attributes value for VGED and is not relevant to planning decisions for the strategic assessment. The habitat attribute analysis was a key input to the avoidance planning process for the strategic assessment, and informs the impact assessment for VGED.

It is noted that the VGED survey program involved access to two properties which were not surveyed by EHP. These include:

- 870 Geelong-Ballan Road. This property is located in the north-west corner of the NGGA
- Part of 970 Anakie Road. This property is located in the west of the NGGA

The information collected for 870 Geelong-Ballan Road in particular was useful for further understanding the overall condition and potential biodiversity values of this property. This information was critical for the avoidance planning process, and is used to inform the impact assessments for threatened species where appropriate.

USE AND INTERPRETATION OF LANDHOLDER SURVEYS AND SITE VISIT OBSERVATIONS

The landholder surveys provide a useful indication of the changes in extent and condition of grasslands within parts of the Growth Areas between survey seasons. This is relevant to help understand ecological trend as part of the Strategic Assessment. The extent of weeds and general trends observed in vegetation condition were confirmed by the Consulting Team during site visits. This information was integrated into the approach for mapping habitat for specific species, as relevant to their individual ecology.

SUITABILITY OF DATA APPROACH TO SURVEYED AREAS OF THE GROWTH AREAS

The suite of information available to understand the MNES values within the surveyed areas of the Growth Areas provides a high level of detail, resolution, and confidence for the assessment. The information is:

- Reliable and accurate, having been developed according to relevant guidelines by suitably qualified ecologists
- Current and best available, taking account of all available information in a robust way

This is both necessary and appropriate given this information has been used in the assessment to:

- Determine the most suitable areas for retention, protection, and management. These decisions need to be supported by the best available data to provide certainty around the conservation outcomes that can be delivered and inform planning in terms of management actions and costs
- Understand the scale and importance of impacts. The areas within the surveyed areas of the Growth Areas that will not be retained will be cleared for development. This is the largest area of land under the Plan that will be subject to direct impacts, which will be both permanent and irreversible. Well defined and reliable data is critical to support an assessment of the significance of these impacts, and subsequently inform the need for, type and quantum of any offsets

13.3.2 WITHIN UNSURVEYED AREAS OF THE GROWTH AREAS

As outlined above, around 33 per cent and 13.2 per cent of the NGGA and WGGA respectively were not subject to site surveys (see Map 13-1) by EHP. The properties which were not accessed within the Growth Areas largely comprise many small, rural residential landholdings which are fragmented by windrows/landscaping and have a much higher proportion of land use for dwellings and driveways compared to the broader Growth Areas. The environment within these unsurveyed areas tends to be more modified or degraded as a result.

The baseline dataset used to assess potential impacts within these unsurveyed areas has been developed using:

- Over-the-fence observations by:
  - EHP during the time of their surveys (EHP, 2021)
  - The consulting team during site visits
- The results of the VGED survey program for two properties not accessed by EHP (870 Geelong-Ballan Road and part of 970 Anakie Road) (as discussed above)
- DELWP HIMs (DELWP, 2017)

- DELWP EVC modelling (DELWP, 2005)
- Historical species records (DELWP, 2022a)

USE AND INTERPRETATION OF OBSERVATIONS FROM EHP AND THE CONSULTING TEAM

EHP were able to undertake visual assessments of some of these unsurveyed areas where they could be viewed over the fence, such as from reserves, roadsides, and adjacent properties. EHP made the following general observations in their report that are relevant to understanding the potential MNES values within the unsurveyed areas (EHP, 2021):

- The majority of the Growth Areas are highly modified due to historical and ongoing agricultural and farming practices, and are dominated mostly by non-indigenous grasses and weeds
- The majority of parcels that were not surveyed comprise small, rural residential landholdings which tend to be more modified or degraded compared to the broader Growth Areas
- These unsurveyed areas may still support remnants of suitable habitat consistent with those already confirmed within the NGGA and WGGA

A similar set of observations have been made by the consulting team during site visits throughout the project.

Based on these observations, the assessment has assumed that:

- The unsurveyed areas provide potential habitat for all of the MNES identified within the respective areas of the surveyed areas by EHP. Note that this excludes Victorian Grassland Earless Dragon (see Section 13.2.2 for further details)
- The scale or extent of potential habitat is broadly commensurate with the extent mapped within the surveyed areas

USE AND INTERPRETATION OF DELWP MODELS

DELWP's HIM and EVC models (DELWP, 2005, 2017) were used to map the potential presence of habitat for species and communities within the unsurveyed areas, where those MNES had been confirmed by EHP to occur within the surveyed areas.

For each MNES, a comparison of the extent predicted to occur within the surveyed areas using the DELWP models was made against the actual extent confirmed by EHP. This allowed a factor to be identified and applied as necessary to the models to arrive at an extent of potential habitat for the unsurveyed areas that is broadly equivalent to that confirmed within the surveyed areas. The full extent of the HIMs was used for the assessment (i.e. no thresholds relating to importance were applied).

SUITABILITY OF DATA APPROACH TO UNSURVEYED AREAS OF THE GROWTH AREAS

The approach to baseline mapping within the unsurveyed areas of the Growth Areas is considered to:

- Appropriately reflect the potential MNES that may occur based on the observations and expert opinions of a number of ecologists
- Be suitably conservative for the purposes of this assessment as:
    - The higher intensity land use associated with the smaller, rural residential landholdings across the unsurveyed areas compared with the surveyed areas means that the habitat attributes or condition needed to support the species or communities are less likely to be retained in these areas. Basing the extent of potential habitat in these areas on the equivalent extent in the surveyed areas is therefore more likely to over-predict, rather than under-predict, potential habitat. This is an appropriate way to address any residual uncertainty that arises from a lack of targeted surveys
    - The full extent of the HIMs were used in the assessment. As a result, even areas with lower levels of relative importance to the species were considered

This information will be used in the assessment to understand the potential scale of habitat for the purposes of calculating direct impacts and an associated offset liability (noting that impacts to MNES within a portion of the Heales Road East precinct will be confirmed as part of the process based development approach). The approach is considered to adequately manage risks to MNES given the current land use and condition of the unsurveyed areas substantially minimises the likelihood that these areas support an important area for MNES.

13.3.3 OUTSIDE THE GROWTH AREAS

The assessment of potential impacts under the Plan needs to address:

- The impacts that could occur as a result of external infrastructure development outside of the Growth Areas and within the Strategic Assessment Area
- The potential indirect impacts of development within the Growth Areas on protected matters outside of the Growth Areas

The baseline information used to assess potential impacts in these areas is discussed in the following sections.

EXTERNAL INFRASTRUCTURE DEVELOPMENT

The Plan allows for infrastructure development *outside* of the Growth Areas but within the SAA (referred to as 'external infrastructure'). This external infrastructure will occur according to a specified scope within a defined footprint under the Plan.

There is potential for this footprint to support small areas of habitat for MNES. Ecological surveys are yet to occur within these areas and there have been no field observations of these areas to support the assessment. The key baseline data sources used to understand potential presence of MNES for the assessment of these areas includes:

- DELWP HIMs (DELWP, 2017)
- DELWP modelled EVCs (DELWP, 2005)
- Historical records (DELWP, 2022a)

This data provides a high-level indication of potential occurrence within the external infrastructure footprints. Further information will be required to inform detailed planning and design of the relevant infrastructure projects to ensure that the potential risks to MNES are adequately addressed and that potential impacts and outcomes are appropriate. To this end, the Plan includes a number of Commitments and Measures relating to survey, design and avoidance. These include:

- A Commitment (19) to design and locate external infrastructure to avoid impacts to protected matters, along with a set of specific avoidance prescriptions relating to particular MNES that may be affected
- A Measure to undertake targeted surveys within the external infrastructure footprints for all protected matters with the potential to occur. Surveys must be undertaken prior to development to inform the detailed planning and design phase of each infrastructure project, and in accordance with relevant survey guidelines or standards
- A series of measures to report, monitor and manage avoidance outcomes against the Commitment

ASSESSMENT OF INDIRECT IMPACTS ON PROTECTED MATTERS OUTSIDE OF THE GROWTH AREAS

Development that occurs within the Growth Areas has the potential to impact protected matters outside of the Growth Areas in an indirect way. For instance, through impacts that may be operating at the interface of development and non-development areas, or through downstream pathways associated with waterways.

A Study Area has been defined for the purposes of the assessment as: the Strategic Assessment Area with a 20 km buffer. This buffer captures the key values associated with protected matters that occur downstream of the Growth Areas (such as Ramsar wetlands) and is considered to be conservative in identifying the spatial reach of any potential indirect impacts of development.

The baseline information used to inform the assessment of potential indirect impacts within the Study Area includes:

- DELWP HIMs (DELWP, 2017)
- DELWP modelled EVCs (DELWP, 2005)
- Historical records (DELWP, 2022a)

The data set provides a good indication of potential presence and relative importance of areas to MNES across the broader Study Area. It provides sufficient detail to understand the context and relationship of key MNES areas to the Growth Areas to support an assessment of potential indirect impacts.

14 Addressing uncertainty and risk

The ToR requires the assessment report to identify key uncertainties and risks associated with implementing the Plan, and identify:

- Responses to those uncertainties and risks
- Proposed adaptations to changing circumstances

The relevant ToR are:

> *6.1. The Report must identify key uncertainties and risks associated with implementing the Plan, responses to these and proposed adaptations to changing circumstances. Key uncertainties may include:*
>
> *a) knowledge gaps in scientific understanding and responding to new knowledge.*
>
> *b) assumptions made in assessing potential impacts and benefits.*
>
> *c) how changes to Commonwealth, State and local government legislation, policies, plans and advice are to be accounted for in the management of the areas impacted by the Plan.*
>
> *d) the capacity to ensure the Plan is implemented.*

The following section provides an analysis of how the Plan addresses the key risks and uncertainties. The analysis is supported by the detailed evaluation of the Plan in Part 5.

Note that ToR 6.1(e) (which relates to differences in survey results relating to MNES and the evaluation and resolution of discrepancies) is addressed in Chapter 13.

14.1 KNOWLEDGE GAPS IN SCIENTIFIC UNDERSTANDING AND RESPONDING TO NEW KNOWLEDGE

14.1.1 KNOWLEDGE GAPS IN SCIENTIFIC UNDERSTANDING

There are two key types of gaps in scientific understanding relevant to the assessment:

- Data gaps
- Gaps in understanding of ecological processes (for example, the particular ecology of a threatened species)

DATA GAPS

Data gaps for this assessment can be defined as a lack of information about a particular element of the environment. For example, presence or absence information for a threatened species at a particular site may not be available at the time required.

Given the large spatial scale of the Plan, it is not possible to have perfect information about the environment and some level of uncertainty in data is inherent in the project. As outlined in Chapter 13 of Part 3, a comprehensive data set has been collected for the assessment which addresses the ToR and is considered appropriate for the assessment.

The data that has been used in the assessment and any limitations are discussed in detail in:

- Chapter 13: Data used in the assessment
- Individual assessment chapters for protected matters

The main areas of data uncertainty relate to the areas within the development footprint that will be subject to direct impacts where no targeted surveys have been undertaken. These include:

- The unsurveyed areas within the Growth Areas, relating to 694.5 ha or 33 per cent in the NGGA and 101.2 ha or 13.2 per cent in the WGGA
- The external infrastructure footprints

As described in Chapter 13, approaches have been developed to address these gaps to sufficiently manage risks to MNES. These approaches involve:

- The use of assessment methods that are conservative or precautionary where uncertainty exists around the scale of potential impacts
- The process based development approach that will be applied to part of the Heales Road East precinct
- The use of Commitments and Measures under the Plan to address data gaps during implementation and provide for clear and appropriate outcomes for MNES

UNDERSTANDING OF ECOLOGICAL PROCESSES

Sufficient understanding of ecological processes is a key challenge for all environmental impact assessments. There is commonly a lack of information about issues such as:

- Species distribution
- Species habitat requirements
- Species population numbers and dynamics
- The effects of key threatening processes (e.g. climate change)
- The best approaches for minimising and mitigating potential impacts

The assessment addresses these uncertainties through:

- Gathering the best available information from scientific literature, expert knowledge, on-ground surveys
- The use of Commitments and Measures under the Plan to generate the technical information needed to address information gaps and inform planning and development in a way that adequately protects MNES
- Applying a precautionary approach to understanding and evaluating potential impacts. An analysis of the application of the precautionary principle is provided in Part 5

The Plan addresses uncertainty through its monitoring, evaluation, reporting and improvement (MERI) framework combined with ongoing adaptive management. This is discussed below in Section 14.5.

14.1.2 RESPONDING TO NEW KNOWLEDGE

Given the long timeframe of the Plan, new knowledge about environmental issues will become available through:

- New scientific research
- Monitoring as part of implementation of the Plan

It will be critical that the Plan can consider this information and respond appropriately. The Plan's approach to this is discussed below in Section 14.5.

14.2 ASSUMPTIONS MADE IN ASSESSING POTENTIAL IMPACTS AND BENEFITS

One of the key risks in environmental impact assessment is making incorrect assumptions about the nature of potential impacts and benefits of a project. In particular, it is important that the consequences of potential impacts are not understated, and the benefits of conservation measures are not overstated.

To address this risk, the assessment report takes a precautionary approach to identifying and analysing impacts and benefits. Two examples of this include:

- The assumption that all MNES values within the areas subject to development will be lost due to a lack of certainty around the additional biodiversity outcomes that will be delivered in accordance with the BCS during precinct planning
- The habitat mapping for threatened species within unsurveyed areas of the Growth Areas generally overestimates the amount of habitat which means the impacts that are assessed are likely to be larger than what will ultimately occur on the ground

The assumptions made in assessing potential impacts and benefits are:

- Outlined in Part 3 – Assessment Approach which describes the methods used in the assessment
- Set out in relation to each protected matter in the individual assessment chapters

The application of the precautionary principle to the assessment is evaluated in Part 5.

14.3 HOW CHANGES TO STATE AND COMMONWEALTH LEGISLATION, POLICIES, PLANS AND ADVICE IS TO BE ACCOUNTED FOR IN THE MANAGEMENT OF THE AREAS IMPACTED BY THE PLAN

Given the long timeframes of the Plan, changes to legislation, policies, plans, and advice are inevitable. These changes may lead to risks around:

- Implementation processes. For example, changes to State planning policies may affect the approaches to addressing indirect impacts
- New information for threatened species and ecological communities, for example:
  - New listings of species or threatened ecological communities (TECs)
  - The re-discovery of a previously considered extinct (in the wild) species
  - New knowledge that changes the understanding about a protected matter
- Compliance. For example, changes to legislation may have implications for compliance under what would then be an approval under outdated legislation

The Plan addresses these risks through:

- Clearly establishing outcomes and commitments that will be delivered despite any changes to legislation, policies, plans and advice
- The use of specific commitments that have been developed to account for potential changes
- Its approach to MERI and adaptive management (discussed in Section 14.5 below) which will provide a way of responding to any changes to legislation, policies, plans and advice

14.4 CAPACITY TO ENSURE THE PLAN IS IMPLEMENTED

Effective implementation is particularly important for strategic assessments because of the size and complexity of the programs, the long timeframes over which they are implemented, the number of stakeholders and the diversity of their interests, the amount of money the programs cost, and the complexity of the legal frameworks they operate within.

Lessons learnt from other strategic assessments around Australia suggest that effective implementation requires:

- Clear and feasible outcomes that the Plan will deliver
- Clarity about the delivery framework and mechanisms to implement the Plan
- Appropriate flexibility within the Plan to ensure it remains relevant over time
- Clear governance arrangements, including certain funding
- Comprehensive processes to monitor and report on implementation, and adapt implementation as needed
- Simplification of Plan documentation
- Publication of progress against commitments and measures

The Plan has been designed to address these issues. A detailed evaluation of the ability of the Plan to be implemented is provided in Section 29.6 of Part 5.

14.5 ADAPTIVE MANAGEMENT UNDER THE PLAN

Adaptive management is a process for improving management practices through learning from the outcomes of previous management (DSEWPC, 2011). It is based on information derived from monitoring and can be applied anywhere uncertainty in management exists.

Adaptive management involves the following steps: monitoring, evaluation, reporting and improvement (referred to as a MERI framework). Each of these steps is applied iteratively over the life of a project to ensure that the project is effective in delivering its objectives over time.

Adaptive management is an essential part of the implementation framework for strategic assessments. It is important because:

- The scale and complexity of strategic assessments means that there may be uncertainty relating to some impacts during the assessment process that need to be addressed during implementation
- The timeframes for strategic assessments are long and implementing agreed outcomes will be subject to a range of uncertainties over the life of the Plan
- Factors relating to the environment are likely to change over the life of a strategic assessment and an adaptive approach to management will be important for achieving the Plan's outcomes
- Changes to State and Commonwealth legislation, policies, plans and advice will occur over the life of the Plan

Providing a process to address uncertainty and deal with changing circumstances during the life of the Plan is therefore critical.

The Plan's approach to adaptive management is provided in the MERI framework which is described in Chapter 7.5 of the Plan. The specific measures and Key Performance Indicators (KPIs) to implement the MERI framework including adaptive management are detailed in the Commitments and Measures document.

An evaluation of the adequacy of the Plan's approach to adaptive management is provided in Part 5 of the SAR.

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