



## 2. Bushfire Regulatory Framework

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Given that bushfire hazard can cause harm to people and social wellbeing, damage to property and impacts to the economy and environment, the management of bushfire hazard in Queensland is considered to be an integral component of land use planning and development decisions.

There are three regulatory mechanisms/instruments considered as part of this assessment that regulate development to avoid and mitigate potential impacts associated with bushfire hazard:

- State Planning Policy (SPP) – July 2017 (DILGP, July 2017);
- Bundaberg Regional Council (BRC) Planning Scheme 2015; and
- Australian Standard, AS3959-2018 – Construction of Buildings in Bushfire-prone Areas (Standards Australia, 2018)

The SPP identifies the Queensland Government’s policies about matters of state interest in land use planning and development (DILGP, July 2017). The SPP is a broad and comprehensive statutory planning instrument. It sits above regional plans, standard planning scheme provisions and local government planning schemes within the hierarchy of planning instruments outlined in the *Planning Act 2016*.

The SPP is supported by the following guidance material:

- The SPP state interest guidance material - Natural hazards, risk and resilience - Bushfire (‘SPP guidance’) (DSDMIP, 2019), which provides further context to the SPP and explains how the SPP policies can be applied, in particular for local government when making or amending local planning instruments. The SPP guidance is also intended to assist assessment managers and practitioners in applying the SPP assessment benchmarks when state interests have not been integrated into the local planning scheme (where applicable).
- The ‘Bushfire Resilient Communities – Technical Reference Guide for the State Planning Policy State Interest - Natural Hazards, Risk and Resilience – Bushfire (‘BRC technical document’) (QFES, 2019), which provides technical guidance and policy positions of the Queensland Fire and Emergency Services (QFES). It includes procedures for undertaking a bushfire hazard assessment (BHA), calculating asset protection zones and preparing a Bushfire Management Plan.

The SPP is also supported by a state-wide map of bushfire prone areas (BPA) (also referred to as ‘bushfire hazard area’) that was developed based on the CSIRO modelling of potential fireline intensity using the methodology described by Leonard et al. (2014). An excerpt from the SPP Assessment Benchmark – BPA mapping published on the SPP Interactive Mapping System (IMS) is provided in Figure 3. The site is mapped as having medium potential bushfire hazard (Figure 3).

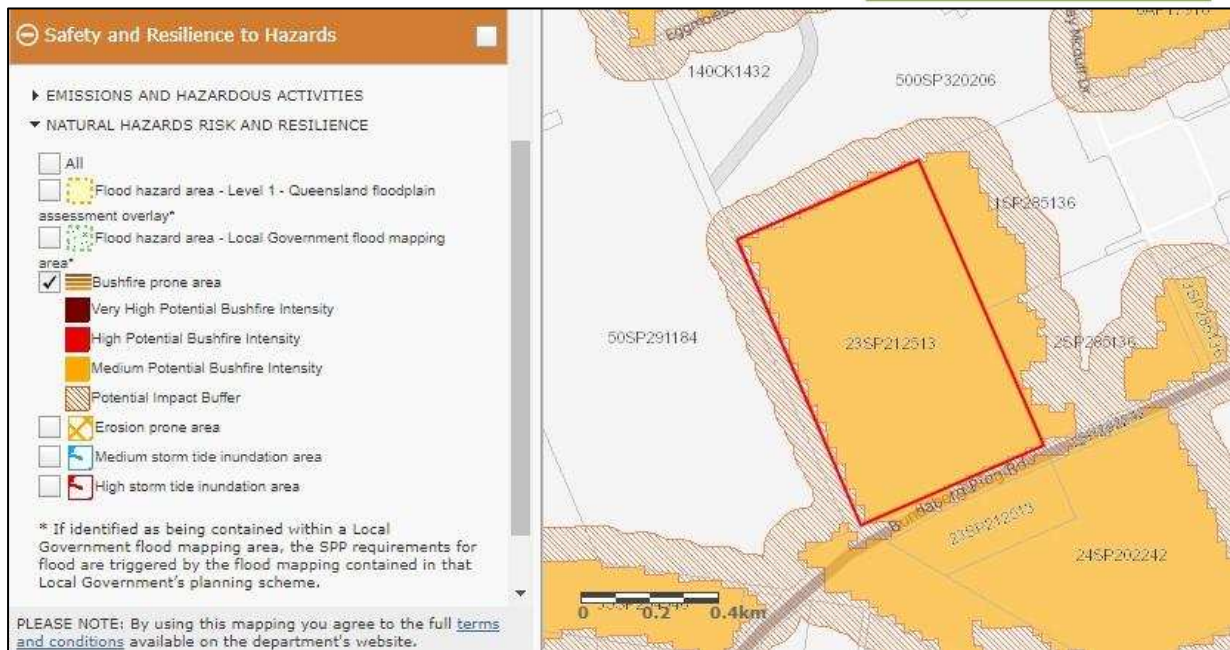


Figure 3: Extract from DSDMIP mapping – Bushfire prone area

## 2.1 Bundaberg Regional Council Planning Scheme

The Building Code of Australia (BCA) nominates local government planning scheme hazard overlay mapping as the relevant trigger for the applicability of the Australian Standard *AS3959-2018 – Construction of Buildings in Bushfire Prone Areas*. Therefore, bushfire hazard overlay mapping under the Bundaberg City Planning Scheme remains relevant pursuant to the provisions of the Building Code of Australia (BCA). The BCA applies only to Class 1, 2 and 3 and some Class 10 structures residential development. On this basis, the overlay mapping is relevant in terms of residential dwelling construction.

The BRC Bushfire Hazard Overlay identifies the site as supporting a medium hazard with a potential impact buffer (Figure 4). As the site is mapped within a bushfire hazard area, an assessment against the BRC Plan Bushfire Hazard Overlay Code has been undertaken. **Section 3** of this plan outlines the methodology used to assess bushfire hazard and compliance with the Code.



Figure 4: Extract from BRC Planning Scheme Mapping - Bushfire hazard risk area. Note this mapping applies the SPP Mapping as shown in Figure 3. It does not show the buffer areas.

## **2.2 Australian Standard 3959-2018 Construction of Buildings in Bushfire Prone Area**

The Australian Standard *AS3959-2018 Construction of Buildings in Bushfire-Prone Areas* (Standards Australia, 2018) specifies the requirements for the construction of buildings in bushfire-prone areas in order to improve their resistance to bushfire attack. AS3959-2018 applies to those areas where a regulated map identifies an area as a bushfire prone area (or similar), requiring calculation of Bushfire Attack Level (BAL) in accordance with a methodology outlined in the standard.

AS3959-2018 thus prescribes the particular construction details for buildings depending on the calculated BAL. The detailed requirements relating to construction methods and materials are typically dealt with as part of building design and enabled via private certification in accordance with the Building Code of Australia.

Note – Under the National Construction Code (NCC) certain buildings that support vulnerable uses, such as schools, hospitals and aged care facilities, are not required to be constructed to withstand bushfire attack (i.e. do not need not comply with AS 3959-2018). Because of the increased level of risk associated with vulnerable uses, such uses should be located outside of bushfire prone areas.

### 3. Bushfire Assessment

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A site-specific bushfire hazard assessment (BHA) for the site has been undertaken in accordance with the methodology outlined in the 'Bushfire Resilient Communities' (BRC) technical document (QFES, 2019). The methodology underpinning the BHA process consists of three stages:

1. An assessment to verify the reliability of existing BPA mapping over the site and land surrounding the site (the 'assessment area').
2. A hazard assessment involving field investigations to ground-truth the accuracy of the BPA mapping for the site, where required. The hazard assessment area must include the development area and all land within 150 meters of the development footprint.
3. Using the results of the site-specific assessment, the asset protection zone width needed to achieve the requisite radiant heat flux levels is calculated using the SPP Bushfire asset protection zone (APZ) calculator or Method 2 of AS3959:2018.

Where the precision and/or accuracy of BPA mapping or map input datasets are insufficient (e.g. where there has been changes in land use and vegetation cover within the assessment area), the process enables applicants to create a local-scale BPA map based on the results of the site investigation and to apply modified input variables that reflect changes that have occurred over time. The BHA process adapts the method used to generate the state-wide BPA mapping, described in Leonard *et. al.* (2014).

The following steps have been undertaken to assess spatial factors that contribute to potential bushfire intensity for the site and surrounding land:

- **Step 1: Identification of Fire weather severity**

Identification of all Forest Fire Danger Index (FFDI) values estimated at a 1:20 year (5%) Annual Exceedance Probability (AEP) using the Bushfire Hazard Area – Bushfire Prone Area – Inputs dataset from the Queensland Government data portal.

- **Step 2: Identification of Vegetation Hazard Classes**

Assessment of vegetation communities to identify the relevant vegetation hazard classes (VHCs) using a combination of remnant and pre-clearing regional ecosystem maps, high-resolution aerial imagery and a ground-truthed assessment of vegetation present within the site and within the required 150 m assessment area.

- **Step 3: Slope assessment**

Identification of site slope and effective slope, and determination of whether proposed buildings are upslope or downslope of hazardous vegetation using Bushfire Hazard Area – Bushfire Prone Area – Inputs dataset from the Queensland Government data portal and 1 m contour data.

- **Step 4: Calculation of potential fireline intensity** - Where a change to the distribution, extent and/or classification of VHCs within the assessment area is proposed, remodeling of bushfire hazard is undertaken to determine how the changes to VHCs and associated fuel loads affect potential fireline intensity. Potential fireline intensity is to be calculated in accordance with the method outlined in Leonard *et. al.* (2014).

VHCs and associated potential fuel loads are in accordance with Leonard *et al.* (2017), as provided in the BRC technical document and SPP Bushfire APZ width calculator published by the Queensland Fire and Emergency Services (QFES).

Relevant spatial datasets published by the QFES were accessed via the Queensland Spatial Catalogue (QSpatial) and redi-PORTAL (PBSA, 2018).

### 3.1 Step 1 – Fire weather severity

The relevant Forest Fire Danger Index (FFDI) for the site was derived from the Fire Weather Severity (Forest Fire Danger Index) raster provided as part of the Bushfire Hazard Area – Bushfire Prone Area – Inputs dataset.

The FFDI for the site and surrounding land is 50.

### 3.2 Step 1 - Assessment of Vegetation

Different types of vegetation communities determine the rate at which dry fuel accumulates. Some vegetation communities protect fuel from drying out in all but extreme bushfire seasons and can then be susceptible to very destructive bushfires. Alternatively, vegetation communities may expose fuels to drying and therefore be frequently available for burning. Frequent bushfires can result in the development of bushfire-tolerant grassy woodlands or grasslands and less destructive bushfire behaviour.

#### Site vegetation

Vegetation across the site is mapped as *Eucalyptus latisinensis* +/- *Corymbia intermedia*, *C. trachyphloia* subsp. *trachyphloia*, *Angophora leiocarpa*, *Eucalyptus exserta* woodland (Regional Ecosystem 12.5.4). The site survey confirmed the vegetation community composition matches the State mapping; however, the categorisation of “woodland” is more correctly described as “forest” (**Plates 1-3**). As such, the state mapped Vegetation Hazard Class (VHC) is VHC 9.2 *Moist to dry eucalypt woodland on coastal lowlands and ranges*. However, given the structural composition of the vegetation on the site, the assessed vegetation is VHC 9.1 *Moist to dry eucalypt open forests on coastal lowlands and ranges*.

A small area of non-remnant vegetation community surrounds the site along the eastern, western and northern boundaries (**Plate 4**). This is the result of clearing for the fence line on these boundaries.



Plate 2: Remnant vegetation community



Plate 3: Remnant vegetation to the east



Plate 4: Remnant vegetation community to south



Plate 5: Non-remnant vegetation in the west

### Surrounding vegetation

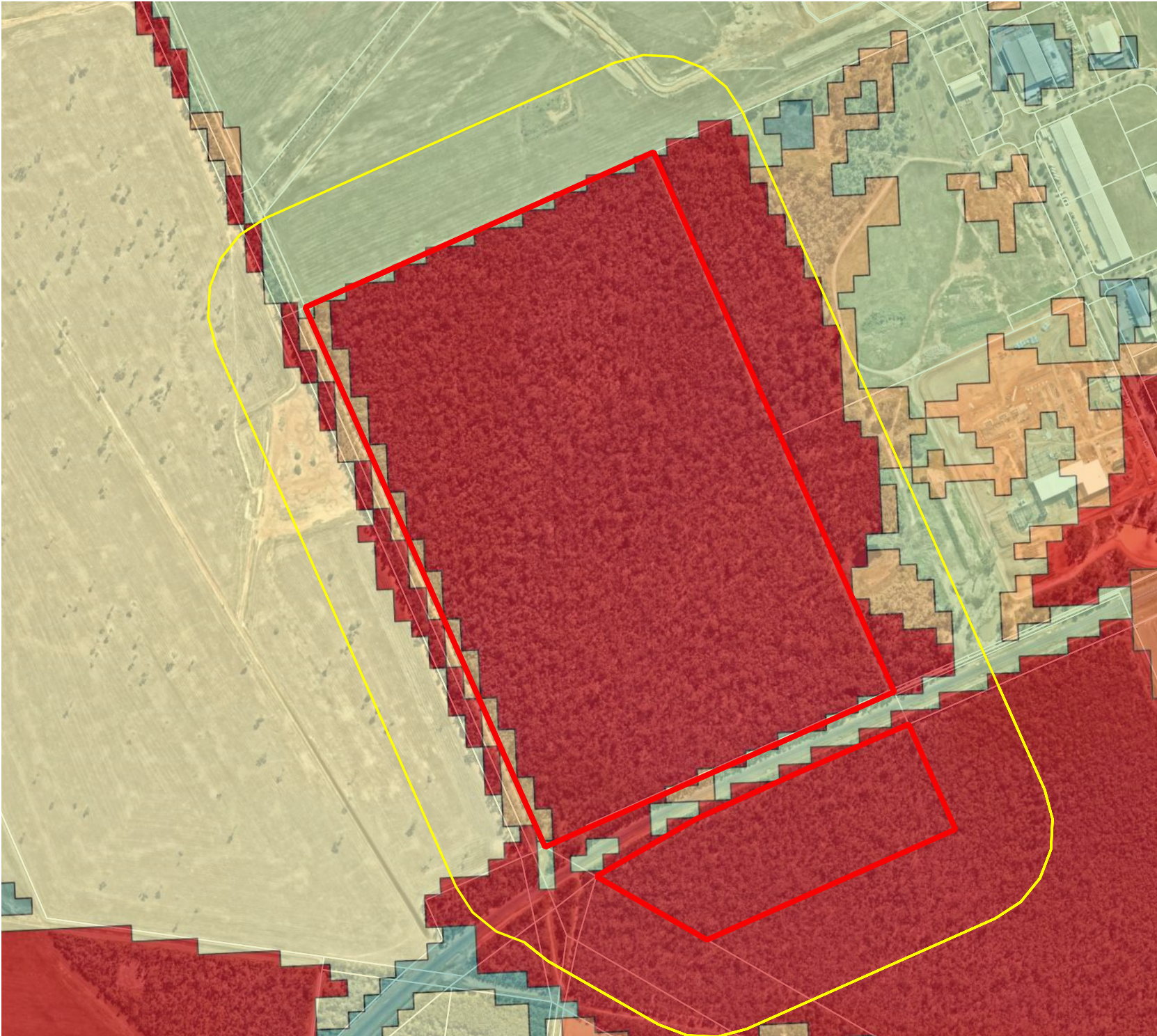
Vegetation communities surrounding the site, to the south and east support a vegetation community like that found within the site. Vegetation to the west and north is non-remnant cleared land categorised as VHC 40.4 Low grass or tree cover in rural areas to the west and VHC 41.4 Low grass or tree cover in built up areas (**Plates 5 and 6**). **Figure 5** illustrates the State Mapped VHC mapping.



Plate 6: Non-remnant vegetation to the north



Plate 7: Non-remnant vegetation in the west



**Figure 5:  
State Mapped VHC**

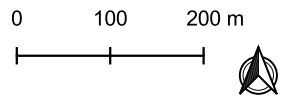
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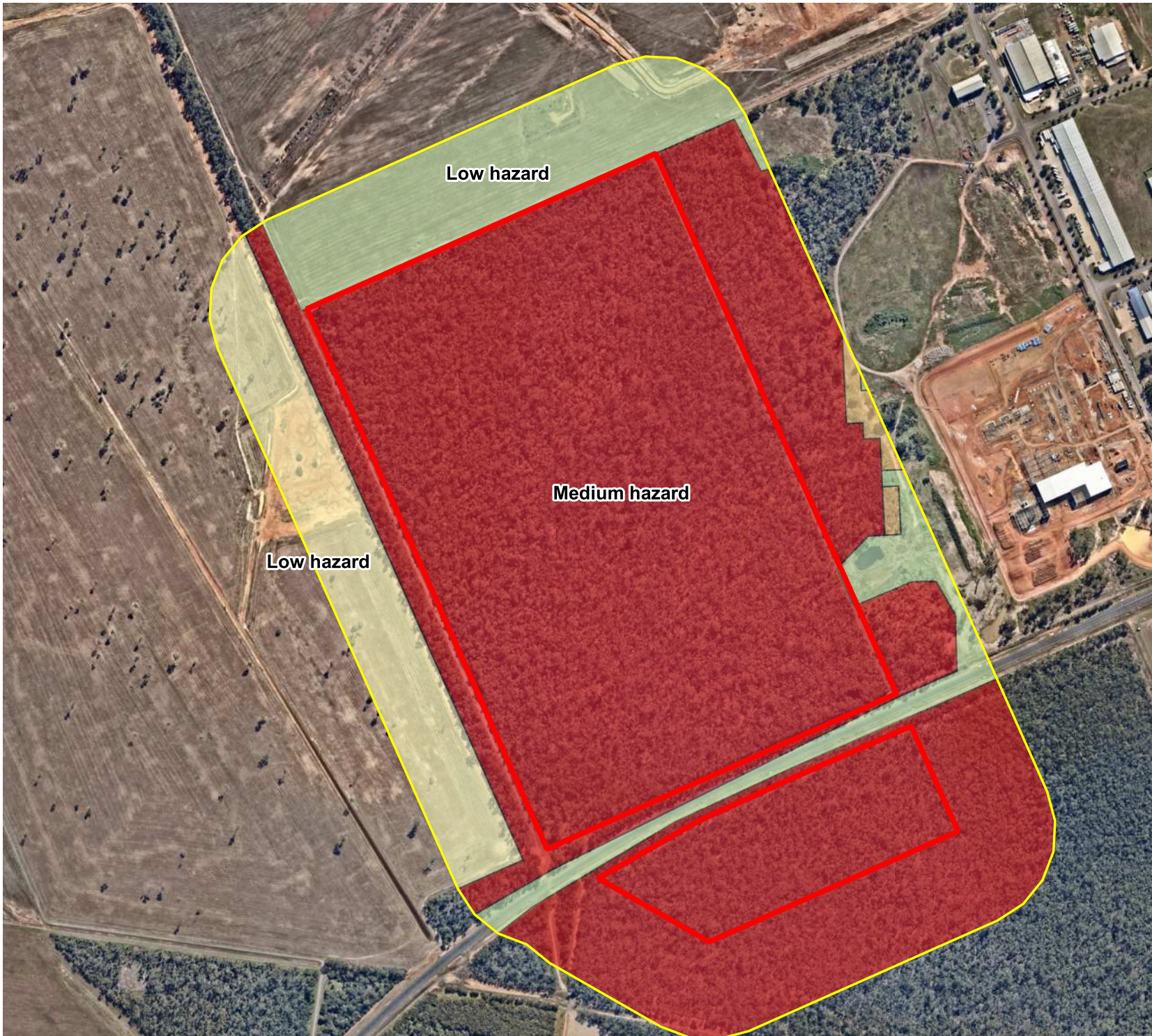
- Lot boundary
- Bushfire Assessment area
- state mapped VHC**
- 9.2 Moist to dry eucalypt woodland on coastal lowlands and ranges
- 38.5 Cropping and horticulture
- 39.2 Low to moderate tree cover in built-up areas
- 40.4 Continuous low grass or tree cover
- 41.4 Discontinuous low grass or tree cover
- 42.6 Nil to very low vegetation cover
- 43.6 Water bodies or very low vegetation cover



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**Figure 6:  
Ground-truthed VHC**

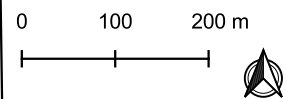
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- Lot boundary
- Bushfire Assessment area
- state mapped VHC**
- 9.1 Moist to dry eucalypt forest on coastal lowlands and ranges
- 38.5 Cropping and horticulture
- 39.2 Low to moderate tree cover in built-up areas
- 40.4 Continuous low grass or tree cover
- 41.4 Discontinuous low grass or tree cover
- 42.6 Nil to very low vegetation cover
- 43.6 Water bodies or very low vegetation cover



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**Green Tape**  
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### 3.3 Step 2 - Assessment of the Slope

Two slope input parameters are required for the estimation of fire behaviour and separation. Site slope is the slope of the ground between the edge of the proposed development (or site boundary) and the edge of hazardous vegetation. Effective slope refers to the slope of the land beneath hazardous vegetation. Effective slope is the more important parameter as it has a direct influence on the potential rate of fire spread, fuel consumption and thus, potential fire-line intensity. The effective slope is based on the slope of all land (in degrees) within the assessment area (including the slope beneath each VHC) and the relative position of land supporting hazardous vegetation in relation to the development sites i.e. upslope or downslope.

Site slope can be determined from the state-wide map of maximum landscape slope, local government data or based on the post-development site slope, for example after earthworks are completed. Given the likely requirement for earthworks to create a level building pad, the site slope is assumed to be 1 degree.

The site and surrounding area are characterised as flat terrain with an overall slope of less than 1 degree.

### 3.4 Step 3 - Assessment of the Fire Weather Severity and Potential Fuel Load

Fire weather severity is a measure of many variables that originate from weather that are known to influence fire behaviour such as recent rainfall, current wind speed and direction, relative humidity and temperature. Due to the complexity of these variables, they are commonly combined to provide a single weather index that can be used to estimate potential fire behaviour. The McArthur Forest Fire Danger Index (FFDI) is the most commonly used fire weather index adopted by fire authorities in Australia and used in regulatory instruments (e.g. AS3959-2009). A review of relevant data using the redi-MAP tool within redi-PORTAL (Public Safety Business Agency, 2018) shows a published FFDI value of 50 for the site.

Fuel loads have been allocated for each Vegetation Hazard Class (VHC) which represent the long-unburnt condition that would be typically exhibited 10 years after fire. In accordance with published fuel load datasets provided by QFES and the State Planning Policy – State interest technical manual for Natural hazards, risk and resilience (DILGP, 2016), ground-truthed vegetation hazard classes within and surrounding the site have the following fuel loads:

- VHC 9.1 - Moist to dry eucalypt open forests on coastal lowlands and ranges: Potential total surface fuel load of 22 t/ha and total potential fuel load (in remnant state) of 24.2 t/ha;
- VHC 40.4 – Continuous low grass or tree cover: Potential surface fuel load of 4.5 t/ha and total potential fuel load of 5 t/ha;
- VHC 41.1 – Discontinuous low grass or tree cover: Potential surface fuel load of 2.5 t/ha and total potential fuel load of 3 t/ha.

### 3.5 Step 4 – Determining Fire-line and Bushfire Intensity

Fire-line intensity is a standard measure of the rate at which an advancing fire would consume fuel energy per unit time per unit length of the fire front. This metric combines potential fuel load, maximum landscape slope and fire weather severity to provide a potential fire-line intensity metric. The potential fire-line intensity (PFI) is represented as the following equation:

$$PFI = 0.62 PFL^2 \times FFDI \exp(0.069 \text{ Slope})$$

Where: PFI = Potential fire line intensity (kW/m), PFL = Potential fuel load (tonnes / ha), FFDI = Potential severe fire weather (FFDI) and Slope = Max slope (degrees)

Fire line intensity was calculated using the SPP Bushfire APZ Width Calculator excel spreadsheet available as part of the Bushfire Resilient Communities data.

**Table 1** shows the potential fire-line intensity ranges (in kilowatts per metre) and the corresponding potential bushfire hazard classes.

**Table 1: Potential fire-line intensity ranges and bushfire hazard classes**

Potential Fire-line Intensity (kW/m)	Potential Bushfire Hazard Class
40,000+ kW/m	Very high
20,000 – 40,000 kW/m	High
4,000–20,000 kW/m	Medium
0 – 4,000 kW/m	Low

The Potential Fire-line Intensity was calculated for all vegetation communities within 100 m of the site. The potential bushfire intensity class was also determined for each vegetation community. The results are presented in **Table 2**.

**Table 2: Potential bushfire intensity classes and corresponding PFL ranges**

Vegetation within 150m of the study area	VHC	Potential Fuel Load (Tonnes/ha)	Max landscape slope (degrees)	Fire weather severity (FFDI)	Potential fire-line intensity (PFI)	Potential bushfire hazard class
Area within the development	9.1 Moist to dry eucalypt open forests on coastal lowlands and ranges	24.2	1	50	19,291 kW/m	Medium
Area to the east	40.4 Continuous low grass or tree cover	5	1	50	830 kW/m	No BPA*
Area to the north	41.1 Discontinuous low grass or tree cover	3	1	50	299 kW/m	No BPA*

\* Bushfire prone area.

The results show that vegetation directly surrounding the development on site is classified as medium hazard while urban vegetation is classified as low hazard. This matches the SPP mapping for the site.

### 3.6 Radiant Heat Exposure and Bushfire Attack Levels

BALs are used to quantify the level of attack that built structures may experience during a fire event. The BAL is defined as ‘a means of measuring the severity of a building’s potential exposure to ember attack, radiant heat and direct flame contact, using increments of radiant heat expressed in kilowatts per metre squared, and the basis for establishing the requirements for construction to improve protection of building elements from attack by bushfire’ (Standards Australia, 2018). BALs apply to buildings and any attached or adjacent structure within 6 m of the building.

AS3959:2018 adopts six BAL categories, which are based on the level of radiant heat flux to which buildings may be exposed to during a bushfire event. This level of heat flux generally relates to the type of vegetation, effective slope and how far a building is from hazardous vegetation.

The BAL for vegetation classified as VHC 9.1 has been calculated in accordance with Method 2 in AS 3959-2018 using the site-specific inputs (including inputs from datasets published by the CSIRO and QFES) provided in Section 3.4. Minimum distances have been calculated using the Flamesol calculator published by Fire Protection Association (FPA) Australia (Appendix 1). The minimum separation distances for each BAL are provided in **Table 3** below.

The QFES BRC Guideline recommends that vulnerable uses (including hospitals) development footprint plan that is separated from the closest edge to the adjacent mapped medium, high or very high potential bushfire intensity area by a distance (APZ width) that achieves a radiant heat flux level of 12.5 kW/m<sup>2</sup> or less at all development footprint boundaries. According to the Table 3, must be provided to all buildings on site to meet the BAL 12.5 bushfire requirement.

**Table 3: Determination of BAL minimum distances for hazardous vegetation**

BAL	12.5	19	29	40	Flame Zone
<b>Minimum separation distances required</b>	27.2m -27.2m	19m – 27.2m	12.9m -19m	9.5m – 12.9m	< 9.5 m

Vegetation management to minimise and mitigate bushfire impacts which is consistent with the QFES BRC Policies 6, 7 and 8 are described in the Bushfire Management Plan in **Section 5**.

## 4. Bushfire Management Plan

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The SPP requires that where it is not possible to avoid a bushfire prone area, development mitigates the bushfire risk to people and property to an acceptable or tolerable level. This can be achieved through hazard reduction practices and emergency mitigation measures for any buildings bordering potentially bushfire-susceptible vegetation. These practices and measures include fuel reduction and management, road infrastructure to provide safe access and egress, appropriate building design and construction standards, procedures for fighting bushfires and fire intensity reduction management measures.

### 4.1 Agencies / Persons Responsible

The responsible fire authority is the Queensland Fire and Emergency Services (QFES), with the Rural Fire Brigade being responsible for bush fires and the Fire and Rescue Service being responsible for structural fires within urban areas. It is the responsibility of the proponent to ensure that the relevant measures required by this hazard report are in place prior to inspection by the Council and the building certifier, and to ensure that the measures are in place prior to enacting the approval. Furthermore, it is the responsibility of the proponent to ensure that a copy of this report is always on hand at the site.

### 4.2 Owner / Occupier Responsibilities

It is the responsibility of the owner of the proposed development to maintain the property in accordance with the conditions outlined in this report. The owner / occupier responsibilities include:

- Specified Asset Protection Zones (APZs) are to be maintained between buildings and retained vegetation. Details of the APZ are provided in **Section 0**;
- Low fuel loads are to be maintained surrounding the development by vegetation management (e.g. brush-cutting, slashing and mowing where practical) and removal of debris and rubbish;
- All access routes are to remain clear of obstacles to enable effective emergency vehicle access and egress; and
- No burning is to be undertaken on-site without a Permit to Burn as issued by the local Fire Warden (and approval if required, in writing, from Council).

### 4.3 Reporting and Auditing

This bushfire report is a controlled working document that is to be updated and revised to reflect adaptive management and constructive feedback. Some sections of the plan may be modified, new procedures may be implemented and responsibilities altered, depending on feedback and application.

This bushfire report will only ever be modified with the agreement of QFES or Council. This agreement allows for changes to the plan scope, as determined through consultation and the acceptance of the proponent. That is, where further actions are deemed necessary or where actions can be reduced in scope.

#### 4.4 Siting of Buildings

In accordance with the SPP 2017, the proposed site design has considered the key principles when siting facilities. The relevant clauses that have been considered are:

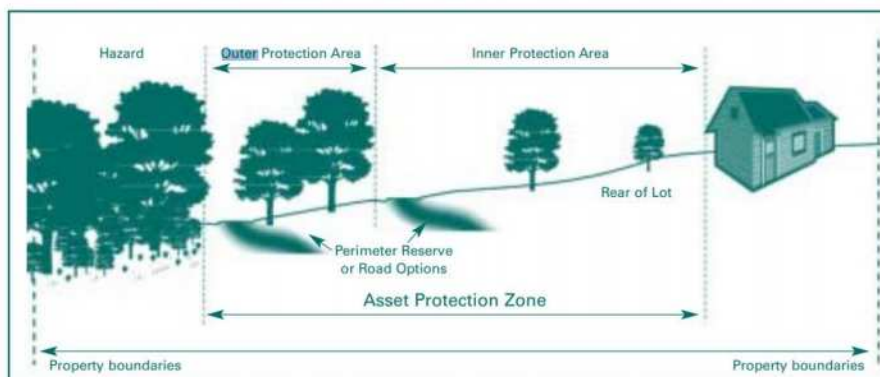
- Maximise where practicable the building frontage setbacks from any hazardous vegetation;
- Site buildings so that elements of the development that are least susceptible to fire, are situated closest to the bushfire hazard (e.g. roads); and,
- Maintain vegetation clearance to achieve a BAL 12.5 separation distance from all development footprint boundaries.

##### Asset Protection Zones

The use of an APZ is the most effective defence against flame and radiant heat and to a lesser extent, ember attack. An APZ is to be located close to buildings, incorporating the defensible space and for managing heat intensities at the building surface.

The Asset Protection Zone for the development site is 27.2m from buildings to the hazardous vegetation. Establishment of the APZ for the site will require development of the following zones (Figures 6 and 7):

- an Inner Protection Zone (IPZ) of a 12-metre setback where near total vegetation clearing must be provided. The IPZ is to be an area maintained at a low fuel load. Scattered single tree can be retained under the condition they do not overhang the buildings, they are not located within 12m of an exposed window or door and they have limbs removed to a height of 2m. Retained trees cannot have connected canopies and need to have any fallen leaves or branches raked to maintain a low ground fuel load. Landscaping can occur within the IPZ but trees, shrubs and mulch should not be located adjacent to exposed windows or doors or underneath retained trees. Landscaping design should incorporate areas of lawn and discontinued garden beds to avoid fuel continuity.
- an Outer Protection Zone (OPZ) where 30% canopy cover can be retained between 12m and 27.2m from all buildings. Understory vegetation is to be managed to reduce fuel loads. Fuel loads are maintained at a level (usually less than 8 t/ha) where the intensity of an approaching bushfire would be significantly reduced. Revegetation and ornamental planting surrounding the site will be undertaken with screening low-flammability species (e.g. appropriate local natives) that are adapted to local conditions and enhance habitat values for wildlife.



**Plate 8: Components of an Asset Protection Zone**



**Figure 7:  
Bushfire Attack level And  
Asset Protection Zone**

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**Impact areas**

●●●● Disturbance footprint

**Asset Protection Zone**

▨ Outer Protection Zone

▨ Inner Protection Zone

**Bushfire Attack Levels**

■ Flame Zone

■ BAL 40

■ BAL 29

■ BAL 19

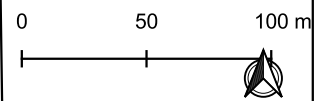
■ BAL 12.5

■ BAL 10



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#### **4.5 Access Roads**

Access to the hospital shall be provided via an extension of Johanna Boulevard to be constructed within an existing dedicated road corridor and a new east-west connector road to Kay McDuff Drive along the northern boundary of the site. Internal access roads have been designed in a manner that provides safe and effective access and egress for emergency vehicles in the event of a bushfire. These roads can be included in the APZ to provide suitable setback from hazardous vegetation.

#### **4.6 Electricity Supply**

The proposed development will have access to mains and emergency electricity supply. Where practicable, electrical transmission lines will be installed underground.

#### **4.7 Water Supply**

The proposed facilities must include a dedicated high flow reticulated water supply to for firefighting and ensure that bushfire emergency can be dealt with quickly by the relevant fire team.

#### **4.8 Climate Change and Fire Weather – Projections for 2020 and 2050**

Climate change can act in two ways to affect fire behaviour. First, it might exacerbate the fire-weather risk of any given day, leading to increased frequency or intensity of extreme and very extreme fire-weather days. Second, an increase in the accumulated fire risk over a year might represent a longer fire season and a reduction in the number of days suitable for prescribed burning.

It is recommended to review this document and associated bushfire procedures at the site over the coming decades in response to any potential increases of bushfire risk from climate change.

#### **4.9 Emergency Response Procedures**

An onsite fire management and evacuation strategy shall be developed and available to implement in the event of an emergency. In the event of a pending fire emergency, assistance is to be obtained by contacting dialling 000.

## 5. Assessment against the Bushfire Hazard Overlay Code

An assessment against the Bundaberg Regional Council Planning Scheme 2015 Bushfire Hazard Overlay Code is provided in **Table 4**.

Table 4: Assessment against the BCR Planning Scheme Bushfire Hazard Overlay Code.

Performance Outcomes	Acceptable Outcomes	Compliance
<b>Table 8.2.5.3.1 Requirements for development accepted subject to requirements and benchmarks for assessable development</b>		
<b>Performance outcomes</b>	<b>Acceptable outcomes</b>	
<b>Dual occupancy and dwelling house</b>		
<p><b>PO1</b>            The dual occupancy or dwelling house is provided with an adequate water supply for firefighting purposes which is reliable, safely located and freely accessible.</p>	<p><b>AO1.1</b>            Premises are connected to a reticulated water supply infrastructure network.  <b>OR</b>            Where there is no reticulated water supply: -</p> <ul style="list-style-type: none"> <li>(a). each dwelling is provided with a minimum water supply capacity of 5,000L dedicated for firefighting purposes; and</li> <li>(b). the water supply dedicated for firefighting purposes is: -               <ul style="list-style-type: none"> <li>i. sourced from a separate tank; or where sourced from the main water supply tank for the dwelling, the building's take off connection from the tank is at a level that allows 5,000L to be dedicated for firefighting purposes;</li> <li>ii. (ii) provided with a hardstand area allowing heavy rigid fire appliance access within 6m of the tank.</li> </ul> </li> </ul> <p><b>AO1.2</b>            The water supply outlet for firefighting purposes is: -</p> <ul style="list-style-type: none"> <li>(a) located remote from any potential fire hazards such as venting gas bottles; and</li> <li>(b). provided with an outlet pipe 50mm in diameter and fitted with a 50mm male camlock (standard rural fire brigade fitting).</li> </ul>	<p><b>Not applicable</b>            The development is not a Dual occupancy and/or dwelling house</p>

Performance Outcomes	Acceptable Outcomes	Compliance
<b>Table 8.2.5.3.2 Benchmarks for assessable development</b>		
<b>Bushfire hazard assessment and management</b>		
<p><b>PO2</b> Bushfire mitigation measures are adequate for the potential bushfire hazard level of the site, having regard to the following: -</p> <ul style="list-style-type: none"> <li>(a) vegetation type;</li> <li>(b) slope;</li> <li>(c) aspect;</li> <li>(d) on-site and off-site bushfire hazard implications of the particular development;</li> <li>(e) bushfire history;</li> <li>(f) conservation values of the site;</li> <li>(g) ongoing maintenance.</li> </ul> <p>Note—where a bushfire hazard assessment and management plan has previously been approved for the development proposed on the site (e.g. as part of a prior approval), design of the proposed development in accordance with that plan shall be taken as achieving compliance with this performance outcome of the code.</p>	<p><b>AO2.1</b> The level of bushfire hazard shown on the SPP interactive mapping system is confirmed via the preparation of a site-specific bushfire hazard assessment and management plan, prepared in accordance with the <b>Planning scheme policy for information Council may request, and preparing well-made applications and technical reports.</b></p> <p><b>AO2.2</b> Development is located, designed and operated in accordance with a Council-approved bushfire hazard assessment and management plan prepared in accordance with the <b>Planning scheme policy for information Council may request, and preparing well-made applications and technical reports.</b></p>	<p><b>Complies with AO2.1 and AO2.2</b></p> <p>The proposal for the hospital is determined to be a vulnerable use under the BRC planning scheme.</p> <p>The SPP Natural hazards, risk and resilience - Bushfire ('SPP guidance') (DSDMIP, 2019) allows for the sighting of such facilities within a mapped bushfire prone area where there are no reasonable alternatives.</p> <p>Where this occurs a BAL of 12.5 kW/m<sup>2</sup> must be applied to the development footprint.</p> <p>This Bushfire Management Plan describes the measures required to minimise and mitigate the risks from the hazardous vegetation on the site.</p>
<b>Safety of people and property</b>		
<p><b>PO3</b> Development maintains the safety of people and property from the adverse impacts of bushfire by avoiding a higher concentration of people living or congregating in bushfire hazard areas.</p>	<p><b>AO3</b> Development which will materially increase the number of people living or congregating on premises, including reconfiguring a lot, avoids confirmed medium, high or very high bushfire hazard areas. This includes, but is not limited to, the following uses: -</p> <ul style="list-style-type: none"> <li>(a) child care centre;</li> <li>(b) community care centre;</li> <li>(c) community residence;</li> <li>(d) community use;</li> </ul>	<p><b>Complies with PO3</b></p> <p>The proposal for the hospital is determined to be a vulnerable use under the BRC planning scheme.</p> <p>The SPP Natural hazards, risk and resilience - Bushfire ('SPP guidance') (DSDMIP, 2019) allows for the sighting of such facilities within a mapped bushfire prone area where there are</p>

Performance Outcomes	Acceptable Outcomes	Compliance
	<p>(e) (e) correctional facility;            (f) (f) educational establishment;            (g) (g) emergency services;            (h) (h) hospital;            (i) (i) indoor sport, recreation and entertainment;            (j) (j) outdoor sport, recreation and entertainment;            (k) (k) relocatable home park;            (l) (l) residential care facility;            (m) (m) retirement facility;            (n) (n) tourist attraction; and            (o) (o) tourist park.</p> <p>Note—the level of bushfire hazard shown on the SPP interactive mapping system is to be confirmed via the preparation of a site-specific bushfire hazard assessment and management plan, prepared in accordance with the <b>Planning scheme policy for information Council may request, and preparing well-made applications and technical reports.</b></p>	<p>no reasonable alternatives.            Where this occurs a BAL of 12.5 kW/m2 must be applied to the development footprint.</p> <p>This will require the removal of much of the vegetation from the site to achieve the recommended Asset Protection Zones as outlined in Section 4.5.</p>
<b>Community infrastructure</b>		
<p><b>PO4</b>            Community infrastructure is able to function effectively during and immediately after bushfire events</p>	<p><b>AO4</b>            Community infrastructure is not located within a confirmed medium, high or very high bushfire hazard area.  <b>OR</b>            Where located in a confirmed medium, high or very high bushfire hazard area, development involving community infrastructure is designed to function effectively during and immediately after bushfire events in accordance with a bushfire hazard assessment and management plan prepared in accordance with the <b>Planning scheme policy for information Council may request, and preparing well-made applications and technical reports.</b></p>	<p><b>Complies with PO4</b></p> <p>The development of a site-specific emergency response plan will be prepared. The establishment of the recommended Asset protection zone will ensure that the hospital can function during and after bushfire events.</p> <p>The site is within a generally cleared landscape and the threat of bushfire from external fires is low.</p>

Performance Outcomes	Acceptable Outcomes	Compliance
<b>Hazardous materials</b>		
<p><b>PO5</b> Public safety and the environment are not adversely affected by the detrimental impacts of bushfire on hazardous materials manufactured or stored in bulk.</p>	<p><b>AO5</b> Development involving the manufacture or storage of hazardous materials in bulk is not located within a confirmed medium or high bushfire hazard area.</p>	<p><b>Complies with PO5</b> Hazardous materials stored on site will be kept in accordance with established standards.</p> <p>The establishment of the Asset Protection Zone will change the bushfire hazard profile from medium to low with reduced vegetation loads across the site</p>
<b>Access and evacuation routes</b>		
<p><b>PO6</b> Where development involves provision of a new public or private road, the layout, design and construction of the road: - (a) allows easy and safe movement away from any encroaching fire; (b) allows easy and safe access for firefighting and other emergency vehicles; and (c) provides for alternative safe access and evacuation routes should access in one direction be blocked in the event of a fire.</p>	<p><b>AO6.1</b> The road layout provides for “through roads” and avoids culs-de-sac and “dead end” roads (except where a perimeter road isolates the development from hazardous vegetation or the cul-de-sacs are provided with an alternative access linking the cul-de-sac to other through roads). <b>AO6.2</b> Roads have a maximum gradient of 12.5%.</p>	<p><b>Complies with PO6</b> Access and evacuation routes from the hospital are addressed in the site plan and the ready access to a new road to the north and west, which allows for easy and safe access by emergency services and movement away from the most likely direction of fire attack by an encroaching fire. . All roads will be a minimum of 6m wide and are on flat terrain.</p>
<b>Fire breaking trails</b>		
<p><b>PO7</b> Fire breaking trails are located, designed and constructed to mitigate against bushfire hazard by: - (a) ensuring adequate access for firefighting and other emergency vehicles; (b) ensuring adequate access for the evacuation of residents and emergency personnel in an emergency situation, including alternative safe access routes should access in one direction be blocked in the event of a fire;</p>	<p><b>AO7</b> Where development involves the creation of a new road, fire breaking trails are: - (a) provided along and within a cleared road reserve having a minimum width of 20m; (b) a maximum gradient of 12.5%; (c) located between the development site and hazardous vegetation. <b>OR</b> Where development does not involve the creation of a new road, fire breaking trails are provided between the</p>	<p><b>Complies with PO7</b> A fire break shall be established around all proposed buildings. Such fire breaking trails will need to meet the following requirement: (a) have a cleared minimum width of 6m; (b) have a maximum gradient of 12.5%; (c) provide continuous access for fire fighting vehicles; (d) allow for vehicle access every 200m;</p>

Performance Outcomes	Acceptable Outcomes	Compliance
(c) providing for the separation of developed areas and adjacent bushland.	development site and hazardous vegetation. Such fire breaking trails: - (a) have a cleared minimum width of 6m; (b) have a maximum gradient of 12.5%; (c) provide continuous access for fire fighting vehicles; (d) allow for vehicle access every 200m; (e) provide passing bays and turning areas for firefighting appliances at frequent intervals (e.g. typically every 200m); (f) have a minimum cleared height of 4m; (g) have a formed width, gradient and erosion control devices, and are provided to all-weather standard; and (h) are located within an access easement that is granted in favour of the Council and the Queensland Fire and Rescue Service.	(e) provide passing bays and turning areas for firefighting appliances at frequent intervals (e.g. typically every 200m); (f) have a minimum cleared height of 4m; (g) have a formed width, gradient and erosion control devices, and are provided to all-weather standard; and (h) will be accessible by QFRS in the case of an emergency.
<b>Lot layout</b>		
<b>PO8</b> The lot layout of new development is designed to: - (a) mitigate any potential bushfire hazard; (b) provide safe building sites.	<b>AO8.1</b> Residential lots are designed so their size and shape allow for efficient emergency access to buildings for firefighting appliances (e.g. by avoiding battle-axe/ hatchet lots and long narrow lots with long access drives to buildings). <b>AO8.2</b> Residential lots are designed to provide building envelopes in locations of lowest hazard within the lot.	<b>Complies with PO8</b>  The site plan allows for efficient emergency access and egress.  All buildings will be sited within a BAL 12.5 area.
<b>Water supply for firefighting purposes</b>		
<b>PO9</b> Development provides an adequate water supply for firefighting purposes which is reliable, safely located and freely accessible.	<b>AO9.1</b> Premises are connected to a reticulated water supply with a minimum pressure and flow of 10 litres a second at 200kPA at all times. <b>OR</b>	<b>Complies with PO9</b>  The proposed facilities include a dedicated high flow reticulated water supply to for firefighting and ensure that bushfire emergency can be

Performance Outcomes	Acceptable Outcomes	Compliance
	<p>Where there is no reticulated water supply: -</p> <ul style="list-style-type: none"> <li>(a) the premises have a minimum water supply capacity of 5,000L dedicated for firefighting purposes; and</li> <li>(b) the water supply dedicated for firefighting purposes is sourced from: -               <ul style="list-style-type: none"> <li>(i) a separate tank; or</li> <li>(ii) a reserve section in the bottom part of the main water supply tank; or</li> <li>(iii) a swimming pool; or</li> <li>(iv) a dam.</li> </ul> </li> </ul> <p><b>AO9.2</b></p> <p>The water supply outlet for firefighting purposes is: -</p> <ul style="list-style-type: none"> <li>(a) located remote from any potential fire hazards such as venting gas bottles;</li> <li>(b) provided with an outlet pipe 50mm in diameter and fitted with a 50mm male camlock (standard rural fire brigade fitting); and</li> <li>(c) provided with an appropriate area stabilised for all-weather use by fire vehicles and which is located within 6m of the outlet or, where applicable, a swimming pool or dam.</li> </ul>	<p>dealt with quickly by the relevant fire team.</p>

## 6. Conclusion

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The results of the site-specific bushfire hazard assessment show that vegetation within and immediately surrounding the site presents a moderate bushfire hazard.

A bushfire attack under extreme fire weather conditions may subject the premises to ember attack, along with wind and smoke. Mitigation measures have been provided to ensure the protection of people and property during a bushfire event. These mitigation measures are summarised as:

- Implementation of asset protection zones and bushfire control capabilities. The QFES BRC Guideline recommends that vulnerable uses (including hospitals) development footprint plan is separated from the closest edge to the adjacent mapped medium, high or very high potential bushfire intensity area by a distance (APZ width) that achieves a radiant heat flux level of 10 kW/m<sup>2</sup> or less at all development footprint boundaries. In this case, the minimum distance is 27.2 metres from hazardous vegetation.
- Vegetation screening with low flammability local native plants is recommended where garden area to be established.
- Provision of reticulated water supply for access by firefighter as required
- The peripheral roads must be included in the APZ to maximise the retention of the vegetation.
- The proposed development will have access to mains and emergency electricity supply. Where practicable, electrical transmission lines will be installed underground.
- An onsite fire management and evacuation strategy must be developed once the building is constructed.

Where the above measures can be implemented, the development complies with the local planning scheme and the State Planning Policy 2017.

## 7. References

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Flamesol calculator published by Fire Protection Association (FPA)  
Australia

Calculated October 2, 2020, 11:50 am (MDc v.4.8)

**Bundaberg Hospital**

**Minimum Distance Calculator - AS3959-2018 (Method 2)**

Inputs		Outputs	
Fire Danger Index	50	Rate of spread	1.31 km/h
Vegetation classification	Forest	Flame length	11.45 m
Surface fuel load	22 t/ha	Flame angle	53 °, 64 °, 72 °, 76 °, 78 ° & 83 °
Overall fuel load	24 t/ha	Elevation of receiver	4.57 m, 5.15 m, 5.44 m, 5.55 m, 5.6 m & 5.68 m
Vegetation height	n/a	Fire intensity	16,367 kW/m
Effective slope	0 °	Transmissivity	0.878, 0.862, 0.839, 0.8149999999999999, 0.801 & 0.735
Site slope	0 °	Viewfactor	0.5962, 0.4389, 0.2967, 0.2011, 0.1637 & 0.0446
Flame width	100 m	Minimum distance to < 40 kW/m <sup>2</sup>	9.5 m
Windspeed	n/a	Minimum distance to < 29 kW/m <sup>2</sup>	12.9 m
Heat of combustion	18,600 kJ/kg	Minimum distance to < 19 kW/m <sup>2</sup>	19 m
Flame temperature	1,090 K	Minimum distance to < 12.5 kW/m <sup>2</sup>	27.2 m
		Minimum distance to < 10 kW/m <sup>2</sup>	32.5 m

Rate of Spread - McArthur, 1973 & Noble et al., 1980

Flame length - NSW Rural Fire Service, 2001 & Noble et al., 1980

Elevation of receiver - Douglas & Tan, 2005

Flame angle - Douglas & Tan, 2005

Radiant heat flux - Drysdale, 1999, Sullivan et al., 2003, Douglas & Tan, 2005

# Attachment A13

## MNES Management Plan



# Matters of National Environmental Significance Management Plan

EPBC -2022/09397

New Bundaberg Hospital, Thabeban, Queensland

Prepared for Queensland Hospital

01 November 2023

Job No. 11612

# Document Control

Document: Matters of National Environmental Significance Management Plan - New Bundaberg Hospital, Thabeban, Queensland under EPBC 2022/09397 prepared by Saunders Havill Group for Queensland Health.

## Document Issue

Issue	Date	Prepared By	Checked By
A	06.10.2023	HM	MD
B	18.10.2023	MD	MS
C	01.11.2023	MD	MS

Prepared by

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# Abbreviations and Acronyms

DAWE	Department of Agriculture, Water and the Environment
DES	Department of Environment and Science (Qld)
DCCEEW	Department of Climate Change, Energy, Environment and Water
EPBC	<i>Environment Protection and Biodiversity Conservation Act 1999</i>
GHFF	Grey-headed Flying-fox ( <i>Pteropus poliocephalus</i> )
MNES	Matters of National Significance
MP	Management Plan
NCA	<i>Nature Conservation Act 1992 (Qld)</i>
NCPR	Nature Conservation (Plants) Regulation 2020

■ MNES Management Plan

OMU	Operational Management Unit
PD	Preliminary Documentation
RAI	Relative Abundance Index
RE	Regional Ecosystem
SEQ	South-east Queensland
SHG	Saunders Havill Group
VMA	<i>Vegetation Management Act 1992 (Qld)</i>
VCFMP	Vegetation Clearing and Fauna Management Plan
WONS	Weeds of National Significance

# 1. Introduction

Saunders Havill Group (SHG) act on behalf of Queensland Health to prepare a Matters of National Significance Management Plan for the proposed New Bundaberg Hospital, Thabeban, Queensland (EPBC Reference: 2022/09397). The site is located at Bundaberg Ring Road, Thabeban (Lot 23 on SP212513). This report is intended to support the response to the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) Controlled Action Determination assessment.

This management plan has been prepared in addition to the detailed Preliminary Documentation (**PD**), which outline the requirements of the referral specifically to address the Request for Information to attain an EPBC approval. On the 15<sup>th</sup> July 2022 a referral under the EPBC Act was made to the Department of Climate Change, Energy, the Environment and Water (DCCEEW) for a controlled action assessment (refer **Attachment A – EPBC Controlled Action Decision Notice**). On the 3<sup>rd</sup> February 2023 this application was deemed a Controlled Action requiring assessment by “Preliminary Documentation”.

The Controlled Action decision was based on the determination of potential impacts on the following Matters of National Environmental Significance (MNES):

- Listed threatened species and communities (sections 18 & 18A) protected under Part 3 of the EPBC Act, specifically:
  - Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) (*Phascolarctos cinereus*) – Endangered.
  - Grey-headed Flying-fox (*Pteropus poliocephalus*) – Vulnerable.
  - Greater Glider (*Petauroides volans*) – Endangered.

This Management Plan (MP) specifically addresses *Item 4 – Avoidance, Mitigation and Management Measures* of the PD. This item requests a draft MNES Management Plan (**Attachment B – Assessment RFI (EPBC 2022/09397)**). This management plan includes procedures and protocols for the management of MNES prior to, during and post-vegetation clearing and construction activities to reduce potential adverse impacts. MNES biodiversity values within or near the project area were identified during desktop analysis of Commonwealth, State and Local environmental databases and overlay mapping. Management specifications and principles incorporated into this MP apply generally to all impacts and focus on incorporating measures to minimise disturbance and avoid conflicts.

## 1.1. Site Summary

The referral area is located within Bundaberg Regional Council and is located approximately 4 kilometres south-west of Bundaberg’s CBD. Almost the entire development site is vegetated with Eucalypt woodland, however, this vegetation is subject to some disturbance from fire, historic logging and surrounding land uses. This includes disturbance from construction and other activities associated with the Bundaberg Brewed Drinks facility to the east. The site is bound immediately to the north and west by cleared land earmarked for residential development, with the Bundaberg Airport beyond the cleared land to the west. In the broader landscape, agriculture dominates land use, along with residential development and infrastructure.

**Table 1: Site summary**

<b>Address</b>	Bundaberg Ring Road, Thabeban, Queensland, 4670
<b>Lot / Plan</b>	Lot 23 on SP212513 Lot 1 on SP285136
<b>Referral Area</b>	64.1 ha
<b>Development Footprint</b>	24.2 ha
<b>Retained Area</b>	41.9 ha

## 1.2. Project Description

Queensland Health ('the Proponent') seeks to develop a new hospital on land located at Bundaberg Ring Road, Thabeban. The referral area is located within Bundaberg Regional Council (BRC). The referral area is shown as **Figure 1** and **Figure 2**. The proposal includes the development of approximately 24.2 ha for a public hospital and supporting infrastructure and the retention of 41.9 ha of native bushland. The proposed action includes earthworks and vegetation clearing to facilitate the approved development. The total impact area is approximately 24.2 ha (16.8 ha for the project area itself, 1 ha for the electrical substation, 1.4 ha for the Joanna Boulevard extension, and a total of 5 ha for the proposed East – West connection road to Kay McDuff Drive).

The proposal is for a public hospital containing four separate buildings being the main hospital, mental health inpatient unit, the facility support centre, and multi-level car park along with six additional expansion zones. These buildings have been planned in a compact arrangement to the northwest corner of the site to minimise the environmental impact and enable significant existing trees and vegetation to be retained. This approach has also helped reduce the extent of new roads and in-ground services. The hospital will require the construction of two new access roads to facilitate vehicle access to the site. These are:

- A new north-south road to the west of the subject site (Johanna Boulevard extension), connecting with the existing road network at Johanna Boulevard and Eggmolesse Street; and
- A new east-west road to the north of the subject site (East West Road), connecting the Johanna Boulevard extension with Kay McDuff Drive.

The extension of Johanna Boulevard from the north west corner of the project site to the southern extent of the hospital impact area is included in the proposed action along with the full extent of the new east-west road to the north of the subject site. The extent of these access roads are shown in **Figure 3 – Development Layout**.

As there is no existing infrastructure, structures or services located inside the property boundary other than a Sunwater irrigation easement on the southern extremity, the project will require the integration of supporting infrastructure including water, sewer and telecommunications, within the road corridors of the two new access roads (Johanna Boulevard extension and East West Road). Electrical infrastructure will also be required

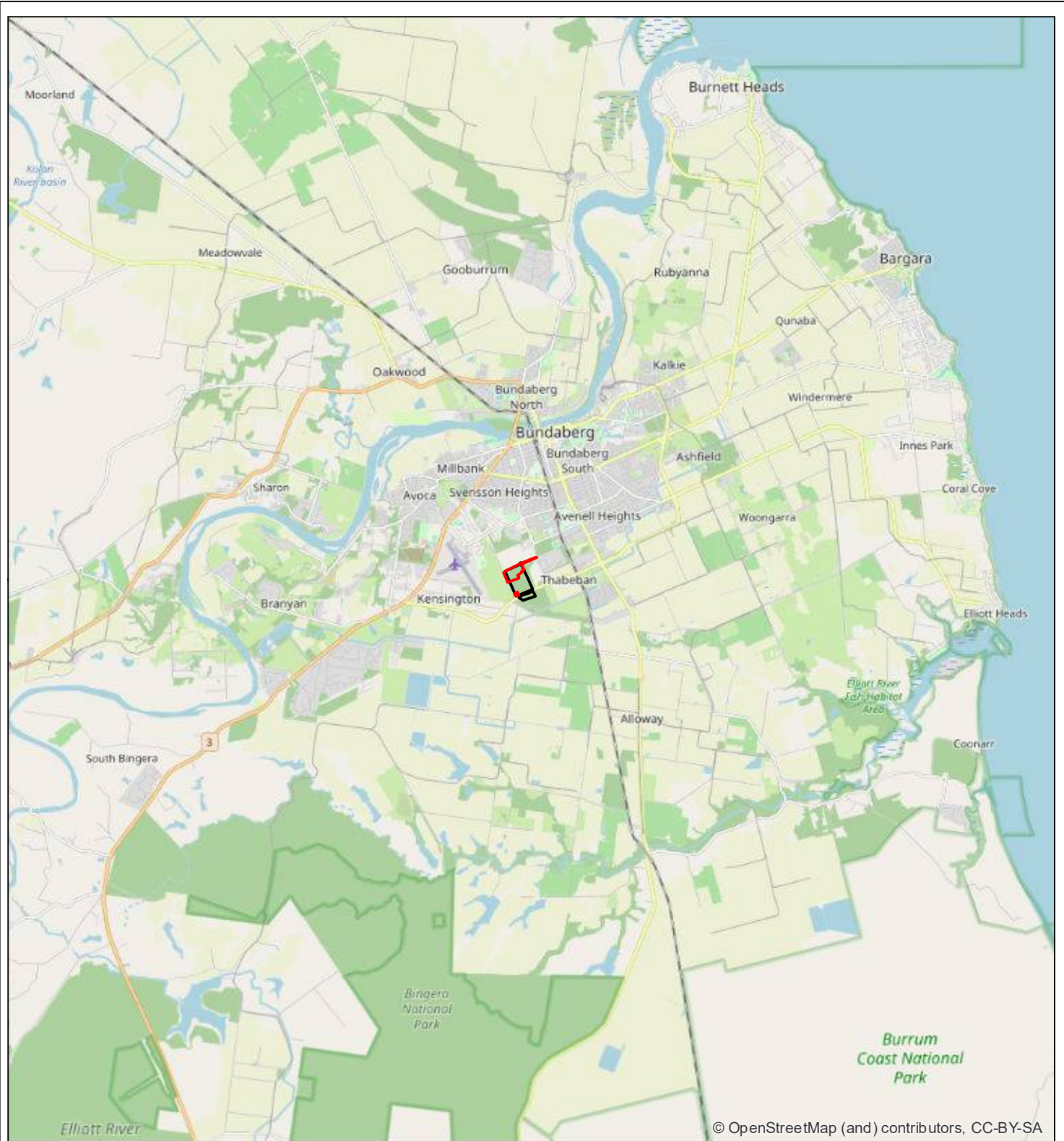
with a new zone substation to service the hospital planned for the southern portion of the site (Lot 23 SP212513), requiring approximately 1 ha of vegetation clearing.

The project includes a stormwater management strategy which involves the development of a series of stormwater quality improvement devices and an onsite detention system. This will include vegetated wetlands and drainage swales which are proposed to be neatly integrated into the landscape and landform.

### 1.3. Relationships to other plans



Various management plans are required to address a range of environmental matters associated with the construction and operation of the Bundaberg Hospital project. The following management plans have been created that are relevant to this MP:

- Species Management Program – Green Tape Solutions (addressing management of animal breeding places under *Nature Conservation Act 1992*)
- Bushfire Hazard Assessment and Management Plan – Green Tape Solutions
- Rehabilitation Management Plan – SHG
- Vegetation Clearing and Fauna Management Plan (VCFMP) – SHG



© OpenStreetMap (and) contributors, CC-BY-SA

**Legend**

-  Site DCDB
-  Project Disturbance Footprint

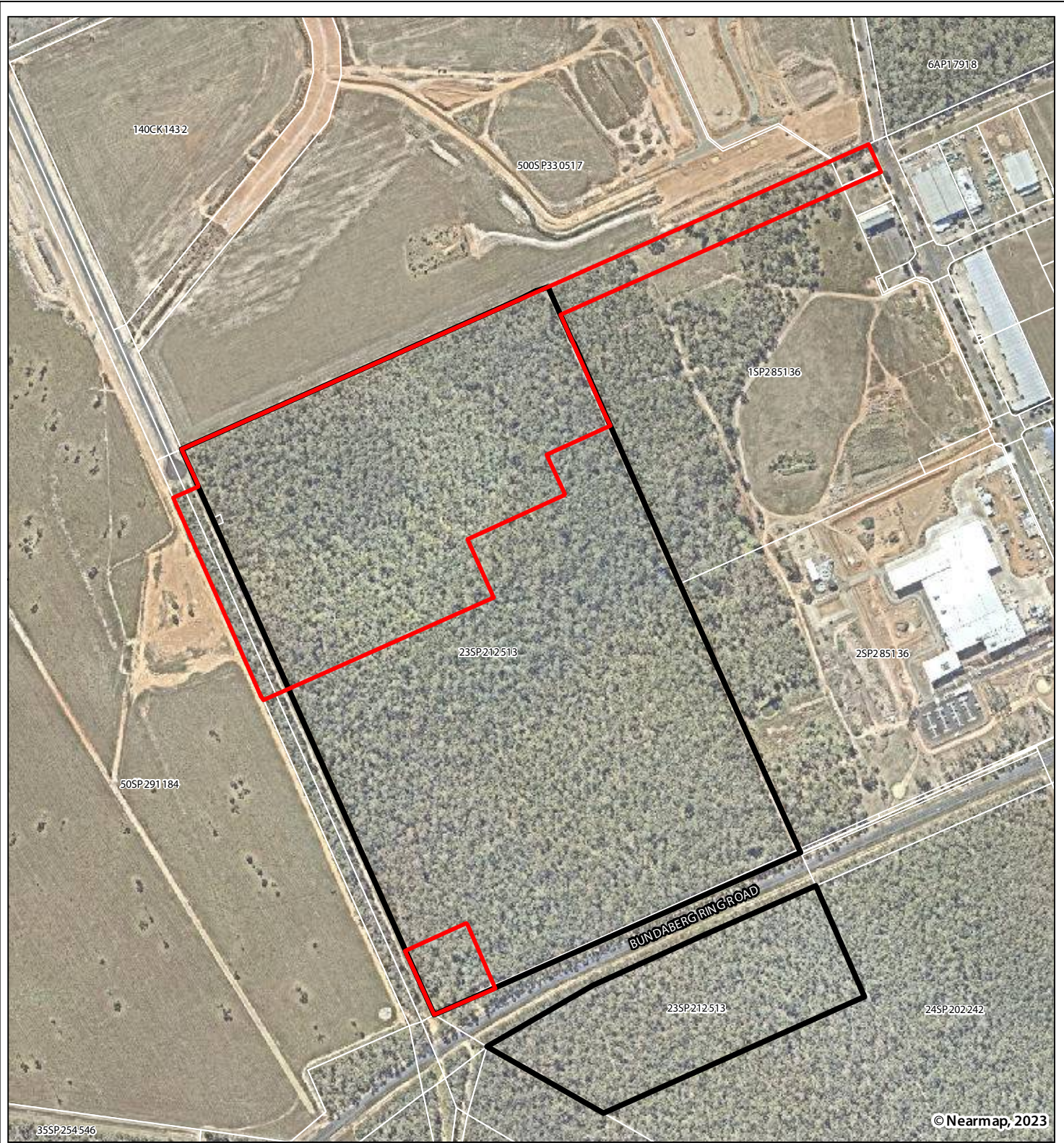
**Figure 1**  
Site Context



**File ref.** 11612 E Figure A1 Site Context A  
**Date** 25/10/2023  
**Project** Bundaberg Hospital



THESE PLANS HAVE BEEN PREPARED FOR THE EXCLUSIVE USE OF THE CLIENT. SAUNDERS HAVILL GROUP CANNOT ACCEPT RESPONSIBILITY FOR ANY USE OF OR RELIANCE UPON THE CONTENTS OF THESE DRAWINGS BY ANY THIRD PARTY.



**Legend**

- Qld DCDB
- Site DCDB
- Project Disturbance Footprint

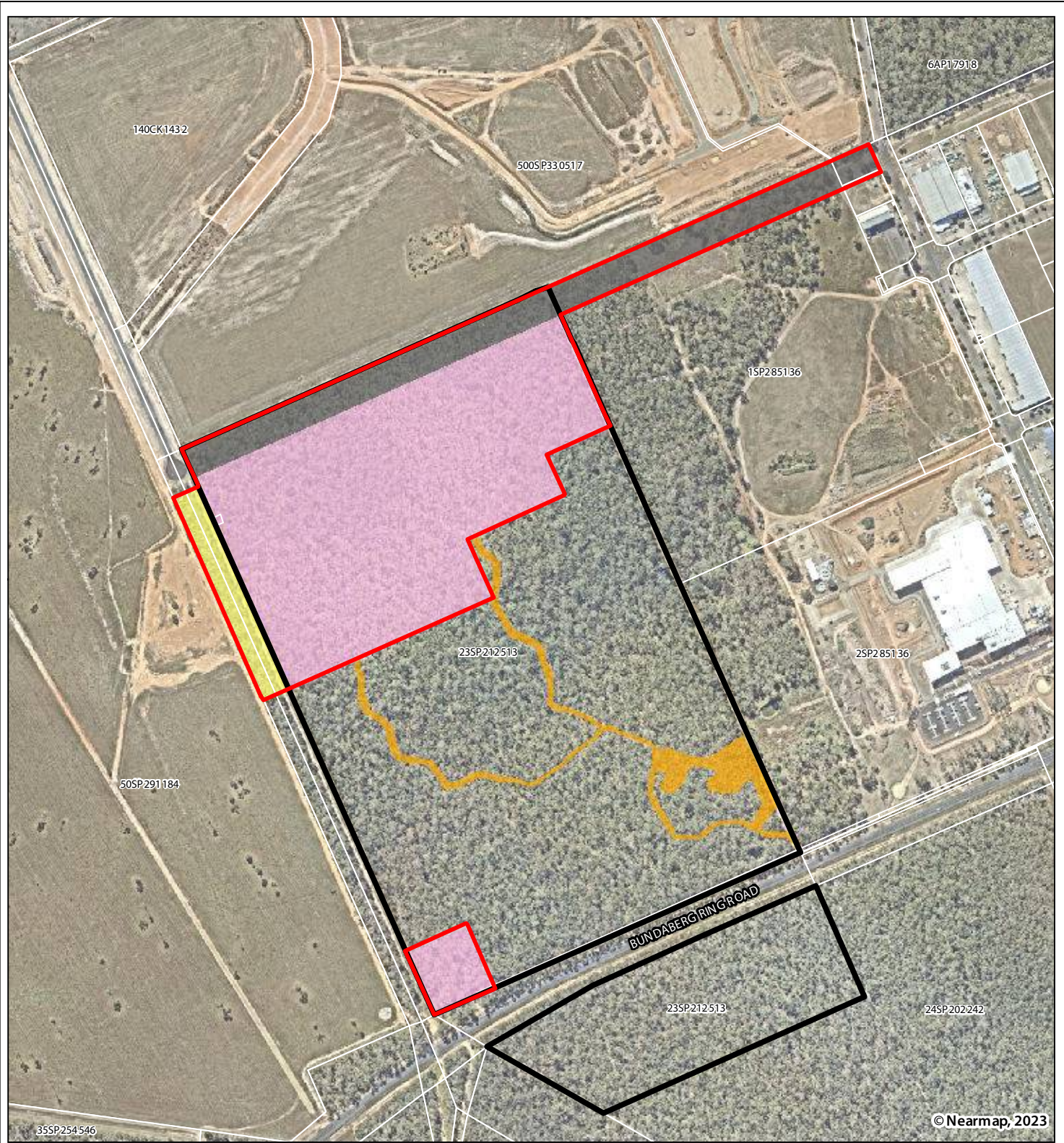
**Figure 2**  
Site Aerial

*File ref.* 11612 E Figure A2 Site Aerial A  
*Date* 25/10/2023  
*Project* Bundaberg Hospital

0 50 100 150 200 250 m  
 Scale (A4): 1:8,000 [GDA 2020 MGA Z56]



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**Legend**

- Qld DCDB
- Site DCDB
- Project Disturbance Footprint [24.2 ha]
- Proposed East-West Connection Road
- Johanna Boulevard Extension
- Development Area
- Stormwater Management Area

**Figure 3**  
Development Footprint

**File ref.** 11612 E Figure A3 Development Footprint A  
**Date** 25/10/2023  
**Project** Bundaberg Hospital



Scale (A4): 1:8,000 [GDA 2020 MGA Z56]



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## 2. Matters of National Environmental Significance (MNES)

Detailed ecological assessments including targeted threatened species surveys were undertaken as part of the project's referral and preliminary documentation to support the State and Commonwealth approvals processes. The surveys aimed to:

- Assess the project area for presence / absence of threatened flora and fauna species;
- Determine vegetation characteristics and species habitat values;
- Describe the likely adverse impacts on MNES within the project area;
- Determine suitable avoidance and mitigation measures to reduce impacts on MNES;
- Assess the site condition and habitat quality within the impact area.

The key findings from the field ecology surveys for each MNES addressed in this MMP is provided within the following sections. Detailed information including habitat quality within the Project area for each of the MNES is outlined within the Preliminary Documentation (PD). Results from the initial site surveys conducted by Green-Tape Solutions are provided in **Part B – Ecological Assessment Report** of the **PD**.

### 2.1. Survey Methodology

Field surveys were undertaken during seasonal conditions generally favourable to the detection and identification of flora and fauna species. Field survey methods were determined based on target species and communities and EPBC Act listed species guidelines. Initial site surveys by Green-Tape solutions for EPBC referral were completed during September 2020, July 2022, August 2022, and September 2022 (see **PD Part B – Ecological Assessment Report**). These surveys involved the following:

- Validation of desktop findings;
- Verification of the floristic structure and composition of vegetation communities present;
- Fauna surveys including diurnal bird surveys, nocturnal searches (spotlighting), camera trap deployment, acoustic detection (Anabat bat detection devices) and targeted searches for conservation-significant species, including a survey by Koala scat-detection dogs;
- Describing the fauna habitat present and recording any incidental fauna sightings;
- Identifying weed species and documenting vegetation disturbance; and
- Assessment of the ecological values on site with respect to the mapped environmental values on the site.

Contemporary targeted MNES flora and fauna field surveys were conducted by two ecologists from SHG to describe the ecological value of the referral area and potential habitat quality for threatened species (**Table 2**). These surveys were conducted by suitably qualified personnel consistent with the Department's approved survey guidelines and designed to provide results that are representative of the Referral Area. A variety of flora

and fauna survey methods were used to detect MNES during the impact assessment surveys in accordance with applicable Commonwealth and Queensland threatened species and communities survey guidelines including:

- EPBC Act survey guidelines for Australia’s threatened mammals (DSEWPC 2011);
- EPBC Act referral guidance for the vulnerable Koala (DCCEEW 2022);
- SPRAT databases for relevant EPBC Act listed species and communities (as of July 2016);
- Terrestrial Vertebrate Fauna Survey Guidelines for Queensland (Eyre et al. 2022);
- Approved Survey Standards: Greater Glider *Petauroides volans* (DSE 2011).

**Table 2: Survey Methodology Summary**

Date	Weather Conditions	Methods
15 May 2023	18.1°C min – 25.8°C max 1.0 mm rainfall recorded	Deployed motion sensing cameras x2
16 May 2023	16.7°C min - 25.5°C max 17.8 mm rainfall recorded	MHQA transects, SAT surveys, Greater Glider Survey and spotlighting for nocturnal arboreal mammals
17 May 2023	13.5°C min - 25.0°C max 0 mm rainfall recorded	MHQA transects, SAT surveys, Greater Glider Survey, diurnal hollow searches and spotlighting for nocturnal arboreal mammals
18 May 2023	12.6°C min - 23.9°C max 0 mm rainfall recorded	Diurnal hollow searches and connectivity assessment, collect motion sensing cameras.

**Source:** Bureau of Meteorology – Bundaberg Aero (039128) weather station for rainfall and temperature data

### 2.1.1 Modified Habitat Quality Assessment (MHQA)

In order to determine the quantum and quality of the habitat suitable for MNES within the referral area, vegetation/habitat quality was derived from the Modified Habitat Quality Assessment tool. The vegetation was assessed using a modified version of the Queensland State Governments “*Guide to determining terrestrial habitat quality: A toolkit for assessing land-based offsets under the Queensland Environmental Offsets Policy*” Version 1.2 April 2017. This assessment approach utilises the *Queensland BioCondition Assessment* method combined with site context and species stocking rate assessments to determine the habitat quality of the referral area. The Modified Habitat Quality Assessment (MHQA) methodology was utilised to assess the referral area condition, site context and species stocking rate. Results from these surveys are included in **Section 4** of the **PD**.

### 2.1.2 Grey-headed Flying-fox Foraging Habitat Assessment

The impact site was assessed using a GHFF Foraging Habitat Assessment (GHFF FHA) tool developed by the Saunders Havill Group. This tool adopts characteristics of the Queensland State Governments “*Guide to determining terrestrial habitat quality: A toolkit for assessing land-based offsets under the Queensland*

*Environmental Offsets Policy*” Version 1.2 April 2017, while also integrating published scientific literature on GHFF foraging habitat. It has been successfully used in multiple EPBC impact and offsets assessments.

The traditional terrestrial habitat quality assessment assesses three (3) core indicators—site condition, site context and species habitat index.

The GHFF FHA tool combines the aspects of the three (3) core indicators and published scientific literature into two (site condition and site context) with site condition being weighted with 64 % and site context weighted at 25 % of the final score. The balance of the weighting (30 %) has been attributed to the third indicator which is independent of the traditional habitat quality assessment, being species stocking rate. The species stocking rate assessment incorporated in the GHFF FHA tool is focussed on ‘foraging habitat’ for GHFF rather than GHFF stocking rates (presence/absence of the species). This assessment of ‘foraging habitat’ for species stocking rate has been incorporated in the GHFF FHA tool as GHFF roosting camp or species presence was not observed on-site however, suitable foraging habitat for the species was evident. Therefore, the density of foraging habitat available on-site is considered an appropriate assessment benchmark for species stocking rate. Results from these surveys are included in **Section 4** of the **PD**.

### 2.1.3 Koala Targeted Searches

Spot Assessment Technique (SAT) surveys were conducted in areas with potential Koala food trees across the site. The aim was to assess Koala usage of the site. Spot Assessment Technique surveys follow the methodology designed by Phillips and Callaghan (2011). It involves a single ecologist combing the ground under Koala food plant trees (or non-food plant trees if necessary) for a 1-metre radius around the trunk searching for scats. Each tree searched must be greater or equal to 100 mm diameter at breast height (DBH) and search of each tree continues for up to 2 minutes. The search can cease prior to the 2-minute limit if scats are detected. A total of three (3) SAT surveys were completed across the site within the survey period (refer **Plan 1**).

### 2.1.4 Motion Sensor Camera Trap

Camera trapping involves setting up a fixed digital camera to capture images or video of animals that pass in front of a camera with an infrared trigger. It is a non-invasive technique designed to detect medium to large sized animals as they pass, although it is possible to detect smaller animals depending on the set-up. This method identifies fauna activity beyond the scope of direct observational studies and with the absence of potential observer impacts. Two cameras were deployed on 15<sup>th</sup> May 2023 removed 18<sup>th</sup> May 2023, for a total of 3 nights (refer **Plan 1**).

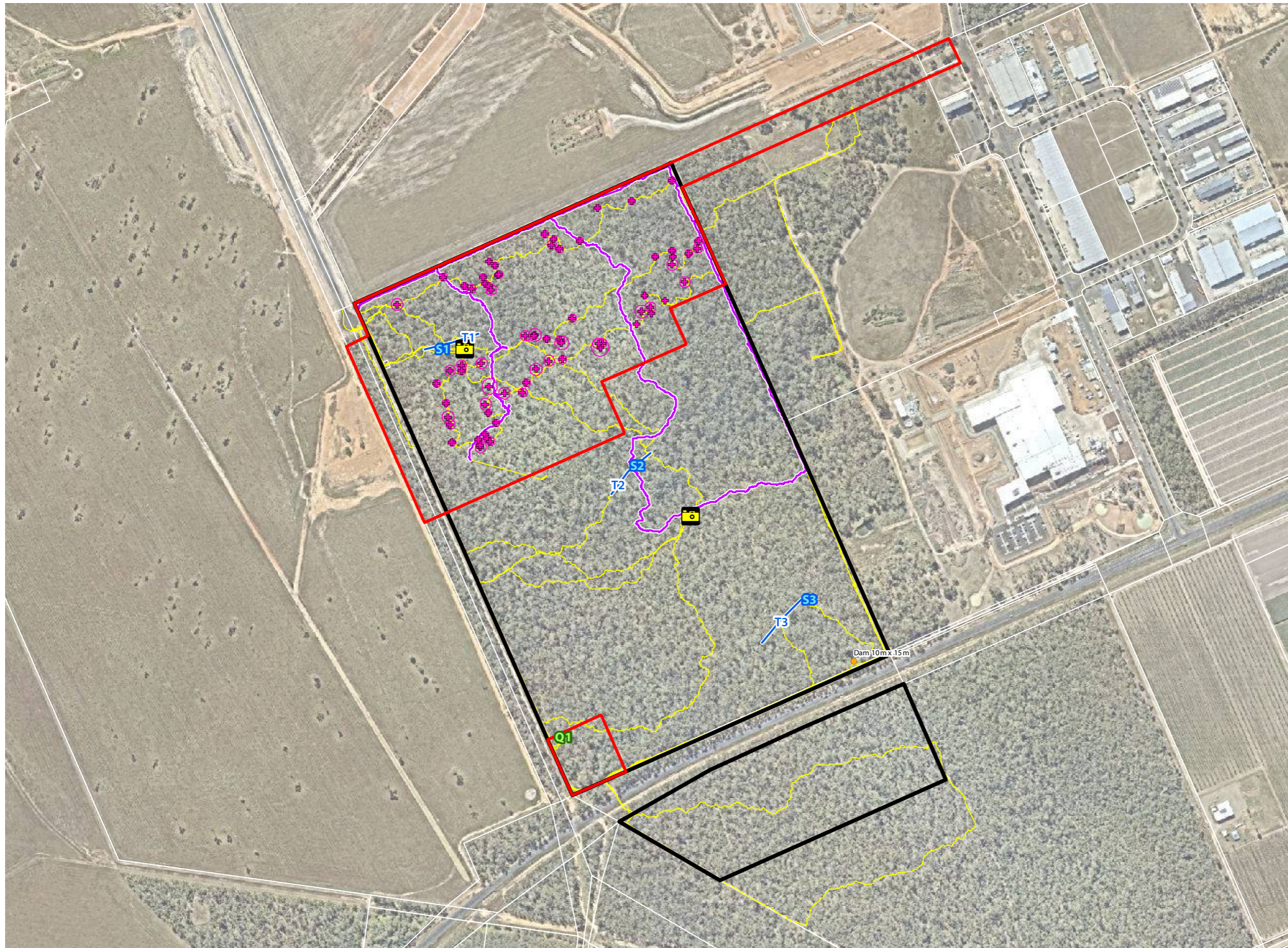
### 2.1.5 Greater Glider Habitat Suitability and Spotlighting Surveys

Species-specific field surveys for determining habitat suitability and species presence of the Greater Glider were undertaken over a 16-hour period on 16 May 2023 – 17 May 2023 (inclusive). The method implemented was an adaptation from *Terrestrial Vertebrate Fauna Survey Guidelines for Queensland* (2018), while also meeting the survey standards produced by The Department of Sustainability and Environment (Victoria, Australia), *Approved Survey Standards: Greater Glider *Petauroides volans** (May 2011) (version 1.0). These surveys

are applied prior to logging and are considered adequate to detect presence of the species. The surveys included identification of large hollow bearing trees and spotlighting transects covering the entire site. No evidence or direct observation of the species was recorded during extensive field surveys.

For spotlighting, the requirement to cover a total distance of as close to 1 km as possible per transect was targeted at a pace of 10 minutes per 100m, as outlined within The Department of Environment, Land, Water and Planning Forest Protection Survey Program *Survey Guideline – Spotlighting and Call Playback* (2020) (version 4.1) and Conservation Regulator Victoria *Guidance Note: Reporting detections of Greater Gliders* (2021). Multiple transects were conducted for each day of surveys to meet the total of 1 km requirement of the guideline. All fauna species observed located in trees during the transects were recorded. This included birds and frogs as well as arboreal mammals. During the spotlighting surveys, hollows were observed with a spotlight and binoculars. The total distance of surveys conducted at the site was 3.4 km across two nights with a survey effort of approximately 270 minutes. Hollow-bearing trees were plotted in the northern extent of the impact area onsite.

# 1. Field Survey Effort



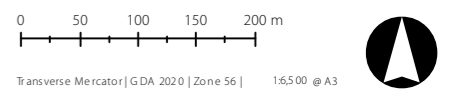
**Notes:**  
 This plan was prepared as a desktop assessment tool. The information on this plan is not suitable for any other purpose. Property dimensions, areas, numbers of lots and contours and other physical features shown have been compiled from existing information and may not have been verified by field survey. These may need verification if the development application is approved and development proceeds, and may change when a full survey is undertaken or in order to comply with development approval conditions. No reliance should be placed on the information on this plan for detailed design or for any financial dealings involving the land. Saunders Havill Group therefore disclaims any liability for any loss or damage whatsoever or howsoever incurred, arising from any party using or relying upon this plan for any purpose other than as a document prepared for the sole purpose of accompanying a development application and which may be subject to alteration beyond the control of the Saunders Havill Group. Unless a development approval states otherwise, this is not an approved plan.

**Layer Sources**  
 © State of Queensland (Department of Resources) 2023  
 Updated data available at  
<http://qldspatial.information.qd.gov.au/catalogue/>  
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- Legend**
- Qld DCDB
  - Site DCDB
  - Project Disturbance Footprint
  - GPS Track Log
  - Habitat Quality Transects
  - Spotlighting
  - SAT Survey Locations
  - Quaternary Survey Location
  - General Observation
  - Hollow-bearing GPS Tree Plot (w/ TPZ)  
 \* Northern extent only

Issue	Date	Description	Drawn	Checked
A	25/10/2023	Preliminary	TF	KH



## 2.2. Ecological Survey Results

### 2.2.1 General Site Description

The Referral Area is almost entirely mapped as Category B (remnant) vegetation under the *Vegetation Management Act 1999* (VMA), comprising 60.1 ha of the referral area. The vegetation is described as Least Concern Regional Ecosystem (RE) 12.5.4. The remainder of the site, and a thin strip of vegetation along an easement at the western boundary is mapped as Category X (non-remnant) vegetation (refer **Figure 4** and **Figure 5**). The description for these communities as confirmed on-site include:

- **RE12.5.4** *Eucalyptus latisinensis* +/- *Corymbia intermedia*, *C. trachyphloia* subsp. *trachyphloia*, *Angophora leiocarpa*, *Eucalyptus exserta* woodland on complex of remnant Tertiary surfaces and Cainozoic and Mesozoic sediments.
- **Non-remnant** Non-remnant vegetation.

Field survey confirmed the on-ground vegetation is representative of the mapped RE12.5.4 (refer **Photo set 1**). Species composition is reflective of 12.5.4, which includes a canopy dominated by *Eucalyptus latisinensis* (White Mahogany), *Corymbia intermedia* (Pink Bloodwood), *Corymbia trachyphloia* (Brown Bloodwood) along with *Angophora leiocarpa* (Smooth-barked Apple), *Eucalyptus exserta* (QLD Peppermint), and *Eucalyptus tereticornis* (Forest Red Gum). The vegetation contains a sub-canopy and shrub layer dominated by native species such as *Melaleuca quinquenervia* (Broad-leaved Paperbark), *Lophostemon suaveolens* (Swamp Box), *Alphitonia excelsa* (Soap Tree), *Acacia disparrima* (Hickory Wattle) and *Acacia leiocalyx* (Early-flowering Black Wattle).

The ground layer is dominated across majority of the site by exotic *Sporobolus pyramidalis* (Giant Rat's Tail Grass), with native forbs and grasses in some open areas including *Imperata cylindrica* (Blady Grass), *Cymbopogon refractus* (Barbed-wire Grass), *Entolasia stricta* (Wiry Panic), *Dianella caerulea* (Blue Flax-lilly) and *Lomandra multiflora* (Many-flowered Matrush). Weed incursion from *Lantana camara* (Lantana) was also present throughout the referral area along with evidence of old fire damage and logging.

A total of seventy-two (72) flora species were recorded within the vegetation communities within the referral area during field surveys, as listed in **Attachment C – Flora and Fauna Species Lists**. Of those, forty-nine (49) are native and twenty-three (23) species are considered to be non-native / introduced species.

A total of forty-three (43) fauna species were recorded during field surveys, including thirty-five (35) birds, one (1) amphibian, six (6) mammals and one (1) reptile. One of these species are identified as marine species under the EPBC Act, *Merops ornatus* (Rainbow Bee-eater), no other EPBC Act nor NCA were directly observed on-site. Despite disturbance and modification from surrounding agricultural land, residential development, roads and highly modified vegetation values, and moderate disturbance levels within the site, the site was observed to contain habitat features for a range of wildlife. These features include arboreal termitaria (with and without hollows), hollow-bearing trees, stick nests, fallen logs and mature vegetation.

One large stick nest, anticipated to be a Wedge-tailed Eagle (*Aquila audax*) nest, was identified within the project impact area. Several smaller stick nests and habitat features were observed throughout the referral area. One invasive species, Cane Toad (*Rhinella marina*), was identified during field survey. In addition, Wild Dog (*Canis sp.*) prints were observed throughout the referral area and calls of the species were heard during night survey works. A complete fauna species list is provided in **Attachment C**.



**Photo set 1:** General condition of Referral Area during site surveys

The adjoining landscape to the west has been cleared and will be utilised for future residential development, beyond which is the Bundaberg Airport. Cleared land directly adjoins the site to the north which has been earmarked for residential development. A patch of vegetation exists to the east, however this vegetation contains significant weed incursion of *Lantana camara* (Lantana) and is subject to disturbance from development within the adjoining Bundaberg Brewed Drinks Factory. Connectivity to surrounding vegetation is considered to be limited due to the surrounding roads including Bundaberg Ring Road to the south and limited through disturbed vegetation to the north-east. It is noted that the remnant vegetation on site is considered by DCCEEW as potential habitat for the Koala, although it is considered a low likelihood that this species would occur given the moderate disturbance onsite and fragmentation levels to surrounding vegetation, and lack of evidence of their activity following field surveys.



**Legend**

- Qld DCDB
- Site DCDB
- Project Disturbance Footprint
- Category C area - High value regrowth vegetation
- Category R area - Reef regrowth watercourse vegetation
- Category A area - Vegetation Offset/Compliance notices/VDecs
- Category B area - Remnant vegetation
- Category X area - Vegetation not regulated under the VMA
- Water
- Area not categorised

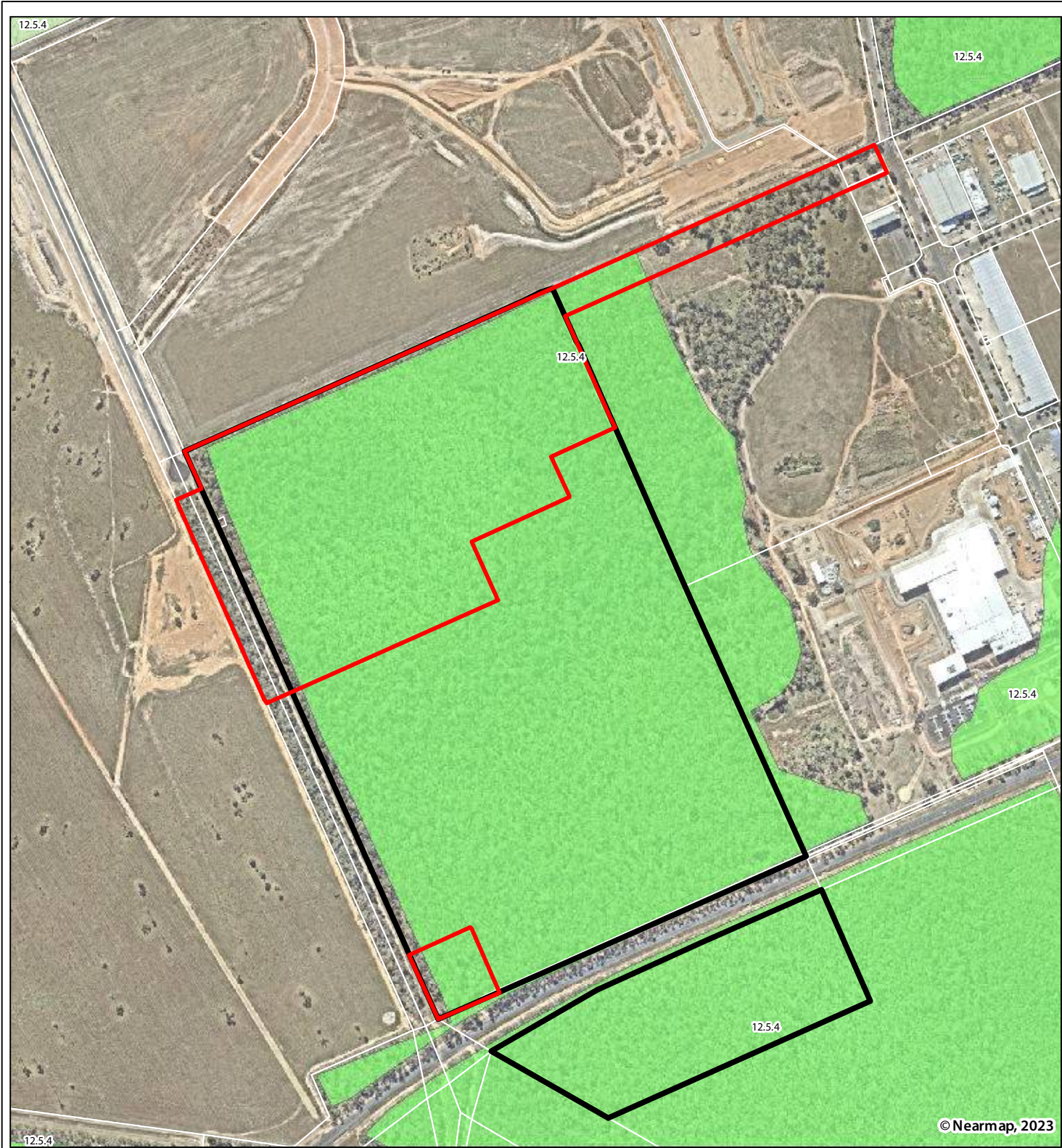
**Figure 4**  
Regulated Vegetation Management Map

**File ref.** 11612 E Figure A4 RVM A  
**Date** 25/10/2023  
**Project** Bundaberg Hospital

0 50 100 150 200 250 m  
Scale (A4): 1:8,000 [GDA 2020 MGA Z56]



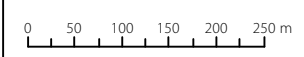
THESE PLANS HAVE BEEN PREPARED FOR THE EXCLUSIVE USE OF THE CLIENT. SAUNDERS HAVILL GROUP CANNOT ACCEPT RESPONSIBILITY FOR ANY USE OF OR RELIANCE UPON THE CONTENTS OF THESE DRAWINGS BY ANY THIRD PARTY.



<b>Legend</b>	
	Qld DCDB
	Site DCDB
	Project Disturbance Footprint
	VM Watercourses
	VM Essential Habitat
	VM Wetland
<b>Vegetation Management Regional Ecosystems Map</b>	
	Category A or B area containing endangered regional ecosystems
	Category A or B area containing of concern regional ecosystems
	Category A or B area that is a least concern regional ecosystem
	Category C area containing endangered regional ecosystems
	Category C area containing of concern regional ecosystems
	Category C area that is a least concern regional ecosystem

**Figure 5**  
Vegetation Management Regional Ecosystems Map

**File ref.** 11612 E Figure A5 RVSM A  
**Date** 25/10/2023  
**Project** Bundaberg Hospital



Scale (A4): 1:8,000 [GDA 2020 MGA Z56]



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### 2.2.2 Threatened Species Habitat

The site contains remnant eucalypt woodland and forest which is suitable habitat for *Phascolarctos cinereus* (Koala) and potential foraging habitat for *Pteropus poliocephalus* (Grey Headed Flying-fox). Across referral area there were habitat features in the form of hollow-bearing trees to provide potential denning habitat for *Petauroides volans* (Greater Glider) along with Eucalypt species to provide foraging resources, however due to the significant fragmentation of the site this species is considered unlikely to occur. These species were targeted as part of this survey effort (refer **Plan 1 – Field Survey Effort**).

#### **Greater Glider**

Potential foraging and denning habitat for the Greater Glider is present within the vegetated areas onsite and adjacent to the project area to the east, south and north-east. Vegetation within the site contains a variety of Eucalypt species including *E. exserta*, *C. trachyphloia* and *A. leiocarpa*. Preferred Greater Glider feed trees *C. intermedia*, *E. latisinensis* and *E. tereticornis* are also present throughout the site (DCCEEW 2022; Eyre *et al.* 2022). The vegetation to the south of the project site consists of similar vegetation and tree species as the subject site, also being mapped at RE12.5.4. However, the site contains some disturbance throughout from historic fire, logging and weed incursion is present in the ground layer which is dominated by *Sporobolus pyramidalis* (Giant Rat's Tail Grass) with patches of *Lantana camara*. These disturbances are considered to limit the habitat quality of the site for Greater Glider.

While the site contains some suitable habitat features for the Greater Glider including hollow-bearing trees and foraging resources, it is not considered to be critical habitat. The site is surrounded by modified habitat, cleared areas and road infrastructure therefore is not considered to be a large contiguous area of eucalypt forest. The area is considered to be a fragmented habitat patch, however, as discussed above, connectivity to larger patches of habitat located in the broader region is restricted due to barriers to movement. In particular, Bundaberg Ring Road to the south, cleared habitat areas to the north and west, and disturbed vegetation through the east and north-east are expected to hinder species movement. Dispersal of the species to enable recolonization into the subject site is therefore considered to be limited.

Targeted surveys for the Greater Glider were conducted over the survey period from 15 – 18 May 2023. This included habitat assessment, two (2) nights of spotlighting surveys, and identification of significant hollow-bearing trees within the northern impact area. No evidence of Greater Glider was identified within the project area during targeted species surveys.

#### **Koala**

The vegetation onsite consists of open Eucalypt woodland containing a variety of known Koala food trees including *C. intermedia*, *E. latisinensis*, *C. trachyphloia*, *E. exserta*, *A. leiocarpa*, and *E. tereticornis*. Due to the provision of potential foraging and sheltering resources on-site, the vegetation is considered habitat for the Koala. However, it is noted the vegetation onsite is fragmented from surrounding patches of vegetation as a result of Bundaberg Ring Road to the south, cleared habitat areas to the north and west, and disturbed vegetation through the east and north-east. Given historical clearing surrounding the site and logging with

the site, Koala habitat value is reduced compared to the high-quality habitat values further to the north, south and west.

Initial site surveys undertaken by GreenTape solutions in September 2020 and July 2022 located potential Koala trunk scratches, however, no records of Koala have been noted within the Bundaberg area in the previous 11 years from these surveys. Given that Koala trunk scratches are difficult to identify and are not considered definitive evidence of Koala presence, an additional targeted survey involving the use of Koala scat-detection dogs was undertaken on 31<sup>st</sup> August – 1<sup>st</sup> September 2022 to provide further certainty regarding the presence or absence of Koalas within the site. This koala scat-detection dog survey covering a total of 26 km did not detect the presence of Koalas within the site, despite potential scratches.

During the survey period from 15<sup>th</sup> – 18<sup>th</sup> May 2023 three (3) SAT surveys to assess Koala activity within the referral area were completed in accordance with Philips and Callaghan (2011) (Refer to **Plan 1** for locations). All SAT surveys scored a 0 out of 30 (refer to **Attachment A9** in the **PD** for full SAT results). No evidence of Koala in the form of direct sightings or scats and scratch marks was detected within the referral area during these targeted surveys nor via incidental searches during tree plot or habitat surveys.

### **Grey-headed Flying-Fox**

The site contains important winter and spring flowering species listed in the GHFF National Recovery Plan including *E. tereticornis* and *M. quinquenervia*. The GHFF has historically occupied forests and woodlands in the coastal lowlands of eastern Australia, having been recorded in the Bundaberg region. As for the Koala, the entire site is potential foraging habitat for the Grey-headed Flying-fox. Available habitat throughout the Bundaberg region is present within eucalypt forests and woodlands, however the area is fragmented by a patchwork of agricultural and residential land uses. No GHFF were observed as fly-over species at the site and no roosting sites were observed within the site or in the vicinity of the site indicating that the site could potentially be used for opportunistic foraging when the species is mobilising.

Although field surveys did not record the Grey-headed Flying-fox (*Pteropus poliocephalus*) utilising the project site, either foraging or roosting, the Department (DCCEEW) considers foraging habitat characteristics for this species are analogous with vegetation characteristics that provide critical habitat for the Koala. The nearest known active roost site is located approximately 5.85 km north (North Bundaberg, Botanic Gardens, Young Street, 585) with individuals recorded in 2019. Additional known flying-fox roost sites are located within 4.5 km north (Bundaberg, Harriet Island/Don Tallon Bridge 293) and over 30 km south of the site (Childers, Mango Hill, 312). Due to the highly mobile nature of the species and the large area of foraging habitat on-site, it is considered likely that the species would opportunistically forage within the referral area.

### 2.2.3 Existing Threats to MNES

The project site is surrounded by a number of agricultural land uses, which attracts and encourages threats to native wildlife. Several flora and fauna species observed directly or indirectly (scats, prints etc.) on-site are listed under the *Biosecurity Act 2014*, Schedule 2 Part 2 as a *restricted matter – invasive biosecurity*. Several of the identified restricted species form the basis of management requirements due to their direct impact to MNES listed species or indirect impact to the habitat required to support these species.

Field surveys recorded the following restricted matter – Category 3 flora species onsite:

- Lantana (*Lantana camara*)
- Giant Rat's Tail Grass (*Sporobolus pyramidalis*)

Field surveys recorded the presence of a variety of exotic fauna (i.e. pest animals), including species identified as restricted matters under the Queensland *Biosecurity Act 2014*, namely:

- Cane toad (*Rhinella marina*)
- Dog (*Canis lupus*)
- European Fox (*Vulpes vulpes*)

Wild dogs (*Canis familiaris dingo*, *Canis familiaris dingo* X *Canis familiaris*, *Canis familiaris*) and European Fox (*Vulpes vulpes*) are considered direct threats to the MNES target species specifically Greater Glider and Koala. This conclusion is based on several federal government documents including:

- DCCEEW Conservation Advice for *Petauroides volans* (greater glider (southern and central)),
- DAWE Conservation Advice for *Phascolarctos cinereus* (Koala) combined populations of Queensland, New South Wales and the Australian Capital Territory
- Department of Environment Threat Abatement Plan for Predation by the European red fox

## 3. Impact Assessment

Potential impacts to MNES (listed in **Section 1**) that may occur as a result of the project are outlined in this section. These include direct impacts (such as vegetation clearing, vehicle strike) or indirect impacts (such as weeds, increased noise, and lighting). Impacts have the potential to occur in all Project phases being; clearing phase, construction and operation of the Bundaberg Hospital.

### 3.1. Direct Impacts

The proponent seeks to develop a new hospital facility including hospital buildings, car parks, internal roads and supporting infrastructure. The action includes the installation of drainage swales and a rehabilitated wetland in the eastern portion of the site for stormwater treatment within the retained vegetation. An electrical substation is also proposed in the southwestern portion of the site and is considered priority works to enable the development. The project requires the construction of two new access roads located west and north of the subject site. The hospital development will involve the construction of nine buildings with the development footprint contained in 24.2 ha (refer **Figure 3**). Direct impacts include the clearing of approximately 23.3 ha (within an impact area of 24.2 ha). Notably, portions of this impact includes wetland rehabilitation for stormwater treatment areas, with 41.9 ha of vegetation that will be retained with adjoining habitat set aside for preservation.

As detailed in the previous sections, field surveys confirmed that, with the exception of Koala, Grey-headed Flying -fox and Greater Glider, the following are unlikely to occur or have a low likelihood of occurrence on the referral area:

- EPBC Act listed TECs;
- EPBC Act and NC Act listed flora species;
- EPBC Act and NC Act listed fauna species;
- EPBC Act Migratory fauna species.

A total of 23.3 ha of vegetation will be directly cleared to facilitate the construction of the New Bundaberg Hospital with an additional 0.26 ha of temporary impact from the stormwater management area. Species specific impacts to MNES are provided below:

- Impact of 23.56 ha to ground-truthed Koala habitat.
- Impact to 23.56 ha to potential GHFF foraging habitat.
- No impact proposed to other MNES.

#### 3.1.1 Vegetation clearing and habitat loss

Clearing of vegetation to support the development will reduce vegetation cover and habitat for flora and fauna dependent on those ecosystems. The development of the Bundaberg Hospital will involve clearing of

approximately 23.3 ha (within an impact area of 24.2 ha). This includes 23.56 ha of habitat identified as critical to the survival of the Koala and Grey-headed Flying-fox.

Impacts to threatened fauna species as a result of clearing may include:

- Injury or death during vegetation clearing;
- Loss of habitat requiring individuals to mobilise from the area and find new breeding and/ or foraging habitats;
- Fragmentation of habitat within the local area and region.

### 3.1.2 Vehicle Strike

During construction, a large number of vehicles will be required on the subject site. Direct impact from vehicle movements on threatened species and vegetation communities include:

- Damage or destruction of vegetation or fauna habitat by vehicles traversing these areas; and
- Fauna strike.

Upon completion of the hospital development, there will be a significant increase of vehicle traffic (compared to baseline conditions) and this will increase the likelihood of fauna strike. The probability of fauna strike is reduced due to the fact that most fauna will generally avoid modified areas. Notwithstanding this, a low number of macropods, as well as reptiles (i.e. snakes and lizards attracted to heat on roads) may occasionally enter the area and be at risk of vehicular strike. However, given the lack of evidence of macropods both on-site and on adjoining allotments, the risk of vehicle strike is considered to be negligible. Further, the area is already subject to heavy vehicular traffic due to surrounding land uses.

### 3.1.3 Predation from Pest Animals

During field surveys, a variety of exotic fauna (i.e pest animals) were identified including species identified as restricted matters under the *Queensland Biosecurity Act 2014* namely:

- Cane toad (*Rhinella marina*);
- Dog (*Canis lupus familiaris*);
- European fox (*Vulpes vulpes*)

Pest species threaten populations of native wildlife through direct predation (from foxes, cats and dogs). The Greater Glider and Koala suffer from predation to varying degrees and predation is listed as a threat in their respective species EPBC Act Conservation advice. Competition for resources can also impact threatened species. Disturbance from the construction of the hospital has the potential to make it easier for feral animals such as foxes and wild dogs to predate on wildlife. Specifically, if present, Koalas will incur increased susceptibility to predation whilst dispersing from habitat being cleared, or whilst attempting to return to habitat that has been cleared. Pest animals have the potential to impact on MNES threatened fauna species during all Project phases.

## 3.2. Indirect Impacts

### 3.2.1 Weeds

Increased vehicle movement during the construction phase has the potential to increase the spread of weeds in the area, particularly during the vegetation clearing phase. Field surveys identified the presence of *Lantana camara* and *Sporobolus pyramidalis* onsite within the project impact area and retained vegetation. Throughout the construction phase and operation of the hospital, vehicle movement may introduce or spread weeds resulting in deterioration or loss of vegetation and important fauna habitat. This may incur indirect impacts to threatened MNES, however with implementation of standard mitigation measures, the project is likely to result in a negligible impact to ecological values due to the potential introduction/spread of weeds.

### 3.2.2 Noise and vibration

Noise levels greater than existing ambient noise levels are expected during the construction within the project area. Sources of noise are likely to consist of noise in short, intense pulses from mobile plant equipment, and more prolonged noise, with consistent vibration, pitch and volume from generators, excavators, and pumps, in addition from noise from vehicles. This in turn can affect feeding, roosting, breeding, or nesting behaviour of threatened MNES species.

Both steady continuous and single noise events have the potential to lead to ecological impacts. Construction noise is expected to elicit some avoidance response from fauna using the surrounding vegetation though, with consideration of the extent of habitat available in the study area, this is likely to be a temporary and negligible to minor impact.

Noise levels are likely to increase once the hospital development is complete as there will be increased vehicular and pedestrian traffic. Road noise will be the primary source of noise impact. The establishment and use of paths through the hospital site will also provide a source of noise and light due to pedestrian traffic.

### 3.2.3 Artificial Light

Artificial light can affect both nocturnal and diurnal animals by disrupting behavioural patterns, with quality of light (e.g. wavelength, colour), intensity and duration potentially evoking different faunal responses. Impacts from increased light levels include disorientation from, or attraction toward, artificial sources of light; mortality from collisions with structures; and effects on light-sensitive cycles of species (e.g. breeding and migration for fauna and flowering in plants). An artificial increase in lighting can also affect abundance of predators.

Presence and intensity of artificial light in the project area will temporarily increase during the construction phase; however, night works will not be common. Lighting will be directed to construction areas within the project area. Some light spillage will be inevitable and is likely to be contained. Potential impacts associated with light emissions will be temporary and unlikely to be significant. With implementation of standard mitigation measures, the project is likely to result in a negligible impact to ecological values due to the use of light pollution during construction.

After construction is complete, the operation of the hospital and presence and intensity of artificial light will have most impact at the edges of adjacent vegetation.

### 3.2.4 Air Quality and Dust

Construction activities have the potential to generate dust emissions. Dust emissions during construction will be temporary. The main sources of dust will be generated via:

- Wheel-generated dust from the haul roads created for the construction phase;
- Dust lift-off from exposed surfaces (e.g. construction roads and pads);
- Earthworks, including construction of the embankments, and moving, dumping and shaping material; and
- Vegetation and soil clearing of the land.

Excessive deposition of dust on leaves of plants can suppress the growth and photosynthesis, resulting in reduced habitat quality for fauna. High levels of airborne dust can irritate the respiratory systems of fauna and potentially result in ingestion of dust-coated seeds and other foods. Excessive deposition of dust on open water bodies may also degrade water quality and overall habitat quality for fauna. With implementation of standard mitigation measures, the project is likely to result in a temporary and minor impact to ecological values due to the generation of dust.

During the operation of the hospital, damage or destruction of vegetation and fauna habitat through smothering by dust generated by vehicles traversing hospital may also occur.

### 3.2.5 Waste disposal

Inappropriate disposal of non-hazardous wastes can attract vermin and other wildlife to site. This may exacerbate potential impacts (e.g. road mortality). Litter may also enter surrounding environments. With implementation of standard mitigation measures, the project is likely to result in a negligible impact to ecological values due to the generation and handling of waste.

### 3.2.6 Hazardous and dangerous goods

Spills and leaks from transfers (fuel, chemicals) and inadequate storage of dangerous goods and hazardous wastes could result in point-source contamination of surrounding land. Adverse impacts could include toxic impacts on vegetation (resulting in degradation or loss of vegetation and habitats), toxic impacts on fauna (from contact, inhalation or ingestion) or indirect impacts on threatened and migratory species from habitat loss. Adverse impacts on surface and groundwater quality are also possible.

With the application of standard mitigation and management measures, impacts from liquid and solid waste disposal will be avoided or localised and small in scale. Further to this, the likelihood of significant spillages is considered low. Therefore, the project is likely to result in a negligible impact to ecological values due to potential spills and leaks.

### 3.2.7 Increased human presence

Increased human activity during construction has the potential to disturb fauna both within adjacent habitat areas. Examples of impacts included heightened vigilance and predator avoidance, which can disrupt foraging and roosting efficiency, or deter wildlife from using particular areas. Impacts essentially represent a reduction in core habitat due to edge effects. The project is likely to result in a temporary and minor impact to ecological values due the increased human presence on site during construction.

Furthermore, increased human activity associated with the hospital operation has the potential to disturb fauna that exist within the broader area and fauna which utilise the retained vegetation onsite.

## 3.3. Summary of Impacts

A summary of the main impacts with potential to occur to MNES as a result of the Project that will be addressed in the mitigation and management measures is provided in **Table 3**.

**Table 3: Summary of potential impacts to MNES**

Impacts	Potential Impacts to MNES	Impacted MNES	Project Phase
Vegetation clearing and habitat loss.	Removal of vegetation that provides foraging and/or breeding habitat for a threatened species. Injury or death during clearing.	All	Clearance
Vehicle Strike	Vehicles, machinery and site access onsite at increased levels may lead to vehicle strike causing injury or death.	All	All phases (clearance, construction, and operation)
Habitat fragmentation and barriers to fauna movement.	In it's current form the site retains limited functional connectivity, however there is potential for a reduction in the ability of MNES to disperse safely through the area.	Koala and Greater Glider	All phases
Increased presence of feral animals – predation and habitat degradation by invasive fauna.	Dogs and foxes have been recorded within the vicinity of the project area and have the potential to increase with disturbance onsite.	Koala and Greater Glider	All phases
Introduction of weed species and pathogens.	Weed dispersal throughout the project area by vehicles, machinery and people leading to habitat degradation.	All	All phases
Noise and vibration	Disturbance of habitat surrounding the hospital from activities within the site, particularly the retained patch of vegetation at the southern extent.	All	All phases

<b>Impacts</b>	<b>Potential Impacts to MNES</b>	<b>Impacted MNES</b>	<b>Project Phase</b>
Air quality and dust	Potential to generate dust emissions from the removal of vegetation and soil during construction and operation. Potential to effect retained patch of vegetation at the southern extent.	All	All phases
Artificial light	Light disturbance at night from construction and hospital operation. Loss of habitat within the retained patch of vegetation at the southern extent due to light disturbance at night.	All	All phases
Erosion and sedimentation	Alterations to local hydrological regimes from erosion and sedimentation.	All	All (predominantly vegetation clearing and construction)

## 4. Avoidance, Mitigation and Management Measures

A number of management and compensatory measures are proposed to avoid, mitigate and manage direct and indirect impacts on the listed threatened fauna. These include measures specific to a particular project phase, or management measures to be implemented over the life of the project as outlined below in **Section 6**. Project design considered a set of hierarchical management principles as outlined in State and Commonwealth offset policies, that are designed to firstly avoid impacts, then mitigate and management impacts to the environmental values.

- **Avoidance:** Avoiding direct and indirect adverse impacts where possible through Project design;
- **Mitigate:** Mitigating direct and indirect adverse impacts where impacts cannot be avoided through actions to reduce likelihood or severity of impacts occurring such as modifying design (e.g. employing specialist clearing and construction methods, reducing vehicle speed limits);
- **Manage:** Implement management actions to prevent or reduce impacts occurring such as weed and feral animal control, fire management. These actions are often over a longer timeframe;
- **Remediation and rehabilitation:** Actively and progressively remediate and rehabilitate impacted areas to promote and maintain long-term recovery;
- **Provide offsets:** Queensland Health are delivering environmental offsets for significant, residual impacts to MNES which will be addressed in a separate Offset Strategy.

### 4.1. SMART Principles

All MNES Management measures have been developed to be consistent with S.M.A.R.T principles which are:

- **Specific** – what and how.
- **Measurable** – baseline information, number/value and auditable.
- **Achievable** – timeframe, money and personnel.
- **Relevant** – conservation advices, recovery plans and threat abatement plans.
- **Time bound** – time-bound (specific timeframe to complete).

### 4.2. MNES Avoidance Assessment

Impacts to MNES have been avoided by focusing the development area on the unconnected portion of the site in the north which adjoins cleared land to the north and east, and the retention and preservation of bushland areas that augment adjoining reserves. The development footprint has been consolidated as much as possible to the northern portion of the site, along the edge of existing tracks and cleared / rural land. The total clearing impact area has been reduced from the previous footprint to a total area of approximately

24.2 ha (16.8 ha for the project area itself, 1 ha for the electrical substation, 1.4 ha for the Joanna Boulevard extension, and a total of 5 ha for the proposed East – West connection road to Kay McDuff Drive). Additionally, by consolidating the layout to the north, clearing to establish the bushfire asset protection zone has been reduced and the setback from Bundaberg Ring Road has been substantially increased thereby removing the need for an acoustic fence, which would also require vegetation clearing. Potential remaining impacts will be mitigated by the implementation of fauna friendly design measures.

Furthermore, an area of approximately 41.9 ha of bushland will be retained to the south of the hospital impact site to provide habitat for fauna and identified MNES. Minimal vegetation clearing to support the installation of vegetated swales and a wetland detention basin for stormwater treatment will occur in this area (**Figure 3**). Exclusion zones will be clearly marked with temporary fencing and signage.

## 4.3. Vegetation Clearing and Construction Phase Mitigation Measures

### 4.3.1 Environmental Pre-clearance Package

Each clearing phase will be subject to issue of an Environmental Pre-Clearance Checklist and Environmental Pre-Clearance Package to ensure all approval requirements are met prior to vegetation clearing. Environmental Pre-Clearance Checklists are designed to easily show compliance for approval requirements, including EPBC approval requirements, in a format where they can be 'ticked off' prior to vegetation clearing. The purpose of the checklist is to ensure:

- All required approvals are in place prior to clearing and all relevant documentation including approvals, approved plans and management documents are compiled and distributed to all relevant personnel;
- Threatened flora and fauna pre-clearance checks are undertaken of the clearing extent and appropriately documented so that:
  - Any threatened flora in the cleared area is identified and appropriate measures are in place,
  - Any threatened fauna and / or fauna habitat is identified and appropriately managed, and
- Appropriate induction procedures are in place and environmental requirements are understood and complied with by all contractors and sub-contractors.

Environmental Pre-clearance Packages require all approval documentation, including EPBC approval requirements, relevant to that clearing stage to be prepared, compiled, and distributed to all relevant parties prior to the commencement of clearing. The Environmental Coordinator will be responsible for preparation of and the Environmental Pre-clearance Package.

All relevant parties (e.g. civil contractor, clearing contractor, fauna spotter, environmental coordinator, superintendent and client) must sign the checklist prior to clearing, acknowledging that they have reviewed all, and will undertake the works in accordance with, approved procedures and reporting.

As way of acknowledgement, the Environmental Pre-Clearance Checklist will be run through at a project pre-start meeting with all personnel and relevant parties required to sign the checklist. No clearing can commence for a specific phase of works until the checklist has been completed and signed off by the Environmental Coordinator.

#### 4.3.2 Vegetation Clearing and Fauna Management Plan

An overarching Vegetation Clearing and Fauna Management Plan (VCFMP) (**Attachment D – VCFMP**) has been prepared to manage and mitigate potential impacts of the construction phase covering the loss of vegetated areas, isolated trees and likely barriers and impediments to local dispersal. Further, separate fauna management measures will be implemented post-development to mitigate potential ongoing impacts to fauna.

Project planning should consider the avoidance of clearing between April and November if possible, to reduce fatalities of juvenile animals and orphaning of fauna during vegetation clearing. As many microbats are expected to occur on site, clearing in autumn would result in the least amount of microbat death. The current project schedule falls outside of this period.

The VCFMP includes details on:

- trees marked for removal;
- all civil works likely to impact existing vegetation;
- temporary and permanent exclusion and protection fencing;
- roles and responsibilities for site contractors, the developer and the consultant group;
- stockpiling and site access locations;
- species surveyed as using the site, focusing on those most likely impacted by development works;
- a list of relevant State and Commonwealth legislation constraints and controls for fauna potentially affected by development works;
- a plan showing existing habitat opportunities and locations;
- details of the threats to existing fauna species;
- a clearing sequence plan showing the commencement of clearing and direction of removal to allow for the appropriate flushing of fauna towards safe havens and/or the application of an appropriate relocation program;
- management and mitigation measures – i.e. temporary use of fauna exclusion fencing and tree protection/exclusion around tree protection zones (TPZ) of vegetation to be retained;
- description of fauna spotter role; and
- specific fauna management procedures for potential or known habitat trees.

A tree felling protocol is provided as part of the VCFMP to guide the removal of hollow-bearing trees where their removal cannot be avoided. This protocol will detail preferred methods of clearing hollow-bearing trees i.e. using a two-stage process, removing surrounding trees one day before habitat trees, and “tapping” trees to encourage fauna to leave before felling. Trees will be felled using an excavator with grabs or a ripper or a tree harvester able to gently lower trees. Trees will not be felled and left to fall under their own weight as the excavator must be able to control the fall of the tree. No bulldozers will be used for tree clearing on site.

#### Fauna Management Plan and Protocols

Under Queensland’s *Nature Conservation Act 1992*, all native fauna are protected and as such the following activities are required to ensure that vegetation removal and construction does not adversely affect native fauna species:

- Immediately prior to the commencement of clearing of native vegetation, a daily visual inspection of the area must be carried out;
- In the event of an animal being located, an area of 5 metres radius should be established around the tree, excluding machinery from this area until the animal has relocated (usually overnight); or
- If an animal requires relocating, this must be undertaken by a suitable qualified fauna expert (e.g. fauna spotter-catcher) recognised by the Queensland Parks and Wildlife Service.
- Any native fauna orphaned or injured by the development process must be reported to the Queensland Parks and Wildlife Service.
- The site supervisor is responsible for the safe management of site fauna and implementation of these specific fauna requirements.

Fauna management protocols are outlined within the VCFMP for potential impacts of the construction phase covering the loss of vegetated areas, isolated trees and likely barriers and impediments to local dispersal. These measures include:

- Clearing sequence plan from the VCFMP
- Management and mitigation measures i.e. temporary use of fauna exclusion fencing
- Fauna spotter role, contacts and certification
- Specific fauna management procedures for potential or known habitat trees

#### 4.3.3 Fauna Spotter Catcher Roles and Reporting

A **DES** registered Fauna Spotter Catcher must be appointed to ensure fauna management, prior to, during and post clearing. This role is mandated for any clearing of native vegetation in Queensland. The role of the Fauna Spotter Catcher is to complete an assessment of the works area no more than 2 weeks prior to clearing and present a short report to the proponent on the findings and how the proposed clearing is to be managed. The Fauna Spotter Catcher is required at the pre-start meeting and be within the referral area during all times of construction.

A registered and suitability qualified fauna spotter catcher/ecologist will need to be employed for the construction phase of the project to implement a protocol of best management practises. Significant habitat

features, should any be identified on site, will be flagged prior to clearing events and these areas supervised by an appropriately experienced Ecologist. Identified within the clearing supervision protocol should be flagging of hollow bearing trees, if present, followed by the removal of vegetation surrounding them. After 24 to 72 hours, these trees should then be removed. Trees must be directionally felled into open or already cleared areas.

The objective of this is to enable hollow dependant fauna an opportunity to move on their own accord as many species utilise multiple den/roost sites within a given home range should they occur. Certain areas could be identified and flagged as significant, such as old-growth trees with hollow resources and on-site identification to construction personnel will help reduce/avoid clearing. Where required, native fauna situated within areas to be cleared will be relocated to a secure area of similar habitat prior to the commencement of vegetation clearance works by a registered fauna spotter/catcher. Should any removal and relocation of nests be required, it is to be undertaken by a suitably qualified and experienced person and advice sought where necessary.

Under the NCA, registered Fauna Spotter Catchers must complete a return of operations report to the Queensland State Government stating all fauna encountered and the specific management measures used to ensure the safety of native animals.

It is the role of the Fauna Spotter Catcher to take all reasonable steps to protect wildlife that may be impacted by vegetation clearing. These steps include the following:

- Undertaking wildlife load reduction measures through the pre-clearing trapping and relocation of wildlife within 1 to 2 weeks prior to the approved clearing being conducted. Sequential clearing cannot be used as a primary fauna management measure.
- Clearly distinguish vegetation found to contain fauna or fauna habitat (e.g. tree hollows, arboreal termite mounds, stick nests or possum drays) with flagging tape, and visually and verbally communicate this information to the tree feller to ensure flagged trees are not felled until authorised by the fauna manager.
- Manage any Koalas identified on-site in accordance with the *Nature Conservation (Koala) Conservation Plan 2017* and *Management Program 2006-2016*.
- Manage any GHFFs identified on-site in accordance with the protocols discussed in the VCFMP.
- Manage any Greater Glider identified on-site in accordance with the protocols discussed in the VCFMP.
- Manage fauna habitat identified during the site inspection using the protocols discussed in the VCFMP.
- Work in conjunction with a professional tree feller in the removal of any vegetation.
- Schedule vegetation clearing to ensure that the impacts on wildlife are minimised and the likelihood of detection and capture of wildlife is maximised and wildlife load reduction measures are productive.
- Ensuring vegetation and rubbish piles are not left to serve as refuge for displaced or roaming wildlife through the implementation of the following measures:

- Immediately (within 12 hours) remove or destroy such material.
- Ensure old (>12 hours) piles of felled vegetation are treated as potential wildlife habitat and inspected by a wildlife spotter/catcher prior to removal or destruction.
- Limiting the felling of habitat and hollow bearing trees to the following methods:
  - Segmental removal of tree, with hollow bearing limbs being checked by the Fauna Spotter Catcher and cleared of fauna using a cherry picker or suitable means determined by the Fauna Spotter Catcher.
  - Segmental removal of the tree, with hollow bearing limbs plugged and lowered to the ground for inspection by wildlife spotter.
  - Use of an excavator with vertical grab to lower the main trunk (only after the removal of lateral limbs).
  - A combination of the above methods.

#### Adoption of aspects of the RSPCA / ESU of WW Draft Code for Fauna Spotting

The project will adopt aspects of the DRAFT Code of Practice for the welfare of animals affected by land-clearing and other habitat impacts (Draft Code) prepared by the Australia Zoo Wildlife Warriors and Voiceless. This Draft Code is not mandatory, however, is advocated by various environmental organisations as the leading practice method for minimising impacts of native wildlife during construction processes.

Aspects of the Draft Code will be adopted to ensure that fair, reasonable and appropriate measures are undertaken to minimise the adverse impacts on wildlife as a result of vegetation clearing. The code provides standards and guidelines for the humane treatment of wild animals affected by land clearing by detailing the general responsibilities of people involved in land clearing and the specific roles of wildlife spotter/catchers. As emphasised within the Draft Code, it will be the responsibility of all relevant parties to:

- Take all reasonable steps necessary to prevent cruelty or suffering to animals;
- Minimise the loss of wildlife caused directly or indirectly by development or land clearing; and
- Conserve, as much as possible, the ecological values of the development site and their surrounding natural environment (Draft Code, p.5)

The following components of the code are to be adopted as the following actions for any clearing works:

#### Action 1 – Developer to Engage Fauna Spotter Catcher

This action requires that Queensland Health engage a Fauna Spotter Catcher with full registrations and licences provided in accordance with **DES**.

#### Action 2 – Fauna Spotter to Prepare a Wildlife Protection and Management Plan (WPMP)

The WPMP should include the following information:

- Description of the project with reference to impacts on wildlife or wildlife habitat;

- Pre-development plan of the referral area showing habitat areas, features, corridors, riparian habitats and adjacent areas;
- Results of any fauna surveys including pre-clearance surveys; and
- A wildlife and habitat impact assessment based on the proposed development works.

#### Action 3 – Prepare a Wildlife and Habitat Impact Mitigation Plan (WHIMP)

Following completion and of the WPMP the Fauna Spotter Catcher should prepare a more specific Wildlife and Habitat Impact Mitigation Plan (WHIMP), which will include details on:

- Measures required to be completed to minimise wildlife and habitat impacts during operational works;
- Wildlife capture and removal plan;
- Contingency plan for wildlife requiring euthanasia, other veterinary procedures or captive care;
- Wildlife storage and housing plan;
- Wildlife release and disposal plan; and
- Post works measures to minimise impacts on wildlife.

#### Action 4 – Fauna Spotter Catcher Role at Pre-Start Meeting

Prior to the commencement of any construction works, a pre-start meeting is to be held between the project manager, site foreperson, plant operators and Local Government representatives. At the pre-start meeting, the Fauna Spotter Catcher is to outline the clearing process and the requirements listed in the MNES Management Plan, WPMP and WHIMP.

#### Action 5 – During Construction

The Fauna Spotter Catcher is to be within the referral area during all phases of construction which involve potential impacts on wildlife or habitat. This will enable to the Fauna Spotter Catcher to make any necessary adjustments to cater for any specific issues encountered during the clearing works.

#### Action 6 – Post Works Reporting (Wildlife Management Report)

During the course of all site works, including the pre-clearance surveys, the Fauna Spotter Catcher is to keep an accurate record of all animals encountered, captured, incidents and disposals. The records should form part of the Wildlife Management Report to be issued under licence requirements to the State Government. The Wildlife Management Report should consist of the following 3 sections:

- a) Wildlife Habitat Management Plan – Aspects of the planning, design, construction and ongoing operation of the project in which risks to wildlife have been identified. This plan should also include recommendations and outline the type, frequency and timeframes for monitoring.
- b) Wildlife Capture and Disposal Plan – Should contain the following details for each captured animals:
  - a. Species
  - b. Identification name or number

- c. Sex (M, F or unknown)
  - d. Approximate Age or Age Class (neonate, juvenile, sub-adult, adult)
  - e. Time and date of capture
  - f. Method of capture
  - g. Exact point of capture (GPS coordinates)
  - h. State of health
  - i. Incidents associated with capture likely to affect health
  - j. Veterinary intervention or treatments
  - k. Time held in captivity
  - l. Disposal method (euthanasia, translocation, re-release)
  - m. Date and time of disposal
  - n. Detailed of disposal (GPS points of release)
  - o. For released animals, location relative to point of capture
- c) Animal Injury and Euthanasia Report – similar details for the Wildlife Capture and Disposal Plan should be included in this report.

#### 4.3.4 Clearing and Construction Protocols

##### Timing of Clearing and Construction

Clearing and construction will occur between 6am – 6pm to avoid light impacts on MNES during night time. In accordance with the Grey-headed Flying-fox National Recovery Plan, vegetation clearing will be timed to minimise impacts (direct or indirect) during optimum breeding periods (e.g. outside of mating (March-April), and birth (Oct-Nov)).

##### Temporary Fencing

Fauna may utilise stormwater culverts running beneath Bundaberg Ring Road to self-relocate during vegetation clearing to the area of remnant vegetation to the south. Temporary fencing (e.g. sediment fencing or wire mesh fencing) prior to clearing will be installed to assist in funnelling fauna to culverts and to minimise the risk of direct mortality of fauna directly crossing Bundaberg Ring Road. Culverts will be cleared of debris to ensure easy access for fauna.

Temporary construction fencing to exclude fauna will also be installed around the clearing impact area to limit fauna from entering the construction site once vegetation is cleared (**Attachment E – NBH Fencing Approach**).

##### Vehicle Speeds

Reduced vehicle speeds will be implemented throughout the project area to minimise vehicle disturbances to reduce threats to Koala from vehicle strike as outlined in the Conservation Advice.

Vehicle speeds will be restricted to a maximum of 40 km/hr within construction areas. Speed limit signs to be installed on each road, and in a number of locations. Wildlife signage to be installed at key fauna habitat areas as the main access road into site to identify potential for wildlife to be present and crossing the road.

### Sediment and Erosion Control

Site specific erosion and sediment controls will be established in order to control sediment outflow. This includes suitable topsoil stockpiles and temporary drainage, erosion and sediment control structures.

#### 4.3.5 Salvage and Relocation of Significant Habitat Features

##### Raptor Nest Relocation

It is noted that a large bird of prey nest, believed to be that of a raptor species (Wedge-tailed Eagle (*Aquila audax*)) was identified onsite within the project impact area. GreenTape solutions identified the nest to be that of a Wedge-tailed Eagle (*Aquila audax*) which are particularly sensitive to disturbance during the breeding season. The raptor nest in the northern portion of the site is located within the main development area and therefore will be relocated to a suitable nearby location (e.g. the vegetation patch to the south of Bundaberg Ring Road) to avoid conflict with hospital activities (e.g. helicopter use).

A detailed High-risk Species Management Program (SMP) has been prepared (refer to **Attachment A11** in the **PD Part A**) mitigate impacts to protected wildlife species and to provide further detail regarding the relocation of the raptor nest. This management plan assesses and provides management measures for potential impacts to animal breeding places of species protected under the *Nature Conservation Act 1992* (Qld). An animal breeding places survey will be required as part of the SMP to inform appropriate mitigation measures to minimise injury to protected wildlife, including colonial breeding species known to occur within the site. The SMP outlines the nest relocation site, timing, procedures and requirements for clearing. Approval of high-risk Species Management Program (SMP) by DES shall be required prior to commencement of any vegetation clearing works.

##### Hollow-bearing Tree Salvaging

Selected identified hollow-bearing trees will be salvaged from the impact site and relocated within the retained vegetation south of the project site to enhance habitat values. Further details on the hollow-bearing tree relocation is provided in **Section 5.5**.

## 4.4. Operational Phase Mitigation Measures

The following subsections includes details about ongoing mitigation measures to prevent injury MNES should they occur onsite during the operation of the hospital.

### 4.4.1 Fencing Design and Predator Exclusion

Wild dogs, Feral Cats, and European Fox are considered direct threats to the MNES target species. This conclusion is based on several federal government documents including:

- DCCEEW Conservation Advice for *Petauroides volans* (greater glider (southern and central)),
- DAWE Conservation Advice for *Phascolarctos cinereus* (Koala) combined populations of Queensland, New South Wales and the Australian Capital Territory
- Department of Environment Threat Abatement Plans for Predation by Feral Cats, European Foxes and Feral Pigs.

Specifically, wild dogs and European fox were identified on and within the vicinity of the project site and therefore will be target species for threat reduction. Feral animals including wild dog were identified during site surveys and have the potential to impose negative pressures on the koala, with dogs representing a key mortality threat to koalas (DAWE, 2022). Remains of Greater Gliders have been found in the stomachs of feral cats and the stomachs and scats of foxes. Predation from both these pests are therefore listed as key threats. Presence of foxes and wild dogs is an impact to all targeted MNES, with particular impact of wild dog on Koala, and fox on Greater Glider.

### **Fauna Climbable Fencing**

Fencing design surrounding the hospital site boundary and the hospital itself has been developed to allow MNES fauna, specifically Koala to access the retained bushland while limit the access of feral predators (namely wild dogs and foxes) to reduce threats to MNES. Climbable fauna-friendly fencing will be installed along the eastern, western, and southern site boundary to continue to allow the movement of MNES fauna across the boundary into and out of the retained bushland habitat. This fencing will aim to exclude wild dogs and foxes, while allowing Koala to access the retained bushland (**Attachment E – NBH Fencing Approach**).

### **Fauna Exclusion Fencing**

Fencing along the southern boundary of the hospital site at the interface of the retained bushland area will implement fauna-exclusion fencing to prevent fauna and identified MNES from entering the hospital and becoming stranded. Fauna exclusion fences will keep MNES, specifically Koala, outside of the hospital site, avoid and minimise Koala injuries from vehicles. **Attachment E** outlines the proposed fencing design. No new or replacement fencing will contain barbed wire. Koala poles will be installed every 200m along the fence line.

To discourage Koalas from climbing the fence and entering the hospital, chain wire fencing with a smooth metal or Perspex sheet on top of the fence in the direction that the Koala will attempt to climb is preferred.

#### 4.4.2 Lighting

To minimise light spill into retained habitat, lighting design will incorporate the installation of directional lighting guards. Lighting shall comply with the dark surrounds lighting levels in AS4282-1997 – Control of the obtrusive effects of outdoor lighting. Lighting design shall also consider the design outlined in the National Light Pollution Guidelines for Wildlife Including Marine Turtles, Seabirds and Migratory Shorebirds.

#### 4.4.3 Road Signage

To improve drive awareness, road design of the east-west road will incorporate installation of wildlife awareness signage within the development area. Speed restrictions will apply on-site for safety and to reduce risk of fauna collision. The project will adopt the *Draft Technical Note Wildlife Signage Guidelines* development by **DTMR** to ensure best practice fauna management is incorporated into the design of wildlife movement solutions (where considered appropriate) or slow down points. Speed restrictions will apply within the hospital site for safety and to reduce risk of fauna collision.

#### 4.4.4 Stormwater Management Plan

To avoid worsening the downstream stormwater drainage collected by the existing Bundaberg Regional Council stormwater system, a detention system is proposed to be constructed as a series of vegetated wetlands for the northern and southern catchments. The wetland follows the natural path of the land and utilise existing draining line. The extent of stormwater management area has been based on minimising the extent of vegetation impact. Where possible the proposed drainage avoids surveyed vegetation and have been designed to utilise open area. The works are expected to include shaping of drainage swales and table drains with battered edges. Drains are proposed to be vegetated and do not contain concrete lining. Drainage channels and wetlands will be re-vegetated and re-stabilised as part of the proposed works with native species providing habitat for wildlife occurring in the area.

The proposed landscaped swales will consist of a vegetation centre invert where stormwater can flow in lieu of a conventional pipe stormwater system and remove sediment and nutrients in the process. Two constructed wetlands are proposed towards the western boundary of the site. The wetlands will be shallow vegetated water bodies that remove pollutants from stormwater via sedimentation, filtration and biological processes. The wetlands will comprise of an inlet zone; a wetland macrophyte zone vegetated with ephemeral, shallow marsh, marsh and deep marsh species; and a high flow bypass channel. Vegetation clearing for the construction of the wetlands will be minimal (approximately 0.41 ha). The wetlands will be constructed and managed in accordance with the site-specific Stormwater Management Plan.

#### 4.5. Summary of Avoidance and Mitigation Measures

A summary of the proposed avoidance and mitigation measures for the Bundaberg Hospital development are outlined in the sections below.

4.5.1 Vegetation Clearing Phase

**Table 4: Avoidance and mitigation for vegetation clearing phase**

Performance Criteria	Method	Effectiveness	Where	Timing	Milestone
<b>Avoidance</b>					
Ensure clearing of native vegetation and/or disturbance to MNES habitat does not occur within the retained habitat (i.e. remains within the hospital impact area).	<p><u>Clearly mark boundaries for clearing</u> Prior to any works occurring, clearly identify the boundaries for vegetation clearing and disturbance. Exclusion zones will also be clearly marked with temporary fencing, signage, flagging tape and barricades. Clearing areas will be inspected during environmental pre-clearance surveys. Through a pre-start meeting, internal training will occur for all personnel involved in the vegetation clearing phase to ensure they are aware of the approved works areas, the requirements they need to meet, and sensitivity of the area for threatened species.</p> <p><u>Tree protection / exclusion fencing</u> Prior to the commencement of any vegetation clearing on site, tree protection/exclusion fencing is to be installed around the tree protection zone/s (TPZ) of vegetation to be retained and trees to be removed shall be visibly marked and identified with flagging tape or similar, in accordance with the fencing locations provided in the VMP. No disturbance is to occur outside of the clearing zone or within exclusion zones without appropriate approvals and/or further assessments.</p>	Protecting retained areas from vegetation clearing will ensure habitat for MNES is maintained.	The approved clearing areas.	Prior to any vegetation clearing occurring onsite.	<p>Works are to be contained within the referral area with mitigation measures outlined earlier effectively applied. The development area is cleared.</p> <p>All disturbed areas shall be rehabilitated either progressively or as soon as activities within any construction zone is completed. Any areas within exclusion zones that are immediately adjacent to construction areas and have been subject to disturbance must also be rehabilitated in accordance with the site-specific Rehabilitation Management Plan.</p>
<b>Mitigation</b>					
Identify potential fauna species utilising the site and locate release sites and significant habitat features.	<p><u>Pre-clearance surveys</u> Pre-clearance surveys undertaken 2 weeks prior to clearing by a suitably qualified fauna spotter catcher to identify the presence of threatened species in the area including Koalas, Greater Glider and Grey-headed Flying fox. Identification of habitat features, specifically hollow-bearing trees, nests and fallen logs to be salvaged will also occur during this period. Visual inspection where possible of habitat features shall be undertaken shortly before clearing to identify resident fauna species that may require relocation. All trees within the clearing area will be thoroughly searched and all large trees that contain obvious or suspected hollows will be identified. Suitable areas for fauna relocation in adjacent areas will also be determined.</p>	Identifying and relocating threatened fauna onsite prior to clearing is an effective way to reduce the risk of injury or death during vegetation clearing.	Within approved clearing area.	At least 2 weeks prior to clearing commencing.	Pre-clearance surveys completed and identified fauna relocated from the site prior to clearing. Hollow-bearing trees, logs and nests to be salvaged located prior to clearing.
Injuries or mortality to MNES threatened species are avoided and mitigated during clearing.	<p><u>Engage Fauna Spotter Catcher</u> The proponent will engage a qualified Fauna Spotter Catcher to participate in all stages of vegetation clearing. The Fauna Spotter Catcher will be</p>	The use of a Fauna Spotter Catcher throughout clearing is an effective tool to:	Within approved clearing area.	Fauna spotter catcher present at all times during clearing.	The use of a fauna spotter catcher is mandated throughout vegetation clearing. Clearing

Performance Criteria	Method	Effectiveness	Where	Timing	Milestone
	<p>required to adopt elements of the Draft Code of Practice endorsed by the Australia Zoo Wildlife Warriors and Voiceless (The Draft Code). The role of the Fauna Spotter Catcher is to ensure that no injury or deaths occur to Koalas or other MNES fauna species.</p> <p>The fauna spotter catcher will also complete appropriate post-clearing reporting after vegetation clearing is complete.</p> <p><u>Temporary fencing</u> Temporary fauna friendly fencing will allow fauna to safely disperse into vegetated areas away from vegetation clearing. Fauna may utilise stormwater culverts running beneath Bundaberg Ring Road to self-relocate during vegetation clearing to the area of remnant vegetation to the south. Temporary fencing (e.g. sediment fencing or wire mesh fencing) prior to clearing will be installed to assist in funnelling fauna to culverts and to minimise the risk of direct mortality of fauna directly crossing Bundaberg Ring Road. Culverts will be cleared of debris to ensure easy access for fauna.</p>	<ol style="list-style-type: none"> <li>1. Identify the types of species within the referral area prior to clearing; and</li> <li>2. Identify and flag habitat features that require thorough examination before clearing.</li> </ol> <p>Fauna Spotter Catchers have a primary role to ensure no fauna are in vegetation before it is cleared. Given the size of Koalas and their utilisation of tree branches, they can quite easily be observed from the ground. As such, it is extremely unlikely that a Koala will be killed or injured during vegetation clearing, particularly given the onerous and thorough procedures set out The Draft Code.</p>	<p>Fauna friendly fencing surrounding clearing areas.</p>	<p>Post-clearing report by fauna spotter catcher to be completed at the end of vegetation clearing.</p> <p>At all times during clearing.</p>	<p>complete with no injury or death to MNES.</p> <p>Temporary fauna fencing is mandated and guided by FMPs and pre-clearance checklists and pre-starts.</p>
Retain habitat features for rehabilitation.	<p><u>Retention of some hollow-bearing trees</u> Some large tree hollows will be salvaged and relocated within the retained bushland habitat. Further details on nest box and hollow installation is provided in <b>Section 6</b>. Some fallen woody debris, large rocks etc. will also be moved to adjacent habitats.</p>	<p>As Greater Gliders are dependent on large, hollow bearing trees for a sheltering/denning resource, relocating potential habitat trees will support denning resources within retained habitat for the species should they occur.</p>	<p>Within approved clearing areas and retained bushland.</p>	<p>Habitat features to be salvaged will be identified during pre-clearance surveys.</p> <p>Movement of salvaged items to occur during clearing phase.</p>	<p>Some hollow-bearing trees salvaged and re-located to retained bushland at southern portion of the site.</p>
Ensure all site personnel are trained and aware of MNES.	<p><u>Inductions, toolbox talks, pre-starts and targeted training</u> All site personnel shall attend environmental training as part of the referral area induction process prior to entering the work site. As part of this training all personnel will be instructed on their obligations in regard to vehicle movement, vehicle speed limits, and exclusion zones. All personnel will be instructed on their obligations in regard to vegetation clearing protocols and to protect native fauna. Additional controls for Koala and Grey-headed Flying-fox will be presented in a toolbox talk. Site personnel will be inducted on the potential threatened species and sensitive environmental areas occurring within the project area.</p>	<p>Ensuring site personnel are aware of their obligations onsite and the relevant MNES will help to mitigate impacts caused by vehicle movement and vegetation clearing.</p>	<p>Training will occur in the office and on-site during toolbox talks and pre-start meetings.</p>	<p>Inductions required to be completed prior to works commencing on site. Training and education will occur on a regular basis during clearing phase.</p>	<p>All site personnel educated through inductions and pre-start meetings on MNES prior to clearing commencing.</p>

Performance Criteria	Method	Effectiveness	Where	Timing	Milestone
Ensure safe handling of MNES during clearing works.	<p><u>Fauna spotter catcher</u> A suitably qualified fauna spotter catcher will be available during clearing and will direct clearing in a manner that encourages and allows fauna to safely move from the clearing area. Where animals are unable to move out of the area on their own as a result of injury or otherwise, they will be captured and placed in adjacent areas of equivalent habitat. In the event that fauna handling is required, handling will occur in accordance with the Draft Code of Practice endorsed by the Australia Zoo Wildlife Warriors and Voiceless (The Draft Code).</p> <p>Fauna spotter catcher is to check the clearing area for presence of native fauna including threatened species. Where Koalas are present identify the tree they are in, adjacent trees and ensure these are not cleared until the individual has left the area of its own accord. Ensure there are safe exits for native fauna and that clearing is occurring towards habitat that will be retained. Fauna exclusion fencing may be erected to ensure Koalas and other fauna do not move towards high risk areas such as a busy road. Any captured fauna will be released into a pre-approved area. These release areas will be suitable habitat for the species, larger habitat areas that are being retained, with good connectivity. These release areas will have been identified during pre-clearance surveys. Any injured wildlife will be taken to a local vet or wildlife carer for treatment. This will be done in accordance with The Draft Code. There will be at least one fauna spotter catcher present to each machine.</p>	Fauna spotter catcher to be responsible for the safe handling, capture and release of native and threatened fauna.	In areas marked for clearing.	Fauna spotter catcher will be present just prior to and during clearing. The area will be checked prior to any vegetation being cleared and monitored during the clearing phase.	Vegetation cleared and all native and threatened fauna identified safely relocated to areas of retained habitat.
Minimise impacts to MNES from clearing through clearing protocols	<p><u>Two-stage removal of hollow-bearing trees</u> A tree felling protocol will be provided as part of the Vegetation Management Plan to guide the removal of hollow-bearing trees where their removal cannot be avoided. This protocol will detail preferred methods of clearing hollow-bearing trees i.e. using a two stage process, removing surrounding trees one day before habitat trees, and “tapping” trees to encourage fauna to leave before felling. Trees will be felled using an excavator with grabs or a ripper or a tree harvester able to gently lower trees. Trees will not be felled and left to fall under their own weight as the excavator must be able to control the fall of the tree. No bulldozers will be used for tree clearing on site.</p>	Felling of hollow-bearing trees in a two-stage process will reduce the risk of injury or mortality to native and threatened fauna utilising the hollows for denning.	Within project clearing area.	At all times during vegetation clearing.	All hollow-bearing trees felled using a two-stage removal process.
Avoid and minimise impacts to MNES species from fragmentation during vegetation clearing through sequential clearing and construction protocols.	<p><u>Sequential clearing</u> Vegetation clearing has the risk of fragmenting habitat areas during the construction phase. To avoid this impact, vegetation will be undertaken sequentially to allow fauna to disperse from construction areas. This aligns with the Koala Conservation Advice and GHFF Recovery Plan which highlights fragmentation as a threat to these species.</p>	Habitat isolation and fragmentation is a primary concern due to its impacts on fauna.  Koalas and Grey-headed Flying-foxes are able to disperse through	Within project clearing area.	At all times during clearing and construction.	Sequential clearing conducted to avoid and minimise impacts to MNES species from fragmentation and clearing.

Performance Criteria	Method	Effectiveness	Where	Timing	Milestone
	<p>Vegetation will be cleared sequentially. Clearing will be conducted so that fauna are flushed into safe, vegetated areas and it will avoid pushing fauna into fragmented areas. Staged clearing of vegetation will allow for the gradual loss of vegetation, giving fauna time to naturally disperse away from the disturbance. The proposed clearing phases are:</p> <p>Phase 1: Removing understorey vegetation and smaller juvenile trees onclude (under 4 m in height or trunk circumference of less than 30 cm). Phase 2: After 48hrs, clear remaining larger trees and hollow-bearing trees. Trees with hollows will be cleared with two-stage process outlined above. Once on the ground, the tree hollows will be inspected by a fauna spotter catcher to ensure no wildlife remain in the hollow.</p> <p>Clearing procedures that avoid the fragmentation of vegetation will be adopted within the FMPs and informed by the Fauna Spotter Cather WHIMPs.</p> <p>Clearing will be undertaken in a way that flushes fauna into connected areas of habitat and will avoid flushing fauna into fragmented or hostile areas. Specifically:</p> <ul style="list-style-type: none"> <li>• Fauna are not required to cross roads or move through developed or disturbed areas, such as residential areas of areas that require movement greater than 100m over cleared ground to reach suitable habitat;</li> <li>• Fauna are not left occupying an 'island' of habitat between hostile environments, such as road and cleared areas;</li> <li>• No habitat trees will be isolated and instead dispersal corridors will be left in place that link vegetation with clearing areas to adjacent areas of retained habitat to allow fauna to disperse under their own volition.</li> <li>• Fauna can safely leave the referral area of clearing and relocate to adjacent habitat;</li> <li>• Demarcation fencing will be fauna friendly to ensure fauna are not trapped within the proposed cleared extent; and</li> <li>• Cleared vegetation is to be stockpiled as to not impede fauna movement.</li> </ul> <p>Temporary fauna friendly fencing will allow fauna to safely disperse into vegetated areas while clearing. Temporary fauna exclusion fencing will then be erected to prevent fauna dispersing into construction areas.</p>	<p>a variety of environs, including bushland and cleared areas. The direction of clearing of vegetation in accordance with the WHIMP will ensure that clearing does not create fragmented habitat islands that could trap fauna. Rather, procedures will be in place to ensure clearing flushes fauna away from construction areas into surrounding habitat areas that are connected to the wider landscape. Adjoining areas are permanently designated as Conservation, and thus will not be subject to fragmentation in the future. As such. No residual impacts are anticipated.</p> <p>The sequential clearing of vegetation will allow for the gradual loss of vegetation, giving fauna time to naturally disperse away from the disturbance. The use of fauna exclusion fencing around construction areas will ensure fauna do not disperse into unsafe, hostile areas, again minimising the risk of injury of death.</p>			
Minimise disturbance to MNES from clearing activities.	<u>Timing of vegetation clearing</u>	Clearing controls implemented through the VC&MP and FMP are considered to be able to	Within project clearing area.	Clearing to be restricted to daylight hours.	Vegetation clearing to occur during daylight hours and no

Performance Criteria	Method	Effectiveness	Where	Timing	Milestone
	<p>The VC&amp;MP and FMP will include controls to avoid, minimise and mitigate risk of disturbance to Grey-headed Flying-fox when foraging in habitat during clearing, specifically:</p> <ul style="list-style-type: none"> <li>• Clearing between 6am – 6pm.</li> <li>• Timing vegetation clearing to minimise impacts (direct or indirect) during optimum breeding periods (e.g. mating (March-April), birth (Oct-Nov) in accordance with the National Recovery Plan.</li> <li>• Monitoring of foraging trees by the Fauna Spotter Catcher and including appropriate clearing controls / management where required to minimise disturbance.</li> </ul>	<p>effectively avoid, minimise and mitigate risk of disturbance to Grey-headed Flying-fox foraging regimes during clearing, and allow for adaptive management where required.</p> <p>With appropriate monitoring of observed feed trees by the Fauna Spotter Catcher no residual impacts are expected to occur.</p> <p>Limiting hours of clearing to daylight hours, allows a 12-hour period for safe dispersal.</p>		<p>Clearing occur outside of MNES breeding periods.</p>	<p>clearing to occur between April – November.</p>
Prevention of vehicle strike on MNES.	<p><u>Reduced vehicle speeds within project site</u></p> <p>Reduced vehicle speeds will be implemented throughout the project area to minimise vehicle disturbances to minimise threats to Koala from vehicle strike as outlined in the Conservation Advice.</p> <p>Vehicle speeds will be restricted to a maximum of 40 km/hr within construction areas. Speed limit signs to be installed on each road, and in a number of locations. Wildlife signage to be installed at key fauna habitat areas as the main access road into site to identify potential for wildlife to be present and crossing the road.</p>	<p>Construction management and clearing controls implemented are considered to be able to effectively avoid, minimise and mitigate risk of disturbance to Koala activities during clearing and construction, and allow for adaptive management where required.</p> <p>Given Grey-headed Flying-foxes are nocturnal, there is minimal risk of mortality from vehicle collision. Restricted clearing and construction hours (i.e. daylight hours) is considered an effective mitigation measure to minimise this risk.</p>	<p>Within project site.</p>	<p>Signage to be installed prior to clearing commencing and vehicle speeds to be adhered to at all times during construction.</p>	<p>All vehicles to adhere to speed limits within the project area.</p>

Performance Criteria	Method	Effectiveness	Where	Timing	Milestone
Prevent the introduction and / or spread of weeds and/or diseases within the project area.	<u>Wash down of vehicles</u> Vehicles coming from a declared or known weed area offsite and are entering the retained bushland will be washed down at an appropriate wash down facility prior to entering the site. Ensure any soil and other materials brought into site are certified as weed free. Personnel are to ensure their clothing and boots do not carry weed seeds. No companion animals (e.g. dogs) will be allowed within construction areas.	Construction activities increase the risk of weeds, pathogens and contamination into the referral area in accordance with the Koala Conservation Advice and GHFF Recovery Plan. To manage these impacts, appropriate controls for weed and pathogen management, disposal and monitoring will occur onsite. Weeds will be actively managed within the construction footprint and disposed of appropriately.	Within the project site and retained bushland.	At all times during vegetation clearing.	Prevention of introducing weeds and pathogens into the project area and retained bushland.
Prevent soil runoff into retained bushland.	<u>Sediment and erosion control methods</u> Effective sediment and erosion control methods will be established during vegetation clearing to ensure that if a rainfall event occurs sediment does not run off the site into the retained bushland to the south. This may include sediment fences to catch runoff from disturbed areas, flow diversion barriers and sandbags to slow runoff.	Sediment fences, flow diversion barriers and sandbags are effective methods to mitigate soil runoff during rain events.	In areas where vegetation clearing is occurring and soil is exposed.	Install sediment and erosion control measures prior to, and during the clearing phase.	Soil runoff into retained bushland is prevented and minimised.
Prevent increase levels of dust.	<u>Proactive and reactive dust control measures</u> Dust control measures will include the use of weather forecasting and real-time measurement of dust levels and meteorological conditions to modify clearing. Speed limits of 40 km/hr to be enforced. Water down dirt tracks if dust plumes are arising.	Proactive and reactive dust control measures are believed to be suitable to ensure dust levels are controlled during clearing.	In areas where vegetation clearing is occurring and soil is exposed.	During clearing phase and all other phases.	Minimise dust levels affecting retained bushland south of the project area.

4.5.2 Construction Phase

**Table 5: Avoidance and mitigation for construction phase**

Performance Criteria	Method	Effectiveness	Where	Timing	Milestone
<b>Avoidance</b>					
Avoid and minimise Koala injury and mortality during construction.	<u>Temporary fauna exclusion fencing</u> Temporary fauna exclusion fencing will be erected to prevent fauna entering into construction areas to avoid and minimise fauna injuries (particularly Koala) from vehicles.	Fauna exclusion fencing will help to prevent MNES fauna entering construction site and becoming injured or stranded within cleared areas.	Fauna exclusion fencing in appropriate locations surrounding construction areas.	At all times during construction.	Koala are prevented from entering the construction site to avoid injury and mortality.

Performance Criteria	Method	Effectiveness	Where	Timing	Milestone
Improve Koala connectivity.	<u>Maintain culverts under Bundaberg Ring Road</u> Installation of Koala fauna furniture under Bundaberg Ring Road and maintaining levels of debris within culverts to allow fauna to safely traverse the busy road.	Prevent Koalas from crossing Bundaberg Ring Road by utilising existing culverts.	Within retained bushland area south of the project site and culverts that traverse under Bundaberg Ring Road.	At all times during construction.	Koala injury and mortality is prevented by improving and maintaining connectivity of the retained bushland either side of Bundaberg Ring Road.
Prevent dog attacks to native fauna	<u>No dogs permitted onsite</u> Site personnel will not be permitted to bring domestic dogs into the Project Area.	Avoiding impacts to MNES through minimising introduced threats.	All areas.	During construction.	Risk of dog attack is avoided by preventing site personnel bringing dogs into the project area.
<b>Mitigation</b>					
Prevent vehicle strike on MNES	<u>Reduced vehicle speeds within project site</u> Reduced vehicle speeds will be implemented throughout the project area to minimise vehicle disturbances to minimise threats to Koala from vehicle strike as outlined in the Conservation Advice.  Vehicle speeds will be restricted to a maximum of 40 km/hr within construction areas. Speed limit signs to be installed on each road, and in a number of locations. Wildlife signage to be installed at key fauna habitat areas as the main access road into site to identify potential for wildlife to be present and crossing the road.	Construction management controls implemented are considered to be able to effectively avoid, minimise and mitigate risk of disturbance to Koala activities during construction, and allow for adaptive management where required.  Given Grey-headed Flying-foxes are nocturnal, there is minimal risk of mortality from vehicle collision. Restricted construction hours (i.e. daylight hours) is considered an effective mitigation measure to minimise this risk.	All internal roads to have reduced speed limits.	Signage to be installed prior to clearing commencing and vehicle speeds to be adhered to at all times during construction.	All vehicles to adhere to speed limits within the project area.
Reduce light spill and noise into adjacent retained bushland habitat	<u>Restricted construction hours</u> Restricted construction hours (e.g. daylight only) will limit disruption from light and noise impacts, as well as allow a 12 hour period for fauna to disperse and forage. Lighting in areas directly adjacent to retained bushland will be reduced where practicable.  Lighting will be designed in a manner that limits disruption on landscape character, views and visual amenity and lighting will be directed towards the infrastructure siting rather than dispersed into native vegetation when sites are adjacent to intact habitat. Lighting at night will be minimised during construction.	Limiting hours of construction and clearing to daylight hours only where possible, allows a 12 hour period for safe dispersal and foraging to occur.	In areas where project infrastructure requires lighting, particularly around buildings.	Construction works to occur during daylight hours.	Limited disturbance to MNES fauna and habitat from light and noise into retained bushland.

Performance Criteria	Method	Effectiveness	Where	Timing	Milestone
Prevent the introduction and / or spread of weeds and/or diseases within the project area.	<u>Wash down of vehicles</u> All vehicles and machinery to be washed down prior to entering the site. Install wheel wash and rumble grids. A designated bay will be established where vehicles and machinery can be cleaned on site before leaving site. Ensure any soil and other materials brought into site are certified as weed free. Personnel are to ensure their clothing and boots do not carry weed seeds. No companion animals (e.g. dogs) will be allowed within construction areas.	Construction activities increase the risk of weeds, pathogens and contamination into the referral area in accordance with the Koala Conservation Advice and GHFF Recovery Plan. To manage these impacts, appropriate controls for weed and pathogen management, disposal and monitoring will occur onsite. Weeds will be actively managed within the construction footprint and disposed of appropriately.	Within the project site and retained bushland.	At all times during construction.	Prevention of introducing weeds and pathogens into the project area and retained bushland.
Prevent soil runoff into retained bushland.	<u>Sediment and erosion control methods</u> Effective sediment and erosion control methods will be established during vegetation clearing to ensure that if a rainfall event occurs sediment does not run off the site into the retained bushland to the south. This may include sediment fences to catch runoff from disturbed areas, flow diversion barriers and sandbags to slow runoff.	Sediment fences, flow diversion barriers and sandbags are effective methods to mitigate soil runoff during rain events.	In areas where vegetation clearing is occurring and soil is exposed.	Install sediment and erosion control measures prior to, and during the clearing phase.	Soil runoff into retained bushland is prevented and minimised.
Prevent increase levels of dust.	<u>Proactive and reactive dust control measures</u> Dust control measures will include the use of weather forecasting and real-time measurement of dust levels and meteorological conditions to modify clearing. Speed limits of 40 km/hr to be enforced. Water down dirt tracks if dust plumes are arising.	Proactive and reactive dust control measures are believed to be suitable to ensure dust levels are controlled during clearing.	In areas where vegetation clearing is occurring and soil is exposed.	During clearing phase and all other phases.	Minimise dust levels affecting retained bushland south of the project area.
Ensure all site personnel are trained and aware of MNES.	<u>Inductions, toolbox talks, pre-starts and targeted training</u> All site personnel shall attend environmental training as part of the referral area induction process prior to entering the work site. As part of this training all personnel will be instructed on their obligations in regard to vehicle movement and vehicle speed limits. All personnel will be instructed on their obligations in regard to vegetation clearing protocols and to protect native fauna. Additional controls for Koala and Grey-headed Flying-fox will be presented in a toolbox talk. Site personnel will be inducted on the potential threatened species and sensitive environmental areas occurring within the project area.	Ensuring site personnel are aware of their obligations onsite and the relevant MNES will help to mitigate impacts caused by vehicle movement and vegetation clearing.	Training will occur in the office and on-site during toolbox talks and pre-start meetings.	Inductions required to be completed prior to works commencing on site. Training and education will occur on a regular basis during construction phase.	All site personnel educated through inductions and pre-start meetings on MNES prior to construction commencing.
Ensure safe handling of MNES	<u>Engage Fauna Spotter</u> If Koala are encountered within the construction area, workers should engage a fauna spotter catcher to safely capture and relocate the animal.	Ensure safe handling of MNES through a suitably qualified fauna spotter catcher.	All project areas.	During construction.	Any native fauna and MNES fauna found within the construction site are safely captured and relocated.

**Table 6: Mitigation and management for operation phase**

Performance Criteria	Method	Effectiveness	Where	Timing	Milestone
<b>Mitigation</b>					
Improve and maintain Koala and other fauna connectivity.	<p><u>Maintain culverts under Bundaberg Ring Road</u> Installation of Koala fauna furniture under Bundaberg Ring Road and maintaining levels of debris within culverts to allow fauna to safely traverse the busy road.</p> <p><u>Install fauna-friendly fencing</u> Fauna friendly fencing will be installed around the retained bushland habitat to allow fauna access to the habitat south of the hospital site (<b>Attachment E</b> for fencing design).</p>	Prevent Koalas from crossing Bundaberg Ring Road by utilising existing culverts. Maintained connectivity to retained vegetation.	<p>Within retained bushland area south of the project site and culverts that traverse under Bundaberg Ring Road.</p> <p>Surrounding the retained bushland.</p>	Maintenance encouraged during operational phase.	<p>Koala injury and mortality is prevented by improving and maintaining connectivity of the retained bushland either side of Bundaberg Ring Road.</p> <p>Fauna are able to freely enter and exit the retained bushland habitat south of the hospital.</p>
Avoid and minimise Koala and other fauna injury and mortality during hospital operation.	<p><u>Fauna exclusion fencing</u> Fauna exclusion fencing will be installed along the southern boundary of the hospital site at the interface of the retained bushland and the hospital to prevent fauna entering into the hospital and minimise fauna injuries (particularly Koala) from vehicles.</p>	Fauna exclusion fencing will help to prevent MNES fauna entering the hospital and becoming injured or stranded within the hospital grounds	Fauna exclusion fencing along the southern boundary of the hospital site.	At all times during hospital operation.	No Koalas or other fauna are able to traverse into the hospital site to avoid injury and mortality.
Prevent vehicle strike on MNES	<p><u>Reduced vehicle speeds within hospital grounds</u> Reduced vehicle speeds will be implemented within the hospital site to minimise vehicle disturbances to minimise threats to Koala from vehicle strike as outlined in the Conservation Advice.</p> <p>Speed limit signs to be installed on each road, and in a number of locations. Wildlife signage to be installed at key fauna habitat areas as the main access road into site to identify potential for wildlife to be present and crossing the road.</p>	Education of visitors to hospital on the potential for fauna to be present is essential for reducing impacts to MNES.	All internal roads to have reduced speed limits.	Signage to be installed during construction.	All vehicles to adhere to speed limits within the hospital site.
Reduce light spill into adjacent habitat	<p><u>Installation of directional lighting guards</u> To minimise light spill into retained habitat, lighting design will incorporate the installation of directional lighting guards. Lighting shall comply with the dark surrounds lighting levels in AS4282-1997 – Control of the obtrusive effects of outdoor lighting. Lighting design shall also consider the design outlined in the National Light Pollution Guidelines for Wildlife Including Marine Turtles, Seabirds and Migratory Shorebirds.</p>	Lighting guards and lighting that complies with AS4282-1997 – Control of the obtrusive effects of outdoor lighting is likely to be effective in limiting disturbance to MNES.	Within hospital where project infrastructure requires lighting.	During operational phase.	Limit the impact of lighting on MNES and retained bushland habitat.

**Management**

Performance Criteria	Method	Effectiveness	Where	Timing	Milestone
Maintain habitat for MNES outside of the approved disturbance limits.	<u>Management of retained bushland</u> The retained bushland in the southern portion of the project site will be retained and managed for MNES habitat value. Active management will occur in these areas including rehabilitation, weed management, feral animal management, and fire management. Management will aim to ensure these areas of habitat are retained and continue to support the species and habitat quality is not degraded over time. Further detail on rehabilitation, weed management, feral animal control, and fire management is provided in <b>Section 6</b> .	To ensure no reduction in habitat quality within retained bushland as a result of the project, management measures will be implemented.	Within retained bushland habitat.	Post-construction and during the operational phase of the hospital.	Retained bushland habitat south of the project area is maintained for MNES.
Prevent soil and water runoff into retained vegetation	<u>Stormwater management</u> Stormwater will be managed with a stormwater management system involving a series of vegetated wetlands.	To ensure no reduction in habitat quality within retained bushland management measures will be implemented.	Within entire project area.	Post-construction and during the operational phase of the hospital.	Stormwater management is to occur in accordance with the site-specific Stormwater Management Plan.
Prevent uncontrolled fire events	<u>Implement Bushfire Management Plan (BMP)</u> A bushfire management plan has been prepared for the project site which will be implemented to avoid the risks of uncontrolled fire event occurring.	Implementing the control measures outlined in the BMP is likely to be an effective in preventing uncontrolled wildfires that risk damage to MNES habitat	Within retained bushland habitat.	Applicable to all phases of the project.	Reduce the impact of uncontrolled wildfires through implementing the Bushfire Management Plan.

# 5. Ongoing Management Strategies and Mitigation Measures

## 5.1. Objectives and Actions

There are four (4) management actions identified as relevant to the site which will benefit the impacted MNES and /or their potential foraging habitat. Excluding actions already occurring or planned to be undertaken, **Table 7** outlines the direct actions proposed within the retained bushland vegetation south of the hospital site. The management actions focus on the enhancement habitat for the impacted protected matters, while also reducing threats. Although there may be overlap between some of the management actions, all management actions are considered to contribute to the improvement of MNES habitat within the retained bushland.

Management actions have been proposed with consideration of the National recovery plan for the Koala *Phascolarctos cinereus* (combined populations of Queensland, New South Wales and the Australian Capital Territory) (DAWE, 2022), National Recovery Plan for the Grey-headed Flying-fox *Pteropus poliocephalus* (DAWE, 2021) and Conservation Advice for *Petauroides volans* (Greater Glider (southern and central)) (DCCEEW, 2022). Additionally, relevant threat abatement plans (for predation by European red fox), site-specific desktop and field assessments and numerous peer-reviewed papers and studies relevant to the threatened species has been utilized to inform the proposed management actions.

Actions to be completed in accordance with this OMP include:

- **Management Action 1:** Weed Reduction and Management (Weeds of National Significance (WONS))
- **Management Action 2:** Rehabilitation and Revegetation
- **Management Action 3:** Hollow-bearing Tree Salvage and Relocation
- **Management Action 4:** Fire Management

Several proposed management activities relevant to habitat improvement will be undertaken across the entire retained bushland area including weed management and rehabilitation. For instance, general weed management is intended in relation to all rehabilitation areas across the site, but targeted rehabilitation actions will occur within specific rehabilitation zones identified in the Rehabilitation Management Plan (**Attachment A14** of the **PD**).

**Table 7: Retained bushland proposed management actions**

Management Action	Details	Benefits to MNES Fauna
<b>1. Weed Reduction &amp; Management</b>	Weed management to reduce the extent of weed cover, targeting WONS particularly	<ul style="list-style-type: none"> <li>• Reduce Lantana infestations which suppress and inhibit natural regeneration of vegetation on-site</li> </ul>

Management Action	Details	Benefits to MNES Fauna
	<p><i>Lantana camara</i> (Lantana) as well as <i>Sporobolus pyramidalis</i> (Giant Rat’s Tail Grass)</p>	<p>to support the growth rates and regeneration of MNES fauna foraging species.</p> <ul style="list-style-type: none"> <li>• Improve overall habitat quality as Lantana can have significant impacts to habitat quality and biodiversity through outcompeting other plant species, shading and altering nutrient and water balancing.</li> </ul>
<p><b>2. Rehabilitation &amp; Revegetation</b></p>	<p>Rehabilitation and revegetation planting within the retained bushland area with Greater Glider preferred tree species, Koala feed tree species and GHFF flowering feed trees in accordance with the site-specific Rehabilitation Plan.</p>	<ul style="list-style-type: none"> <li>• Improve habitat quality by supporting natural regeneration.</li> <li>• Increasing fauna habitat through planting foraging and denning trees.</li> <li>• Providing future potential foraging habitat, roosting and denning trees.</li> </ul>
<p><b>3. Hollow-bearing Tree Salvage and Re-location</b></p>	<p>Salvaging existing hollow-bearing trees from the impact area and relocating to areas within the retained bushland that lack native hollow-bearing trees and stags. Protect and maintain existing and relocated hollow-bearing trees.</p>	<ul style="list-style-type: none"> <li>• Provision of denning habitat for Greater Glider individuals, roosting habitat for White-throated Needletail roosting and habitat for a wide range of other species.</li> <li>• Protect significant native hollow-bearing trees within the site from threats including timber harvesting and fire damage to support Greater Glider denning, White-throated Needletail roosting and other fauna habitat opportunities.</li> </ul>
<p><b>4. Fire Management</b></p>	<p>Develop appropriate fire management strategies which minimize direct mortality during burning, incorporate unburnt refuges, protect large hollow-bearing trees from fire damage and develop suitable prescribed burning frequency to protect and support MNES identified fauna and its habitat.</p>	<ul style="list-style-type: none"> <li>• Protects large hollow-bearing trees, mature trees and remnant vegetation containing trees likely to develop hollows in future from wildfire damage.</li> <li>• Management of revegetation planting to support growth of fauna preferred tree species.</li> <li>• Instates a suitable prescribed burning frequency to promote unburnt refuges and protects large</li> </ul>

Management Action	Details	Benefits to MNES Fauna
		hollow-bearing trees from fire damage.

## 5.2. Management Action 1 – Weed Reduction & Management

### 5.2.1 Justification and Benefits to MNES

The aim of weed management is to minimize the introduction, establishment and spread of restricted and prohibited pest plants under the *Biosecurity Act 2014* (BS Act) (QLD) and other invasive species that present a threat to vegetation communities and species habitat in the retained bushland vegetation. These include *Lantana camara* (Lantana) and *Sporobolus pyramidalis* (Giant Rat’s Tail Grass).

More than 1400 native species are negatively affected by lantana invasion, including many endangered and threatened species according to the Department of Agriculture and Fisheries (2023). Lantana adversely impacts species richness and some soil faunal assemblages through suppressing plant growth from Lantanas aggressive growth form. *Lantana camara* thickets can form a barrier to terrestrial species, including limiting the Koalas ability to access areas containing NJKHTs. Lantana has been observed to create hotter bushfires due to its woody shrub with thin combustible canes, which significantly alters native vegetation communities and pastures (DAF, 2023).

Increased intensity/ frequency of bushfire is listed as a key threatening process under the Conservation Advice for Koala. Although this largely refers to the impacts caused by Climate Change, the presence of Lantana within bushland can significantly increase the extremity of bushfire and thus the impact it has directly on Koala and other listed species habitat; GHFF and Greater Glider rely on Eucalypt bushland for foraging and breeding. As such, the Queensland Governments ‘South East Queensland Koala Conservation Strategy 2022 – 2025’ lists management of invasive weeds both in Action Area 1: Habitat Protection and Action Area 3: Threat Management (DES, 2020). Impact management of invasive flora, particularly Lantana, a Weed of National Significance (WoNS), is therefore considered a key direct action to addressing threats on Koala and other listed species that share the same habitat requirements.

*Lantana camara* occurs within the retained bushland south of the hospital site in isolated clusters and thickets within the understory of remnant vegetation. This infers that the potential for these areas to provide optimal habitat to Koala is impacted by weed infestation. The highly invasive and spreading nature of the species, coupled with the in-active management in areas would result in progressive increases particularly as local climatic events align with optimal germination and seeding periods.

*Lantana camara* is listed as a restricted invasive species under the *Biosecurity Act 2014*. Under the Queensland *Biosecurity Act 2014* it requires everyone to take all reasonable and practical steps to minimise the risks associated with invasive plants and animals under their control, this is called the General Biosecurity Obligation (GBO). The GBO states that reasonable and practical is dependent on the current land use practices undertaken by the landholder. The GBO is a risk ratings-based approach, where risks are managed appropriately based on their threat to the land use practices.

Presence of WoNs is an impact to all targeted MNES, particularly Koala.

### 5.2.2 Proposed Management Actions

Baseline surveys will be completed in the first year of Project commencement to determine the percentage of weed infestation across the retained bushland. This data will form the basis for targeted weed management activities across the site. Proposed treatment sites should be examined and desirable trees and regrowth clearly marked with pink flagging tape to help reduce native vegetation prior to any use of mechanical clearing. The following methods will be deployed:

#### **Lantana camara**

- Stick rake, grubbing, ploughing or slashing major accessible areas of Lantana where not on a slope greater than 15% or where no existing native values occur.
- Apply broadscale herbicide and spot spray during high germination summer periods (Nov-March). Utilize organic based Lantana targeted herbicides which minimize impacts on native vegetation regenerating within and surrounding Lantana patches. Control methods applied will be guided by methods outlined in the DAF guide to best management practices and as per Biosecurity Queensland recommendations.
- Control methods applied will be guided by methods outlined in the DAFs guide to best management practices and as per Biosecurity Queensland recommendations.

#### **Other Weeds**

- Chemical or non-chemical mechanical removal of *Sporobolus pyramidalis* (Giant Rat's Tail Grass).

Weed management actions will occur in areas outlined within the Rehabilitation Management Plan (**Attachment A14** of the **PD**). Post major weed removal operations, periodical weed maintenance rotations for removal / suppression of Lantana regeneration will occur, with the same environmental considerations as the wholesale removing of weeds applied. Weed suppression activities will incorporate adaptive management principles into weed management methods to streamline overall management to the most effective control types.

### 5.2.3 Tasks, Completion Criteria and Timing

The objectives of weed management within the retained bushland area are outlined below:

- Removal and control of all major *Lantana camara* infestations using a variety of mechanical and herbicide methods. *Lantana camara* infestations are to be reduced to below 5% of the retained bushland area. Areas identified as containing higher infestations are to be targeted during weed removal events.
- Ongoing maintenance to ensure that *Lantana camara* extents within the bushland are retained at or below 5% of the total area through weed management actions; and

- Prevent further spread or establishing of new *Lantana camara* outbreaks within the retained bushland.
- Removal and management of *Sporobolus pyramidalis* in accordance with the Rehabilitation Management Plan (**Attachment A14** of the **PD**).

These objectives for weed reduction and management will occur in accordance with the methods outlined in the Rehabilitation Management Plan with the timing of actions outlined in **Table 8** below.

**Table 8: Management Action 1 Timing**

Timing	Preliminary Completion Criteria
<b>Year 1</b>	Complete detailed baseline / weed extent survey utilising an antenna-based GPS system to map the full extent of all <i>Lantana camara</i> areas within the retained bushland. Results of baseline weed extent surveys to be included in the year 1 annual report.
<b>Year 2 – 5</b>	Commence detailed weed management control activities within the retained bushland. Methods deployed are to be based on extent of infestation, existing native vegetation values, topography and sensitive receiving environments. The following methods are to be deployed: <ul style="list-style-type: none"> <li>○ Stick rake, grubbing, ploughing or slashing major accessible areas of Lantana where not on a slope greater than 15% or where no existing native values occur; and</li> <li>○ Apply broadscale herbicide and spot spray during high germination summer periods (Nov-March). Utilize organic based Lantana targeted herbicides which minimize impacts on native vegetation regenerating within and surrounding Lantana patches.</li> <li>○ Target additional weed species onsite in accordance with the Rehabilitation Management Plan (<b>Attachment A14</b> of the <b>PD</b>).</li> </ul>
<b>Year 2 – 5</b>	Demonstrate a downward trend in the weed extent, vigor and health annually through years 2-5, achieving a significant reduction in <i>Lantana spp.</i> extent within the retained bushland by year 5, with less than 10% of the retained bushland containing weed infestations. Actions and downward trend to be reported annually in the relevant annual report.
<b>Year 5</b>	Replicate detailed weed survey through retained bushland. Include plans and calculations in Year 5 annual report demonstrating less than 10% of the retained bushland to contain weed infestations.

Timing	Preliminary Completion Criteria
<b>Year 6 – 10</b>	Continue to implement detailed weed management control methods in accordance with any recommended adaptive management changes. Demonstrate a downward trend in the weed extent, vigor and health annually through years 6-10, achieving a further reduction in <i>Lantana spp.</i> extent within the retained bushland by year 10, with less than 5% of the area to contain weed infestation. Actions and downward trend to be reported annually in the relevant annual report.
<b>Year 10</b>	Remobilize and replicate detailed weed extent survey along with proposed amendments to the targeted pest management activities. Demonstrate less than 5% of the retained bushland area to contain weed infestation.
<b>Year 11 Onwards</b>	Continue to implement detailed weed management control methods in accordance with any recommended adaptive management changes to maintain <i>Lantana camara</i> weed infestations to 5% or below within the retained bushland area.

#### 5.2.4 Monitoring

Baseline *Lantana* surveys within the retained bushland will be completed to provide an actual mapped extent of infestations and occurrences to be used as the benchmark for measuring improvement. Survey methods and results are to be replicated. Year 2 to 5 weed management are to demonstrate a downward trend in weed extent and outbreak to less than 10% of the bushland area. Replicate baseline surveys in year 5 to demonstrate less than 10% of the retained bushland area to contain weed infestations.

Replication of baseline surveys in year 10 to demonstrate a downward trend in the weed extent, vigor and health annually through years 6-10, achieving further reduction in *Lantana camara* within the retained bushland by year 10 with less than 5% of the area to contain weed infestation. Continue weed management actions after Year 10 to maintain weed infestations below 5%.

### 5.3. Management Action 2 – Rehabilitation & Revegetation

#### 5.3.1 Justification and Benefits to MNES

According to the relative statutory documents (i.e., conservation advice and national recovery plans), all 3 of the targeted MNES species referred to in this MNES Management Plan are significantly impacted by habitat clearing and fragmentation.

Overall, the retained bushland area is in good condition representing remnant vegetation; however, it does contain a variety of weed species, particularly along patch edges (including species listed as Restricted (Category 3) matter under the *Qld Biosecurity Act 2014*). Ecological benefit can be derived through restoration of retained vegetation particularly within the understorey e.g. weed management and natural regeneration to reduce weed cover within priority areas, which has benefits for wildlife movement. Appropriate steps need to be undertaken to manage infestations of these species, particularly within areas subject to disturbance

during construction. Habitat degradation will be minimised by undertaking weed management during construction and managing waste and water quality.

The remnant and regrowth vegetation areas on-site provide foraging and habitat values in their current state, however, are observed to contain significant infestation of weeds (namely *Lantana camara*), therefore regeneration of native species for foraging is limited and safe fauna movement impacted. The rehabilitation of these areas will allow for the regeneration of native seedbank, increase habitat for the Koala, Greater Glider, and Grey-headed Flying-fox and improve safe movement opportunities for fauna. Rehabilitation activity on-site will contribute to functional ecological habitat and corridors due to the surrounding landscape containing potential habitat for MNES species.

### **Koala**

The Koala has a specialist diet, feeding on the leaves of select species of *Eucalyptus*, *Lophostemon*, *Corymbia*, *Angophora* and occasionally *Melaleuca* and *Leptospermum*. Consequently, koalas are reliant on access to stands of forest and woodland that support those key food-tree species.

Habitat protection and habitat restoration are Action Areas 1 and 2 respectively within the South East Queensland Koala Conservation Strategy 2020 – 2025. Rehabilitation therefore a key action that will improve koala habitat values within the retained bushland. Specifically, improving the natural RE community onsite has the potential to increase habitat connectivity and increase the availability of key resources including food and shelter trees for the koala.

### **Grey-headed Flying-Fox**

Grey-headed Flying-fox requires foraging resources and roosting sites to persist. The species is known to feed primarily on the nectar and pollen in eucalypt flowers and fleshy subtropical rainforest fruits, and around 100 species of plant have been recorded in their diet.

Under the National Recovery Plan for GHFF, recovery objective 1 lists enhancing and rehabilitating native vegetation on public and private lands as a way to increase foraging habitat critical to the species survival. Rehabilitation is therefore a key action that will improve GHFF foraging values within the retained bushland.

### **Greater Glider**

The Greater Glider subsists almost entirely on the young leaves and flower buds of select eucalypt species, especially including *Corymbia citriodora* (Spotted Gum), *Eucalyptus tereticornis* (Forest Red Gum), *E. acmenoides* (White Mahogany) and *C. intermedia* (Pink Bloodwood) (Eyre 2006; Eyre et al. 2022).

Under the Conservation Advice for Greater Glider restoring habitat and connectivity is listed as a conservation and management priority, particularly where habitat has been substantially fragmented, disturbed or modified. While connectivity to the site is limited for the species, improving the remnant areas on-site will improve habitat for this species to move into should it occur.

### 5.3.2 Proposed Management Actions

Objectives of this management action will be to ensure that native remnant vegetation contained within the retained bushland are enhanced and preserved over the life of the project managing and maintaining a ground layer, understory and canopy that is consistent with the nominated regional ecosystem classifications. The rehabilitation program will be undertaken by suitably qualified personnel and will include measures to ensure the maintenance and survival of new breeding and foraging trees within the retained bushland.

MNES habitat assisted rehabilitation will occur through conditional improvement of habitat which primarily centers around weed removal (namely, Lantana), revegetation of areas within the wetland stormwater management areas and rehabilitation where required due to disturbances from vegetation clearing and construction. To achieve the scheduled improvements in the condition and health of the vegetation, two of the four restoration approaches outlined in the South-East Queensland Ecological Restoration Framework – Guideline will be used, being:

- Natural regeneration;
- Assisted natural regeneration;
- Reconstruction; and
- Fabrication.

Restoration is a high cost and high labor-intensive task from preparation to commencement through to the first 5 years of establishment. Only planning and preparation works are proposed within year 1 of the project while beginning communication with a local nursery for stock will be conducted. However, all rehabilitation plantings are to be completed by the end of Year 5. This staged process of rehabilitation is recommended under the *SEQ Restoration Framework Manual* (Chenoweth EPLA, 2012) and *SER Australasia National Restoration Standards* (SERA, 2017). Under these guidelines it is suggested that larger sites be broken into a number of different management zones with progress occurring at different stages within each zone. Therefore, allowing for each zone to get the same amount of care and management practices. As these zones move to maintenance and the time required for each zone is reduced these can be consolidated.

Rehabilitation actions will be undertaken in accordance with the site-specific Rehabilitation Management Plan (RMP) (**Attachment A14** of the **PD**). The RMP outlines five (5) management zones within the retained bushland vegetation which are outlined in **Table 9**.

**Table 9: Management zone rehabilitation actions for the retained bushland area.**

<b>Management Zone</b>	<b>Total Area</b>	<b>Plant Density</b>	<b>Rehabilitation Actions</b>
<b>Management Zone 1 – Existing Vegetation (Natural Regeneration)</b>	306,500 m <sup>2</sup>	Vegetation Allowance for minor disturbances – 15,000 m <sup>2</sup>	<ul style="list-style-type: none"> <li>Existing native trees, shrubs and groundcovers to be protected and retained.</li> <li>Weed management to entire zone to encourage natural regeneration by reducing competition.</li> <li>Appropriate (sensitive) weed management methodology within this zone to minimize any native vegetation damage / losses.</li> <li>Revegetation using tubestock installation including a diversity of tree, shrub and groundcover species to match regional ecosystem mapping for the site where minor disturbances occur.</li> </ul>
<b>Management Zone 2 – General Revegetation / Rehabilitation (Reconstruction)</b>	6,500 m <sup>2</sup>	1 plant min per m <sup>2</sup>	<ul style="list-style-type: none"> <li>Weed management to entire zone to encourage natural regeneration by reducing competition.</li> <li>Any existing/ occurring regrowth of native trees, shrubs and groundcovers to be protected and retained.</li> </ul>
<b>Management Zone 3 – Swale Rehabilitation (Reconstruction)</b>	13,150 m <sup>2</sup>	3 plants min per m <sup>2</sup>	<ul style="list-style-type: none"> <li>All bare / denuded areas to be appropriately cultivated, topsoiled and blanket mulched (100mm depth) or tecmatting (1:3 batters and locations prone to erosion) as required. All jutenetting to be installed to manufacturer's recommendations.</li> </ul>
<b>Management Zone 4 – Detention Revegetation (Reconstruction)</b>	7,700 m <sup>2</sup>	3 plants min per m <sup>2</sup>	<ul style="list-style-type: none"> <li>Reconstruction of natural environment to be undertaken via tubestock installation including a diversity of tree, shrub and groundcover species to match regional ecosystem mapping for site.</li> </ul>
<b>Management Zone 5 – Basin / Wetland Revegetation (Reconstruction)</b>	800 m <sup>2</sup>	6 plants min per m <sup>2</sup>	

Benchmarks for rehabilitation efforts are derived from the definition of remnant vegetation under the *Vegetation Management Act 1999*. Vegetation can be mapped as remnant vegetation and associated essential habitat for Koalas if the canopy is 70% of the height, 50% of the cover and similar species composition of the appropriate pre-clearing RE (Queensland Government 2015). Therefore, the final benchmark at 20 years for rehabilitation is 70% of the reference benchmark cover (for canopy, shrub and ground-layer) and 50% of the reference benchmark height (for canopy and shrub layer) of the appropriate RE.

On-site regional ecosystem vegetation communities show the retained bushland contains the following regional ecosystem type:

12.5.4 – *Eucalyptus latisinensis* +/- *Corymbia intermedia*, *C. trachyphloia* subsp. *trachyphloia*, *Angophora leiocarpa*, *Eucalyptus exserta* woodland on complex of remnant Tertiary surfaces and Cainozoic and Mesozoic sediments.

Under the Queensland Herbarium biocondition benchmarks for this regional ecosystem indicate remnant canopy tree height as 17 m and subcanopy 8 m, whilst the remnant tree canopy coverage is 37%, sub-canopy coverage 14% and shrub canopy coverage 19%. Therefore, once the AU1 revegetation reaches 70% of these prescribed heights and 50% of these prescribed canopy coverages it can be considered remnant.

The rehabilitation planting will reflect the mapped regional ecosystem on-site RE 12.5.4 via incorporating the following species into revegetation:

- *Angophora leiocarpa* (Smooth-barked Apple)
- *Eucalyptus crebra* (Narrow-leaved Ironbark)
- *Eucalyptus exserta* (Queensland Peppermint)
- *Corymbia intermedia* (Pink Bloodwood)
- *Corymbia trachyphloia* (Brown Bloodwood)
- *Eucalyptus latisinensis* (White Mahogany)
- *Eucalyptus tereticornis* (Forest Red Gum)
- *Lophostemon confertus* (Brush Box)
- *Lophostemon suaveolens* (Swamp Box)

### 5.3.3 Tasks, Completion Criteria and Timing

The main objective of rehabilitation and revegetation within the retained bushland area is to:

- Encourage natural regeneration through weed management.
- Cover bare areas with topsoil and mulch or tecmatting where required.
- Reconstruct natural environment where required via tubestock installation including a diversity of tree, shrub and groundcover species to match regional ecosystem mapping for site.

The timing of the proposed rehabilitation measures is outlined below in **Table 10**.

**Table 10: Management Action 2 Timing**

<b>Timing</b>	<b>Preliminary Completion Criteria</b>
<b>Year 1</b>	Establish photo point monitoring and protocols.
<b>Year 1 – 5</b>	Complete treatment within the retained bushland as per the detailed Rehabilitation Management Plan. Monitor and maintain the treated rehabilitation management areas on a bi-monthly basis. Report in each relevant annual report the extent of rehabilitation management undertaken within the treatment zones.
<b>Year 6 – 10</b>	Monitor and maintain the treated rehabilitation management areas. Report in each relevant annual report the extent of rehabilitation management undertaken within the stratified treatment zones.
<b>Year 10</b>	Report on results/progress of rehabilitation within the Year 10 annual report including a detailed review of the effectiveness of restoration procedures applied and adaptive management changes for future implementation.

#### 5.3.4 Monitoring

Implement site rehabilitation in accordance with the site-specific Rehabilitation Management Plan. Complete replicated transect surveys in accordance with the Modified Habitat Quality Assessment methodology (Koala) and Grey-headed Flying-fox Foraging Habitat Assessment methodology. Evidence through photo point monitoring of assisted habitat rehabilitation containing NJKHTs and MNES foraging trees. Plan of completed MNES habitat assisted rehabilitation extents in annual reporting.

Reporting on MNES habitat restoration activities will occur within each 12 month annual report with major surveys results and adaptive management changes documented at Year 5, 10, & 15.

### 5.4. Management Action 3 – Hollow-bearing Tree Salvage and Relocation

#### 5.4.1 Justification and Benefits to MNES

Selected trees will be salvaged from the impact site and reused as fauna habitat to enhance retained vegetation habitat values. Salvage and re-location of natural hollows to areas of retained vegetation will be used to compensate for the unavoidable loss off tree-hollows that are confirmed or considered likely to provide breeding habitat within the impact area.

Furthermore, the improvement of the remnant retained vegetation via weed management and rehabilitation will ultimately restore the habitat value of this area which already contains suitable large trees (> 300 mm DBH) and hollow-bearing trees likely to support gliders. Trees with a DBH of 300 mm or above are indicators of potential foraging and dispersal trees for Greater Glider (Eyre et al. 2015). Rehabilitation efforts on-site will contribute to long-term protected habitat for threatened species. Therefore, rehabilitation of remnant vegetation will contribute as foraging, denning and dispersal areas for MNES species.

## Greater Glider

Under the Conservation Advice for Greater Glider restoring habitat and connectivity is listed as a conservation and management priority which includes measures to reduce the loss of hollow-bearing trees. Hollow-bearing trees are a critical denning resource relied upon by the Greater Glider. The Conservation Advice outlines artificial hollows may be used to supplement the loss of hollow-bearing trees where hollows are limiting. Furthermore, protecting hollow-bearing trees on private property, and incorporating measures to ensure ongoing recruitment of hollow-bearing trees are listed as potential management actions in the Conservation Advice.

### 5.4.2 Proposed Management Actions

The salvage and reinstallation of hollows and habitat features is to be undertaken by / or under the supervision and direction of a suitably qualified fauna spotter-catcher or arborist, and in accordance with relevant guidelines. Salvaged hollows will include hollows suitable for a range of species including Greater Glider, Common Brush-tail possum, Sugar Glider and Bats. Salvaged hollows shall be installed within retained adjacent vegetation and within vegetation on the southern side of Bundaberg Ring Road in areas identified as suitable by a qualified fauna spotter-catcher.

#### Salvage from clearing area:

- Hollows should only be salvaged in circumstances where clearing of habitat cannot be avoided.
- Habitat or hollow-bearing trees are to be felled last and cleared using special plant and equipment aimed at reducing the risk of death or injury to occupying fauna.
- Donor habitat tree particulars to be documented by the suitably qualified fauna spotter-catcher prior to salvage – including but not limited to tree species, height and diameter at breast height (DBH), height above ground and aspect of hollow, any other significant features.
- Hollow / habitat feature sections from each identified habitat tree to be carefully removed by, or under direction and supervision of a suitably qualified fauna spotter-catcher.

#### Reinstallation at receiving area:

- Hollows are to be salvaged and reinstalled within the retained vegetation onsite.
- The salvaged hollow is to be reinstalled in a similar tree specimen, and at a similar height and aspect as the donor tree where it is practical and safe to do so.
- As a general rule, salvaged hollows should be positioned:
  - In a tree species preferred by the target fauna species.
  - At a location in the receiving tree to meet the target species requirements.
  - High enough in the receiving tree to reduce the chances of predation by introduced fauna species, out of reach of humans. Greater than 4 metres above ground level is recommended to minimise predation.
  - Away from potential edge effects to further mitigate feral uptake.
  - Where they can be easily inspected / maintained.
  - Away from bright lights.
  - In a direction that is protected from sever storms and/or prevailing winds. A north-east to south-east aspect is preferred by many species.

- In a location that is shaded during the hottest parts of the day.
- Where they are least vulnerable to branch fall.
- Level with a tree branch to provide easy access for fauna.
- Firmly mounted with least impact to the tree.
- If not practical or safe to install a tree hollow / habitat feature in a tree at the receiving area, it should be positioned on ground providing there are no conflicts with bushfire requirements at the receiving area.

### 5.4.3 Tasks, Completion Criteria and Timing

The main objective of hollow-bearing tree salvage and relocation within the retained bushland area is to:

- Identify and salvage natural hollows from the impact area prior to clearing.
- Relocate and establish salvaged hollows within the retained bushland.
- Maintain existing hollows within the retained bushland.

The timing of the proposed hollow-bearing tree relocation is outlined below in **Table 11**.

**Table 11: Management Action 3 Timing**

Timing	Preliminary Completion Criteria
<b>Vegetation Clearing Phase</b>	Identify suitable habitat trees and hollow-bearing trees for relocation prior to vegetation clearing. Identify reinstallation tree and location within the retained bushland vegetation. Conduct clearing and hollow relocation in accordance with VCFMP.
<b>Year 1 – 5</b>	<p>Monitor the success of hollow relocation including:</p> <ul style="list-style-type: none"> <li>● Condition of the re-located hollow</li> <li>● Utilization by fauna</li> <li>● Tree health</li> </ul>
<b>Year 6 – 20</b>	Maintain hollow-bearing trees within the retained vegetation.

### 5.4.4 Monitoring

Once the natural hollows have been salvaged and reinstalled within the retained vegetation, within the first five (5) years, annual audit occupancy of the installed nest boxes shall occur. Inspections will identify the following:

- Fauna use including target and/or non-target species.
- Rectification procedures for introduced species. N.B. native predators should not be removed from boxes unless they are endangering a threatened fauna species.
- Any damage or dieback, or risk to the next box.
- Maintenance required.

Following each inspection, a report is to be issued within 21 days by the consulting ecologist and issued to the Proponent and Environmental Coordinator. This report will detail the results of the inspection and outline any further measures to improve beneficial outcomes of the strategy for fauna (i.e. eradication of pest species, minor repairs or replacement).

## 5.5. Management Action 4 – Fire management

### 5.5.1 Justification and Benefits to MNES

The project site is mapped as having medium potential bushfire hazard as identified within the site-specific Bushfire Management Plan (**Attachment A12** of the **PD**). The last recorded bushfire within the project area occurred in July 2023. The bushfire was contained by Queensland Fire and Emergency Services (QFES) with no recorded damage to people or property.

The bushland south of the impact site which is proposed to be retained contains Eucalypt woodland and a system of boundary line firebreaks and access tracks. Bushfire management onsite will occur in accordance with the Bushfire Management Plan (**Attachment A12** of the **PD**). This will be achieved through hazard reduction practices and emergency mitigation measures for any buildings bordering potentially bushfire-susceptible vegetation. These practices and measures include fuel reduction and management, road infrastructure to provide safe access and egress, appropriate building design and construction standards, procedures for fighting bushfires and fire intensity reduction management measures.

Habitat loss from bushfires and increased intensity / frequency of bushfire are listed as key threats to the three MNES; Koala, Greater Glider and Grey-headed Flying-fox as outlined within the relevant Conservation Advice and National Recovery Plans. Extensive severe bushfires leading to habitat loss, disturbance and modification has implications for these three MNES and inappropriate fire regimes is an impact to all targeted MNES.

### 5.5.2 Proposed Management Actions

Fire management will occur in accordance with the site-specific Bushfire Management Plan. This plan outlines the following:

- Agencies / persons responsible for fire management.
- Owner / occupier responsibilities.
- Reporting and auditing.
- Siting of buildings.
- Access roads.
- Electrical supply.
- Water supply.
- Climate change and fire weather projections.
- Emergency response procedures.

### 5.5.3 Tasks, Completion Criteria and Timing

The main objective of fire management within the site is to:

- Protect infrastructure and environmental values from damage as a result of severe bushfire.
- Undertake fire management activities in accordance with the site-specific Bushfire Management Plan.

The timing of the proposed fire management is outlined below in **Table 12**.

**Table 12: Management Action 4 Timing**

<b>Timing</b>	<b>Preliminary Completion Criteria</b>
<b>Project duration</b>	Implement site-specific Bushfire Management Plan. Incorporate corrective actions where required.

## 6. Reporting

Each calendar year an annual report will summarise:

- Management actions completed during the 12-month period;
- Monitoring activities and results;
- Assessment of results against performance criteria to determine effectiveness;
- Identification of any issues that arose that require adaptive management and alternative actions.

The annual report will contribute to any required annual compliance reporting specified within the EPBC approval once attained.

### 6.1. Responsibilities

Management strategies outlined within this plan are the responsibility of all personnel undertaking Project activities. This MNES Management Plan will be implemented by:

1. Project director to initiate formal reviews of MMP.
2. Project Environmental Manager to ensure implementation of prescribed avoidance, mitigation and management strategies for each phase within this plan.
3. Project Site Manager for ensuring the MMP is implemented during clearing, construction and operation.
4. Project Environmental Manager to review results of review and ensure corrective actions are implemented in a timely and effective manner.

# 7. Risk Assessment

A risk assessment was undertaken to assess the risks associated with failing to achieve the management objectives outlined in this MNES Management Plan for mitigating impacts to MNES. Risks are generally described and assessed against the likelihood and consequence model outlined in the Commonwealth Government’s Department of Environment – *Environmental Management Plan Guidelines* (2014) as shown in **Table 13**.

**Table 13: Risk Rating Table (DAWE, 2022)**

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

■ MNES Management Report

	Unlikely	Low	Low	Medium	High	High
	Rare	Low	Low	Low	Medium	High

**Table 14: Risk Assessment and Management Table**

Management objective/desired outcome	Risk Event or circumstance	Relevant management actions/measures	Residual risk			Trigger detection and monitoring activity/ies	Feasible/effective corrective actions
			L	C	RL		
Ensure clearing of native vegetation and/or disturbance to MNES habitat does not occur within the retained habitat (i.e. remains within the hospital impact area).	Clearing of habitat for MNES occurs outside of the approved impact area.	<ul style="list-style-type: none"> <li>• Areas of vegetation to be removed will be clearly marked with temporary fencing.</li> <li>• GIS shapefiles of exclusion areas will be provided to clearing personnel.</li> <li>• All relevant personnel to participate in pre-start meetings and site inductions.</li> <li>• Pre-clearance surveys undertaken prior to clearing</li> <li>• Fauna-spotter catcher to be present for all clearing activities</li> </ul>	U	High	Med	Evidence of clearing within exclusion areas. Damage to retained vegetation from vehicle tracks etc.	Works are to cease immediately if clearing occurs within exclusion zone. Assessment and reporting to DCCEE and DES. Revegetation to occur in cleared areas.
Injuries or mortality to MNES threatened species are avoided and mitigated during	Vehicle strike to MNES and other fauna. Injury or mortality from	<ul style="list-style-type: none"> <li>• Trees to be felled sequentially and in accordance with methodology outlined in the VCFMP.</li> </ul>	U	High	Med	Any injury or mortality to a MNES species.	Investigation to determine the cause of fauna injury/mortality. Reduce vehicle speeds further. Install

Management objective/desired outcome	Risk Event or circumstance	Relevant management actions/measures	Residual risk			Trigger detection and monitoring activity/ies	Feasible/effective corrective actions
			L	C	RL		
clearing and construction.	clearing processes.	<ul style="list-style-type: none"> <li>• Reduced speed limits enforced within clearing and construction zone.</li> <li>• Fauna-spotter catcher to be onsite at all times during clearing.</li> <li>• Wildlife signage to be installed.</li> <li>• Site induction including injured fauna protocols and procedures.</li> <li>• Fauna exclusion fencing will be installed surrounding the construction site.</li> </ul>					additional fauna exclusion fencing where appropriate.
Weed (WoNS) Management	Introduction of invasive weed species and / or failure to control existing invasive weed species.	<ul style="list-style-type: none"> <li>• Undertake weed management in accordance with the Rehabilitation Management Plan.</li> <li>• Vehicles to wash down prior to site entry.</li> <li>• Site induction to inform weed management responsibilities of staff, contractors and visitors.</li> </ul>	U	Mod	Low	New weed species detected. Weed monitoring determine increase in density of existing weeds. Failure of weed control attempts.	Investigate cause of increased weed cover. Increase frequency and duration of weed control efforts. Investigate alternate weed management controls. Weed control program to be expanded/ adapted to improve outcomes. Amend weed hygiene practices.

Management objective/desired outcome	Risk Event or circumstance	Relevant management actions/measures	Residual risk			Trigger detection and monitoring activity/ies	Feasible/effective corrective actions
			L	C	RL		
		<ul style="list-style-type: none"> <li>• Access to retained vegetation will be limited.</li> <li>• Chemical and physical control methods implemented in accordance with Rehabilitation Management Plan.</li> </ul>					
Fire management	A high intensity uncontrolled fire occurs onsite which causes loss of habitat.	<ul style="list-style-type: none"> <li>• Fire management to occur onsite in accordance with the site-specific Bushfire Management Plan.</li> <li>• Actions as directed by the local authority which may include prescribed burning or other techniques undertaken in consultation with the Queensland Rural Fire Brigade to manage fuel loads.</li> <li>• Maintain bushfire zones and fire breaks as outlined in the Bushfire Management Plan.</li> </ul>	U	High	Med	Uncontrolled or unplanned fires occur. Monitoring to review access tracks, fire breaks, fuel loads and outcomes of controlled burns.	Emergency Response Plan enacted. Implement fire control. Repair any fire breaks and access tracks. Stay informed through the Rural Fire Service. Assess damage caused by the wild fire and monitor for natural regeneration. Monitoring to occur 3-6 months post event or after the next wet weather event (whichever is sooner). Where natural regeneration is failing to thrive, assist natural regeneration through direct seeding and planting.

Management objective/desired outcome	Risk Event or circumstance	Relevant management actions/measures	Residual risk			Trigger detection and monitoring activity/ies	Feasible/effective corrective actions
			L	C	RL		
Maintain habitat for MNES within retained vegetation.	MNES habitat degradation.	<ul style="list-style-type: none"> <li>Fencing design to exclude feral pest animals from the retained habitat.</li> <li>Weed management in accordance with the Rehabilitation Management Plan.</li> <li>Areas of MNES habitat within the retained vegetation not to be cleared – clearly delineated by temporary fencing and signage.</li> <li>Site access along designated tracks.</li> <li>Selected hollow-bearing trees will be salvaged and relocated into the retained habitat area.</li> <li>Light spill will be directed internally.</li> </ul>	U	Mod	Low	Evidence of clearing within exclusion areas. Increased weed infestation. Evidence of habitat degradation.	Develop species specific management plans. MNES habitat to be rehabilitated in accordance with the site-specific Rehabilitation Management Plan. Increase weed control measures and evaluate effectiveness. Repair fences if damaged or install new ones.

Management objective/desired outcome	Risk Event or circumstance	Relevant management actions/measures	Residual risk			Trigger detection and monitoring activity/ies	Feasible/effective corrective actions
			L	C	RL		
		<ul style="list-style-type: none"> <li>• Fire management in accordance with Bushfire Management Plan</li> </ul>					
Rehabilitation within retained habitat.	High plant stock failure within rehabilitation areas.	<ul style="list-style-type: none"> <li>• Implement revegetation in accordance with Rehabilitation Management Plan.</li> <li>• Undertaken weed control activities.</li> </ul>	U	Mod	Low	Planting and monitoring event schedules by the qualified bush regenerator. Scheduled monitoring/surveys and Annual Compliance Reports.	If there is a high rate of plant stock failure adaptive management and corrective actions will be implemented and may include, additional supplementary planting, direct seeding, weed control, fertiliser, water spike, mulching, tree guards, etc. Implement adaptive management and corrective actions. Should plant stock fail supplementary planting, direct seeding, weed control, fertiliser, amelioration or other management actions necessary to stimulate tree growth.

## 8. References

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Phillips, S & Callaghan, J 2011, "The *Spot Assessment Technique*: a tools for determining localised levels of habitat use by Koala *Phascolarctos cinereus*", *Australian Zoologist*, 35:3.

# 9. Attachments

## Attachment A

Referral Decision (EPBC 2022/09397)

## Attachment B

Assessment RFI (EPBC 2022/09397)

## Attachment C

Flora and Fauna Lists

## Attachment D

Vegetation Clearing and Fauna Management Plan (VCFMP)

## Attachment E

NBH Fencing Approach

# Attachment A

Referral Decision (EPBC 2022/09397)



Australian Government

Department of Climate Change, Energy,  
the Environment and Water

## Notification of referral decision and designated proponent – controlled action

### New Bundaberg Hospital, Thabeban, Queensland (EPBC 2022/09397)

This decision is made under section 75 and section 87 of the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act).

#### Proposed action

**designated proponent** Department of Health Qld

ABN/ACN: 66329169412

**proposed action** To construct and operate the new Bundaberg Hospital and associated infrastructure in Thabeban, Queensland (See EPBC Act referral 2022/09397)

#### Referral decision: controlled action

**status of proposed action** The proposed action is a controlled action.

The project will require assessment and approval under the EPBC Act before it can proceed.

**relevant controlling provisions**

- Listed threatened species and communities (sections 18 & 18A)

#### Assessment approach decision

**assessment approach** The project will be assessed by preliminary documentation

#### Person authorised to make decision

**name and position** Mark Say, Acting Branch Head, Environmental Assessments Queensland and Sea Dumping Branch

**signature**

**date of decision** 3 February 2023

# Attachment B

Assessment RFI (EPBC 2022/09397)



## Further information required for assessment by preliminary documentation

### New Bundaberg Hospital, Thabeban, Queensland (EPBC 2022/09397)

On 03 February 2023 a delegate of the Minister for the Environment and Water determined the above project is a controlled action due to likely significant impacts on the following matters protected under Part 3 of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act):

- Listed threatened species and communities (sections 18 & 18A);

The delegate also determined that the proposed action will be assessed by preliminary documentation. Preliminary documentation for the proposal will include:

- The information contained in the original referral;
- The further information you provide on the impacts of the action and the strategies you propose to avoid, mitigate and offset those impacts (as described below); and
- Any other relevant information on the matters protected by the EPBC Act.

The preliminary documentation should be sufficient to allow the Minister (or delegate) to make an informed decision on whether to approve, under Part 9 of the EPBC Act, the taking of the action for the purposes of the controlling provision above.

The preliminary documentation must address the matters set out below and follow the content, style and formatting requirements set out in [Appendix A](#).

### 1. DESCRIPTION OF THE ACTION

Information required	
1.1	The location, boundaries and size (in hectares) of the disturbance footprint including the proposed wetlands to be constructed and any temporary vegetation clearance required. Include mapping and coordinates.
1.2	A description of all components of the action, including the anticipated timing and duration (including start and completion dates) of each component of the project. In addition, any components which were included in the referral material, but are no longer part of the proposed action, must be clarified.
1.3	A description of the operational requirements of the action including but not limited to any anticipated maintenance works, use of roads, lighting and fencing.
1.5	An indicative layout plan for the proposed action area, including the location and type of land use, key infrastructure, and the number and location of each component of the project (including the wetlands) proposed to be constructed. Include mapping and coordinates for each of the above.
1.6	To the extent reasonably practicable, provide any alternatives to the proposed project site and design of the proposed action (including the wetlands) including a

	comparative description of the impacts of each alternative on the matters protected by the controlling provisions for the action.
1.7	Provide a description of any approval that has been obtained from a State or Commonwealth agency or authority, including any conditions that apply to the action. Include a statement identifying any additional approval that is required.

## 2. HABITAT ASSESSMENT

### Background

Based on the information provided in your referral, and other available information, the department considers that the listed threatened species identified below may be significantly impacted by the proposed action.

Please note, it is the proponent's responsibility to be aware of any changes to the distribution of listed threatened and information available in the Species Profile and Threats (SPRAT) Database. The proponent must ensure that a recent Protected Matters Search Tool (PMST) report has been generated and considered before finalising the draft preliminary documentation.

The department does not accept the consideration of only Queensland Regional Ecosystem (RE) mapping to determine habitat for listed threatened species. Further, habitat assessments must not only consider remnant vegetation.

Habitat assessments must be informed by desktop and field surveys (in accordance with departmental guidelines or evidence-based best practice methods), and with reference to relevant departmental documents (e.g., approved Conservation Advices, Recovery Plans, draft referral guidelines and Listing Advices, and the SPRAT Database), including published research and other relevant sources. Where habitat assessments depart from departmental information, adequate justification must be provided to substantiate their suitability to the assessment.

Listed threatened species and communities:

- Greater Glider (*Petauroides volans*)
- Koala (*Phascolarctos cinereus*) (combined populations of Qld, NSW, and the ACT); and
- Grey-headed Flying-fox (*Pteropus poliocephalus*).

### 2.1 Species general information

Information required	
2.1.1	Provide a habitat assessment for relevant listed threatened species.
2.1.2	Identify and describe known historical records of the listed threatened species in the broader region. All known records must be supported by an appropriate source (i.e., Commonwealth and State databases, published research, publicly available survey reports, etc.), the year of the record and a description of the habitat in which the record was identified.

2.1.3	<p>Provide detailed mapping of suitable habitat (within, adjacent to and downstream of the project site, where relevant) for all listed threatened species, which:</p> <ul style="list-style-type: none"> <li>• is specific to the habitat assessment undertaken for each listed threatened species (i.e., does not only illustrate relevant Queensland Regional Ecosystems);</li> <li>• includes an overlay of the project disturbance footprint (including the wetlands);</li> <li>• includes known records of individuals derived from desktop analysis and field surveys; and</li> <li>• is provided separately as attachments in JPEG format.</li> </ul>
2.1.4	<p>Include an assessment of the adequacy of any surveys undertaken (including survey effort and timing). In particular, the extent to which these surveys were appropriate for the listed species or community and undertaken in accordance with relevant departmental survey guidelines.</p>
2.1.5	<p>Attach all relevant ecological surveys referenced in the referral and preliminary documentation as supporting documents to the preliminary documentation.</p>

## 2.2 Species specific information

The preliminary documentation must address the following matters in addition to the general information listed above.

<b>Information required</b>	
<b>Greater Glider (southern and central) (<i>Petauroides volans</i>) – Endangered</b>	
2.2.1	<p>To provide further evidence of presence/absence, and density (if present), undertake targeted surveys for the Greater Glider in accordance with relevant Commonwealth, State guidelines or best practice survey guidelines at the time of the surveys. If possible, this should include nearby potential habitat with connectivity to the project area, and it should maximise likelihood of detection through using a combination of methods (for e.g., spotlighting and baited arboreal cameras) and spreading survey effort over time.</p>
2.2.2	<p>State the total number of records (individuals and evidence of presence) within and/or adjacent to the project site identified during surveys.</p>
2.2.3	<p>Identification of all areas of Eucalypt forest and woodland within and adjacent to the project site which contain hollow-bearing trees.</p>
2.2.4	<p>An analysis of tree hollow size and density suitable for use by the Greater Glider (e.g., denning) in the identified areas of Eucalypt forest and woodland containing hollow-bearing trees within and adjacent to the project site.</p>
2.2.5	<p>A detailed discussion of potential foraging habitat in Eucalypt forest and woodland adjacent to areas of Eucalypt forest and woodland which contain tree hollows.</p>

2.2.6	A discussion of habitat and habitat use requirements (e.g., foraging, dispersal, shelter, etc.) in line with the updated <a href="#">Conservation Advice for the Greater Glider</a> (July 2022).
2.2.7	The total area (in hectares) of Greater Glider habitat, including foraging habitat.
<b>Koala (<i>Phascolarctos cinereus</i>) (combined populations of Qld, NSW and the ACT) – Endangered</b>	
2.2.8	A discussion of vegetation composition and structure (i.e., known food trees).
2.2.9	A discussion of habitat and habitat use requirements (e.g., foraging, dispersal, shelter, etc.) in line with the updated <a href="#">Conservation Advice</a> and <a href="#">National Recovery Plan</a> for the Koala (March 2022).
2.2.10	The total area (in hectares) of each identified habitat type (e.g., foraging, dispersal, shelter, etc.)
<b>Grey-headed Flying-fox (<i>Pteropus poliocephalus</i>) – Vulnerable</b>	
2.2.11	A discussion of vegetation composition and structure (i.e., known food trees).
2.2.12	A discussion of habitat and habitat use requirements (e.g., foraging, dispersal, shelter, etc.) in line with the <a href="#">National Recovery Plan for the Grey-headed Flying-fox</a> (March 2021).
2.2.13	The total area (in hectares) of each identified habitat type (e.g., foraging, dispersal, shelter, etc.)

### 2.3 'Habitat critical' descriptions for listed threatened species likely to be impacted by the proposed action

MNES Habitat		Description of habitat critical to the survival of the species
2.3.1	Greater Glider (southern and central)	<p>Habitat critical to survival for the greater glider (southern and central) relevant to this project includes but is not limited to:</p> <ul style="list-style-type: none"> <li>• large contiguous areas of eucalypt forest, which contain mature hollow-bearing trees and a diverse range of the species' preferred food species in a particular region; and</li> <li>• smaller or fragmented habitat patches connected to larger patches of habitat, that can facilitate dispersal of the species and/or that enable recolonization.</li> </ul> <p>Note: The presence of trees with basal diameter &gt;30 cm can be used as a proxy measure for tree hollows used by Greater Gliders in Queensland.</p> <p>Forest areas currently unoccupied by the greater glider (southern and central) may still represent habitat critical to survival, if the recruitment of hollow-bearing trees as the forest ages could allow the species to colonise these areas and ensure persistence of a subpopulation.</p>

		<p>For the full definition refer to:  <a href="#">Conservation Advice for Petauroides volans (greater glider (southern and central))</a> (2022).</p>
2.3.2	Koala (combined populations of Qld, NSW and the ACT)	<p>Habitat critical to the survival of the Koala (combined populations of Qld, NSW and the ACT) includes any forest or woodland (including remnant, regrowth, and modified vegetation communities) containing species that are Koala food trees or any shrubland with emergent Koala food trees. In addition, the Conservation advice for the Koala considers habitat critical to include paddock trees (and the safe intervening matrix for traveling between trees) and any trees that are not food trees but are commonly used by the species for shelter or predator avoidance. Areas of climate refugia such as drainage lines, riparian zones and patches that are resilient to drying conditions are also considered to be critical habitat.</p> <p>Note: Habitat critical to the survival of the species includes habitat occupied and habitat currently unoccupied.</p> <p>For the full definition refer to:  <a href="#">Conservation Advice for Phascolarctos cinereus (Koala) combined populations of Queensland, New South Wales and the Australian Capital Territory</a> (2022)  <a href="#">National Recovery Plan for the Koala Phascolarctos cinereus (combined populations of Queensland, New South Wales and the Australian Capital Territory)</a> (2022).</p>
2.3.3	Grey-headed Flying-fox	<p>Where the existence of important winter and spring flowering vegetation communities is verified in the field, they are considered habitat critical to the survival of the Grey-headed Flying-fox.</p> <p>Important winter and spring vegetation communities are those that contain <i>Eucalyptus tereticornis</i>, <i>E. albens</i>, <i>E. crebra</i>, <i>E. fibrosa</i>, <i>E. melliodora</i>, <i>E. paniculata</i>, <i>E. pilularis</i>, <i>E. robusta</i>, <i>E. seeana</i>, <i>E. sideroxylon</i>, <i>E. siderophloia</i>, <i>Banksia integrifolia</i>, <i>Castanospermum australe</i>, <i>Corymbia citriodora citriodora</i>, <i>C. eximia</i>, <i>C. maculata</i>, <i>Grevillea robusta</i>, <i>Melaleuca quinquenervia</i> or <i>Syncarpia glomulifera</i>.</p> <p>Note: Habitat critical to the survival of the Grey-headed Flying-fox may also be vegetation communities not containing the above tree species but which:</p> <ul style="list-style-type: none"> <li>• contain native species that are known to be productive as foraging habitat during the final weeks of gestation, and during the weeks of birth, lactation and conception (August to May)</li> <li>• contain native species used for foraging and occur within 20 km of a nationally important camp as identified on the <a href="#">Department's interactive flying-fox web viewer</a>, or</li> <li>• contain native and or exotic species used for roosting at the site of a nationally important Grey-Headed Flying-Fox camp</li> </ul>

		<p>as identified on the <a href="#">Department's interactive flying-fox web viewer</a></p> <p>For the full definition refer to: <a href="#">National Recovery Plan for the Grey-headed Flying-fox Pteropus poliocephalus (2021)</a>.</p>
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### 3. IMPACT ASSESSMENT

#### Background

The preliminary documentation must include an assessment of direct, indirect and facilitated or consequential impacts on the relevant controlling provisions as a result of the proposed action and must be assessed in accordance with relevant departmental policies and guidelines, including the SPRAT Database.

The department considers the proposed action may result in, but is not limited to, the following impacts:

- Vegetation clearance and loss of habitat, including temporary loss of habitat.
- Habitat fragmentation and loss of connectivity.
- Habitat degrading processes such as edge effects (e.g., weed invasion).
- Mortality during vegetation clearance/ construction stage.
- Increased predation from introduced species.
- Increased risk of vehicle strike (including on the North-South Road).
- Increased light and noise pollution.

#### 3.1 Listed Threatened Species

Information required	
3.1.1	An assessment of the likely impacts associated with the proposed action, including project specific impacts i.e., vegetation clearance, construction, operational, maintenance and (if relevant) decommissioning components of the project.
3.1.2	Include the direct and indirect loss and/or disturbance of each of the protected matters and their habitat as a result of the proposed action. This must include the area (in hectares) and quality of the habitat <sup>1</sup> to be impacted and quantification of the individuals to be impacted (where applicable).
3.1.3	An assessment of the impacts of habitat fragmentation in the project area and surrounding areas, including consideration of species' movement patterns.

<sup>1</sup> It is important that both the impact and offset sites are assessed using the same habitat quality assessment approaches. Please refer to item B1.6 in Appendix B1 or item B2.1 in Appendix B2 for more information on the habitat quality assessment approaches.

3.1.4	An assessment of the likely duration of impacts to protected matters as a result of the proposed action.
3.1.5	A discussion of whether any impacts are likely to be repeated, for example as part of maintenance.
3.1.6	A discussion of whether any impacts are likely to be unknown, unpredictable or irreversible.
3.1.7	Justify, with supporting evidence, how the proposed action will not be inconsistent with: <ul style="list-style-type: none"> <li>• Australia’s obligations under the Biodiversity Convention, the Convention on Conservation of Nature in the South Pacific (Apia Convention), and the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES); and</li> <li>• a recovery plan or threat abatement plan.</li> </ul>
3.1.8	Assess the impacts of noise, light, vibration, dust and vehicle strike resulting from the construction and operation of the project on habitat in the project site and surrounding areas.

### 3.2 Specific threatened species information required for impact assessment

<b>Greater Glider (southern and central) (<i>Petauroides volans</i>) – Endangered</b>	
3.2.1	A discussion of the Greater Glider impact assessment with reference to the updated Conservation Advice (July 2022)
3.2.2	A discussion of the impacts to hollow-bearing trees (HBT) within the disturbance footprint and an estimation of how many HBT will be lost.
<b>Koala (<i>Phascolarctos cinereus</i>) (combined populations of Qld, NSW and the ACT) – Endangered</b>	
3.2.3	A discussion of the Koala impact assessment with reference to the updated Recovery Plan and Conservation Advice (March 2022)
<b>Grey-headed Flying-fox (<i>Pteropus poliocephalus</i>) – Vulnerable</b>	
3.2.4	A discussion of the Grey-headed Flying-fox impact assessment with reference to the National Recovery Plan (March 2021)

## 4. AVOIDANCE, MITIGATION AND MANAGEMENT MEASURES

### Background

Avoidance and mitigation measures are the primary methods of eliminating and reducing significant impacts on protected matters. Where possible and practicable, it is best to avoid impacts. Even if it is not possible to completely avoid a protected matter there may be ways to reduce the impact. If impacts cannot be avoided, then they should be minimised or mitigated as much as possible.

Avoidance and mitigation measures must be investigated thoroughly as a part of the assessment and be supported by evidence to demonstrate likely success. The SPRAT Database and associated statutory documents may provide relevant mitigation measures for protected matters. Management commitments by the person proposing to take the action must be clearly distinguished from recommendations or statements of best practice made by the document author or other technical expert.

The department notes the referral includes a short description of the proposed avoidance, mitigation and management measures to be implemented by the proponent, which are further described in the Ecological Assessment Report for each stage of the proposed action.

If any relevant management plans are developed, they should be included as appendices to the preliminary documentation. If so, sufficient detail must be provided in each plan to ensure an assessment can be undertaken as to their likely suitability and effectiveness. Please note that any plans relied upon to mitigate and manage impacts to MNES would require approval prior to the commencement of the proposed action. The department recommends that all management measures for MNES are contained within one MNES management plan.

The information required is detailed in the table below.

<b>Information required in Management Plans</b>	
4.1	Include any relevant management plans (in approved or draft format) as appendices to the preliminary documentation.
4.2	<p>A detailed summary of measures proposed to be undertaken by the proponent to avoid, mitigate and manage relevant impacts (as identified in the impact assessment section) of the proposed action on relevant protected matters (including any measures required through other Commonwealth, State and/or local government approvals). This must also include measures to mitigate any loss of connectivity and temporary loss of vegetation due to the proposed action (including information on the plant species proposed for any revegetation activities [such as the wetlands revegetation]).</p> <p>Proposed measures must be based on best available practices, appropriate standards, evidence of success for other similar actions and supported by published scientific evidence. All commitments must be drafted using committal language (e.g., ‘will’ and ‘must’) when describing the proposed measures.</p> <p>All proposed measures must also be drafted to meet the ‘S.M.A.R.T’ principle:</p> <ul style="list-style-type: none"> <li>• S – Specific (what and how)</li> <li>• M – Measurable (baseline information, number/value, auditable)</li> <li>• A – Achievable (timeframe, money, personnel)</li> <li>• R – Relevant (conservation advices, recovery plans, threat abatement plans)</li> </ul>

	<ul style="list-style-type: none"> <li>• T – Time-bound (specific timeframe to complete).</li> </ul>
4.2	Information on the timing, frequency and duration of the proposed avoidance, mitigation and management measures to be implemented.
4.3	Details of specific and measurable environmental outcomes to be achieved for relevant protected matters, including an assessment of the expected or predicted effectiveness of the proposed measures.
4.4	Any statutory or policy basis for the proposed measures, including reference to the SPRAT Database and relevant approved conservation advice, recovery plan or threat abatement plan, and a discussion on how the proposed measures are consistent with relevant plans.
4.5	Details of ongoing management and monitoring programs, including timing, to validate the effectiveness of proposed measures and demonstrate that environmental outcomes will be, or have been, achieved.
4.6	Details of tangible, on-ground corrective actions that will be implemented, including timing, in the event that monitoring programs indicate that the environmental outcomes have not been, or will not be, achieved.

## 5. REHABILITATION REQUIREMENTS

If any rehabilitation of temporary impacts are proposed, the proponent must provide the following information to the department.

<b>Information required</b>	
5.1	<p>The details of any rehabilitation activities proposed to be undertaken, including any activities required through other Commonwealth, State and/or local government approvals.</p> <p>All commitments must be drafted using committal language (e.g., 'will' and 'must') when describing the proposed activities.</p>
5.2	The proposed final landform, including rehabilitation completion criteria, and its relation to the pre-disturbance vegetation community. Include an assessment of the expected or predicted effectiveness of the proposed rehabilitation activities.
5.3	Provide detailed mapping of the project site that clearly identifies areas to be rehabilitated.
5.4	Information on the timing, frequency and duration of proposed rehabilitation activities to be implemented, including anticipated time to completion.
5.5	Details of ongoing management and monitoring programs, including timing, to validate the effectiveness of proposed rehabilitation activities and demonstrate that completion criteria will be, or have been, achieved.

	OR Details of strategies and outcomes in regard to the relevant impacted species, including details of ongoing monitoring to demonstrate the outcomes will be, or have been, achieved.
5.6	Details of tangible, on-ground corrective actions that will be implemented, including timing, in the event that monitoring programs indicate that the completion criteria OR outcomes have not been, or will not be, achieved.

## 6. OFFSETS

### Background

Environmental offsets are measures that compensate for the residual significant impacts of an action on the environment. Offsets provide environmental benefits to counterbalance the impacts that remain after consideration of avoidance and mitigation measures. Offsets do not reduce the impacts of an action and are not intended to make proposals with unacceptable impacts acceptable. It is important to consider environmental offsets early in the assessment process. Correspondence with the department regarding offsetting is highly encouraged. The department's *EPBC Act Environmental Offsets Policy (2012)* (Offsets Policy) is available at: [www.environment.gov.au/epbc/publications/epbc-act-environmental-offsets-policy](http://www.environment.gov.au/epbc/publications/epbc-act-environmental-offsets-policy).

Include a draft Offset Strategy (OS) OR a draft Offset Management Plan (OMP) as an appendix in the preliminary documentation for assessment and approval. If an offset area has been nominated, then provide an OMP. If not, provide an OS. It is important to note, the department will recommend to the Minister (or delegate) that the conditions of approval require the environmental offset/s and the OMP be approved and implemented prior to the commencement of the proposed action. Hence, if the project timeframes are constricting, the department recommends that where significant residual impacts have been identified, an offset is nominated and a draft OMP is provided for assessment in conjunction with the PD. It is up to the proponent's discretion to decide the most appropriate approach for the proposed action based on the project timeframe requirements.

Information required	
6.1	An assessment of the likelihood of residual significant impacts occurring on relevant protected matters, after avoidance, mitigation and management measures have been applied.
6.2	A summary of the proposed environmental offset and key commitments to achieve a conservation gain for each protected matter (as per the principles of the <a href="http://www.environment.gov.au/epbc/publications/epbc-act-environmental-offsets-policy">EPBC Environmental Offsets Policy</a> (2012)).
6.3	Details, with supporting evidence, of how the environmental offset/s meets the requirements of the EPBC Act Environmental Offsets Policy (2012) (Offsets Policy), available at: <a href="http://www.environment.gov.au/epbc/publications/epbc-act-environmental-offsets-policy">www.environment.gov.au/epbc/publications/epbc-act-environmental-offsets-policy</a> .
6.4	Where offset area/s will be nominated, include a draft OMP as an appendix to the preliminary documentation. The draft OMP must meet the information requirements set out in <a href="#">Appendix B.1</a> , and must be prepared by a suitably qualified ecologist and in accordance with the department's <i>Environmental Management Plan Guidelines</i> (2014), available at:

	<a href="http://www.environment.gov.au/epbc/publications/environmental-management-plan-guidelines">www.environment.gov.au/epbc/publications/environmental-management-plan-guidelines</a> .
6.5	If an offset area will not be nominated, include a draft OS as an appendix to the preliminary documentation. The draft OS must meet the information requirements set out in <u>Appendix B.2</u> .

## 7. ECOLOGICALLY SUSTAINABLE DEVELOPMENT (ESD)

Information required	
7.1	<p>A description of how the proposed action meets the principles of ESD, as defined in section 3A of the EPBC Act. The following are the <b><i>principles of ecologically sustainable development</i></b>:</p> <ul style="list-style-type: none"> <li>• decision making processes should effectively integrate both long term and short term economic, environmental, social and equitable considerations</li> <li>• if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation</li> <li>• the principle of inter-generational equity—that the present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations</li> <li>• the conservation of biological diversity and ecological integrity should be a fundamental consideration in decision making</li> <li>• improved valuation, pricing and incentive mechanisms should be promoted.</li> </ul>

## 8. ECONOMIC AND SOCIAL MATTERS

Information required	
8.1	An analysis of the economic and social impacts of the action, both positive and negative.
8.2	Details of any public consultation activities undertaken and their outcomes.
8.3	<p>Details of any consultation with Indigenous stakeholders.</p> <p><b>Engaging First Nations peoples and communities</b></p> <p>Identify existing or potential native title rights and interests, including any areas and objects that are of particular significance to First Nations peoples and communities, that could be impacted by the proposed action and the potential for managing those impacts.</p> <p>Describe any First Nations consultation that has been undertaken, or will be undertaken, in relation to the proposed action and their outcomes.</p> <p>The department considers that best practice consultation, in accordance with the <a href="#">Interim Engaging with First Nations People and Communities on Assessment and Approvals under the Environment Protection and Biodiversity Conservation Act 1999</a> (2023) includes:</p>

	<ul style="list-style-type: none"> <li>ensuring cultural safety by protecting the cultural identity, wants and needs of First Nations peoples and communities</li> <li>building and maintaining trust by investing in ongoing relationships and partnerships and demonstrating cultural awareness and competence</li> <li>engaging early and often, ideally directly with the relevant First Nations peoples, communities, groups and organisations who may be affected by the proposed project</li> <li>negotiating suitable timeframes in consideration of cultural obligations of First Nations peoples and communities</li> <li>negotiating suitable submission formats that reflect the communication needs and preferences of First Nations peoples and communities.</li> </ul> <p>Describe any state requirements for approval or conditions that apply, or that the proponent reasonably believes are likely to apply, to the proposed action with regards to First Nations peoples and communities.</p>
8.4	Projected economic costs and benefits of the project, including the basis for the estimate through cost/benefit analysis or similar studies.
8.5	Employment opportunities expected to be generated by the project (including construction and operational phases).

## 9. ENVIRONMENTAL RECORD OF THE PERSON PROPOSING TO TAKE THE ACTION

Information required	
9.1	<p>Include details of any past or present proceedings under a Commonwealth, State or Territory law for the protection of the environment or the conservation and sustainable use of natural resources against:</p> <ul style="list-style-type: none"> <li>the person proposing to take the action</li> <li>for an action for which a person has applied for a permit, the person making the application</li> <li>if the person is a body corporate—the history of its executive officers in relation to environmental matters</li> <li>if the person is a body corporate that is a subsidiary of another body or company (the parent body)—the history in relation to environmental matters of the parent body and its executive officers.</li> </ul>

## **APPENDIX A: Preliminary documentation content, style and formatting requirements**

<b>A1. Content requirements</b>	
A1.1	Be a stand-alone document containing sufficient information to avoid the need to search out previous or supplementary reports.
A1.2	Enable interested stakeholders and the Minister to easily understand the consequences of the project on matters of national environmental significance (MNES).
A1.3	Be written so that any conclusions reached can be independently assessed. Include all key claims, findings, proposals and undertakings in the main document.
A1.4	Refer to all relevant standards, policies and other guidance material published by the department. Any instances where published guidance is not followed must be justified. Where no Commonwealth standards exist, state government and industry standards may be useful.
A1.5	Include the names, roles and qualifications (where relevant) of all persons involved in preparing the preliminary documentation.
A1.6	Include a copy of this request for information and a cross-reference table indicating where the information fulfilling this request is included in the preliminary documentation (e.g., Section 4.2.2 and Appendix A, Chapter 2.1).
A1.7	The preliminary documentation must state the following for all information provided: <ul style="list-style-type: none"><li>• the source and date of the information;</li><li>• how the reliability of the information was tested;</li><li>• the uncertainties (if any) in the information; and</li><li>• the guidelines, plans, and/or policies considered.</li></ul>
<b>A2. Format and style requirements</b>	
A2.1	Be in a suitable format to be published in hardcopy (A4 or A3 size, with maps and diagrams in A4 or A3 size and in colour) and published in electronic format (e.g., MSWord or PDF) on the internet.
A2.2	Include detailed technical information, studies or investigations necessary to support the information in the stand-alone document as appendices.
A2.3	Be objective, clear, succinct, avoid technical jargon and, where appropriate, be supported by maps, plans, diagrams, data or other descriptive detail.
A2.4	Reference all sources using the Harvard standard of referencing. Ensure that other supporting documents (e.g., academic studies, regulatory standards) are publicly accessible, with electronic links provided where possible.

A2.5	Redact the names and contact details of departmental officers.
A2.6	Not contain any commercial-in-confidence markings. If the preliminary documentation contains sensitive information, please discuss this with the assessment officer.
<b>A3. Ecological data provision</b>	
A3.1	The preliminary documentation must include an appendix of occurrence records (both sightings and evidence of presence) for all listed threatened and migratory species identified during field surveys for the proposed action. This data may be used by the department to update the relevant species distribution models that underpin the publicly available Protected Matters Search Tool (PMST).
A3.2	The species occurrence records must be provided in accordance with the department's <a href="#">Guidelines for biological survey and mapped data (2018)</a> using the department's <a href="#">Species observation data template</a> . Sensitive ecological data must be identified and treated in accordance with the department's <a href="#">Sensitive Ecological Data – Access and Management Policy V1.0</a> (2016) or subsequent revision.

## **APPENDIX B: Information Requirements for EPBC Act Offset Proposals**

Guidance on environmental offsets is available on the department's website at:  
<https://www.dcceew.gov.au/environment/epbc/advice-for-complying-with-the-epbc-act/environmental-offsets-under-epbc/environmental-offsets-guidance>.

<b>B1. Minimum Requirements for a draft Offset Management Plan:</b>	
<p>The Offset Management Plan (OMP) outlines what needs to be done to manage an offset site once it is in place, such as setting milestones, monitoring, and reporting. It should also include a risk assessment and identify triggers for adaptive management. All direct offsets require an OMP.</p>	
B1.1	<p>Details of the residual impacts to protected matters as a result of the proposed action. This must include the area/s of habitat (in hectares) and its quality within the impact site for which the offset/s is to compensate (i.e., the quantum of impact).</p> <p>For this project, the department recommends that habitat quality data within the impact site be collected following the method described in B1.6.</p>
B1.2	<p>A description of the offset area/s, including location, size, condition, environmental values present and surrounding land uses.</p>
B1.3	<p>Details, with supporting evidence, of how the environmental offset/s meets the requirements of the <i>EPBC Act Environmental Offsets Policy (2012)</i> (Offsets Policy), available at:  <a href="http://www.environment.gov.au/epbc/publications/epbc-act-environmental-offsets-policy">www.environment.gov.au/epbc/publications/epbc-act-environmental-offsets-policy</a>.</p>
B1.4	<p>Maps and shapefiles to clearly define the location and boundaries of the offset area/s, accompanied by the offset attributes (e.g., physical address of the offset area/s, coordinates of the boundary points in decimal degrees, the relevant protected matter that the environmental offset/s compensates for, and the size of the environmental offset/s in hectares).</p>
B1.5	<p>Baseline data and other supporting evidence that documents the presence of the relevant protected matter/s within the offset area/s.</p>
B1.6	<p>Details, with supporting evidence, to demonstrate how the environmental offset/s compensate for residual significant impacts of the proposed action on relevant protected matters, and/or their habitat, in accordance with the principles of the Offsets Policy and the Offsets Assessment Guide, including:</p> <ul style="list-style-type: none"> <li>• time over which loss is averted (max. 20 years);</li> <li>• time until ecological benefit;</li> <li>• risk of loss (%) without offset;</li> <li>• risk of loss (%) with offset; and</li> <li>• confidence in result (%).</li> </ul> <p><u>Please note</u>, risk of loss should not include consideration of stochastic events (e.g., bushfires), activities that contribute to changes in habitat quality scores or impacts that would otherwise require an offset under any relevant legislation.</p>

	Provide the inputs and calculations used for the Offsets Assessment Guide for all triggered species.
B1.7	<p>An assessment of the habitat quality for the offset area/s. A methodology that is suitable for each species in question must be used to assess habitat quality (i.e., endorsed by the department or supported by literature), noting the same scoring mechanism must be used at both the impact site and the offset site.</p> <p>This must include the methodology, with justification and supporting evidence, used to inform the inputs of the Offsets Assessment Guide in relation to both the impact site and offset site/s for each relevant protected matter.</p> <p>The department does not mandate the use of any specific method for deriving Habitat Quality scores for the Offset Assessment Guide (calculator). The important factor is that both impact and offset sites are assessed using the same approaches. Guidance is provided in the <a href="#">How to use the Offset Assessment Guide</a> and the <a href="#">EPBC Environmental Offset Policy</a> (2012).</p> <p>For this project, the Modified Habitat Quality Assessment (MHQA) (to be provided by the department) is recommended, which is largely underpinned by Version 1.2 of Queensland Government <a href="#">Guide to determining terrestrial habitat quality: A toolkit for assessing land-based offsets under the Queensland Environmental Offsets Policy</a>.</p> <p>Provide all the calculations done with the MHQA spreadsheet if this method is chosen.</p> <p>Note: It is important to avoid confounding the presence of threats at a site <i>that might affect the future state of a site</i>, with those affecting its <i>current</i> state. These threats are appropriately dealt with in consideration of future risk of loss in the Offsets Assessment Guide and so should not be included in the score for current habitat condition.</p>
B1.8	Details of how the offset area/s will provide connectivity with other habitats and biodiversity corridors and/or will contribute to a larger strategic offset for the relevant protected matter.
B1.9	Specific, committal and measurable environmental outcomes that detail the nature of the conservation gain to be achieved for each protected matter, including the creation, restoration and revegetation of habitat in the proposed offset area/s.
B1.10	Specific offset completion criteria derived from the offset area habitat quality to demonstrate the improvement in the quality of habitat in the offset area/s over a 20-year period.
B1.11	<p>Details of the management measures, and timeframes for implementation, to be carried out to meet the offset completion criteria.</p> <p>All proposed management measures must be written using committed language (e.g., 'will' and 'must').</p>
B1.12	Interim milestones that set targets at appropriate intervals for progress towards achieving the offset completion criteria.

B1.13	Details of the nature, timing and frequency of monitoring to inform progress against achieving the interim milestones (the frequency of monitoring must be sufficient to track progress towards each set of milestones, and sufficient to determine whether the offset area/s are likely to achieve those milestones in adequate time to implement all necessary corrective actions).
B1.14	Proposed timing for the submission of monitoring reports which provide evidence demonstrating whether the interim milestones have been achieved.
B1.15	<p>Details of the tangible, on-ground corrective actions, and timeframes for implementation, if monitoring activities indicate an interim milestone has not been achieved, including an approach to monitoring the effectiveness of the corrective actions.</p> <p>All proposed corrective actions must be written using committed language (e.g., 'will' and 'must').</p>
B1.16	Evidence of how the management actions and corrective actions take into account relevant approved conservation advices and are consistent with relevant recovery plans and threat abatement plans.
B1.17	Risk analysis and a risk management and mitigation strategy for all risks to the successful implementation of the OMP and timely achievement of the offset completion criteria, including a rating of all initial and post-mitigation residual risks in accordance with a risk assessment matrix.
B1.18	Details and execution timing of the mechanism to legally secure the proposed offset area/s, such that legal security remains in force over the offset area/s for at least 20 years to provide enduring protection for the offset area/s against development incompatible with conservation.
<p><b>B2. Minimum Requirements for a draft Offset Strategy:</b></p> <p>An Offset Strategy (OS) is like a proof-of-concept for an offset proposal. It demonstrates suitability and feasibility and commits to a timeframe. When impacts and offsets are well understood and suitability of the proposed offset is high, an OS may not be required.</p>	
B2.1	<p>Details of the residual impacts to protected matters as a result of the proposed action. This must include the methodology, with justification and supporting evidence (including the input values), used to inform the inputs of the Offsets Assessment Guide in relation to the impact site for each relevant protected matter, including:</p> <ul style="list-style-type: none"> <li>• total area of habitat (in hectares); and</li> <li>• habitat quality</li> </ul> <p>A methodology that is suitable for the species in question must be used to assess habitat quality (i.e., approved by the department or supported by literature), noting the same scoring mechanism must be used at both the impact site and the offset site.</p> <p>The department does not mandate the use of any specific method for deriving Habitat Quality scores for the Offset Assessment Guide (calculator). The important factor is that both impact and offset sites are assessed using</p>

	<p>the same approaches. Guidance is provided in the <a href="#">How to use the Offset Assessment Guide</a> and the <a href="#">EPBC Environmental Offsets Policy</a> (2012).</p> <p>For this project, the Modified Habitat Quality Assessment (MHQA) (to be provided by the department) is recommended, which is largely underpinned by Version 1.2 of Queensland Government <a href="#">Guide to determining terrestrial habitat quality: A toolkit for assessing land-based offsets under the Queensland Environmental Offsets Policy</a>.</p> <p>Provide all the calculations done with the MHQA spreadsheet if this method is chosen.</p> <p>It is important to avoid confounding the presence of threats at a site <i>that might affect the future state of a site</i>, with those affecting its <i>current</i> state. These threats are appropriately dealt with in consideration of future risk of loss in the Offsets Assessment Guide and so should not be included in the score for current habitat condition.</p>
B2.2	Details of the potential offset area/s (including a map) to compensate for the residual impacts of the proposed action on relevant protected matters.
B2.3	Specific details of the nature of the conservation gain to be achieved for relevant protected matters, including the creation, restoration and revegetation of habitat in the proposed offset area/s.
B2.4	Details, with supporting evidence, of how the environmental offset/s meets the requirements of the <i>EPBC Act Environmental Offsets Policy</i> (2012) (Offsets Policy), available at: <a href="http://www.environment.gov.au/epbc/publications/epbc-act-environmental-offsets-policy">www.environment.gov.au/epbc/publications/epbc-act-environmental-offsets-policy</a> .
B2.5	<p>The methodology, with justification and supporting evidence, used to inform the inputs of the Offsets Assessment Guide in relation to each potential offset area/s for each relevant protected matter, including:</p> <ul style="list-style-type: none"> <li>• time over which loss is averted (max. 20 years);</li> <li>• time until ecological benefit;</li> <li>• risk of loss (%) without offset;</li> <li>• risk of loss (%) with offset; and</li> <li>• confidence in result (%).</li> </ul> <p><u>Please note</u>, risk of loss should not include consideration of stochastic events (e.g., bushfires), activities that contribute to changes in habitat quality scores or impacts that would otherwise require an offset under any relevant legislation.</p> <p>Provide the inputs and calculations used for the Offsets Assessment Guide, for all triggered species.</p>
B2.6	Evidence that the relevant protected matter, and/or their habitat, can be present in the potential offset area/s.

B2.7	Information about how the potential offset area/s provides connectivity with other relevant habitats and biodiversity corridors.
B2.8	Details and execution timing of the mechanism to legally secure the environmental offset/s (under Queensland legislation or equivalent) to provide enduring protection for the potential offset area/s against development incompatible with conservation.

# Attachment C

## Flora and Fauna Lists

## Flora Species List Table

Scientific Name	Common Name	Native/Introduced
<i>Ageratum houstonianum</i>	Blue Billygoat	Introduced
<i>Bidens pilosa</i>	Cobbler's Pegs	Introduced
<i>Brachiaria decumbens</i>	Signal Grass	Introduced
<i>Conyza sumatrensis</i>	Tall Fleabane	Introduced
<i>Crotalaria lanceolata</i>	Rattlepod	Introduced
<i>Cuphea carthagenensis</i>	Columbian Waxweed	Introduced
<i>Desmodium intortum</i>	Greenleaf Desmodium	Introduced
<i>Emilia sonchifolia</i>	Emila	Introduced
<i>Lantana camara</i>	Lantana	Introduced
<i>Macroptilium atropurpureum</i>	Siratro	Introduced
<i>Macroptilium lathyroides</i>	Phasey Bean	Introduced
<i>Megathyrsus maximus</i>	Guinea Grass	Introduced
<i>Ochna serrulata</i>	Ochna	Introduced
<i>Passiflora foetida</i>	Stinking Passionfruit	Introduced
<i>Passiflora suberosa</i>	Corky Passionflower	Introduced
<i>Praxelis clematidea</i>	Praxelis	Introduced
<i>Richardia brasiliensis</i>	White Eye	Introduced
<i>Sida cordifolia</i>	Flannel Weed	Introduced
<i>Solanum seaforthianum</i>	Brazilian Nightshade	Introduced
<i>Solanum torvum</i>	Devil's Fig	Introduced
<i>Sporobolus pyramidalis</i>	Giant Rat's Tail Grass	Introduced
<i>Stachytarpheta cayennensis</i>	Blue Snake Plant	Introduced
<i>Urena lobata</i>	Urena Burr	Introduced
<i>Acacia disparrima</i>	Hickory Wattle	Native
<i>Acacia flavescens</i>	Yellow Wattle	Native
<i>Acacia leiocalyx</i>	Early-flowering Black Wattle	Native
<i>Allocasuarina littoralis</i>	Black She-oak	Native
<i>Alphitonia excelsa</i>	Soap Tree	Native
<i>Angophora leiocarpa</i>	Smooth-bark Apple	Native
<i>Bothriochloa macra</i>	Red-leg Grass	Native
<i>Cheilanthes distans</i>	Bristle Cloak Fern	Native
<i>Convolvulus angustissimus</i>	Slender Binweed	Native
<i>Corymbia henryi</i>	Large-leaved Spotted Gum	Native
<i>Corymbia intermedia</i>	Pink Bloodwood	Native
<i>Corymbia trachyphloia</i>	Brown Bloodwood	Native
<i>Cupaniopsis anacardioides</i>	Tuckeroo	Native
<i>Cymbopogon refractus</i>	Barbed-wire Grass	Native
<i>Desmodium rhytidophyllum</i>	Hairy Trefoil	Native
<i>Dianella caerulea</i>	Blue Flax-lilly	Native
<i>Dianella longifolia</i>	Pale Flax-lilly	Native
<i>Dichondra repens</i>	Kidneyweed	Native
<i>Entolasia stricta</i>	Wiry Panic	Native
<i>Eragrostis brownii</i>	Brown's Love Grass	Native
<i>Eriachne pallescens</i>	Wanderrie grass	Native
<i>Eriachne pallescens</i>	Wanderrie Grass	Native
<i>Eucalyptus exserta</i>	Queensland Peppermint	Native
<i>Eucalyptus latisinensis</i>	White Mahogany	Native

<i>Eucalyptus siderophloia</i>	Northern Grey Ironbark	Native
<i>Eucalyptus tereticornis</i>	Forest Red Gum	Native
<i>Ficus coronata</i>	Sandpaper Fig	Native
<i>Flindersia brayleyana</i>	Queensland Maple	Native
<i>Gahnia aspera</i>	Saw Sedge	Native
<i>Geitonoplesium cymosum</i>	Scrambling Lilly	Native
<i>Geodorum densiflorum</i>	Sherperd's Crook Orchid	Native
<i>Glycine clandestina</i>	Slender Glycine	Native
<i>Goodenia hederacea</i>	Forest Goodenia	Native
<i>Goodenia rotundifolia</i>	Star Goodenia	Native
<i>Greveilla banksii</i>	Dwarf Banksia	Native
<i>Imperata cylindrica</i>	Blady Grass	Native
<i>Jagera pseudorhus</i>	Foambark	Native
<i>Leptospermum polygalifolium</i>	Wild May	Native
<i>Lobelia purpurascens</i>	White Root	Native
<i>Lomandra multiflora</i>	Many-flowered Matrush	Native
<i>Lophostemon suaveolens</i>	Swamp Box	Native
<i>Melaleuca quinquenervia</i>	Broad-leaved Paperbark	Native
<i>Oplismenus aemulus</i>	Basket Grass	Native
<i>Panicum decompositum</i>	Native Millet	Native
<i>Parsonsia straminea</i>	Monkey Rope	Native
<i>Stephania japonica</i>	Tape Vine	Native
<i>Themeda triandra</i>	Kangaroo Grass	Native
<i>Trema tomentosa</i>	Posion Peach	Native
<i>Xanthorrhoea johnsonii</i>	Grass tree	Native

**Fauna Species List Table**

<b>Scientific Name</b>	<b>Common Name</b>	<b>Native/Introduced</b>	<b>Observation Method</b>
<i>Canis sp.</i>	Wild Dog or Dingo	Introduced	Spotlighting
<i>Rhinella marina</i>	Cane toad	Introduced	Spotlighting
<i>Accipiter fasciatus</i>	Brown Goshawk	Native	Incidental
<i>Aquila audax</i>	Wedge-tailed Eagle	Native	Incidental
<i>Ardea pacifica</i>	White-necked Heron	Native	Incidental
<i>Artamus leucorhynchus</i>	White-breasted Woodswallow	Native	Incidental
<i>Centropus phasianinus</i>	Pheasant Coucal	Native	Incidental
<i>Cincloramphus timoriensis</i>	Tawny Grassbird	Native	Incidental
<i>Colluricincla harmonica</i>	Grey Shrike-thrush	Native	Incidental
<i>Coracina novaehollandiae</i>	Black-faced Cuckoo-shrike	Native	Incidental
<i>Corvus orru</i>	Torresian Crow	Native	Incidental
<i>Cracticus nigrogularis</i>	Pied Butcherbird	Native	Incidental
<i>Cracticus tibicen</i>	Australian Magpie	Native	Incidental
<i>Dacelo novaeguineae</i>	Laughing Kookaburra	Native	Incidental
<i>Dicrurus bracteatus</i>	Spangled Drongo	Native	Incidental
<i>Elanus axillaris</i>	Black-shouldered Kite	Native	Incidental
<i>Eopsaltria australis</i>	Eastern Yellow Robin	Native	Incidental
<i>Eurostopodus mystacalis</i>	White-throated Nightjar	Native	Spotlighting and incidental
<i>Geopelia placida</i>	Peaceful Dove	Native	Incidental
<i>Gerygone olivacea</i>	White-throated Gerygone	Native	Incidental
<i>Grallina cyanoleuca</i>	Magpie-lark	Native	Incidental
<i>Hirundo neoxena</i>	Welcome Swallow	Native	Incidental
<i>Lampropholis delicata</i>	Garden Skink	Native	Incidental
<i>Macropus giganteus</i>	Eastern Grey Kangaroo	Native	Incidental and Camera trap
<i>Malurus cyaneus</i>	Superb Fairy-wren	Native	Incidental
<i>Manorina melanocephala</i>	Noisy Miner	Native	Incidental
<i>Meliphaga lewinii</i>	Lewin's Honeyeater	Native	Incidental
<i>Melithreptus albogularis</i>	White-throated Honeyeater	Native	Incidental
<i>Merops ornatus</i>	Rainbow Bee-eater	Native	Incidental
<i>Pachycephala rufiventris</i>	Rufous Whistler	Native	Incidental
<i>Pardalotus striatus</i>	Striated Pardalote	Native	Incidental
<i>Petaurus breviceps</i>	Sugar Glider	Native	Spotlighting
<i>Petaurus norfolcensis</i>	Squirrel Glider	Native	Spotlighting
<i>Phaps chalcoptera</i>	Common Bronzewing	Native	Incidental
<i>Philemon corniculatus</i>	Noisy Friarbird	Native	Incidental
<i>Podargus strigoides</i>	Tawny Frogmouth	Native	Spotlighting
<i>Taeniopygia bichenovii</i>	Double-barred Finch	Native	Incidental
<i>Threskiornis molucca</i>	Australian White Ibis	Native	Incidental
<i>Trichoglossus chlorolepidotus</i>	Scaly-breasted Lorikeet	Native	Incidental
<i>Trichoglossus moluccanus</i>	Rainbow Lorikeet	Native	Incidental
<i>Trichosurus vulpecula</i>	Common Brushtail Possum	Native	Spotlighting
<i>Wallabia bicolor</i>	Swamp Wallaby	Native	Incidental and Camera trap
<i>Zosterpos lateralis</i>	Silvereye	Native	Incidental

# Attachment D

## Vegetation Clearing and Fauna Management Plan (VCFMP)

# Vegetation Clearing & Fauna Management Plan

*Economic Development  
Queensland (EDQ) / Bundaberg  
Regional Council (BRC)*

Bundaberg Hospital

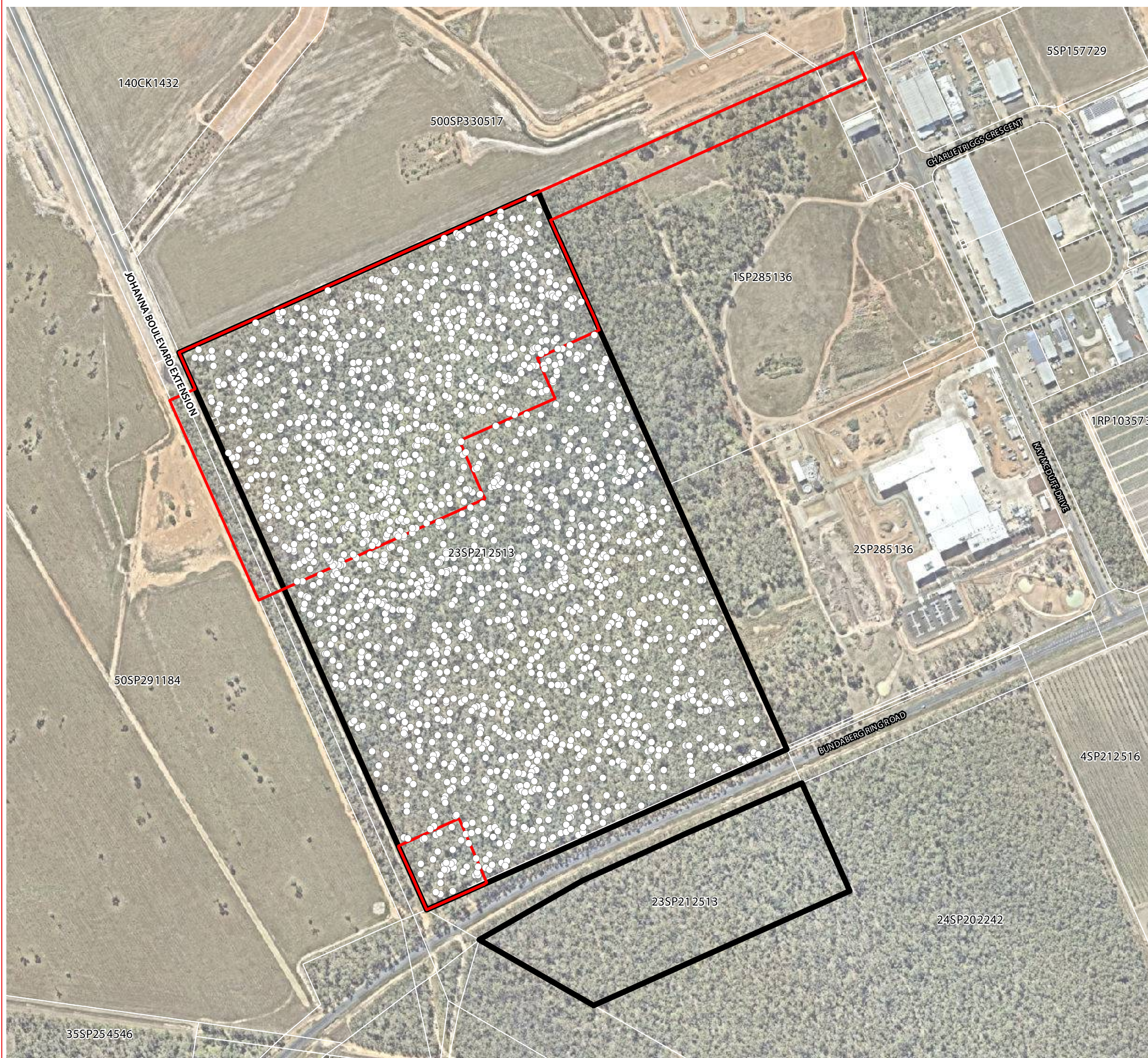


## CONTENTS

- 11612 E 02 VCFMP A -- Vegetation Clearing Notes
- 11612 E 03-04 VCFMP A -- Fauna Notes
- 11612 E 05 VCFMP A -- Detail Sheet Context
- 11612 E 06 - 17 VCFMP A -- Detail Sheets
- 11612 E 18 VCFMP A -- Clearing Direction
- Appendix A -- RPS Tree Schedule

## SHG Contact

Ms Madeline Dooley  
Email: [mail@saundershavill.com](mailto:mail@saundershavill.com)



# Vegetation Clearing and Fauna Management Plan - Notes

## Introduction

The Environmental Management Division of the **Saunders Havill Group (SHG)** was engaged by **Queensland Health** to prepare a Vegetation Clearing and Fauna Management Plan (VCFMP) for the proposed Bundaberg Hospital site at Lot 23 Bundaberg Ring Road, Thabeban, QLD, 4670 (Lot 23 on SP212513).

The purpose of this plan is to manage the vegetation removal process and the protection of fauna species within the disturbance area. This VCFMP has been prepared for Bundaberg Regional Council (BRC)/Economic Development Queensland (EDQ) and is required to be approved prior to clearing works commencing. The clearing works will follow general principles for vegetation clearing documented on this sheet and *Sheet 3*, and all Council/EDQ specific requirements.

This VCFMP has been produced by overlaying the following site datasets to determine impacts and disturbance on existing vegetation:

1. Tree data including specimen details & features (RPS, 2023)
2. Site Inspection of Existing Vegetation (RPS, 2023)
3. Site Layout Plans (Stantec, 2023)
4. Arborist inspection (TBD)

## Project Management

Vegetation management and processes are an integral part of the construction and operational works phases. The site supervisor is responsible for all onsite works including overseeing vegetation clearing, health and safety of fauna and adhering to Council's / EDQ's conditions and guidelines and Australian Standards - Protection of Trees on Development Sites AS4970-2009 and Pruning of Amenity Trees AS4373-1996.

When required, the project arborist (with minimum AQF Level 5 in Arboriculture and minimum 5 years' experience) is responsible for: undertaking all appropriate arboricultural measures prior to the commencement of any earthworks on site to ensure the survival and long-term health of existing trees to be retained. These measures may include soil decompaction, soil aeration, fertilising, mulching, watering, root or crown reduction and hazard reduction or as otherwise determined by the arborist. The site arborist is also required to direct and supervise all works within TPZs of trees to be retained, and perform arboricultural care requirements where necessary.

The roles and responsibilities of the Fauna Spotter-catcher are provided on *Sheet 3*.

## Site Contacts

Site and consulting contacts for queries relating to vegetation clearing include:

Client Contact: Queensland Health	Environmental Contact: Saunders Havill Group E: mail@saundershavill.com
Site Contractor: <i>To be advised</i>	Site Arborist: <i>To be advised</i>
Site Fauna spotter-catcher: <i>To be advised</i> (Refer to <i>Sheet 3</i> for responsibilities)	Site Bushfire Consultant: <i>To be advised</i>

## Clearing Phases and Process

PHASE 1 - Tree Protection Fencing to be installed

Fencing to be installed prior to the commencement of any clearing works on the site. Tree protection fencing to be located at or beyond 12 x diameter at breast height (DBH) (AS4970-2009 Protection of trees on development sites)—unless approved by the appointed arborist. Signs identifying the tree retention area as a 'no go zone' to be installed at regular intervals along tree protection fencing.

PHASE 2 - Council Pre-start Meeting (if required by Council/EDQ)

Fencing shall be in place at the time of the official pre-start meeting for inspection and sign off by Council/EDQ Officers.

PHASE 3 - Fauna Inspections and Management

Undertake necessary fauna management requirements prior to clearing works - as a minimum, this should include the specifications listed on *Sheet 3*, and acknowledge specific Council/EDQ approval requirements.

PHASE 4 - Undertake Bulk Clearing

Undertake wholesale removal of vegetation once approved for removal by a qualified fauna spotter and all necessary permits are obtained. Clearing will occur in the direction outlined in *Sheet 5* of this VCFMP, and managed by the appointed fauna spotter-catcher to allow all fauna to move unimpeded towards retained vegetation on, and adjacent to, the site.

Vegetation clearing techniques:

- i. By utilising the most appropriate machinery and equipment during vegetation clearing, the probability of injury or death of wildlife during clearing can be significantly reduced or eliminated while still maintaining an efficient vegetation removal process.
- ii. Suggested techniques are as follows: (a) a vertical tree grab attachment on an excavator (30 tonne) can be used to pull entire trees in size up to 30-40cm diameter at a height measured at 1.3 metres above ground level and lay them down in a steady controlled fashion, allowing inspection by a fauna spotter-catcher (b) where large trees are too large for a vertical tree grab and have been identified, an elevated work platform or where practical, cherry picker should be used in conjunction with a chainsaw operator and fauna spotter-catcher. Alternatively, careful removal of hollow section from habitat tree and gentle lowering for inspection by fauna spotter-catcher (c) the use of bulldozers to clear vegetation is limited to vegetation that has been thoroughly inspected by a fauna spotter-catcher and is found to contain no fauna or potential habitat. Bulldozers are not to be used to push over large trees that contain hollows or other habitat features.

NOTE: Dogs are not permitted onsite at any time during construction. Construction works including clearing must occur between the hours of 6.00am and 6.00pm.

## Access and Stockpiling

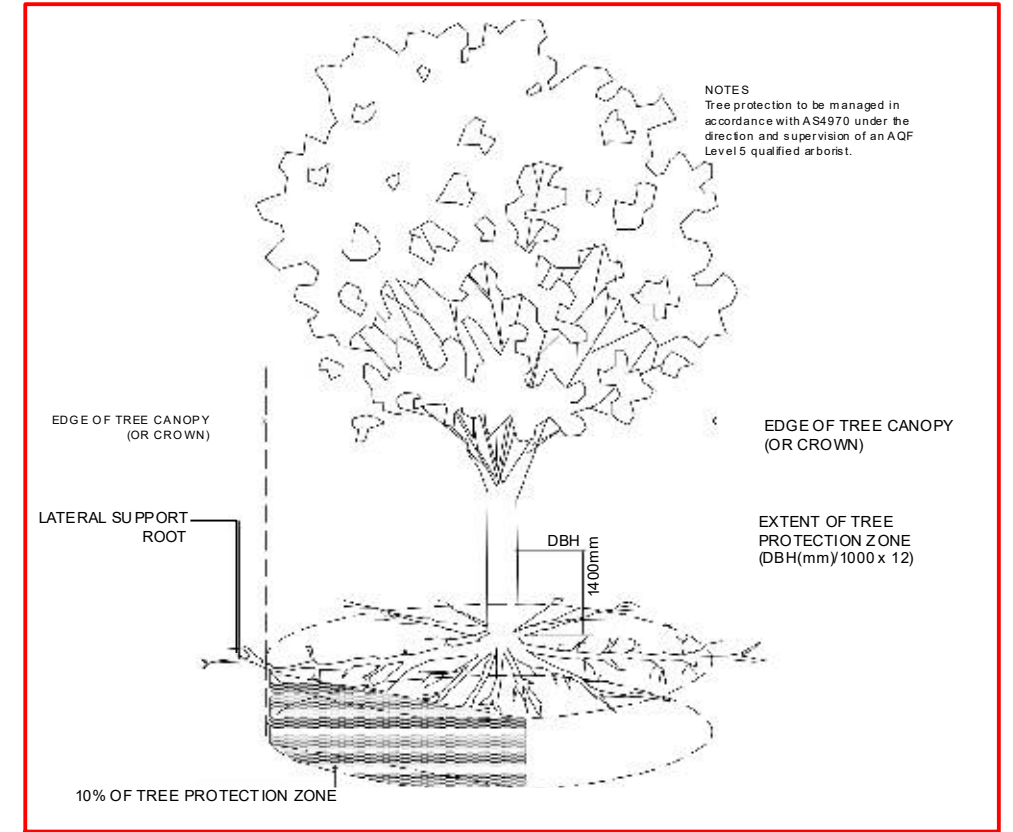
Vegetation stockpiling locations are to be designated in easily accessible areas outside of TPZs. Indicative vegetation stockpiling locations have been allocated within the clearing area, allowing for material to be easily delivered and stored. These locations are subject to minor change according to cut/fill activities and intended location for reuse.

Cleared vegetation free of weeds is to be reused on or off the project site. Recycling techniques include mulching, tub-grinding, wood chipping and salvage (e.g. custom milling). Trees with identified hollows should have the hollow section preserved and should be suitably mounted on nearby or adjacent suitable trees.

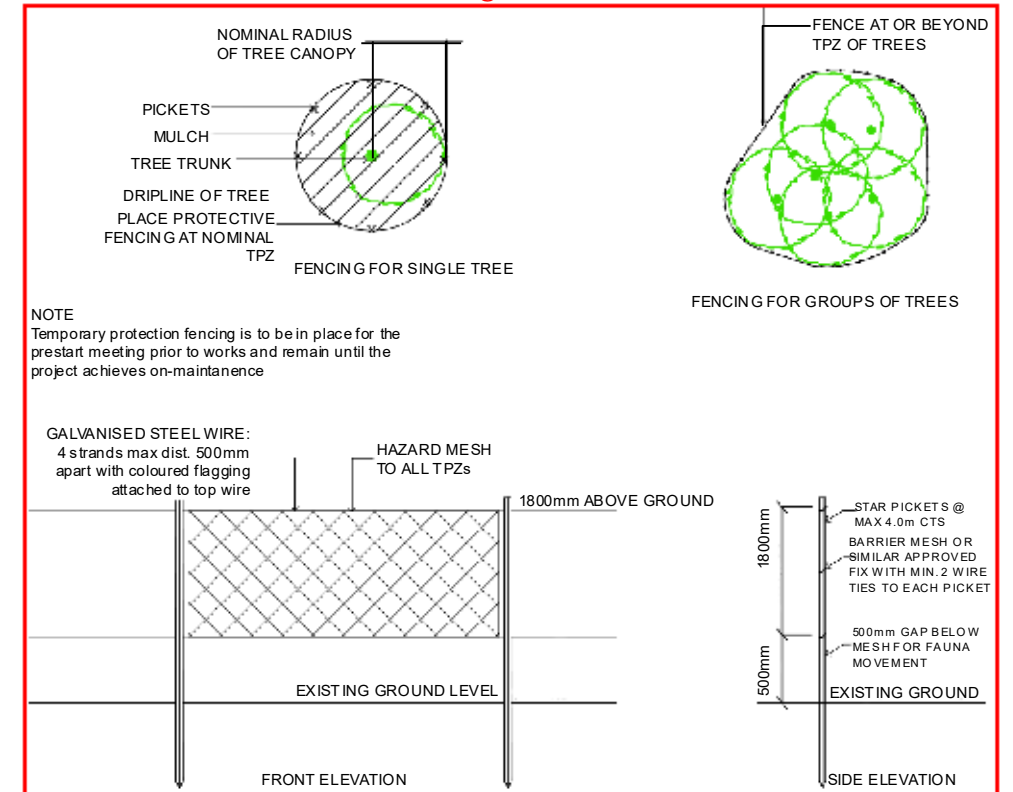
## Maintenance

After tree clearing works on site, an analysis of the vegetation's health and growth should be undertaken by the project arborist to determine specific maintenance needs. Follow-up maintenance works should be carried out on retained vegetation where required. If conditioned in the approval—the project arborist may be required to submit a report to Council/EDQ detailing the measures undertaken during the construction period and any further work required post this period.

Tree Protection Zone - Detail (not to scale)



Tree Protection Fencing - Detail (not to scale)



Queensland Health

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**References:**  
AS4970-2:009 Protection of trees on development sites

Issue	Date	Description	Checked
A	1/1/2023	Client Draft	MD

**Project:**  
Bundaberg Ring Road,  
Thabeban

environmental management	
Plan of: Vegetation Clearing & Fauna Management Plan	
Date: 1/1/2023	Checked: MD
Client Ref: 11612	Drawn: TF
Drawing No.: 11612 E02 VCFMP A	

# Vegetation Clearing and Fauna Management Plan - Notes

## Introduction

The Fauna Management specification on this VCFMP is designed to protect native animals and control/manage impacts during the vegetation clearing works. The clearing area occurs within the northern and south-western sections of the site. The site abuts cleared land and active construction zones to the north and west, Bundaberg Ring Road to the south, and a brewery and other industrial land uses to the west. Common species associated with semi-urban landscapes were spotted at the clearing area during the field assessment. The fauna management specifications and principles incorporated in this VCFMP apply generically to all native animals and focus on avoiding conflicts and incorporating measures to minimise disturbance. Compliance with this section of the VCFMP is compulsory and incorporates the use of expert consultants including a Fauna Spotter (holding a valid Wildlife Rehabilitation Permit issued by the **Department of Environment and Science**). The management protocols outlined in the following section can vary at the site, as determined by the registered fauna spotter catcher or arborist.

## Fauna Impacts

Clearing of vegetation provides an obvious source of impact to existing habitat and animal safety. More specifically the existing vegetation provides habitat, movement and protection opportunities for some fauna through both regrowth and canopy trees. These opportunities may be altered during and post vegetation clearing works. Potential impacts include:

### Construction Impacts

- Direct removal of site vegetation
- Loss of habitat
- Noise, vibration and dust
- Erosion and sedimentation
- Threats associated with open cuts etc. and fauna entrapment
- Loss of food sources
- Excavation/compaction/changes in ground levels
- Altering hydrological flows
- Fragmentation of habitat

### Operational Impacts

- Weed introduction (garden escapees)
- Increased hydrology with increased hardstand
- Altering of run-off chemical and nutrient components (quality)
- Barriers to fauna movement
- Vehicles and pedestrian movement and trespass
- Introduction of domestic and predatory species

## Fauna Management Schedule

1.0 Pre - Clearing				
Ref.	Management Item	Responsibility	Timing	Reporting
1.1	<b>Temporary Fencing</b> Prior to the commencement of works and to be inspected by the site Environmental Coordinator and/or Project Arborist—Delineate areas where vegetation is proposed to be retained with exclusion fencing to prevent accidental felling. Clearing is to be undertaken in accordance with AS 4970-2009 Protection of Trees on Development Sites. <ul style="list-style-type: none"> <li>▪ Fencing shall be fauna friendly</li> <li>▪ No clearing, stockpiling, site access, earthworks, storage, etc. is to occur within the temporary protection fencing.</li> <li>▪ Only approved weed management works to occur within the temporary protection fencing</li> <li>▪ Fencing to be reinstated immediately if damaged or knocked down, any damage to retained trees to be immediately reported to Project Arborist.</li> <li>▪ Fencing to remain until the completion of all site works.</li> </ul>	Site Supervisor	Prior to the commencement of clearing	Inspected by Council / EDQ and Project Arborist
1.2	<b>Contractor Education &amp; Awareness</b> All site contractors and subcontractors will be made aware of their responsibilities to protect native fauna. The Fauna Management notes on this VCFMP are provided as a working document to assist on-site management and protection of native animals. This generally will form part of education and training on a broader work place health and safety but as a minimum will include: <ul style="list-style-type: none"> <li>▪ Copy of VCFMP kept on-site (Site Office).</li> <li>▪ General education and awareness notification of contractors and sub-contractors involved in activities potentially impacting native animals as part of site induction – contractors must know the location of the VCFMP, key phone numbers and who to report to if they breach the VCFMP.</li> <li>▪ A list of relevant contact phone numbers as listed on these drawings is kept in a visible and accessible location in the site office.</li> </ul>	Site Supervisor / The Proponent	Prior to the commencement of clearing and as part of the site induction for new staff and sub-contractors	Site Supervisor
1.3	<b>Fauna Spotter-Catcher / Relocator</b> Immediately prior to the commencement of clearing of native vegetation, a daily visual inspection of the area must be carried out by a qualified fauna spotter-catcher holding a valid Rehabilitation Permit from the relevant State Government Agency. The fauna spotter-catcher should clearly flag vegetation found to contain fauna or fauna habitat (such as tree hollows, arboreal termite mounds, stick nests or possum drays with flagging tape and verbally communicate this information to the tree feller to ensure flagged trees are not felled until authorised by the fauna manager.	Site Supervisor	Prior to the commencement, of clearing	Inspected by the Fauna Spotter-catcher
2.0 Vegetation Clearing				
2.1	<b>Fauna Spotter-Catcher / Relocator</b> The qualified fauna spotter-catcher is to be present on site during all clearing operations to supervise and direct clearing works, and to respond to any situations that may arise in relation to fauna. In the event of an animal being located, a suitable buffer area (as determined by the fauna spotter-catcher) should be established around the animal's location that excludes machinery until it has relocated at its own accord (usually overnight). If an animal requires relocating this must be undertaken by a suitable qualified fauna expert recognized by the <b>Department of Environment &amp; Science</b> . For some fauna, specific permit requirements may apply.  If vegetation is left stockpiled for more than 12 hours or overnight, the fauna spotter-catcher must inspect the vegetation prior to chipping or removal from site.  The Fauna Spotter-catcher will manage the care of any injured or orphaned wildlife (e.g. veterinary attention or delivery to a wildlife carer). Any native fauna listed as a threatened species under the Nature Conservation Regulation 2020 that are injured or orphaned by the development process, must be reported to the <b>Department of Environment &amp; Science</b> (1300 130 372). Any other injured or orphaned fauna must be reported through the Rehabilitation Permit return process by the Fauna Spotter-catcher. The Site Supervisor is responsible for the safe management of site fauna and implementation of these specific fauna requirements.	Site Supervisor	During / post clearing	Inspected by the Fauna Spotter-catcher
2.2	<b>Specific Koala Management Notes</b> A Koala/Fauna spotter-catcher is a person who holds a valid Rehabilitation Permit from the relevant State Government Agency, and has either a tertiary qualification in Biology or Zoology, or who is demonstrably experienced in the identification and location of Koalas in their natural habitat. For example, a koala keeper employed by a licensed Wildlife exhibitor (i.e. a zoo) may be capable of demonstrating competence in locating Koala's. Prior to the commencement and during felling operations, it is the responsibility of the Koala spotter to be present at the site of felling operations identify any tree at the site within which a Koala is present, as well as any tree that has a crown which is intermeshed or overlapping with such a tree; and advise the person who is authorised to conduct the felling operation, or that persons' representative, of the precise location of each such tree Management Item.	Site Supervisor	Prior to the commencement, and during clearing	Inspected by the Fauna Spotter-catcher



Client:

Queensland Health

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References:

AS4970-2009 Protection of trees on development sites

Amendments:

Issue	Date	Description	Checked
A	1/1/2023	Client Draft	MD

Project:

Bundaberg Ring Road,  
Thabeban



Plan of:  
Vegetation Clearing & Fauna Management Plan

Date: 1/1/2023 checked: MD

Client Ref: 11612 Drawn: TF

Drawing No.: 11612 E03 VCFMP A

Vegetation Clearing and Fauna Management Plan - Notes cont.

2.0 Vegetation Clearing (cont.)				
2.3	<p><b>Clearing Pattern / Fauna Flushing</b></p> <p>Clearing occurs once the fauna spotter-catcher gives sign off the site is clear of all native species and all necessary permits are obtained. The intended clearing direction is towards retained vegetation. Clearing direction is subject to amendment by the fauna spotter-catcher.</p> <p>At the completion of operational works, and prior to the sealing of survey plans for the relevant stage, the fauna spotter-catcher must provide certification to Council / EDQ officers that all works were undertaken in accordance with these fauna management requirements and specific Council/EDQ requirements.</p>	Site Supervisor	Prior to the commencement, and during clearing	Inspected by the Fauna Spotter-catcher
2.4	<p><b>Specific Habitat Tree Notes</b></p> <p>Where possible, clearing of habitat trees is to be avoided during late winter and spring (typically July – October) when many native birds are actively nesting/have young in nests and arboreal mammals have dependent and/or pouch young.</p>	Site Supervisor	Prior to the commencement, and during clearing	Inspected by the Fauna Spotter-catcher
2.5	<p><b>Hollow / Habitat Feature Salvage Notes</b></p> <p>Hollows and other habitat features such as large fallen logs, log piles, rock piles or outcrops may provide important refuges / protection for fauna within bushland and open space areas near the development site. There are currently no regulatory guidelines in Queensland for the salvage and reinstallation of hollows and habitat features at development sites. The information below has been extracted from nest box installation material provided by MBRC, Redland and Ipswich City Council, and "Nest boxes for wildlife, a practical guide" by Alan and Stacey Franks (2015). The salvage and reinstallation of hollows and habitat features is to be undertaken by / or under the supervision and direction of a suitably qualified fauna spotter-catcher or arborist, and in accordance with these guidelines. The reinstallation of hollows and habitat features is required to comply with the bushfire management requirements of the receiving area.</p> <p><b>Salvage from clearing area:</b></p> <ul style="list-style-type: none"> <li>▪ Hollows should only be salvaged in circumstances where clearing of habitat trees cannot be avoided.</li> <li>▪ Habitat or hollow-bearing trees are to be felled last and cleared using special plant and equipment aimed at reducing the risk of death or injury to occupying fauna</li> <li>▪ Donor habitat tree particulars to be documented by the suitably qualified fauna spotter-catcher or arborist prior to salvage—including but not limited to tree species, height and diameter at breast height (DBH), height above ground and aspect of hollow, any other significant features.</li> <li>▪ Hollow / habitat feature sections from each identified habitat tree to be carefully removed by, or under direction and supervision of a suitably qualified fauna spotter-catcher or arborist. All additional trees to be inspected on ground to ensure all habitat features are salvaged from the clearing area.</li> <li>▪ Additional habitat features, such as site logs and rock should be inspected by the fauna spotter-catcher prior to relocation.</li> </ul> <p><b>Reinstallation at receiving area:</b></p> <ul style="list-style-type: none"> <li>▪ Hollows are to be salvaged and reinstalled at a suitable receiving area within an environmental area onsite, or as close to the site as possible.</li> <li>▪ The salvaged hollow is to be reinstalled in a similar tree specimen, and at a similar height and aspect as the donor tree where it is practical and safe to do so.</li> <li>▪ As a general rule, salvaged hollows should be positioned:                             <ul style="list-style-type: none"> <li>○ in a tree species preferred by the target fauna species. For example, Phascogales prefer rough-barked trees whereas Scaly-breasted Lorikeets prefer smooth-barked or dead trees</li> <li>○ at a location in the receiving tree to meet the target species requirements</li> <li>○ high enough in the receiving tree to reduce the chances of predation by introduced fauna species, and out of reach of humans. Greater than 4 metres (12 feet) above ground level is recommended to minimise predation from cats</li> <li>○ away from potential edge effects to further mitigate feral uptake</li> <li>○ where they can be easily inspected/maintained</li> <li>○ away from bright lights</li> <li>○ in a direction that is protected from severe storms and / or prevailing winds. A north-east to south-east aspect is preferred by many species</li> <li>○ in a location that is shaded during the hottest parts of the day.</li> <li>○ Where they are least vulnerable to branch fall</li> <li>○ level with a tree branch to provide easy access for fauna</li> <li>○ firmly mounted with least impact to the tree</li> </ul> </li> <li>▪ If not practical or safe to install a tree hollow / habitat feature in a tree at the receiving area, it should be positioned on ground providing there are no conflicts with bushfire requirements at the receiving area.</li> </ul> <p>Other habitat features may be strategically positioned at the receiving area to optimise habitat and movement opportunities for fauna. Where possible, rocks and log material should be piled to increase habitat values.</p>	Site Supervisor	Prior to the commencement/ and during clearing	Fauna spotter-catcher or arborist



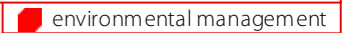
Client:  
Queensland Health

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References:  
AS4970-2009 Protection of trees on development sites

Amendments:			
Issue	Date	Description	Checked
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Project:  
Bundaberg Ring Road,  
Thabeban

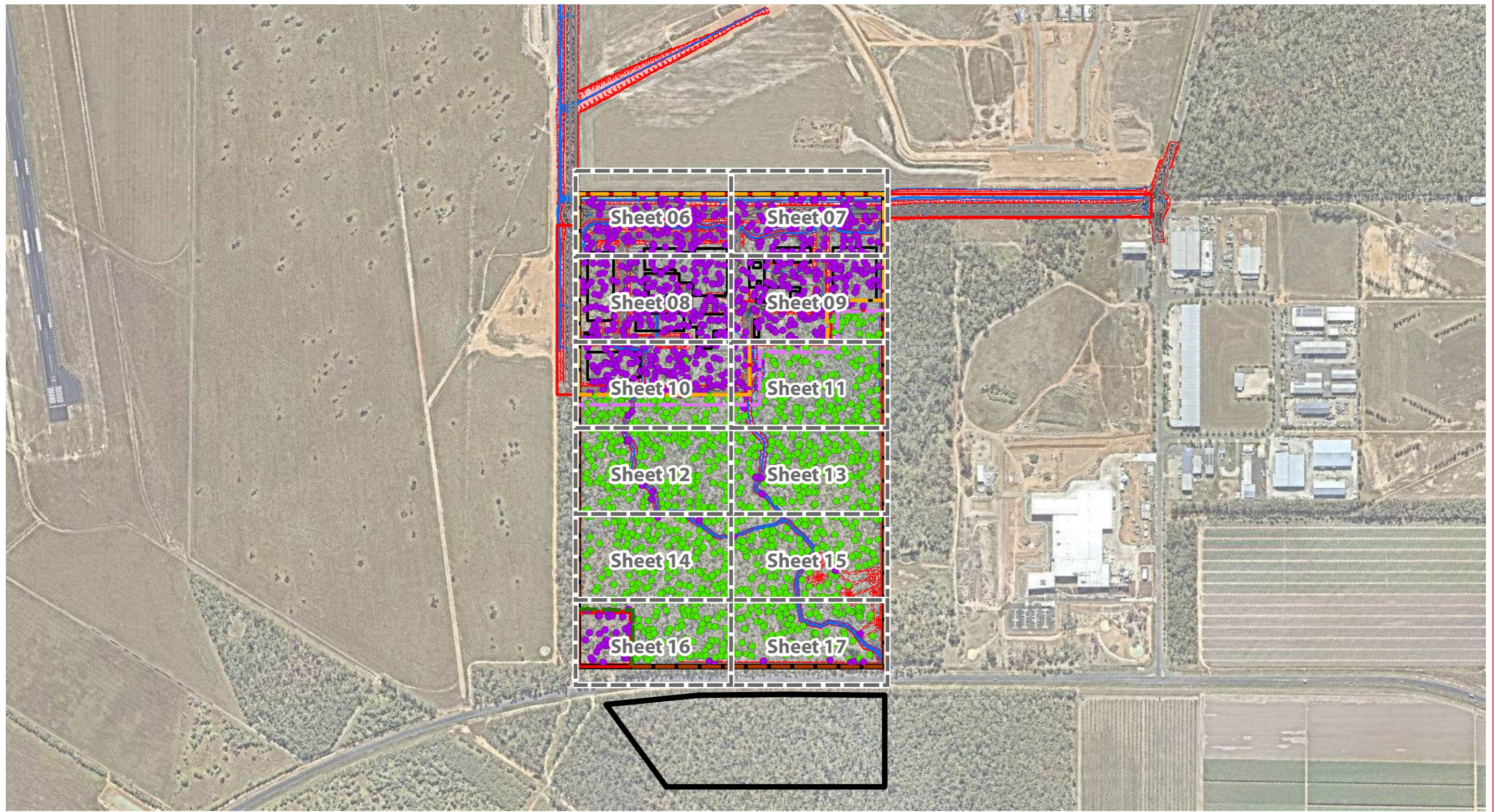


Plan of:  
Vegetation Clearing & Fauna Management Plan

Date: 1/1/2023 checked: MD

Client Ref: 11612 Drawn: TF

Drawing No.: 11612 E04 VCFMP A



**RPS Tree Plot**

- Tree to retain
- Tree to retain subject to detailed stormwater design
- Tree to remove

- Engineering Detail**
- Disturbance Area
  - Proposed Buildings
  - Proposed Roads
  - Proposed Footpaths
  - Stage Boundaries
  - Retaining Walls

- Road and Footpath Detail
- Stage Boundaries
- Retaining Walls

- Stormwater Design
- Earthworks Batters
- Design Contours

**Fencing Locations (External, Indicative)**

- 1500h Boundary Fencing - dimbale/fauna-friendly wire fence (replace existing dilapidated log fence)
- 1800h Fence (Energy QLD standard)
- 1800h Fauna Exclusion fencing
- Temporary Construction Fence (1800h chain wire fence with shade cloth)

**Vegetation Clearing & Fauna Management Plan - Detail Sheet Context**



Client: Queensland Health

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References:  
Engineering drawing (Stantec, 2023)



Amendments:				
Issue	Date	Description	Checked	
A	1/1/2023	Client Draft	MD	



Project: Bundaberg Ring Road, Thabeban

Plan of: Vegetation Clearing & Fauna Management Plan	
Date: 1/1/2023	Checked: MD
Client Ref: 11612	Drawn: TF
Drawing No.: 11612 E05 VCFMP A	