APPENDIX 1: PRELIMINARY DOCUMENTATION REPORT

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

Preliminary Documentation Report - Part A For Final Publication

Queensland Health
February 2024

Document Control

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Acronyms and Abbreviations

Legislation, Policies and Guidelines

EOP	EPBC Act Environmental Offset Policy (Cth)
EPBC	*Environment Protection and Biodiversity Conservation Act 1999* (Cth)
NCA	*Nature Conservation Act 1992* (Qld)
SPP	State Planning Policy (Qld)
SPRP	State Regulatory Planning Provisions (Qld)
VMA	*Vegetation Management Act 1999* (Qld)

Government Departments

BRC	Bundaberg Regional Council
DAF	Department of Agriculture and Fisheries (Qld)
DCCEEW	Department of Climate Change, Energy the Environment and Water
DES	Department of Environment and Science (Qld)
DSDILGP	Department of State Development, Infrastructure, Local Government and Planning (Qld)
EDQ	Economic Development Queensland (as part of DSDIMP)
DTMR	Department of Transport and Main Road (Qld)

General Terms

AU	Assessment Unit
BMP	Bushfire Management Plan
FMP	Fauna Management Plan
GHFF	Grey-headed Flying-fox
HSMP	High-risk Species Management Plan
KHAT	Koala Habitat Assessment Tool (as per the Koala Referral Guidelines)
LMP	Lighting Management Plan
MID	Ministerial Infrastructure Designation
MHQA	Modified Habitat Quality Assessment
MNES	Matters of National Environmental Significance
MSES	Matters of State Environmental Significance
NBMP	Nest Box Management Plan
PD	Preliminary Documentation
PMST	Protected Matters Search Tool
OMP	Offset Management Plan
RE	Regional Ecosystem
RMP	Rehabilitation Management Plan
SAT	Spot Assessment Technique
SHG	Saunders Havill Group
SWMP	Stormwater Management Plan
TEC	Threatened Ecological Community
WWBW	Waterway for Waterway Barrier Works
VC&MP	Vegetation Clearing and Management Plan

Reference Documents

Code of Practice

Wildlife and Threatened Species Operations Branch, Department of Environment and Science (DES), Code of Practice – Care of Sick, Injured or Orphaned Protected Animals in Queensland, Nature Conservation Act 1992, August 2020.

Draft Code

Hanger, J & Nottidgem B., Queensland code of practice for the welfare of wild animals affected by land-clearing and other habitat impacts and wildlife spotter /catchers, Australia Wildlife Hospital, 2009.

EPBC Environmental Offsets Policy (EOP)

Environment Protection and Biodiversity Conservation Act 1999 Environmental Offsets Policy (October 2012), Commonwealth of Australia, 2012.

EPBC Offsets Guide

Environment Protection and Biodiversity Conservation Act 1999 How to use the offsets assessment guide, (October 2012), Commonwealth of Australia, 2012.

FSRDM

Fauna Sensitive Road Design Manual Volume 2: Preferred Practices, State of Queensland (Department of Transport and Main Roads), 2010.

Koala Referral Guidelines

EPBC Act referral guidelines for the vulnerable Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory, Commonwealth of Australia, 2014.

SI Guidelines

Matters of National Environmental Significance: Significant impact guidelines 1.1 Environment Protection and Biodiversity Conservation Act 1999, Commonwealth of Australia, 2013.

Executive Summary

The referral area is located within Bundaberg Regional Council, a regional centre undergoing residential expansion and ongoing agricultural production. 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, and the Bundaberg Brewed Drinks Factory immediately to the east. Bundaberg Ring Road intersects the site to the south, beyond which is a patch of remnant vegetation which forms the southern portion of the site. While the property to the east is partly vegetated, this vegetation is undergoing moderate disturbance from construction and other activities associated with the Bundaberg Brewed Drinks facility.

Historically, the referral area has been subject to logging and disturbance from fire. Overall, vegetative cover is relatively intact despite historical land uses, with abundant large trees and hollows providing habitat features throughout the site. However, the ground layer is dominated by exotic *Sporobolus pyramidalis* (Giant Rat's Tail Grass) with some patches of *Lantana camara* (Lantana). Clearing and modification of surrounding land has resulted in the degradation of habitat along the edges of the site, with significant weed incursion in these areas and throughout the site as a whole. The site is considered to be highly fragmented due to surrounding residential, industrial and agricultural land uses.

The referral area is zoned as 'Open Space' under the Bundaberg Regional Council Planning Scheme 2015 and the proposed action has been guided on both the intent of the Planning Scheme and physical constraints informed by technical consultants reporting. The proposed action is for a New Bundaberg Hospital Precinct, including associated health facilities, and the proposed east-west road corridor to provide secondary access to the site. The proposed development site is located on Kay McDuff Drive in the suburb of Thabeban, on Lot 23 SP212513 and occurs on land that totals 61.7 ha. The proposed action includes the main hospital, mental health inpatient unit, facility support centre and multi-level car park. The proposed action comprises of approximately 24.2 ha of developable land with approximately 41.1 ha bushland retained to the south (refer to **Plan A01 – Development Footprint**).

The Protected Matters database search returned four (4) listed Threatened Ecological Communities (TEC), eleven (11) flora species and forty-one (41) fauna species protected under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) as potential occurrences. Of these, only two (2) threatened fauna species were identified as likely occurrences following desktop analysis, being the Koala (*Phascolarctos cinereus*) and Grey-headed Flying-fox (*Pteropus poliocephalus*). The Greater Glider (*Petauroides volans*) was also considered as a potential occurrence due to the presence of some habitat features within the subject site.

Field surveys did not observe any direct evidence of Greater Glider, Koala or Grey-headed Flying-fox within or adjacent to the referral area, and no indirect evidence of use was recorded in the form of scats. Modified Habitat Quality Assessments (MHQA) determined the site to contain potential habitat for Koala due to the presence of suitable habitat features (Eucalypt dominated vegetation and presence of hollow-bearing trees), and potential Grey-headed Flying-fox foraging habitat. However, the site is notably fragmented by

surrounding residential development, cleared areas and agricultural land, therefore following field surveys, it is considered unlikely Greater Glider would utilise or move to the site. No Grey-headed Flying-fox were recorded foraging or flying over the site during the survey period. No roosts were recorded within the referral area, with the nearest active camp being located approximately 4.5 km to the north.

The referral documentation (**Part B**) determined that all other MNES including the Squatter Pigeon, Northern Quoll, Red Goshawk and Collared Delma were a low likelihood of occurrence based on desktop analysis, however, remained target species throughout the survey period. Despite comprehensive field surveys, these species were not detected on or adjacent to the referral area and they are not expected to occur given the moderate disturbance levels and fragmentation of the site. Despite this, applying the precautionary principle the site is considered to support some potential habitat for the Koala (*Phascolarctos cinereus*) and Grey-headed Flying-fox (*Pteropus poliocephalus*).

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. A detailed High-risk Species Management Program has been prepared (refer **Part B** and **Attachment A11**) to mitigate impacts to protected wildlife species and to provide further detail regarding the relocation of the raptor nest. In addition, the Rainbow Bee-eater (*Merops ornatus*), listed as Marine under the EPBC Act, and the Short beaked Echidna (*Tachyglossus aculeatus*), listed as Special Least Concern (SLC) species under the *Nature Conservation Act 1992* (NC Act), were confirmed onsite during initial field surveys. The proposed action is not considered to have a significant impact on these species nor any other MNES aside from potential Koala and Grey-headed Flying-fox (GHFF) foraging habitat.

The proposal has allocated a significant portion of the referral area as retained vegetation for conservation purposes. Open space areas have been strategically located to retain areas of the highest environmental significance at the southern portion of the site, to minimise impacts from the proposed action. Although considered potentially functionally lost for the Koala and Greater Glider due to existing fragmentation factors from cleared land and residential development, these areas of remnant vegetation provide potential habitat for transient Koala and other highly mobile species including the Grey-headed Flying-fox. These areas will be rehabilitated as part of the proposed action to maintain biodiversity value, ecological function and wildlife connectivity within the site and wider landscape.

Field surveys did not confirm the presence or evidence of Greater Glider, within the referral area, and based on the desktop and field surveys, there is a moderate to high level of confidence this species is not present within the site nor surrounding area and is unlikely to travel to the site. Koala and Grey-headed Flying-fox may occur as transient individuals or flyovers and occasionally utilise the site for foraging, however no evidence of these species were identified onsite. Although the proposal has sought to avoid, minimise, and mitigate impacts, the proposed action will result in the clearing of vegetation identified by the Department of Climate Change, Energy, the Environment and Water (DCCEEW) as habitat critical to the survival of the Koala and foraging habitat for the Grey-headed Flying-fox. Impacts to the Greater Glider have been assessed against the *EPBC Significant Impact Guidelines 1.1* and determined the project is unlikely to have a significant impact on the Greater Glider.

As such, an offset will be delivered in accordance with the *EPBC Act Environmental Offsets Policy 2012* to compensate for the unavoidable loss (direct and functional) of 23.56 ha of habitat critical to the survival of the Koala and 23.56ha of foraging habitat for the Grey-headed Flying-fox. An offset will be provided to adequately address any residual impacts as a result of the proposed action and achieve *EPBC Act Environmental Offsets Policy 2012* requirements as discussed in **Section 7**.

1. Introduction

Saunders Havill Group (SHG) act on behalf of Queensland Health in the coordination and production of the response to the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) Controlled Action Determination assessment on Preliminary Documentation (PD) 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).

On the 15th 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 A1 – EPBC Controlled Action Decision Notice**). On the 3rd 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.

It is acknowledged that the referral application, which included an assessment of the proposed action against the applicable EPBC Act guidelines and policies, including the Significant Impact Guidelines 1.1, determined the proposed action was unlikely to have a significant impact on MNES confirmed present (i.e. Rainbow Bee-eater) or likely to regularly utilise the site (i.e. Grey-headed Flying-fox). A review of the Significant Impact Guidelines 1.1 established the project is unlikely to have a significant impact on the Greater Glider due to the site's significant fragmentation and lack of habitat requirements for the species. Residual impacts can be appropriately managed as part of the proposed action to mitigate impacts of MNES (refer to **Part B** for a copy of the original Referral Application).

With the February 2023 controlled action determination, the DCCEEW provided a list of additional information required to be addressed within the Preliminary Documentation (PD) report. A copy of this PD additional information request is included as **Attachment A2 – PD Additional Information Request** and each item has been extracted as each subsequent chapter of this PD. As part of this assessment process, the PD must be published for public comment.

The purpose of this report is to provide additional information to the DCCEEW to accompany the PD assessment process to ultimately obtain formal approval for the Proposed Action.

For readability of this document, the supporting information has been separated into two folders using the following structure:

- **Part A: Preliminary Documentation Report**
- **Part B: Referral Material and Technical Studies**

Part A: Preliminary Documentation refers to this document. Part A includes relevant figures, plans and supporting material required to support full assessment of the action by the DCCEEW. These have been referenced with the prefix A (i.e. Figure A1, Plan A1, Attachment A1). Figures and Plans have been provided in **Section 13** and Attachments in **Section 14** at the back of the PD for ease of reference. Refer to the front of this document for a full table of contents and list of attachments.

The following sections within this report address the item requirements of the request for additional information, and have been numbered to correspond to each of the additional information item requests, specifically:

- Section 1: Introduction
- Section 2: Description of the action
- Section 3: Habitat Assessment
- Section 4: Impact Assessment
- Section 5: Avoidance, Mitigation and Management Measures
- Section 6: Rehabilitation Requirements
- Section 7: Proposed Offsets
- Section 8: Ecological Sustainable Development
- Section 9: Economic and Social Matters
- Section 10: Environmental Record of the person proposing to take the action

Part B: Referral Material and Technical Documents refers to a copy of the full referral material submitted for the controlled action assessment as well as any supporting studies and request for information responses, in full, prepared by technical consultants in preparation for this PD. Relevant sections from each of these documents have been brought forward and incorporated into Part A of the PD for ease of reference and readability. It is noted that changes to the referral material are not possible and Part A of the PD supersedes the information in the referral.

Reference Table

In response to Appendix A1.6 of the PD request, which requires *'a cross-reference table indicating where the information fulfilling this request is included in the preliminary documentation'*, this section provides a reference table indicating report chapters which correspond with items requested within the additional information request included as **Attachment A2.** Each item has been extracted and provided within the corresponding chapter of this PD.

Table A1: Reference Table

Item	Details	Section
1.0	Description of the Action	2
2.0	Habitat Assessment	3
3.0	Impact Assessment	4
4.0	Avoidance, Mitigation and Management Measures	5
5.0	Rehabilitation Requirements	6
6.0	Proposed Offsets	7
7.0	Ecologically Sustainable Development	8
8.0	Economic and Social Matters	9
9.0	Environmental Record	10

Further from Appendix A on the General content, format and style, the PD is required to:

'A1.1 Be a stand alone document containing sufficient information to avoid he need to search out previous or supplementary reports.

1.2 Enable interested stakeholders and the Minister to easily understand the consequences of the project on matters of national environmental significance (MNES)

1.3 Be written so that any conclusions reached can be independently assessed. Include all key claims, findings, proposals and undertakings in the main document.

1.4 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.

1.5 Include the names, roles and qualifications (where relevant) of all persons involved in preparing the preliminary documentation.

1.7 The preliminary documentation must state the following for all information provided:

- *The source and date of the information;*
- *how the reliability of the information was tested;*
- *the uncertainties (if any) in the information; and*
- *the guidelines, plans, and/or policies considered.*

The following sections of this PD address the above requirements of Appendix A and subsequent requirements outlined in the PD Request for information.

2. Description of the Action

This section responds to Item 1 of the PD request which requires the proponent to provide a description of the action, including:

2.1. The location, boundaries and size of the impact

Item 1.1 of the PD Request asks for ***'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***.'

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 A1** and **Figure A2**. For ease of reading, all referenced Figures and Plans are provided as Attachments to Part A. Key site details for the impact area are presented in **Table A2.**

The referral area is located within Bundaberg Regional Council Local Government Area in the suburb of Thabeban. As such, BRC have jurisdiction for the implementation and enforcement of development applications in relation to the referral site. The planning intent of the site is therefore demonstrated within the Bundaberg Regional Council Planning Scheme (2015). The site is zoned as Open Space and the proposal has been guided on both the intent of the development scheme and physical constraints informed by technical consultants reporting.

The site is located approximately 4 kilometres south-west of Bundaberg's CBD. The surrounding area has been extensively cleared for agricultural, cropping, and residential land uses. The main development area (Lot 23) supports remnant native vegetation that forms part of a larger patch. The New Bundaberg Hospital is one of Queensland Government's high priority infrastructure projects and will provide significant expansion to health capacity and capability in the Wide Bay Region.

The project is primarily located within a lot with a total area of 61.7 ha. Overall, the project has a disturbance footprint of approximately 24.2 ha (refer to **Plan A01 – Development Footprint**). The proposed action includes earthworks and vegetation clearing to facilitate the approved development. The total vegetation clearing 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 Johanna Boulevard Extension and approximately 5 ha for the proposed East – West connection road to Kay McDuff Drive). This clearing impact area represents approximately 37% of the total patch area of 65.3ha. Approximately 19.9 ha of the total impact area comprises good-quality remnant vegetation. Consolidation of the development footprint to the northern portion of the site has reduced additional clearing for the bushfire asset protection zone and maximised the setback from Bundaberg Ring Road thereby removing the need for an acoustic barrier which would otherwise require additional vegetation clearing. A large parcel of natural bushland comprising a total area of 41.1 ha will be retained to the south (refer to **Plan A01 – Development Footprint**), and the patient rooms, terraces and other spaces overlooking will benefit from this view. All areas disturbed during the construction will be rehabilitated and

any areas within exclusion zones that are immediately adjacent to construction areas will also be rehabilitated.

Immediately adjacent to the site, to the west, there is a small strip of vegetation adjoining cleared land, beyond which is a large, cleared patch for Bundaberg Airport further to the west. A strip of vegetation is located to the east, associated with the Bundaberg Brewed Drinks Factory on the neighbouring allotment. Cleared land earmarked for residential development is directly north and west of the site, with residential developments further to the northeast, west and east. Agricultural land dominates much of the south and west of the site. The site intersected by Bundaberg Ring Road to the south beyond which the southern portion of the lot contains remnant vegetation. The wider surrounding landscape contains a mixture of agricultural, residential development, urban infrastructure, transport infrastructure and industrial land uses.

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 will facilitate access to the west of the hospital. Notably, the northern extent of the North South Road (also known as the Johanna Boulevard extension) up to the northwest corner of the project site was constructed in an existing gazetted road corridor (Unnamed Road No. 4262) and forms part of Bundaberg Regional Council's Local Government Infrastructure Plan. While the road was constructed to facilitate access to the new Bundaberg Hospital on Lot 23 SP212513, it will also provide access to the adjacent lots and has the potential to ultimately connect to Bundaberg Ring Road. This portion of the road was built regardless of the new hospital development. The construction of this road to the northwest corner of the project site commenced in late 2022 and was completed in 2023.

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 **Plan A01** and reflect plans outlined in the project referral material (included in **Part B** of this PD). It is noted that the North-South Road (Johanna Boulevard) extension up to the southern extent of the hospital site was excluded from the proposed action in the referral documentation.

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 about 1 ha of vegetation clearing (refer to **Plan A1 – Development Footprint**).

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 channel drains which are proposed to be neatly integrated into the landscape and landform. 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 0.26 ha) and temporary. Minor clearing of vegetation involving approximately 20 trees which make up a total area of 0.26 ha are marked for removal as part of the swale, basin and bund works. This area was calculated for trees which have a Tree Protection Zone that overlaps the stormwater swale by > 10% and the total area calculated using the TPZ (a calculation which uses the tree diameter at breast height (DBH)).

The site is currently comprised of a vegetated allotment, with cleared tracks along the boundary on all sides (refer **Figure A2 – Site Aerial**). Vegetation across the site is comprised of remnant Regional Ecosystem with some disturbance throughout from historic logging and fire. The understorey layer is dominated by exotic species throughout the site predominantly *Sporobolus pyramidalis* (Giant Rat's Tail Grass) and *Lantana camara* (Lantana).

The proposal includes the development of approximately 24.2 ha for a public hospital and supporting infrastructure and the retention of 41.1 ha of native bushland. As the proposed action will result in the clearing of vegetation identified as critical habitat for the Koala and foraging habitat for the Grey-headed Flying-fox, and potentially foraging habitat for the Greater Glider, an offset will be delivered in accordance with the *EPBC Act Environmental Offsets Policy 2012*.

Table A2: Referral Property Details

Address	Bundaberg Ring Road, Thabeban, Queensland, 4670
RPD	Lot 23 on SP212513 Lot 1 on SP285136
Referral Area	65.3ha
Development Footprint	24.2 ha
Retained Area	41.1 ha

NCA 1992	High Risk Area for Protected Plants
VMA 1999	Category X (non-remnant), Category B (Least Concern),
Fisheries 1994	No Waterways for Waterway Barrier Works are mapped onsite.
State Planning Policy	Does not apply
Koala Habitat	Does not apply
LGA	Bundaberg Regional Council
Planning Scheme / Local Plan	Bundaberg Regional Council Planning Scheme 2015
Existing Land Use	Open Space
Proposed Land Use	Hospital / Open Space

2.2. Timeframes and staging

Item 1.2 of the PD Request asks for *'**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**'*.

Works for the entire referral area is pending EPBC Act approval; with the hospital completion expected in late 2027.

Clearing works are not expected to be staged. Vegetation will be cleared sequentially in accordance with Queensland's *Nature Conservation (Koala) Conservation Plan 2017*.

2.3. Operational requirements

Item 1.3 of the PD Request asks for *'**a description of the operational requirements of the action including but not limited to any anticipated maintenance works, use of roads, lighting and fencing**'*.

The action will function as a hospital and supporting infrastructure including water, sewer, and telecommunications within the road corridors of the two new access roads. Restoration and weed management of the retained vegetation will occur to reduce weed cover within priority areas. Habitat degradation will be minimised by undertaking weed management during construction and managing waste and water quality. More detailed weed management activities and objectives will be provided in the Vegetation Clearing & Management Plan (VCMP) and Rehabilitation Management Plan (RMP).

Lighting and road use will be in accordance with hospital requirements. Fauna-exclusion fencing will be constructed along the southern boundary of the hospital site at the interface of the retained bushland vegetation with the intention to avoid fauna entering and becoming stranded within the hospital grounds. Fauna-friendly fencing will be implemented along the project boundary at the eastern, western and southern boundary of the retained bushland.

2.4. Proposed layout

Item 1.5 of the PD Request asks for *'**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.**'*

The layout of the proposed action area is presented in **Plan 1 – Development Footprint**, which includes the location and type of land use, for each component of the project (including the wetlands) proposed to be constructed. Refer to **Attachment A3 – CPB Preliminary Swale, Basin and Bunding Methodology** for design details for the proposed stormwater management swales and wetland basin.

2.5. Potential Alternatives

Item 1.6 of the PD Request asks for *'**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.**'*

Investigations were undertaken to identify and review suitable sites in and around Bundaberg for a hospital that meets the long-term needs of local communities. The comprehensive evaluation process considered more than 40 sites, including more than 20 privately-owned sites put forward through publicly advertised expression of interest process. A multidisciplinary team of technical experts identified the site as being the most suitable, after assessing it against criteria vital to developing and future-proofing a new hospital. Considerations included:

- A range of technical criteria to ensure the hospital would be able to deliver on its core purpose;
- Providing sufficient space for flexibility to respond to anticipated future growth;
- Providing space that would allow for opportunities to collaborate to increase economic, community and social value by co-locating with other services, including education and research;
- Addressing flood protection issues experienced at the current Bundaberg Hospital site and throughout much of the Bundaberg region;
- Accessibility and proximity to the existing road network;
- Impact on surrounding residents and services; and
- Accessibility to public transport and active transport options for patients, families, staff and volunteers.

Over the past three years, the development design has been refined multiple times to consolidate the development footprint in order to:

- Minimise vegetation clearing and ecological impacts as much as possible;

- Ensure sufficient visibility for people accessing the facility;
- Maximise the setback from Bundaberg Ring Road to avoid noise impacts and the need to undertake additional clearing for installation of an acoustic barrier; and
- Reduce addition clearing for the bushfire asset protection zone.

The project has been designed in a compact arrangement in the north-western corner of the site to reduce the environmental impact as much as reasonably possible by minimising the extent of vegetation and supporting habitat for MNES-listed species to be cleared and to enable retention of significant existing trees and vegetation.

The original 2020 development design required the clearing of approximately 37 ha of high-quality vegetation (refer **Frame 1**). Following discussion and redesign, the final development footprint requires only 23.56 ha clearing.

There are no further alternatives to the project site and design of the proposed action.

Frame 1: Original development footprint in 2020 (left) and final development footprint 2022 (right). Source: GreenTape Solutions (2023).

2.6. Other Approvals

Item 1.7 of the PD Request asks for '***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.***'

A Ministerial Infrastructure Designation (MID) is required to enable the development of the new hospital site. The Department of Health is progressing the MID process for the site with the Department of State Development, Infrastructure, Local Government and Planning (DSDILGP). The MID process provides an

alternative to lodging a development application with the relevant local government authority where the development does not require approval under the Bundaberg Regional Council's local planning scheme.

Operational works that is clearing of native vegetation for a Ministerial Infrastructure Designation project is exempt clearing work under Schedule 24 and Schedule 21, Part 1 of the Queensland *Planning Regulation 2017* (i.e. clearing of native vegetation on designated premises for the construction of infrastructure stated in Schedule 5, which includes hospitals). As such, assessment against the State Development Assessment Provisions for native vegetation clearing and the significant impact guidelines for impacts to Matters of State Environmental Significance (MSES) is not required. Consequently, formal offsets under the Queensland planning framework for MSES are not required. Compensatory planting under other legislation (e.g. the Qld *Nature Conservation Act 1992*) may be required. The development does not require assessment against the *Bundaberg Regional Council Planning Scheme 2015*.

As the development involves tampering with protected animal breeding places, a High-risk Species Management Program (HSMP) is required to be submitted to DES. The SMP must be prepared and approved by the Department of Environment and Science (Qld) prior to commencement of works. A High-risk Species Management Plan (HSMP) has been prepared which includes further details regarding relocation of the raptor nest onsite and management of colonial breeding species. 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 active raptor nest located in the northern portion of the site cannot be retained as it is within the main development area. The presence of nesting raptors may also present a significant conflict with hospital activities (e.g. use of helicopter etc); therefore, the nest should be relocated to a suitable nearby location (e.g. the vegetation patch to the south of Bundaberg Ring Road). The nest is suspected to be that of Wedge-tailed Eagle (*Aquila audax*); a species which is particularly sensitive to disturbance during the breeding season. A suitable site and recipient tree has been identified in the southern portion of the site and details of the nest relocation site, timing, procedures and requirements are provided in the HSMP.

Preparation and implementation of a Vegetation Clearing and Management Plan (VCMP) to protect retained vegetation, outline weed management and other restoration actions (including relocation of hollows salvaged from cleared vegetation), provide a vegetation clearing protocol to ensure compliance with sequential clearing requirements under the *Nature Conservation (Koala) Conservation Plan 2017*, including the presence of a suitably qualified and experienced fauna spotter catcher/koala spotter to supervise all vegetation clearing.

Preparation and implementation of a Nest Box Management Plan (NBMP) to guide installation and management of nest boxes within retained vegetation to compensate for the loss of hollows. Preparation and implementation of a Lighting Management Plan for the site.

A Construction Environmental Management Plan shall be prepared for the project and submitted to DSDILGP for approval prior to commencement.

3. Habitat Assessment

This section responds to Item 2 of the PD request which requires the proponent to provide information on listed threatened species, ecological communities and listed migratory species, along with determine habitat extent, that will be or are likely to be significantly impacted by the proposed action.

'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).'***

3.1. Habitat Assessment of Relevant Listed Species

The following subsection along with **Section 3.2**, **Section 3.3**, and **Section 3.4**, responds to Item 2.1 of the PD Request.

Item 2.1.1 of the PD Request requires '***provide a habitat assessment for relevant listed threatened species.'***

Item 2.1.2 of the PD Request requires '***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.***'

Item 2.1.3 of the PD Request requires '***Provide detailed mapping of suitable habitat (within, adjacent to and downstream of the project site, where relevant) for all listed threatened species, which:***

- ***is specific to the habitat assessment undertaken for each listed threatened species (i.e., does not only illustrate relevant Queensland Regional Ecosystems);***
- ***includes an overlay of the project disturbance footprint (including the wetlands);***
- ***includes known records of individuals derived from desktop analysis and field surveys; and***
- ***is provided separately as attachments in JPEG format.*** '

Item 2.1.4 of the PD Request requires '***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***.'

Item 2.1.5 of the PD Request requires '***Attach all relevant ecological surveys referenced in the referral and preliminary documentation as supporting documents to the preliminary documentation***.'

The referral area is situated in a landscape dominated by cleared agricultural land, residential developments, areas earmarked for future residential development as well as highly disturbed areas including the Bundaberg Airport. The greater landscape has isolated remnant and regrowth vegetation areas that have been fragmented historically (refer **Plan A02 – Historical Aerial Imagery**). Currently, the site contains remnant bushland vegetation with historic disturbance from logging and fire, and intrusion from invasive species at the ground layer. There is one broad vegetation community across the site 1) *Eucalyptus sp.* dominated remnant woodland-open forest. Vegetation on-site is somewhat modified due to past and ongoing land uses. However, large patches of intact vegetation remain providing potentially suitable habitat to a number of fauna species. Habitat features observed across the site include some large habitat trees, hollows, coarse woody debris, and large stick nests (anticipated to be associated with raptor species).

The Department considers that from information previously provided, matters that may or are likely to be significantly impacted by the proposed action include, but are not limited to:

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

The Ecological Assessment Report (GreenTape Solutions, 2022) submitted as part of the original referral (included in **Part B** of this PD) confirmed the presence on-site of Rainbow Bee-eater (*Merops ornatus*), listed as a Marine species under the EPBC Act. In addition, the site supports non-breeding habitat for, and is located within the known seasonal (summer) distribution range of four (4) other listed species:

- Fork -tailed Swift (*Apus pacificus*) – listed as Marine and Migratory under the EPBC Act;
- Oriental Cuckoo (*Cuculus optatus*) – listed as Migratory under the EPBC Act;
- White-throated Needletail (*Hirundapus caudacutus*) – listed as Vulnerable, Marine and Migratory under the EPBC Act (Cth) and Vulnerable under the NC Act (Qld); and
- Satin Flycatcher (*Myiagra cyanoleuca*) – listed as Marine and Migratory under the EPBC Act.

None of these species were recorded during the ecological surveys, however it is possible that these species may periodically use the site, albeit infrequently. Residual impacts can be appropriately managed as part of the proposed action to mitigate impacts of MNES (refer to **Part B** for a copy of the original Referral Application).

Field surveys were conducted in conjunction with desktop assessment to provide a habitat assessment of relevant listed threatened species (refer **Plan A03 – Field Survey Effort**). The details of these habitat assessments are outlined in the following sections. **Section 4.8.2** provides additional information on the habitat quality on site for Koala and **Section 4.8.3** provides a habitat assessment for the Grey-headed Flying-fox.

3.1.1 Likelihood of Occurrence Assessment

A detailed Likelihood of Occurrence assessment of threatened species and ecological communities, and migratory species, respectively, previously recorded within a 5 km radius of the site and considered to potentially occur on or adjacent to the referral area was conducted based on desktop and field assessments. **Attachment A4** includes results from a Protected Matters Search Tool (PMST) within a 5 km radius of the impact area, which details any potential MNES that occur in the project area and adjacent areas.

Attachment A5 provides a Likelihood of Occurrence Assessment for MNES identified in the *EPBC Act* Protected Matters Search as having the potential to occur within 5 km of the site. Two (2) species; *Phascolarctos cinereus* (Koala) and *Pteropus poliocephalus* (Grey-headed Flying-fox) were considered as having the potential to occur on or adjacent to the project site or the project area contains habitat suitable for these species. While potential habitat features are present onsite for *Petauroides volans* (Greater Glider), it is considered unlikely the species would occur within the referral area due to fragmenting factors. *Hirundapus caudacutus* (White-throated Needletail) was considered to potentially occur as a flyover but is

unlikely to permanently reside within the referral area. Several additional matters protected by the *EPBC Act 1999* were considered to have a low to moderate likelihood of occurrence from the desktop assessment, however after field surveys confirmed the absence of suitable habitat typologies, the species were not considered to be present or utilise the vegetation onsite.

Table A3 provides an extract of the Likelihood of Occurrence Assessment for the above listed species from **Attachment A5** of this PD. This extract has been amended to provide additional detail relevant to the species reviewed and their potential occurrence on-site and on land adjacent to the site. Further detailed literature review of preferred species habitat and assessment of the site for the species identified by the DCCEW is contained in the sections below.

Table A3: Likelihood of Occurrence Assessment Extract

Species	Common Name	Status	Description of Community /Habitat	Likelihood of Occurrence
FAUNA				
Cuculus optatus	Oriental Cuckoo	-	Non-breeding habitat only: monsoonal rainforest, vine thickets, wet sclerophyll forest or open Casuarina, Acacia or Eucalyptus woodlands. Frequently at edges or ecotones between habitat types	Habitat in the form of Eucalypt woodland is present on site however the site lacks monsoonal rainforest, vine thickets and wet sclerophyll forests. Records of the species have been recorded approximately 10 km north of the site from 2004. It is possible this species may occur as a fly-over or vagrant individual but is unlikely to use the subject site for breeding purposes as the species does not breed in Australia. The species use of the site is likely restricted to occasionally foraging.
Hirundapus caudacutus	White-throated Needletail	Vulnerable	Although they occur over most types of habitat, they are probably recorded most often above wooded areas, including open forest and rainforest, and may also fly between trees or in clearings, below the canopy, but they are less commonly recorded flying above woodland. They also commonly occur over heathland, but less often over treeless areas, such as grassland or swamps.	Wooded areas cover most of the project area which provides potential habitat for the White-throated Needletail. Records from 2019 of the species have been recorded approximately 5 km north of the site. It is possible this species may occur as a fly-over above the subject site, although site surveys did not record the presence of the species.

Species	Common Name	Status	Description of Community /Habitat	Likelihood of Occurrence
Petaurus australis australis	Yellow-bellied Glider	Vulnerable	Occur in tall mature eucalypt forest generally in areas with high rainfall and nutrient rich soils. Forest type preferences vary with latitude and elevation; mixed coastal forests to dry escarpment forests in the north; moist coastal gullies and creek flats to tall montane forests in the south. Den, often in family groups, in hollows of large trees. Very mobile and occupy large home ranges between 20 to 85 ha to encompass dispersed and seasonally variable food resources.	Eucalypt vegetation is present over the entire site. No recent records of the species have been documented within proximity to the project area. The site contains Eucalypt vegetation with some hollow-bearing trees although the lack of recent records of the species and limited connectivity to surrounding vegetation suggests a low likelihood that the Yellow-bellied Glider would occur onsite.
Petauroides volans volans	Greater Glider	Endangered	The Greater Glider is an arboreal nocturnal marsupial that is mostly restricted to eucalypt forests and woodlands, although it occurs in highest abundance in taller, montane, moist eucalypt forests with abundant (large) hollow-bearing trees for shelter and a variety of eucalypt species for feeding. Diet consists of eucalypt leaves, and occasionally flowers. Small home ranges and low dispersability make this species sensitive to clearing and fragmentation, with low persistence in small forest fragments.	Eucalypt vegetation is present over the entire site, with dominate species including *Eucalyptus latinensis* (White Mahogany), *Eucalyptus exerta* (Queensland Peppermint), *Corymbia intermedia* (Pink Bloodwood), *Corymbia trachyphlioa* (Brown Bloodwood) and *Eucalyptus tereticornis* (Forest Red Gum). There were a number of large mature and hollow-bearing trees identified onsite to provide suitable shelter habitat, although historic disturbances of logging and fire throughout the site mean there are relatively few large trees. An ALA record of the species has been recorded within 10 km north of the project area. Suitable shelter habitat in the form of some large and hollow bearing trees exists on site however the site is largely disconnected from surrounding vegetation, which would likely limit the Greater Glider dispersal to the site as the species is highly sensitive to disturbance. The species was not recorded despite targeted searches.

Species	Common Name	Status	Description of Community /Habitat	Likelihood of Occurrence
Phascolarctos cinereus	Koala	Endangered	The Koala is found in a range of habitats, from coastal islands and tall eucalypt forests to low woodlands inland.	Eucalypt vegetation is present over the entire site, with dominate species including *Eucalyptus latinensis* (White Mahogany), *Eucalyptus exerta* (Queensland Peppermint), *Corymbia intermedia* (Pink Bloodwood), *Corymbia trachyphlioa* (Brown Bloodwood) and *Eucalyptus tereticornis* (Forest Red Gum). Online databases show a record of a Koala occurrence approximately 4 km north west of the site in 2011. Although connectivity to surrounding vegetation is limited, due to suitable Eucalypt vegetation covering the area, it is considered a low to moderate likelihood that the Koala would utilise the habitat onsite. Site surveys did not observe Koala within the subject site and surveys using Koala scat detection dogs did not detect the presence of Koalas within the site.
Pteropus poliocephalus	Grey-headed Flying-fox	Vulnerable	Species generally roosts in camps in trees adjacent to larger permanent watercourse. The Grey-headed Flying-fox requires foraging resources and roosting sites. It is a canopy-feeding frugivore and nectarivore, which utilises vegetation communities including rainforests, open forests, closed and open woodlands, Melaleuca swamps and Banksia woodlands. It also feeds on commercial fruit crops. The primary food source is blossom from Eucalyptus and related genera.	Suitable foraging vegetation occurs on-site with the area being entirely covered by Eucalypt dominated vegetation. Records of the Grey-headed Flying-fox have been documented approximately 5 km north of the site in 2011. The nearest known flying-fox roost site is located approximately 5 km north of the site at Harriet Island / Don Tallon Bridge, Bundaberg (293) followed by Baldwin Swamp Conservation Park (772). The nearest known roost supporting Grey-headed Flying-fox with recent records (2019) is located at North Bundaberg Botanic Gardens (585), approximately 5.85 km north-east of the site.
FLORA				

Species	Common Name	Status	Description of Community /Habitat	Likelihood of Occurrence
Cupaniopsis shirleyana	Wedge-leaf Tuckeroo	Vulnerable	The Wedge-leaf Tuckeroo occurs in a variety of dry rainforest vegetation types, including vine thicket communities on hillsides, stream beds and along riverbanks at altitudes up to 550 m above sea level. This species is also likely to occur on the margins of native vegetation in scrubby urbanised areas. Predominately found on dark brown sandy loams and sandy clay loams (pH 5-7.5) and rocky scree slopes. Generally, these soils have formed from volcanic parent materials (mainly granites and granodiorites, basalt and andesitic flows, and pyroclastics).	Dry rainforest vegetation types and vine thicket communities are absent from the subject site. A record of the Wedge-leaf Tuckeroo was documented in 2022 approximately 10 km north-east of the subject site and in 2013 approximately 6 km north-east of the subject site. Although potential habitat in the form of native vegetation is located onsite, field surveys did not identify this species within the referral area therefore it is considered to have a low likelihood of occurrence.
Eucalyptus hallii	Goodwood Gum	Vulnerable	Goodwood Gum is known from the coastal lowlands between Bundaberg and Maryborough, Queensland. The number of populations and the total number of plants is unknown. This species occurs within the Burnett Mary (Queensland) Natural Resource Management Region. The species grows in woodland or open forest with a number of other eucalypts, notably *Eucalyptus latisinensis*, Brown Bloodwood (*Corymbia trachyphloia*) and Smooth-barked Apple (*Angophora leiocarpa*), on flat or gently undulating terrain (Queensland Herbarium, 2008). Soils are grey, sandy to silty in texture with an acidic reaction and derived from tertiary sedimentary rocks (Halford, 1998).	Potential habitat occurs on-site in the mapped Category B (RE12.5.4) vegetation containing *Eucalyptus latisinensis* and *Corymbia trachyphloia* woodlands. Records of the species have been documented in proximity to the subject site approximately 8 km south-west in 2003. No evidence of this species was found onsite and although there is potential habitat located within the referral area it is considered a low likelihood of occurring onsite.

Species	Common Name	Status	Description of Community /Habitat	Likelihood of Occurrence
Macrozamia lomandroides	Cycad	Endangered	Cycad occurs south of Bundaberg between the Elliot and Isis Rivers, in banksia or eucalypt dominated woodlands (wallum) or open forest, on coastal plains or hill slopes in sandy and loamy soil.	Potential habitat for the Cycad is present on the subject site within Eucalypt dominated vegetation. Records of the species from 2006 have been recorded within 10 km of the subject site and there is a record from 1993 approximately 5 km east of the site. No cycad specimens were found within the subject site during the field survey.

3.1.2 Field Surveys

Field surveys utilising the methods outlined in the following subsections were conducted to describe ecological value of the referral area. 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 field surveys for EPBC referral were completed during September 2020, July 2022, August 2022, and September 2022 (see **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.

Infrared fauna camera trapping was applied at the referral area to detect fauna activity in the absence of observers. 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 across it, 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.

Infrared sensing cameras with an infrared flash that use motion to trigger were deployed. Two (2) cameras were installed across the subject site (**Plan A03 – Field Survey Effort**). Cameras were attached 30-100 cm from the ground on a tree or post and directed towards landscape features. The cameras were baited to target evidence of fauna including wild dogs and other potential threats to known MNES in the broader area.

For inventory surveys, cameras were placed in the vicinity of an assumed animal trail within remnant areas more likely to support fauna. Heavy, loose vegetation was avoided as this can cause false triggering, and the camera was aimed to avoid sun shining directly onto the lens. The camera position was directed towards an area away from other frequent survey activity.

Contemporary targeted MNES flora and fauna surveys were undertaken on 15 – 18 May 2023, during relatively warm conditions with minimal recent rainfall within the locality (<20 mm rainfall recorded, BOM 2023) (refer **Table A4**).

Table A4: Field Survey Methods 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

The referral area was broken into one (1) assessment units (AU) to reflect the differing states of the vegetation within the referral area (**Plan A04 – Assessment Units**) as shown in **Table A5**.

Table A5: Referral Area Assessment Units

Assessment Unit	VMA Category	Vegetation Status	Regional Ecosystem	Area (ha)
AU1	Category B	Remnant	RE12.5.4	60.1

Three MHQA transects were applied per assessment unit with observation points utilised to ascertain assessment unit extent (**Plan A03 – Field Survey Effort**).

In order to determine the quantum and quality of the habitat suitable for Koala and Grey-headed Flying-fox within the referral area, vegetation/habitat quality was derived from the Modified Habitat Quality Assessment tool. 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. Refer to **Section 4.8** for more detail on methodology.

Targeted Greater Glider surveys were conducted during the survey period as described within **Section 3.2.1**. Spot Assessment Technique (SAT) surveys were applied to estimate Koala activity levels as described within **Section 3.3.1** following Philips & Callaghan (2011). A GHFF Foraging Habitat Assessment (GHFF FHA) was used to assess the foraging habitat for Grey-headed Flying-fox, described in **Section 3.4.1**.

This PD provides all literature reviewed and cited within a reference list. The source of survey methods, guidelines and historical records are also provided. All survey methods undertaken have been guided by best practice and where applicable, Commonwealth and State survey guidelines for threatened species. This includes the following methodologies:

- *Survey guidelines for Australia's threatened bats.*
- *Terrestrial Vertebrate Fauna Survey Guidelines.*
- *Survey Guidelines for Australia's Threatened Mammals.*
- *EPBC Act referral guidelines for the endangered Koala.*

3.1.3 Desktop analysis

Prior to the commencement of field surveys, a desktop analysis was conducted of Commonwealth, State and Local environmental databases and overlay mapping to identify potential MNES and included the following:

- Commonwealth MNES protected under the EPBC Act on and around the referral area using the protected matters search tool with a 5 km radius (refer **Attachment A4**);
- *Nature Conservation Act 1992* (NCA) listed threatened species on and around the referral area using the wildlife online database search tool with a 5 km radius (refer **Attachment A6**);
- Public environmental databases including Atlas of Living Australia and BioMaps;
- State regulated vegetation management and vegetation supporting maps under the VMA including essential habitat mapping; and
- Local government records where MNES threatened species and communities are known to occur in the area.

Additionally, a review of aerial photography history was undertaken via QImagery to assist with the broad delineation of vegetation communities and to determine historical patterns to local vegetation communities.

3.1.4 Vegetation Communities

The site 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. A summary of the mapped Regional Ecosystems is provided in **Table A6**.

Table A6: Regional Ecosystem Descriptions

Regional Ecosystem	VMA Status	Short Description
12.5.4	Least Concern	*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	None	Non-remnant vegetation

The vegetation within the referral area is mostly consistent with mapped the Regional Ecosystem although some disturbance throughout the vegetation from weed incursion is present. Reviewing the above, the site can be broadly separated into one (1) assessment unit based on the on-ground values (refer to **Plan A04 – Assessment Units**). A total of 41.1 ha of vegetation is proposed to be retained. The assessment units are:

- AU1: Remnant (RE12.5.4) [60.1 ha]

AU1: Remnant (RE12.5.4)

Assessment Unit 1, mapped as RE12.5.4, covers majority of the site. Field survey identified the on-ground vegetation is representative of the mapped RE12.5.4 (refer **Photos 1 and 2**). Species composition is reflective of 12.5.4, which includes a canopy dominated by *Eucalyptus latisinensis* (White Mahogany), *Corymbia intermedia* (Pink Bloodwood), *C. trachyphloia* (Brown Bloodwood) along with *Angophora leiocarpa* (Smooth-barked Apple), *E. exserta* (QLD Peppermint), and *E. 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 (refer **Photo 3**).

Photo 1: **AU1 – Remnant RE 12.5.4 with dominant *Eucalyptus latinensis* and *Corymbia intermedia*.**

Photo 2: **AU1 – Remnant RE 12.5.4 with Giant Rat's Tail Grass dominating the ground layer.**

Photo 3: **AU1 – Evidence of historic fire and *Lantana camara* weed incursion.**

3.1.5 Habitat for Threatened Species

No fauna species listed as threatened under the 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.

Field surveys verified vegetation communities within the site as mapped RE12.5.4 remnant eucalypt woodland dominated by *Eucalyptus latinensis* and *Corymbia intermedia*. 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). There were potential habitat features in the form of hollow-bearing trees to provide potential habitat for *Petauroides volans* (Greater Glider), 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 A03 – Field Survey Effort**).

A total of 43 fauna species were observed across the site (refer **Attachment A7 – Field Data Species Lists**). 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. 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.

Within the original referral Ecological Assessment Report, several MNES were identified as having the potential to occur within or abutting the subject site and therefore were targeted as part of the field survey effort (see **Part B** for details and findings). The following is a summary of the field findings relevant to MNES.

Although field surveys did not record the Grey-headed Flying-fox (*Pteropus poliocephalus*) utilising the referral area, 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.

This PD will consider Koala and Grey-headed Flying-fox as having potential to occur on-site and be impacted by the proposed action. As stated, the proposed action is unlikely to have an impact on Greater Glider, however, assessment of habitat features, and targeted field surveys have been included to justify the lack of significant impact to this species. Detailed surveys for potential habitat surveys have occurred across the referral area – results and discussions are provided in the following subsections.

The quantification of impacts likely to occur on MNES is detailed within **Section 4**, where the avoidance and mitigation measures to be implemented are provided in **Section 5**.

3.2. Greater Glider (*Petauroides volans*)

3.2.1 General Information

Distribution

The Greater Glider is restricted to eastern Australia, occurring from the Windsor Tableland in north Queensland through to central Victoria (Wombat State Forest), with an elevational range from sea level to 1,200 m above sea level.

Habitat and Ecology

The Greater Glider is an arboreal nocturnal marsupial, largely restricted to eucalypt forest and woodlands. It is primarily folivorous with a diet mostly comprising of eucalypt leaves and occasionally flowers. It is typically found in highest abundance in taller, montane, moist eucalypt forests with relatively old trees and abundant hollows. The species favours forests with a diversity of eucalypt species, due to seasonal variation in its preferred tree species.

During the day it shelters in tree hollows, with a particular preference for large hollows in large, old growth trees (Smith *et al.,* 2007). The presence of large trees and hollow-bearing trees within a forest provides essential foraging and sheltering resources for Greater Gliders in Queensland, while small trees may also be selected for foraging and occasionally denning (Eyre *et al.* 2022). Hollows utilised by Greater Gliders have been described by a mean diameter entrance of 18 cm (Kehl & Borsboom 1984) and between 8 to 15 cm (Mackowski 1984). However Greater Glider individuals located within Woodlinks development (EPBC ref 2013/6866) in 2019 were associated with hollows ranging from 50-100mm diameter (i.e. 5-10 cm).

The species is considered to be particularly sensitive to forest clearance and intensive logging practices (Kavanagh and Wheeler, 2004). Subsequently, Greater Gliders have relatively low persistence in small forest fragments and disperse poorly across vegetation that is not native forest. Modelling suggest that they require native forest patches of at least 160 km^2 to maintain viable populations (Eyre 2002).

Item 2.1.1 of the PD request asks for ***'Provide a habitat assessment for relevant listed species'.***

Vegetation within the referral area is mapped as remnant vegetation, consisting of a relatively large patch of bushland dominated by *Eucalyptus sp.* The site has been subject to moderate disturbance from logging and historic fire, along with significant weed incursion at the ground layer. Whilst disturbed, the site contains some larger trees and hollow-bearing trees which are required for breeding and shelter that may be suitable for Greater Glider habitat. Refer to **Plan A05 – Greater Glider Habitat and Impact** for the of extent potential Greater Glider habitat mapped across the site.

Greater Gliders are reported to be absent from forests with fewer than six habitat trees per hectare, however, a recent review of Greater Glider habitat in Queensland suggests the presence of large trees rather than densities of hollow-bearing trees should be used to define whether an area is Greater Glider habitat or not habitat (Eyre *et al.* 2022). The presence of remnant *Eucalyptus sp.* of a range of sizes on the referral site is therefore indicative of potential suitable Greater Glider habitat (Eyre *et al.* 2022). It is considered possible

that Greater Glider individuals could utilise the site and utilise resources present for foraging due to the presence of preferential tree species *Eucalyptus tereticornis* and *Corymbia intermedia*.

However, the Greater Glider is known to be highly sensitive to disturbance and fragmentation. Significant fragmentation occurs surrounding the site, and it is considered unlikely the species would traverse these areas to reach the site. Further, the absence of recent species records suggests a low likelihood of occurrence. Disturbances onsite including logging and fire are expected to be deterrents to the species, along with competition from habitat analogous species *Petaurus breviceps* (Sugar Glider).

Item 2.1.2 of the PD request asks for ***'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'.***

Plan A06 – Greater Glider Records shows no records of Greater Glider within 5 km of the site, while one (1) record of the Greater Glider is present within 20 km of the site. In addition, a search of Atlas of Living Australia using a 10 km search radius from the site returned no recent records of Greater Glider, although two records without a date are located within 5 km north of the site and are suspected to be record errors. It is noted significant barriers exist between the site and this record in the form of residential developments, main roads and cleared agricultural land. Other surrounding records pre-date the year 2001, with the most recent record (2016) approximate 40 km north-west of the site. According to the Queensland BioMaps recent local records for the species are lacking.

Item 2.1.3 of the PD request asks for **'Provide detailed mapping of suitable habitat (within, adjacent to and downstream of the project site, where relevant) for all listed threatened species, which:**

- **is specific to the habitat assessment undertaken for each listed threatened species (i.e., does not only illustrate relevant Queensland Regional Ecosystems);**
- **includes an overlay of the project disturbance footprint (including the wetlands);**
- **includes known records of individuals derived from desktop analysis and field surveys; and**
- **is provided separately as attachments in JPEG format'.**

Plan A07 – Greater Glider Fragmentation Analysis, shows the extent of potential Greater Glider habitat within 5km and 10km of the subject site. Suitable habitat areas are severely limited surrounding the referral area due to existing infrastructure and cleared areas impacting retained vegetation. There is only approximately 9.3% of potential Greater Glider habitat within 10km of the referral area and these areas represent small, unconnected patches of retained vegetation amidst a fragmented landscape of residential and agricultural areas. These do not represent large contiguous areas of eucalypt forest and do not form smaller habitat patches connected to larger patches of habitat as defined in Greater Glider critical habitat. Greater Gliders are absent from cleared areas and have little ability to disperse through cleared areas, with the species more likely to occur within large patches of native forest than remnant isolated patches particularly in southern Queensland (Pope *et al.* 2004; Eyre 2006; Youngentob *et al.* 2013). Surveys in

southern Queensland by Eyre (2006) determined the smallest forested patch Greater Gliders were detected in was 160 ha. Eyre (2006) predicted Greater Glider density to decline with > 15 % clearing within 1 km. As such, **Plan A07** includes a 100 m buffer from existing cleared areas and infrastructure likely to impact potential Greater Glider habitat with fragmented and small habitat patches removed from potential habitat.

Adjoining landscape to the west of the site contains cleared land earmarked for future residential development which adjoins the Bundaberg Airport further to the west. Cleared land exists to the north which is also earmarked for future 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 activities 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 foraging habitat for the Greater Glider, 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.

Item 2.1.4 of the PD request asks for **'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'.**

Desktop searches and analyses were undertaken prior to field surveys to determine the likelihood of occurrence of the species within or near the site. This assessment determined that based on the data the potential likelihood of occurrence for this species was 'low - moderate'. Following field surveys, the likelihood of occurrence was reduced to 'low'. The species was not recorded on-site, despite targeted searches, and while potential suitable habitat is available, it is considered low likelihood that Greater Glider would utilise the site due to limited connectivity to surrounding vegetation, and moderate disturbance onsite. Previous surveys were undertaken at the referral area during September 2020, July 2022 and August 2022 which did not identify any evidence of the species.

Targeted surveys completed across the subject site included habitat assessment and diurnal surveys, where the site was assessed for potential MNES. The diurnal surveys were completed during 15 – 18 May 2023. In addition, spotlighting surveys were completed on 16 and 17 May 2023. As part of the referral documentation (refer **Part B**), trees over 300mm diameter at breast height (DBH) were identified and the location plotted using a handheld GPS unit across the entire site during site surveys in 2020 (refer **Plan A03 – Field Survey Effort**). Specific trees bearing hollows were mapped during the contemporary field surveys from 15 – 18 May 2023.

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.

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 where necessary to meet the total of 1 km requirement of the guideline, notably, all transects except Transect 1 exceed 1 km in length. Transect 1 was completed for less than 1 km due to poor weather conditions during evening surveys which resulted in the survey finishing prematurely. This aligns with the *Terrestrial Vertebrate Fauna Survey Guidelines for Queensland* (2022) which recommend spotlighting surveys not be undertake during inclement weather, as this significantly reduces detection rates. 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. In accordance with the *Terrestrial Vertebrate Fauna Survey Guidelines for Queensland* (2022) a high-quality pair of binoculars and 14W spotlight was used to detect arboreal species.

The total distance of spotlighting surveys conducted at the site was 3.4 km across two nights with a survey effort of approximately 270 minutes (**Table A7**). While the duration of the surveys does not entirely meet the duration requirements outlined in the Conservation Regulator Victoria Guidance Note: *Reporting detections of Greater Gliders* (2021) (which would be 340 minutes for 3.4 km), it is anticipated that 3.4 km survey effort was adequate to identify the presence / absence of Greater Glider across the site and surrounding vegetation as these were completed by multiple observers. As two observers surveyed the site the total duration of surveys is 540-person minutes in accordance with *Terrestrial Vertebrate Fauna Survey Guidelines for Queensland* (2022) which is adequate to detect the presence of Greater Glider onsite.

The two observers surveyed the referral area on three (3) separate occasions during the survey period on different nights as per the *Terrestrial Vertebrate Fauna Survey Guidelines for Queensland* (2022). These surveys included spotlighting close to dusk (< 1 hr after dusk) on two occasions and once later (> 1 hr after dusk) (Eyre and Ferguson *et al.* 2022). It is considered that the survey methodology, effort, timing, and equipment used was appropriate for surveying Greater Gliders and was undertaken suitably in accordance with the relevant survey guidelines discussed above (**Table A7**).

Table A7: Greater Glider Survey Guidelines compared to SHG Survey Effort

Transect	Date	Duration	Observers	Distance
Transect 1	16th May 2023	60 minutes	Two (120-person minutes)	610 m
Transect 2	17th May 2023	170 minutes	Two (340-person minutes)	1.52 km
Transect 3	17th May 2023	40 minutes	Two (80-person minutes)	1.28 km
Total	N /A	270 minutes		3.4 km
Survey Guidelines (Victoria)	N / A	10 mins per 100 m 1 hr 40 minutes per transect	Two	1 km per transect
Survey Guidelines (Queensland)	N/A	30-person minutes	Two	100 m x 100 m survey site, 100 m per transect

Item 2.1.5 of the PD request asks for **'Attach all relevant ecological surveys referenced in the referral and preliminary documentation as supporting documents to the preliminary documentation'.**

Plan A03 – Field Survey Effort provides a summary of the field survey effort. **Attachment A7** outlines the flora and fauna species detected onsite during the contemporary field surveys and further details on the results and methodologies used are provided in **Sections 3.2.2** and **4.8.1** below.

Refer to **Attachment A21** for targeted spotlighting survey data and results.

3.2.2 Species Specific Information

This section addresses Section 2.2 of the PD Request.

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

Item 2.2.1 of the PD Request asks for, *'**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**.'*

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. As outlined above, these surveys were conducted in accordance with *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). Spotlighting surveys utilised methods outlined in 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).

Connectivity to nearby vegetated areas was assessed, with connectivity to the site from these areas considered poor. To the south, Bundaberg Ring Road poses a significant barrier to fauna movement into the remnant patch of vegetation to the south (refer **Figure A1 – Development Footprint**). A thin strip of linear vegetation adjoins the site to the west, however beyond this is cleared land earmarked for residential development along with the Bundaberg Airport which contains a large tract of cleared land. Vegetation adjoining the site to the east is considered to have some connectivity to the site, however this vegetation contains moderate weed incursion from *Lantana camara* (Lantana) and disturbance (clearing) from activities within the adjoining Bundaberg Brewed Drinks Factory. It is noted that cleared tracks border the edge of the site along all boundaries (refer **Photo 4**). Patches of remnant vegetation exist further to the north and north-east, however cleared land and residential development are present between these patches and the site, limiting connectivity to these areas.

Photo 4: Eastern boundary of the site with cleared track along the boundary.

Item 2.2.2 of the PD Request asks to '***state the total number of records (individuals and evidence of presence) within and/or adjacent to the project site identified during surveys***.'

No Greater Glider individuals nor evidence of presence were detected within or adjacent to the project site during field surveys.

Item 2.2.3 of the PD Request asks for '***identification of all areas of Eucalypt forest and woodland within and adjacent to the project site which contain hollow-bearing trees.'***

Plan A05 – Potential Greater Habitat and Impact shows all areas of Eucalypt forest and woodland that provides potential habitat for Greater Glider within and adjacent to the project site which contain hollow-bearing trees.

Item 2.2.4 of the PD Request asks to provide '***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.'***

Hollow-bearing trees were plotted in the northern extent of the impact area onsite (refer **Plan A03 – Field Survey Effort**). Within this 16ha subset area, 69 trees containing hollows were identified (refer **Table A8**). The diameter at breast height (DBH) of these trees varied from 200mm – 1300mm, with the majority (86.96%) of the hollow-bearing trees with a DBH less than 800mm (refer **Table A9**). A total of 184 hollows were recorded with the majority of hollows identified being medium (100-300mm) at 97 (52.71%) and small (0-100mm) at 80 (43.47%) (refer **Table A10**).

From the subset area of 16ha, it is estimated the density of hollow-bearing trees across the site is 4.31 trees / ha. This equates to approximately 266 trees across the 61.737ha site.

Table A8: Hollow-bearing Tree Plot Summary

Scientific Name	Common Name	Number Recorded	Percentage Recorded (%)
Corymbia intermedia	Pink Bloodwood	4	5.80%
Corymbia trachyphloia	Brown Bloodwood	9	13.04%
DEAD/STAG	-	30	43.48%
Eucalyptus exserta	Queensland Peppermint	15	21.74%
Eucalyptus latisinensis	White Mahogany	9	13.04%
Eucalyptus tereticornis	Forest Red Gum	2	2.90%
TOTAL		**69**	**100%**

Table A9: Hollow-bearing Tree Plot DBH Summary

Total DBH (mm)	Number Recorded	Percentage Recorded (%)
<0 or (blank)	0 (Not Recorded)	0.00%
200-299	3	4.35%
300-399	6	8.70%
400-499	13	18.84%
500-599	18	26.09%
600-699	9	13.04%
700-799	11	15.94%
800-899	5	7.25%
900-999	2	2.90%
1000-1099	1	1.45%
1200-1299	1	1.45%
TOTAL	**69**	**100%**

Table A10: Size of hollow's identified during Hollow-bearing Tree Plot

Hollow Type	Number Recorded	Percentage Recorded (%)
Small Hollows 0 – 100mm	80	43.47%
Medium Hollows 100 – 300mm	97	52.71%
Large Hollows > 300mm	7	3.80%
TOTAL	**184**	**100%**

Item 2.2.5 of the PD Request asks for '***A detailed discussion of potential foraging habitat in Eucalypt forest and woodland adjacent to areas of Eucalypt forest and woodland which contain tree hollows.'***

The Greater Glider shows a foraging preference for young eucalypt leaves with higher nitrogen concentrations in tree species with higher concentrations of foliar nutrients (Smith *et al.* 2007; Eyre *et al.* 2022). The species has been shown to preferentially feed on *Eucalyptus moluccana* (Grey Box), *E. fibrosa* (Red Ironbark) and *Corymbia citriodora* (Spotted Gum) trees of 30 – 70cm (DBH) (Smith *et al.* 2007). Greater Gliders also commonly feeds on *Corymbia intermedia* and *Eucalyptus portuensis* (Eyre *et al.* 2022). Forests with a diversity of eucalypt species are important for the species due to seasonal variation in growth and nutrient content of foliage where specific foraging species favoured by Greater Gliders varies between areas. As such, Greater Gliders are associated with forests dominated by old-growth, hollow-bearing trees or particular tree species with either high folia nutrients and production of young leaf growth. In Queensland, both large trees and hollow-bearing trees are essential foraging and sheltering resources for Greater Gliders (Eyre *et al.* 2022).

Potential foraging 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 *Eucalyptus exserta* (Queensland Peppermint), *Corymbia trachyphloia* (Brown Bloodwood)

and *Angophora leiocarpa* (Smooth-barked Apple). Preferred Greater Glider feed trees *Corymbia intermedia* (Pink Bloodwood), *Eucalyptus latisinensis* (White Mahogany) and *E. tereticornis* (Forest Red Gum) 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.

Item 2.2.6 of the PD Request asks for '***A discussion of habitat and habitat use requirements (e.g., foraging, dispersal, shelter, etc.) in line with the updated Conservation Advice for the Greater Glider (July 2022).'***

Greater Glider habitat consists of eucalypt forests and woodland of eastern Australia with a preference for fertile areas with relatively old trees and abundant hollows (Eyre 2006). Tree hollows are critical habitat features used by the species for denning during the day, where there is a preference for large hollows (> 10cm diameter at breast height, DBH) in large, old trees (Smith *et al.* 2007; Goldingay 2012). Greater Glider home ranges tend to be small at approximately 1– 4 ha (Pope *et al.* 2004) in fertile areas but have been shown to vary up to 19 ha in forests on less fertile sites and more open woodlands. Species density in south eastern QLD varies from 0.2 to 2.3 individuals per hectare (Smith *et al.* 2007).

In Queensland Greater Gliders are commonly associated with Regional Ecosystems (RE's) containing the tree species *Corymbia citriodora* (Spotted Gum), *Eucalyptus moluccana* (Grey Box), and *E. tereticornis* (Forest Red Gum) (Eyre *et al.* 2022). Although the species has been found in higher abundance in more productive tall eucalypt forests, the species does occur in moderately productive dry mixed eucalypt forest types dominated by *E. tereticornis* or *E. camaldulensis*, grey gum species (predominantly *E. longirostrata* and *E. biturbinata*), *Lophostemon spp.* and *C. citriodora* (Eyre 2006). Large, older trees in the stand cohort (> 50 cm DBH) are important for denning use by Greater Gliders as most tree species tend to form hollows when they are relatively large such as *Corymbia citriodora* and *Eucalyptus tereticornis* (>80 cm DBH) (Eyre 2006; Smith *et al.* 2007; Eyre *et al.* 2022). Tree species preferentially selected for denning by the species in south-eastern QLD include *Eucalyptus acemenoides* (Broad-leaved White Mahogany), *E. fibrosa* (Red Ironbark), *E. tereticornis* (Forest Red Gum) and *Corymbia citriodora* (Spotted Gum) as these trees tend to form hollows more readily than others, however a variety of tree species have been shown to be used for denning across the distribution (Smith *et al.* 2007).

Item 2.2.7 of the PD Request asks for '***the total area (in hectares) of Greater Glider habitat, including foraging habitat.'***

While the site contains potential habitat features including large hollow-bearing trees, the site does not represent a large continuous patch of vegetation nor a small connected habitat patch. The site is isolated from surrounding habitat patches from roads, cleared areas and existing development. Therefore, while the site contains approximately 59.6 ha of vegetation that could represent Greater Glider habitat, this area is not considered habitat as it is highly fragmented.

3.2.3 Critical Habitat Discussion

Section 2.3 of the PD lists '***Habitat critical' descriptions for listed threatened species likely to be impacted by the proposed action'***.

Item 2.3.1 of the PD Request describes '***Habitat critical to survival for the greater glider (southern and central) relevant to this project includes but is not limited to:***

- ***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***
- ***smaller or fragmented habitat patches connected to larger patches of habitat, that can facilitate dispersal of the species and/or that enable recolonization.***

Note: The presence of trees with basal diameter >30 cm can be used as a proxy measure for tree hollows used by Greater Gliders in Queensland.

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.'

As discussed in the sections above, features of Greater Glider habitat are present within the subject site. Vegetation onsite is characteristic of an open woodland with a variety of Eucalypt species including *Eucalyptus latisinensis, Corymbia intermedia*, *C. trachyphlioa*, *Eucalyptus exserta*, *E. tereticornis* and *Angophora leiocarpa*. Other tree species present across the site include *Melaleuca quinquenervia* (Broad-leaved Paperbark), *Lophostemon suaveolens* (Swamp Box), *Alphitonia excelsa* (Soap Tree), *Acacia disparrima* (Hickory Wattle) and *Acacia leiocalyx* (Early-flowering Black Wattle) in the sub-canopy. Field surveys confirm the presence of hollow-bearing trees within the referral area and the vegetation contains a diverse range of the species' preferred food species. 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.

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 largely 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. There is only approximately 9.3% of potential Greater Glider habitat within 10km of the referral area and these areas represent small, unconnected patches of retained vegetation amidst a fragmented landscape of residential and agricultural areas. These do not represent large contiguous areas of eucalypt forest nor are smaller habitat patches connected to larger patches of habitat defined as Greater Glider critical habitat.

3.3. Koala (*Phascolarctos cinereus*)

3.3.1 General Information

Distribution

The Koala is found from north-east Queensland to the south-east corner of South Australia. As a consequence of translocations, the Koala are found outside their historic range, for example, Kangaroo Island. The distribution of Koala is influenced by altitude, temperature and leaf moisture. The density of the Koala population in coastal regions is generally greater than inland areas.

Habitat and Ecology

While Koalas choose their habitat based on the suitability of food trees, the reasons for choosing these trees are not well understood. Soil fertility is thought to strongly influence the acceptability, palatability and nutritional content of selected browse species, whilst chemical composition is also suspected as a major factor determining the acceptance of selected foliage (Cork & Sanson 1990, Cork & Braithwaite 1996; Moore & Foley 2000; Moore *et al.,* 2005). Collectively, the suite of tree species considered to be of primary and/or secondary importance to Koalas within South East Queensland include the following (after: Pahl 1993; QEPA 2002 & 2006a; & EHP 2012): *Eucalyptus acmenoides, E. carnea, E. crebra, E. exserta, E. fibrosa, E. grandis, E. major, E. moluccana, E. populnea, E. propinqua, E. racemosa, E. resinifera, E. robusta, E. seeana, E. siderophloia, E. signata, E. tereticornis, E. tindaliae, E. microcorys, E. umbra, Corymbia citriodora, C. intermedia, Lophostemon confertus*, and *Melaleuca quinquenervia*.

Home ranges are also known to vary considerably due to a variety of factors including location (e.g. home ranges in habitats of lower productivity being larger than those within higher quality habitats) and availability of preferred forage trees, though typically, males have larger home ranges on average than females. In South East Queensland, Koala Coast home ranges were found to vary between 2-20 ha (Thomson 2006), whilst in rural south-east Queensland, home ranges varied between 5.3-91.4 ha (White 1999). Koalas successfully use highly fragmented habitats that have only small remnants of the original vegetation (White 1999; QEPA 2006a and references cited therein). They also use young forest and highly modified vegetation such as grazed, disturbed or thinned forest and regrowth areas, moving significant distances across the ground between preferred trees (e.g. White 1999). Research has also found they prefer larger trees (QEPA 2006a and references cited therein). Koala populations in SEQ, the Brigalow Belt and Mulga Lands bioregions are subject to substantial declines (Dique *et al.,* 2004; DERM 2009).

The main identified threats to the Koala are loss and fragmentation of habitat, vehicle strike, disease, and predation by dogs (*Canis lupus familiaris*) (DERM 2009). Studies completed as part of the Moreton Bay Rail project (DTMR 2016) found that between 2013 and 2016, 113 koalas had been killed by wild dogs with an additional 38 koala deaths suspected as wild dog predation, 82 koala deaths caused by illness and nine (9) vehicle strike deaths. These figures indicate that the threat of wild dog predation is at the forefront, while disease and vehicle strikes are also ongoing contributors to koala deaths.

Item 2.1.1 of the PD request asks for ***'Provide a habitat assessment for relevant listed species'.***

The referral area is dominated by vegetation types containing non-juvenile Koala habitat trees (NJKHTs) which provide habitat for the Koala. Vegetation surveys conducted across the site determined the property is dominated by species that achieve the definition of 'woodland' and 'forest' with open areas as referenced in the Koala Referral Guidelines. Refer to **Plan A08 – Koala Habitat and Impact** for the of extent critical Koala habitat mapped across the site.

Koala (*Phascolarctos cinereus*) is considered to have potential to occur on-site due to the vegetation communities present. Detailed vegetation assessments were undertaken across the referral area and identified that suitable habitat for Koala was available in areas where Eucalypt, Corymbia, Lophostemon and Melaleuca tree species were available for Koalas to utilise. It is noted, surveys utilising Koala detection dogs outlined in the Ecological Assessment Report (see **Part B** for details and findings) did not find any evidence of Koala utilising the referral area.

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. A detailed assessment of habitat quality for Koala onsite is provide in **Section 4.8.2**.

Item 2.1.2 of the PD request asks for ***'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'.***

Detailed analysis of available DES and Koala Hospital data indicates that records of Koala have been recorded within a 5 km radius of the proposed action area. **Plan A09 – Koala Records** shows one (1) record of the species within 5km of the site and two (2) records of Koala within 20km of the site. This reflects Koala sightings shown by Atas of Living Australia (ALA) and Wildlife Online include one (1) record from 2011 within 5km of the subject site, and three records from 1968, 1987, 1997 within 20km of the subject site. The records are located to the north-west and south of the subject site.

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 31st August – 1st 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 (see **Part B – Ecological Assessment Report**).

Item 2.1.3 of the PD request asks for **'Provide detailed mapping of suitable habitat (within, adjacent to and downstream of the project site, where relevant) for all listed threatened species, which:**

- **is specific to the habitat assessment undertaken for each listed threatened species (i.e., does not only illustrate relevant Queensland Regional Ecosystems);**
- **includes an overlay of the project disturbance footprint (including the wetlands);**
- **includes known records of individuals derived from desktop analysis and field surveys; and**
- **is provided separately as attachments in JPEG format'.**

Plan A10 – Koala Context Assessment, shows the extent of potential Koala habitat within 1km of the subject site. 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.

Item 2.1.4 of the PD request asks for **'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'.**

Surveys for detecting the presence of Koala within the subject were undertaken during September 2020, July 2022, and August 2022 as part of the EPBC referral and contemporary surveys conducted during May 2023. Targeted survey involving the use of Koala scat-detection dogs was undertaken 31st August – 1st September 2022 to provide further certainty regarding the presence or absence of Koalas within the site. The survey was undertaken by OWAD covering a total of 26 km in a systematic manner across the entire site area (refer **Part B – Ecological Assessment Report**). This survey did not detect the presence of Koalas within the site.

Tools for determining localised levels of use by *Phascolarctos cinereus* (Koala) included the Spot Assessment Technique (SAT), spotlighting, two (2) motion sensing cameras as well as direct observations for Koala and Koala activity throughout the field survey period. An assessment for habitat suitability for Koala was also completed using the MHQA methodology. Targeted surveys for Koala were undertaken during the field surveys period from 15 – 18 May 2023. SAT surveys were undertaken on-site in accordance with the

methodology developed by the AKF[1] and specified in the EPBC Act Referral Guidelines for the Vulnerable Koala (specifically, the *Survey Guidelines for Australia's Threatened Mammals* was incorporated where relevant). Previous surveys were undertaken at the referral area during September 2020, July 2022 and August 2022 which did not identify any evidence of the species.

In accordance with the *EPBC Act Referral Guidelines for the Vulnerable Koala* (hereafter referred to as the 'Koala referral guideline') the Spot Assessment Technique (SAT) was applied in to search the site for the potential presence of the Koala. The SAT method is an assessment of Koala activity involving a search for any Koalas and / or signs of Koala usage. The SAT involves identifying a non-juvenile tree of any species within the site that is either observed to have a Koala or scats or is known to be a food tree or otherwise important for Koalas and recording any evidence of Koala usage of that tree including presence, identifiable scratches or scats. The nearest non-juvenile tree is then identified, and the same data recorded. The next closest non-juvenile tree to the first tree is then assessed and so on until 30 trees have been surveyed. Assessment of each tree involves a systematic search for Koala scats beneath the tree within one metre radius of the trunk. After approximately two minutes of searching for scats, the base of the trunk is observed for scratches and the crown for Koala. The number of trees showing evidence of Koala activity is expressed as a percentage of the total number of trees sampled to indicate the frequency of Koala usage[1]. Three (3) SAT surveys were completed during the survey period from 15 – 18 May 2023 and no evidence of Koala utilisation of the site was found.

In addition, assessing the suitability of habitat on-site for Koala and assessing potential connectivity values on properties adjacent to the site was completed. Habitat assessment surveys were completed during the survey period from 15 – 18 May 2023. Habitat values were assessed through identifying the extent of known Koala food trees on-site (i.e., Eucalypt, Corymbia, Angophora, Lophostemon, Melaleuca), modification levels (i.e., within woodland, site disturbance, surrounding activities) and the potential connectivity opportunity to surrounding habitat. Connectivity opportunity was assessed through considering the surrounding regional ecosystems, and ground-truthing these where possible, identifying current and approved future land uses, and substantial barriers intersecting potential habitat such as major roads. The resultant field survey efforts were analysed through GIS and are illustrated in **Plan A03 – Field Survey Effort**.

Koala stocking rate scores are calculated using the SAT activity categories taken from the Australian Koala Foundation Koala activity level classification table by Phillips & Callaghan (2011) (refer **Table A11**).

Table A11: Koala Activity Level Classification (Phillips and Callaghan 2011)

Usage	East Coastal (low)	East Coastal (med-high)	Western (med-high)
Low	<9.5%	<22.5%	<35.8
Moderate	9.5-12.6%	22.5-32.8%	35.8-46.7

[1] 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.

Usage	East Coastal (low)	East Coastal (med-high)	Western (med-high)
High	>12.6%	>32.8	>46.7

Categories are assigned as follows:

- Sites considered to be suitable or have high suitability for Koalas are assigned the East Coastal (med-high) category;
- Sites considered to have low suitability are assigned the East Coastal (low) category; and
- The Western category does not apply to South East Queensland Local Government Areas.

The East Coast (low) Activity Category is applicable to low density populations in central Queensland (Ellis *et al.* 2002).

Surveys of Koala utilization were conducted across the subject site to determine the likelihood of occurrence throughout the entire extent and identify whether there was any concentrated occurrence. A total of three Koala SAT surveys were conducted, at the three transect locations. **Table A12** presents the Koala usage scores for the 3 SAT surveys completed.

Table A12: Summary of SAT Results

SAT Site Number	SAT Score	Evidence of Koala Use (%)	Mean usage per AU	Koala Use (High/Medium/Low)
AU1				
S1 (@T1)	0/30	0%	0%	Low
S2 (@T2)	0/30	0%		
S3 (@T3)	0/30	0%		

The Australian Koala Foundation Koala activity level classification table (following Philips and Callaghan 2011) provides an estimate of koala utilisation based on defined Activity Categories. The East Coast (low) Activity Category is appropriate for the site. No evidence of Koala activity was found within the site. It is noted that search conditions for scats were hindered due to dense *Sporobolus pyramidalis* (Giant Rat's Tail Grass) at the ground layer, however surveys by a scat detection dog during surveys in 2022 did not find any evidence of Koala usage onsite. The apparent absence of Koala usage at the site may be a result of major changes in the immediate landscape including Bundaberg Ring Road and recent, ongoing residential development.

Opportunistic searches for Koalas were also undertaken as part of the field survey effort. No Koalas were observed on the site. Overall, across the survey period (September 2020, July 2022 and March 2023), a combination of survey methodologies to detect the presence of Koalas onsite were utilised. These included opportunistic daytime searches, Koala scat-detection dog, utilization SAT surveys, two nights spotlighting, deployment of motion sensing cameras and habitat assessment. The survey effort from 2023 included three (3) day time targeted survey periods and two (2) targeted night time surveys. It is anticipated the

combination of these methodologies, which were undertaken in accordance with departmental survey guidelines, provides an adequate survey effort across the site to determine the presence / absence of Koala.

Item 2.1.5 of the PD request asks for **'Attach all relevant ecological surveys referenced in the referral and preliminary documentation as supporting documents to the preliminary documentation'.**

Plan A03 – Field Survey Effort provides a summary of the field survey effort. **Attachment A7** outlines the flora and fauna species detected onsite during the contemporary field surveys and further details on the results and methodologies used are provided in **Sections 3.3.2** and **4.8.2** below.

3.3.2 Species Specific Information

This section addresses Section 2.2 of the PD Request.

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

Item 2.2.8 of the PD Request asks for '***A discussion of vegetation composition and structure (i.e., known food trees).'***

The vegetation onsite consists of open Eucalypt woodland containing a variety of known Koala food trees. The site is dominated by *Corymbia intermedia* and *Eucalyptus latisinensis* with *Corymbia trachyphlioa*, *Eucalyptus exserta*, *Angophora leiocarpa*, and *Eucalyptus tereticornis*. Other tree species present across the site include Koala food species *Melaleuca quinquenervia* (Broad-leaved Paperbark) along with *Lophostemon suaveolens* (Swamp Box), *Alphitonia excelsa* (Soap Tree), *Acacia disparrima* (Hickory Wattle) and *Acacia leiocalyx* (Early-flowering Black Wattle) in the sub-canopy. Native vegetation is limited in the shrub and ground layer, with *Sporobolus pyramidalis* (Giant Rat's Tail Grass) dominating much of the later, and patches of *Lantana camara* throughout the shrub layer. Some disturbance from historic fire and logging was present throughout the vegetated site.

Item 2.2.9 of the PD Request asks for '***A discussion of habitat and habitat use requirements (e.g., foraging, dispersal, shelter, etc.) in line with the updated Conservation Advice and National Recovery Plan for the Koala (March 2022).'***

Koala's inhabit forests and woodlands dominated by *Eucalyptus* species with models suggesting suitable habitat where the mean maximum summer temperatures are 23-26◦C and mean annual rainfall ranges from 700-1500mm (DAWE 2022). Habitat requirements for the species include access to sufficient food and shelter trees to achieve daily energetic requirements and reproductive needs along with predator avoidance. Koala's diet consists of a variety of *Eucalyptus, Corymbia* and *Angophora* species and are reported to utilise more than 400 different species of tree for their food and habitat requirements. Tree species selection for browsing varies between regions based on species availability and nutritional value. Koalas are nocturnal and spend time moving across the ground between food and shelter trees, which increases during breeding season (DAWE 2022).

Item 2.2.10 of the PD Request asks for '***The total area (in hectares) of each identified habitat type (e.g., foraging, dispersal, shelter, etc.).'***

Approximately 59.6 ha of the site contains potential foraging, dispersal, and shelter habitat for the Koala. However, no evidence of Koala usage was found onsite, and due to significant fragmentation from surround disturbances it is considered a low likelihood the species would occur onsite.

3.3.3 Critical Habitat Discussion

Section 2.3 of the PD lists '***Habitat critical' descriptions for listed threatened species likely to be impacted by the proposed action'.***

Item 2.3.2 of the PD Request describes '***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.***

Note: Habitat critical to the survival of the species includes habitat occupied and habitat currently unoccupied.'

As outlined above, the site contains suitable habitat for Koala in the form of remnant woodland vegetation dominated by Koala food trees *Corymbia intermedia* and *Eucalyptus latisinensis* with *Corymbia trachyphlioa*, *Eucalyptus exserta*, *Angophora leiocarpa*, and *Eucalyptus tereticornis*. As such habitat critical to the survival of the Koala is present onsite. The subcanopy contains Koala food species *Melaleuca quinquenervia*. 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 Koala.

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 largely 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.

3.4. Grey-headed Flying-fox (*Pteropus poliocephalus*)

3.4.1 General Information

Distribution

The Grey-headed Flying-fox (GHFF) occurs between Rockhampton in Queensland to Melbourne in Victoria. The species will usually selectively forage where food is available and as such, its patterns of occurrence and relative abundance vary between seasons and years. There are no separate or distinct populations due to the constant genetic exchange and movement between camps throughout its geographic range.

Habitat and Ecology

GHFF requires foraging resources and roosting sites to persist. The species is known to use a wide variety of habitats including subtropical and temperate rainforests, tall sclerophyll forest and woodlands, heaths, swamps and also urban and agricultural areas where food trees have been cultivated. The species is highly adaptive with its diverse native diet, which it can supplement with introduced species. It is known to forage within a variety of habitat areas as each resource does not produce food throughout the entire year.

Item 2.1.1 of the PD request asks for ***'Provide a habitat assessment for relevant listed species'.***

The site contains Eucalypt dominated open woodland containing species including *Corymbia intermedia* and *Eucalyptus latisinensis*, along with *Corymbia trachyphloia*, *Eucalyptus exserta* and *Eucalyptus tereticornis*. Important winter and spring flowering species listed in the GHFF National Recovery Plan were identified onsite including *Eucalyptus tereticornis* and *Melaleuca 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 (refer **Plan A11 – GHFF Habitat Impact**). 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.

It is acknowledged that the DCCEEW considered Grey-headed Flying-fox foraging habitat analogous with critical habitat for the Koala. As such, vegetation on site is considered to provide suitable foraging habitat for the Grey-headed Flying-fox. It is likely that the site would provide potential foraging habitat for the GHFF. No camps are currently active flying-fox in the direct vicinity of the site with the closest active roost to the subject site located approximately 5 km north of the site at Harriet Island / Don Tallon Bridge, Bundaberg (293) followed by Baldwin Swamp Conservation Park (772). The nearest known roost supporting Grey-headed Flying-fox with recent records (2019) is located at North Bundaberg Botanic Gardens (585), approximately 5.85 km north-east of the site.

As discussed, no roosts for this species were identified within the site, nor were individuals recorded foraging within the site. Vegetation within the site is considered to provide foraging habitat for this species, given the distribution of important winter and spring flowering species including *Corymbia* and eucalypts within the site. However, habitat did not contain any special or unique values and the nearest known roost

site is located approximately 5 km north-east of the site. The removal of the potential foraging habitat is considered unlikely to have a significant impact on the availability of habitat in the landscape, given the vast quantity and availability of flowering flora in the broader area, most notably the dedicated conservation areas including Bingera National Park, Burrum Coast National Park and Cordalba National Park south of the site. Refer to **Plan A11 – GHFF Foraging Habitat and Impact** for the of extent potential GHFF foraging habitat mapped across the site. A detailed assessment of habitat quality for GHFF onsite is provide in **Section 4.8.3**.

Item 2.1.2 of the PD request asks for ***'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'.***

The closest recorded camp to the subject site is located at Harriet Island / Don Tallon Bridge, Bundaberg (293). A further five (5) inactive and active roosts are located within 20 km of the site, notably Bundaberg, Baldwin Swamp Environment Park (722), North Bundaberg Botanic Gardens, Young St (585) and Avoca, McCoys Creek (712) (refer **Plan A12 – GHFF Records** and **Plan A13 – GHFF Context Assessment**). There are no observed roosts within the site. Two (2) known roosts supporting Grey-headed Flying-fox are located within 20 km of the site, with the nearest known roost site with recent records (2019) located at North Bundaberg Botanic Gardens (585), approximately 5.85 km north-east of the site (refer to **Table A13** and **Plan A12 – GHFF Records & Roost Locations**).

Table A13: Grey-headed Flying-fox camps within 20km of the proposed action (DCCEEW, 2023)

ID	Location	Approximate Distance (km)	GHFF Records	BFF Records	Survey Date
293	Bundaberg, Harriet Island / Don Tallon Bridge	4.65 km	0	2,500 – 9,999	11/2021
772	Bundaberg, Baldwin Swamp Environment Park	5.15 km	0	2,500 – 9,999	05/2022
585	North Bundaberg Botanic Gardens, Young St	5.85 km	1 – 499	1 – 499	11/2019
782	Gooburrum, Billabong Drive	9.43 km	500 – 2,499	500 – 2,499	02/2014
712	Avoca, McCoys Creek	11.8 km	0	1 – 499	11/2019
279	Bagara, Larder Street	15.2 km	0	500 – 2,499	08/2013

During the initial site surveys undertaken by GreenTape solutions in September 2020 and July 2022, flying-foxes were heard calling, however the exact species was unable to be confirmed. The site is not currently utilised by this species as a roost site ('camp') and the closest known roosting site is approximately 5 km away, which is known to be occupied by Grey-headed Flying-foxes. This species is capable of nightly flights up to 50 km to forage on flowering vegetation. Given that the surrounding landscape has been extensively cleared, it is likely that Grey-headed Flying-foxes would utilise the site for foraging during times of flowering (see **Part B – Ecological Assessment Report**).

Item 2.1.3 of the PD request asks for **'Provide detailed mapping of suitable habitat (within, adjacent to and downstream of the project site, where relevant) for all listed threatened species, which:**

- **is specific to the habitat assessment undertaken for each listed threatened species (i.e., does not only illustrate relevant Queensland Regional Ecosystems);**
- **includes an overlay of the project disturbance footprint (including the wetlands);**
- **includes known records of individuals derived from desktop analysis and field surveys; and**
- **is provided separately as attachments in JPEG format'.**

Plan A13 – GHFF Context Assessment, shows the extent of potential Grey-headed Flying-fox foraging habitat within 5km and 20km of the subject site. The adjoining landscape to the west is cleared and planned for future residential development with the Bundaberg Airport beyond this area and cleared to the north is also planned 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. Eucalypt dominated vegetation is present to the south of the site, which connects to a narrow corridor of vegetation lining Yellow Waterholes Creek to the south-east. In the wider environment, larger tracts of remnant vegetation are located to the south within dedicated conservation areas including Bingera National Park, Burrum Coast National Park and Cordalba National Park. These areas are likely to provide higher quality foraging habitat for the GHFF than the relatively small and disturbed vegetation on site.

Item 2.1.4 of the PD request asks for **'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'.**

Potential foraging habitat for the species was identified across the entire site. Opportunistic and targeted surveys covering the entire referral area did not locate roosting sites in the application area or within the immediate vicinity of the site. No Grey-headed Flying-fox individuals were recorded during field surveys. The surveys are considered adequate.

In accordance with the *Survey guidelines for Australia's threatened bats*, both desktop searches and field surveys were undertaken to determine this species presence/absence within the site and habitat extent. Thus, the following was undertaken:

1. Prior to the survey – a review of known Flying-fox camps was conducted for the project area, and the wider general area.
2. Daytime field surveys for camps for determining the presence of unrecorded day roosts.
3. Ground-truthed vegetation mapping and identification of foraging resources.
4. Spotlighting surveys were conducted across the site to identify foraging or flying individuals.

Opportunistic and targeted surveys did not locate roosting sites in the application area or within the immediate vicinity of the site.

Diurnal surveys were completed during September 2020, July 2022, August 2022 and targeted contemporary surveys conducted during 15 – 18 May 2023. These surveys recorded that the site does not contain any unrecorded GHFF or Flying-fox roosts, nor where GHFF individuals recorded on-site. However, vegetation surveys completed across the site recorded species that are considered important winter flowering species and defined in the National Recovery Plan for GHFF. Vegetation on-site is considered critical habitat under the National Recovery Plan.

Item 2.1.5 of the PD request asks for **'Attach all relevant ecological surveys referenced in the referral and preliminary documentation as supporting documents to the preliminary documentation'.**

Plan A03 – Field Survey Effort provides a summary of the field survey effort. **Attachment A7** outlines the flora and fauna species detected onsite during the contemporary field surveys and further details on the results and methodologies used are provided in **Sections 3.4.2** and **4.8.3** below.

3.4.2 Species Specific Information

This section addresses Section 2.2 of the PD Request.

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

Item 2.2.11 of the PD Request asks for '***A discussion of vegetation composition and structure (i.e., known food trees).***

Known food trees for the GHFF including *Eucalyptus tereticornis* and *Melaleuca quinquenervia* as well as *Corymbia intermedia* were identified across the subject site. A number of other species from genera *Eucalyptus, Corymbia* and *Angophora* were found within vegetation at the site. The vegetation onsite consists of open Eucalypt woodland dominated by *Corymbia intermedia* and *Eucalyptus latisinensis* with *Corymbia trachyphlioa*, *Eucalyptus exserta*, *Angophora leiocarpa*, and *Eucalyptus tereticornis*. Other tree species present across the site include *Melaleuca quinquenervia* (Broad-leaved Paperbark) along with *Lophostemon suaveolens* (Swamp Box), *Alphitonia excelsa* (Soap Tree), *Acacia disparrima* (Hickory Wattle) and *Acacia leiocalyx* (Early-flowering Black Wattle) in the sub-canopy. Native vegetation is limited in the shrub and ground layer, with *Sporobolus pyramidalis* (Giant Rat's Tail Grass) dominating much of the later, and patches of *Lantana camara* throughout the shrub layer. Some disturbance from historic fire and logging was present throughout the vegetated site.

Item 2.2.12 of the PD Request asks for '***A discussion of habitat and habitat use requirements (e.g., foraging, dispersal, shelter, etc.) in line with the National Recovery Plan for the Grey-headed Flying-fox (March 2021).'***

Item 2.2.13 of the PD Request asks for '***The total area (in hectares) of each identified habitat type (e.g., foraging, dispersal, shelter, etc.)'.***

Foraging habitat for the GHFF is considered to be vegetation communities with an array of winter and spring flowering Eucalypt species that contains species including *Eucalyptus tereticornis*, *E. albens*, *E. crebra*, *E. fibrosa*, *E. melliodora*, *E. paniculata*, *E. pilularis*, *E. robusta*, *E. seeana*, *E. sideroxylon*, *E. siderophloia*, *Banksia integrifolia*, *Castanospermum australe*, *Corymbia citriodora citriodora*, *C. eximia*, *C. maculata*, *Grevillea robusta*, *Melaleuca quinquenervia* or *Syncarpia glomulifera*. GHFF have been known to fly as far as 40 km to feed (DAWE 2021). The GHFF requires multiple populations of food trees dispersed over a large area. GHFF roost in large aggregations in the exposed branches of trees in vegetation ranging from continuous forest to patches as small as 1 ha (DAWE 2021).

No roost sites were located on or within the vicinity of the project area, therefore the site is considered to be potential foraging habitat for the GHFF. The total amount of potential foraging habitat on-site is 59.6 ha.

3.4.3 Critical Habitat Discussion

Section 2.3 of the PD lists '***Habitat critical' descriptions for listed threatened species likely to be impacted by the proposed action'.***

Item 2.3.3 of the PD Request describes GHFF critical habitat as '***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.***

Important winter and spring vegetation communities are those that contain Eucalyptus tereticornis, E. albens, E. crebra, E. fibrosa, E. melliodora, E. paniculata, E. pilularis, E. robusta, E. seeana, E. sideroxylon, E. siderophloia, Banksia integrifolia, Castanospermum australe, Corymbia citriodora citriodora, C. eximia, C. maculata, Grevillea robusta, Melaleuca quinquenervia or Syncarpia glomulifera.

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:

- ***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).***
- ***contain native species used for foraging and occur within 20 km of a nationally important camp as identified on the Department's interactive flying -fox web viewer, or***
- ***contain native and or exotic species used for roosting at the site of a nationally important Grey-Headed Flying-Fox camp***.'

As outlined above, the site includes vegetation communities which contain important winter and spring flowering species *Eucalyptus tereticornis* and *Melaleuca quinquenervia* and therefore is considered habitat critical to the survival of Grey-headed Flying-fox. Two (2) known roosts supporting Grey-headed Flying-fox are located within 20 km of the site, with the nearest known roost site with recent records (2019) located at North Bundaberg Botanic Gardens (585), approximately 5.85 km north-east of the site. While there are no nationally important flying-fox camps located within 20 km of the site, due to the presence of active GHFF camps near to the site, it is considered potential foraging habitat for the species.

4. Impact Assessment

This section responds to Item 3 of the PD Request which requires an assessment of direct, indirect and facilitated or consequential impacts on listed threatened species and communities 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.

Item 3.1.1 of the PD request asks for '***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***.'

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 **Plan A01**). Direct impacts include the clearing of approximately 24.2 ha. Notably, portions of this impact include the construction of drainage swales and wetland basins for stormwater treatment involving the clearing of approximately 20 trees equating to 0.26 ha. In the south of the project area, approximately 41.1 ha of vegetation will be retained with adjoining habitat south of Bundaberg Ring Road set aside for preservation.

The site is surrounded by highly disturbed areas, including Bundaberg Airport, Bundaberg Brewed Drinks Factory as well as cleared areas, devoid of native vegetation. The greater landscape has been adversely impacted by historical land uses, resulting in disturbed remnant vegetation within the subject site. The impacts to retained vegetation areas will include rehabilitation of wetland for stormwater treatment. These works to plant and cultivate the pre-clear regional ecosystem and remove current impediments, such as weeds, specifically *Sporobolus pyramidalis* (Giant Rats Tail Grass) and *Lantana camara* (Lantana), which will result in the improvement of these portions of the lot.

Refer to **Table A14** and **Plan A01** for an impact summary for further details. **Table A14** below provides further details of the direct, indirect, and facilitated impacts from the proposed project.

Table A14: Impact Summary

Referral Area	65.3 ha
Project Disturbance Footprint Development Area: East West Connection Road: Johanna Boulevard Extension:	24.2 ha 17.8 ha 5 ha 1.4 ha
Direct Impacts Remnant Vegetation Non-remnant Vegetation Cleared Areas	24.2 ha vegetation clearing 19.7 ha + additional temporary impacts 3.6 ha 0.9 ha
Additional Temporary Impacts	0.26 ha stormwater management system
Koala Habitat Impacts	23.56 ha
GHFF Foraging Habitat Impacts	23.56 ha
Stormwater Management Area	2.1 ha (approximately)
Retained Vegetation	41.1 ha

The proposed action will impact remnant and non-remnant vegetation which provides habitat values for a range of native flora and fauna species. A risk of impact to MNES identified as having a greater likelihood of occurrence has been prepared to determine the risk of potential project related impacts upon each matter (refer to **Table A15**).

The risk of impact assessment is qualitative and based upon the potential extent of habitat loss resulting from the construction phase of the project and to a lesser degree the operational phase of the project. It considered, but was not limited to the following:

- The value of the impacted habitat to each respective matter;
- The amount of habitat to be directly impacted (lost) against that to be retained;
- Potential indirect impacts (e.g. dust, noise and soil erosion);
- Potential fragmentation of a population into two or more populations;
- Increased fragmentation of wildlife corridors in the Site;
- Risk of operational impacts (e.g. noise); and
- Each species ability (e.g. fauna) or inability (e.g. flora) to move away from areas of direct impact into retained habitat

Table A15: Impact Risk Assessment

Scientific Name	Common Name	EPBC Act Status	Likelihood of Occurrence	Risk of Impact
Threatened fauna species				
Phascolarctos cinereus	Koala	Endangered	**Moderate** Suitable Koala habitat is present on-site in the form of eucalypt dominated vegetation. Despite targeted surveys, Koalas or evidence of Koalas have not been observed within the application area.	Yes – foraging habitat
Pteropus poliocephalus	Grey-headed Flying-fox	Vulnerable	**Moderate** There are no observed roosts on-site, with the nearest known roost site located in Bundaberg, Harriet Island / Don Tallon Bridge (293), approximately 4.65 km north of the site (refer **Plan A12**). Given the site's proximity to a roosting site the site is considered to provide foraging habitat for this species.	Yes – foraging habitat
Petauroides volans	Greater Glider	Endangered	**Low** This species was not identified during field surveys. The species is known to be sensitive to fragmentation and disturbances. Due to the level of modification adjoining the proposed impact area, the species is not considered likely to rely on the vegetation. While the site contains suitable habitat features and is representative of Greater Glider habitat, the lack of recent local records, adjoining disturbance and significant fragmentation suggests the species is highly unlikely to utilise the site.	Unlikely – refer **Attachment A8** for detailed assessment against Significant Impact Guidelines 1.1.
Unlikely Occurrences				
Cuculus optatus	Oriental Cuckoo	Migratory	**Low** Habitat in the form of Eucalyptus woodlands is present on site however the site lacks monsoonal rainforest, vine thickets and wet sclerophyll forests. Records of the species have been recorded approximately 10 km north of the site from 2004. It is possible this species may occur as a fly-over or vagrant individual but is unlikely to use the subject site for breeding purposes as the	No

Scientific Name	Common Name	EPBC Act Status	Likelihood of Occurrence	Risk of Impact
			species does not breed in Australia. The species use of the site is likely restricted to occasionally foraging.	
Hirundapus caudacutus	White-throated Needletail	Vulnerable	**Low** Wooded areas cover most of the project area which provides potential habitat for the White-throated Needletail. Records from 2019 of the species have been recorded approximately 5 km north of the site. It is possible this species may occur as a fly-over above the subject site, although site surveys did not record the presence of the species.	No
Petaurus australis australis	Yellow-bellied Glider	Vulnerable	**Low** Eucalypt vegetation is present over the entire site. No recent records of the species have been documented within proximity to the project area. The site contains Eucalypt vegetation with some hollow-bearing trees although the lack of recent records of the species and limited connectivity to surrounding vegetation suggests a low likelihood that the Yellow-bellied Glider would occur onsite.	No
Threatened Flora Species				
Cupaniopsis shirleyana	Wedge-leaf Tuckeroo	Vulnerable	**Low** Dry rainforest vegetation types and vine thicket communities are absent from the subject site. A record of the Wedge-leaf Tuckeroo was documented in 2022 approximately 10 km north-east of the subject site and in 2013 approximately 6 km north-east of the subject site. Although potential habitat in the form of native vegetation is located onsite, field surveys did not identify this species within the referral area therefore it is considered to have a low likelihood of occurrence.	No
Eucalyptus hallii	Goodwood Gum	Vulnerable	**Low** Potential habitat occurs on-site in the mapped Category B (RE12.5.4) vegetation containing Eucalyptus latisinensis and	No

Scientific Name	Common Name	EPBC Act Status	Likelihood of Occurrence	Risk of Impact
			Corymbia trachyphloia woodlands. Records of the species have been documented in proximity to the subject site approximately 8 km south-west in 2003. No evidence of this species was found onsite and although there is potential habitat located within the referral area it is considered a low likelihood of occurring onsite.	

The direct, indirect and facilitate impacts have been summarised in **Table A16.** A detailed description of potential indirect impacts and an analysis of their potential impacts to Koala and Grey-headed Flying-fox and Greater Glider are included in **Table A34** below in **Section 4.2.** Impacts to other MNES including Oriental Cuckoo (*Cuculus optatus*), White-throated Needletail (*Hirundapus caudacutus*) and Greater Glider (*Petauroides volans*) area not considered likely to occur as part of the proposed action and so they are therefore not included within **Table A34** (refer **Table A15**).

Table A16: Direct, Indirect and Facilitated Impacts Summary

Construction Phase	Operation Phase (ongoing disturbance)
• Vegetation clearing • Habitat removal • Intensification of effects of fragmentation effects (i.e. edge effect, habitat degradation, barrier effects) • Weed dispersal and establishment • Vehicle movements • Earthworks • Light emissions during construction • Noise and vibration • Waste disposal • Hazardous and dangerous goods • Increased human presence	• Vehicle strike • Noise and light pollution • Increased human presence

4.1. Direct and Indirect Impacts to Protected Matters

Item 3.1.2 of the PD request asks to '***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 to be impacted and quantification of the individuals to be impacted (where applicable).'

Plan A01 outlines the proposed development footprint. A total of 21.6 ha of vegetation will be directly cleared to facilitate the construction of the New Bundaberg Hospital. Species specific impacts are provided below:

- Impact of 23.56 ha to ground-truthed Koala habitat (refer to **Plan A08**).
- Impact to 23.56 ha to potential GHFF foraging habitat (refer to **Plan A11**).
- No impact proposed to other MNES.

The following sections provide further details on the assessment of habitat quality of Koala and Grey-headed Flying Fox habitat to be impacted as part of the proposed action.

4.1.1 Greater Glider Impact Assessment

A detailed assessment against the Significant Impact Guidelines 1.1 have been included as **Attachment A8 – Greater Glider Detailed Assessment**. The assessment confirmed the proposed action is unlikely to have a significant impact on the Greater Glider. This is based on the highly fragmented nature of the site which remains unconnected to surrounding habitat patches, the moderate levels of disturbance onsite, surrounding barriers to movement (e.g. Bundaberg Ring Road and cleared areas) and lack of evidence of the species onsite (refer **Plan A07 – Greater Glider Fragmentation Analysis**). **Section 4.6.1** details a discussion of the Greater Glider impact assessment with reference to the updated Conservation Advice.

4.1.2 Koala Habitat Assessment

Assessment Methodology

The proposal results in the clearing and functional loss of 23.56 ha of vegetation that is identified as providing critical habitat for the Koala (refer to **Plan A08 – Potential Koala Habitat and Impact**). The site was assessed using one (1) assessment unit to reflect the vegetation on-site (refer **Plan A04 – Assessment Units**).

In order to determine the quantum and quality of the habitat suitable for Koala on-site, the vegetation has been 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 1.3 February 2020 and Version 1.2 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 purpose of this guideline is to provide a methodology for proponents to determine the habitat quality of a site under the Queensland Environmental Offsets framework. The guideline is a step-by-step methodology explaining how to measure habitat quality for land-based offsets. This methodology has been adopted and tailored/modified to assess the impacts and offsets relating to Matters of National Environmental Significance (MNES). *BioCondition: A Condition Assessment Framework for Terrestrial Biodiversity in Queensland V2.2* February 2015 provides the base methodology for the Guide to determining terrestrial habitat quality and in some

cases the scoring and methods from BioCondition have been used within our Modified Habitat Quality Assessment Tool. These instances are identified within the methodology.

Assessment Units

The variance in quality of habitat on an impact or offset site is accounted for by delineating sites into assessment units (AUs). AUs are mapped to determine where the sample sites will be and how many are required to adequately assess the site's condition. AUs can be defined using desktop information but can be refined during field surveys where appropriate. In general, they should be relatively homogenous, defined by a distinct regional ecosystem or habitat type and distinct from other patches of vegetation on the site. The AUs identified are used in the assessment of habitat values for both Koala and Grey-headed Flying-fox.

The site has one (1) AU which is:

- AU1: Remnant (RE12.5.4) [23.56 ha impacted]

Modified Habitat Quality Assessment

The Queensland State Governments *"Guide to determining terrestrial habitat quality: A toolkit for assessing land based offsets under the Queensland Environmental Offsets Policy"* Version 1.3 February 2020 methodology recognises the following three (3) key indicators:

1. site condition – a general condition assessment of vegetation compared to a benchmark;
2. site context – an analysis of the site in relation to the surrounding environment; and
3. species habitat index – the ability of the site to support a species.

The MHQA for the Koala used here combines the three (3) key indicators from the Queensland State Government guide into two (2) (site condition and site context) with each being weighted 30% of the final score, respectively. The balance of the weighting, 40%, has been attributed to the third indicator (species stocking rate), that is independent of the Queensland State Government habitat quality assessment. The species stocking rate has been added to the MHQA to better incorporate MNES, and specifically the vulnerable *Phascolarctos cinereus* (Koala).

The following section details the methodology utilised to assess the site condition, site context and species stocking rate under the MHQA.

Site Condition (30 %)

Assessing site condition is an integral step in determining specific quantification of impacts, while also determining whether an offset site is suitable to establish a desired capacity to support the prescribed environmental matters being offset. The on-site condition is a key element of habitat quality and has a direct influence on the biodiversity it supports. Site condition is assessed using a suite of attributes to describe the structure and function of the vegetation community and is benchmarked against the expected range for a relatively undisturbed community.

The site condition assessment under the MHQA is assessed using 15 condition characteristics being:

- recruitment of woody perennial species in EDL;
- native plant species richness – trees;
- native plant species richness – shrubs;
- native plant species richness – grasses;
- native plant species richness – forbs;
- tree canopy height;
- sub-canopy cover;
- tree canopy cover;
- native grass cover;
- organic litter;
- large trees;
- coarse woody debris;
- non-native plant cover;
- quality and availability of food and foraging habitat; and
- quality and availability of shelters.

Assessment of the above condition characteristics do not differ from the traditional habitat quality assessment. Scoring tables for the site condition attributes follows the scoring tables within the BioCondition manual (see above). In developing the MHQA to better incorporate MNES, two (2) species habitat index characteristics, being, (1) quality and availability of food and foraging habitat, and (2) quality and availability of shelters have been added to the site condition indicator. The two Koala habitat index attributes are site wide characteristics and are based on the site condition attributes that relate to the presence of trees. Namely, tree canopy height, tree canopy cover and the number of large trees. In this circumstance, *site condition* was weighted more heavily.

Site Context (30 %)

The site context assessment deals with the site and its adjacent surroundings. Site context is measured using a suite of attributes to describe the location of the habitat within the surrounding landscape and the influence of its associated threats. This assessment also considers the influence of adjacent vegetated areas and ecological corridors. Under the MHQA, site context is measured using the following seven characteristics:

- size of patch (refer **Plan A10**);
- connectedness (refer **Plan A10**);
- context (refer **Plan A10**);
- ecological corridors;
- role of site location to species overall population in the state;
- threats to the species; and
- species mobility capacity.

Unlike the traditional habitat quality assessment methodology where site connectedness is assessed against the surrounding remnant vegetation only, the MHQA site connectedness is assessed against the surrounding

MNES habitat, in this instance, Koala habitat. Whilst remnant eucalypt forest vegetation is critical habitat for Koala, equally Koalas can utilise areas of non-remnant vegetation or high value regrowth vegetation that does not yet achieve remnant status. Therefore, site context under the MHQA accounts for surrounding Koala habitat rather than remnant vegetation.

Habitat critical to the survival of the Koala was determined using the combination of the Unsupervised Classification tool within ESRI's ArcGIS software and the most recently available aerial photograph from Nearmap.com. The Unsupervised Classification tool is able to determine vegetation areas through the near infrared (NIR) composite band of the Landsat 8 imagery available online. The tool is able to create a dataset of vegetation areas without the analyst's intervention providing a rapid method for mapping habitat critical to the survival of the Koala over large regions such as Southeast Queensland. Nearmap.com aerial image is used for calibration purposes, particularly when dealing with smaller scale EPBC assessment areas. The dataset created by the Unsupervised Classification tool is revised using the latest aerial imagery available from Nearmap.com at scale of 1:40,000 and provides a more accurate depiction of habitat critical to the survival of the Koala at the assessment scale for EPBC referrals. Vegetation described as Koala critical habitat includes areas mapped within Category X (non-remnant), Category C (regrowth) and Category B (remnant) vegetation based on Queensland Regional Ecosystem mapping.

Assessment methodology for site context assessment for Koala is outlined below:

1. patch size – The calculation of the area of the patch size uses the method outlined in the Biocondition assessment manual v2.2 that considers the patch to be areas connected by corridors greater than 200 m wide within a 1 km radius of the site. This methodology includes use of a "segmentation" process that removes areas connected to the assessment area by narrow corridors.
2. connectedness – Connectivity relates to the capacity that the species have to disperse through the landscape. The attribute is calculated using GIS by measuring the length of Koala habitat that is along the boundary of the site.
3. context – The context score is calculated by GIS to quantify the amount of vegetation immediately surrounding the assessment site. The attribute is measure of the percentage of Koala habitat within a 1 km buffer of the site. The 1 km buffer of the site is based on the methodology outlined in *Guide to determining terrestrial habitat quality V1.2*.
4. ecological corridors – This attribute is as per the methods of the *Guide to determining terrestrial habitat quality V1.2* and is used to determine if a site is located within or shares a boundary with an ecological corridor that facilitates long term ecosystem function by connecting large patches of remnant vegetation with sufficient tract size (corridor width in relation to the fragmentation of the landscape) (EHP 2014). These corridors support the habitat of MNES by providing opportunity for long term dispersal of habitat species following landscape level changes in climate. Although the ecological corridors allow for the dispersal of MNES themselves, for example, Koala, this is not their primary function when assessing the attribute. The ecological corridors have been mapped by the Queensland State Government under the 'CORR_TYPE' attribute table. The mapping can also be viewed on Queensland Globe in the 'Statewide Biodiversity Corridors' layer.
5. role of site location to species overall population in the state – This attribute is based on the observed role of the site in relation to the overall population of the species. The scoring table considers the

effect that of damage to or removal of the site would have to the likelihood of the species' overall population survival.

6. threats to species – Threats to Koala are predominantly, habitat loss, car strike, dog attack and disease. The highest threat level is given to a site if it isolated from other Koala habitat, or if major roads without exclusion measures, or residential encroachment is within 1500 m of the site boundary.
7. species mobility capacity – This attribute is a measure of the presence and severity of factors that would contribute to a reduction in mobility of Koala and is scored on the presence of roads or large cleared areas bordering the site.

In developing the MHQA, three (3) species habitat index characteristics were nominated — role of site location to overall species population in the state, threats to the species and species mobility capacity.

Species Stocking Rate (40 %)

The MHQA incorporates species stocking rate as an attribute not discussed under the traditional terrestrial habitat assessment methodology. Species stocking rates are estimates of the Koala carrying capacity of the site at the time of undertaking the survey. Given the discreet nature of the Koala and limited to no published literature on habitat carrying capacity of the species, the species stocking rate scoring methodology has been derived through the collation of site-specific surveys and surrounding contextual habitat analysis.

Species stocking rate is calculated using the following parameters:

- Species presence on or adjacent to the site
- Species usage of the site
- Approximate density of the species on the site
- Role/importance of species population on site

Baseline Koala activity levels were determined through utilising the Spot Assessment Technique (SAT) (Phillips *et al.* 2011). The SAT method is an industry recognised technique for identifying presence/absence of koala at a site and is specified as an appropriate survey method in the *EPBC Act Referral Guidelines for the Vulnerable Koala*. Results from the SAT surveys are compared against current available published scientific literature to identify an estimated Koala carrying capacity (stocking rate) to be determined. The SAT methodology is explained in further detail **Section 3.3.1.**

Table A17 outlines the attributes utilised to assess species stocking rate.

Table A17: Species Stocking Rate Table

Species Stocking Rate Table	
Presence detected on or adjacent to site (neighbouring property with connecting habitat)	/10
Species usage of the site (habitat type and evidenced usage)	/15
Approximate density (per ha)	/30
Role/importance of species population on site*	/15

Species Stocking Rate Table	
Total Species Stocking Rate Score	/70
Species Stocking Rate Score – out of 4	

*SSR Supplementary Table – Total supplementary score 0 = 0, 5-15 = 5, 20-35 = 10, 40-45 = 15	
Key source population for breeding	/5
Key source population for dispersal	/5
Necessary for maintaining genetic diversity	/15
Near the limit of the species range	/15

Scoring Weight Justification

For this project, Site Condition and Site Context were given a weighted score out of three (3), while Species Stocking Rate given a weighted score out of four (4).

Species Stocking Rate was assigned the highest weighting as it is considered the greatest determinant of site suitability for the Koala. Species Stocking Rate is an important component when assessing the overall habitat quality of a site as it indicates species usage.

Site Condition and Site Context were assigned the equal weighting (scored out of 3). The Koala is known to occupy a variety of habitats, ranging from non-remnant regrowth eucalypt forest/woodland through to old growth remnant forest/woodland, however, the site condition of the habitat is considered to directly influence the long-term Koala carrying capacity. Site Context is considered an important component when assessing the Koala as it directly relates to the long-term survival rate of the species. The proximity of the site to other areas of suitable habitat, the movement pattern through the landscape of the Koala (and/or barriers inhibiting movement) and threats to the species are important attributes to assess when considering the overall functionality of the site.

It is considered that the provision of this weighted scoring most accurately quantifies the ecological requirements of the Koala, which will then assist in determining whether an offset site is suitable to establish a desired capacity to support the prescribed environmental matters being offset.

Discussion

The habitat quality scores for each assessment unit, combining Site Condition, Site Context and Species Stocking Rate are reported in **Table A18** to **Table A19** and data sheets are in **Attachment A9**. The scores for Site Condition are derived directly from the MHQA tool data. These scores are then used to determine the scores for Quality and Availability of Food and Foraging Habitat, and Quality and Availability of Shelter. The site was given an overall weighted habitat quality score of **5.90** out of the total of **10** (rounded to a **6**) which is considered an average habitat quality score (refer **Table A18**).

Site Condition (30%)

One (1) assessment unit (AU) was defined on-site to reflect the state of the vegetation across the entire referral area (refer **Plan A04**). AU1 achieved a site condition score of **70.5** which equates to a weighted score of **2.12**

out of **3**. Tree species richness was high across the site, although lacking in the shrub, grass and forb layers. Notably, non-native plant cover was high throughout the referral area with the ground layer being dominated by exotic *Sporobolus pyramidalis* (Giant Rat's Tail Grass). The consistent weed presence was evident across the site, reducing the non-native plant cover score across the transects, with coarse woody debris and native grass cover also scoring poorly. The site as a whole was considered to have average to moderate quality site condition characteristics.

The habitat quality scores for AU1, combining Site Condition, Site Context and Species Stocking Rate, are reported in **Table A18** to **Table A19**. The scores for Site Condition are derived directly from the MHQA tool data. These scores are then used to determine the scores for Quality and Availability of Food and Foraging Habitat, and Quality and Availability of Shelter. Given the high scores for recruitment of native perennial species (3/5), native plant species richness of trees (5/5), tree canopy height (5/5) and tree canopy cover (5/5), the Quality and Availability of Food and Foraging Habitat and Quality and Availability of Shelter were both scored the maximum of 10.

The site was given an overall habitat quality score of **5.90** out of the total of **10**. The action is considered to only impact on average to moderate Koala habitat and not the species or population.

Site Context (30%)

Size of patch

This attribute is a measure of the size of the patch of vegetation in which the assessment unit is located. The scoring reflects the importance of large patches in the landscape and is based on the size of the patch of critical Koala habitat connected to the site in this instance. This attribute is scored such that is reflects the fact that larger patches are less susceptible to ecological edge effects and are more likely to sustain viable populations of native flora and fauna than smaller patches. The size of patch attribute was calculated using GIS and determined the referral area to be part of a patch size of 74 ha. This component was assigned a score of **5** out of **10** (refer **Plan A10**).

Connectedness

As a landscape level attribute, connectedness aims to assess the degree to which the assessment unit is connected to adjacent native vegetation. Connectedness relates to the capacity of the species to disperse through the landscape between sustainable patches of habitat, and therefore has important implications for species persistence. Connectedness was calculated using GIS, with the percentage of referral area boundary length supporting a Koala critical habitat connection off and on site was calculated at 50% (49%), and consequently this attribute scored a **2** out of **5** as per the *Queensland BioCondition Assessment* methodology (refer **Plan A10**).

Context

The context attribute refers to the amount of critical Koala habitat that is retained within a 1 km buffer of the site being assessed and is calculated using GIS. This buffer area of 1 km is based on the methodology outlined in *Guide to determining terrestrial habitat quality V1.2*.

The vegetation on the site is relatively isolated from a contiguous landscape of habitat to the south by Bundaberg Ring Road, and existing barriers and threats exist to the north including low density residential dwellings and business to the east. Cleared land bounds the site directly to the north and west. It is considered that any potential impacts on any transient Koalas during clearing and operation can be appropriately managed through the proposed mitigation and management measures.

Retained critical Koala habitat within a 1 km buffer of the site was calculated at 21%, and therefore the context attribute achieved a score of **2** out of **5** as per the methodology (refer **Plan A10**).

Ecological Corridors

GIS was utilised to identify the site's role in any ecological corridors on or adjacent to the site (refer **Plan A10**). This attribute was scored **0** out of **6**, as the site is entirely outside of any mapped ecological corridors.

Role of site location to species overall population in the State

This attribute aims to quantify the geographical importance of the referral area for Koala populations across the broader State. This attribute achieved a score of **5** out of **5**.

Threats to the species

The 'threats to the species' attribute quantifies potential risks to the survival of Koala existing within and adjacent to the referral area. Key known threats to the survival of the Koala include proximity to main roads increasing the risk of motor vehicle strike, as well as predation by wild or domestic dogs. Dogs were recorded within proximity to the site and Bundaberg Ring Road intersecting the site pose moderate threats to Koala. This attribute was scored a **7** out of **15**.

Species mobility capacity

Species mobility capacity is used to quantify the ability of the species to move from the site and through the surrounding landscape to meet survival needs. Species mobility capacity is considered especially important in response to rapid changes to the surrounding environment, such as the commencement of land clearing. GHFF and avi-fauna for example are considered highly mobile species due to their ability to fly quickly and over land barriers such as highly frequented roads or residential developments. Conversely, the Koala is considered a relatively immobile species due to it being an arboreal species, moving relatively slowly and hence its vulnerability to threats on-ground as outlined above.

In this instance, the species mobility capacity for the Koala on-site was assigned the score of **7** out of **10**. This score of 'moderately restricted – 25 to 50% reduction' species mobility capacity is supported by the fact that bushland connected to the site will be limited to the southern corridor, however Bundaberg Ring Road poses a substantial barrier to fauna movement to this area. The site is not considered to be conducive for Koala movement due to fragmentation by significant barriers surrounding the site. Further, the presence of lantana restricts movement for Koala on ground and is present across the impact site.

Species Stocking Rate (40%)

The final component of the MHQA technique is species stocking rate. Species stocking rates are estimates of the Koala carrying capacity of the site at the time of undertaking the survey. A species stocking rate score of 40 out of 70 was attributed to all assessment units, which equates to a weighted score of **2.29** out of **4**.

Species stocking rate characteristics reflect presence of Koala activity detected on-site, foraging or dispersal and breeding as evidenced by the absence or presence of scats and referenced in the conservation advice, respectively, approximate density from SAT results and role of the site from the supplementary table noting no key source population occurs on or adjoining the site.

No evidence of Koala activity was detected on-site based on targeted Koala detection dog surveys and SAT results from contemporary surveys. However, the Department considers the scratches found onsite during initial site surveys to be evidence of Koala usage and the presence of foraging resources within the impact area suggests the habitat is breeding habitat for the Koala. Although given the lack of evidence of breeding occurring, the site is not considered to currently support a breeding population of Koalas. SAT surveys showed no evidence of Koala presence onsite therefore it is not considered to be used currently for foraging or breeding, however utilising the precautionary principle, it is considered possible that the Koala may utilise the site for dispersal.

Summary

To summarise, the Action is considered to impact on average quality Koala habitat and not the species or an important population, having a total weighted impact of **5.90 out of 10 (rounded to a 6)**. Substantial avoidance, management and mitigation measures are considered to result in a negligible impact on Koala habitat. It is considered that any potential impacts on any transient Koalas during clearing and operation can be appropriately managed through the proposed mitigation and management measure

Table A18: Assessment Unit 1 – Remnant (RE12.5.4)– Koala MHQA results

Assessment Unit - Regional Ecosystem	AU 1 - Cat B - Open woodland vegetated area with Sporobolus pyramidalis dominating the ground layer (RE12.5.4)						
	RE12.5.4 Benchmark	Transect 1	Transect 2	Transect 3	Average of Transect(s)	% Benchmark	Score
SITE CONDITION							
Recruitment of woody perennial species in EDL	**100**	40	33	100	**57.67**	57.67	**3**
Native plant species richness - trees	**5**	10	12	11	**11.00**	220.00	**5**
Native plant species richness - shrubs	**9**	4	4	2	**3.33**	37.04	**2.5**
Native plant species richness - grasses	**7**	4	4	4	**4.00**	57.14	**2.5**
Native plant species richness - forbs	**18**	3	8	6	**5.67**	31.48	**2.5**
Tree canopy height (Canopy)*	**17**	18	19	17	**18.00**	105.88	5
Tree canopy height (Sub-canopy)*	**8**	10	8	10	**9.33**	116.67	5
						***Average tree canopy height**	**5**
Tree canopy cover (Canopy)**	**37**	24.8	54.8	58.8	**46.13**	124.68	5
Tree canopy cover (Sub-canopy)**	**14**	45	44.5	51.5	**47.00**	335.71	3
						****Average tree canopy cover**	**4**
Shrub canopy cover	**19**	20.3	6.9	19.5	**15.57**	81.93	**5**
Native grass cover*	**42**	16	6	7	**9.67**	23.02	**1**
Organic litter*	**29**	36	19	23	**26.00**	89.66	**5**
Large trees (euc plus non-euc) (per ha)	**27**	18	24	32	**24.67**	91.36	**10**
Coarse woody debris (per ha)	**416**	283	215	488	**328.67**	79.01	**5**
Non-native plant cover	**0**	70	80	75	**75.00**	75.00	**0**
Quality and availability of food and foraging habitat	**NA**	10	10	**10**	**10.00**	-	**10**
Quality and availability of shelter	**NA**	10	10	**10**	**10.00**	-	**10**
						Site Condition Score (/100)	**70.5**
						Overall Site Condition Score - out of 3	**2.12**
SITE CONTEXT							
Size of patch	**10**	5	5	5	5		**5**

Connectedness	**5**	2	2	2	2		**2**
Context	**5**	2	2	2	2		**2**
Ecological Corridors	**6**	0	0	0	0		**0**
Role of site location to species overall population in the state	**5**	5	5	5	5		**5**
Threats to the species	**15**	7	7	7	7		**7**
Species mobility capacity	**10**	7	7	7	7		**7**
						Site Context Score (/56)	**28**
						Overall Site Context Score - out of 3	**1.50**
SPECIES STOCKING RATE							
Koala Stocking Rate (utilising SSR & SSR Supplementary Table(s)	**70**			40			**40**
						Species Stocking Rate Score (/70)	**40.00**
						Overall Species Stocking Rate Score - out of 4	**2.29**
						Overall Assessment Unit Score	**5.90**

Table A19: Assessment Unit 1 – Remnant (RE12.5.4) – Koala Species Stocking Rate Results

Species Stocking Rate Table	
Presence detected on or adjacent to site (neighbouring property with connecting habitat)	10/10
Species usage of the site (habitat type and evidenced usage)	15/15
Approximate density (per ha)	10/30
Role / importance of species population on site*	5/15
Total Species Stocking Rate Score	**40/70**
Species stocking rate score	**2.29**

***SSR Supplementary Table**	
Key source population for breeding	0/10
Key source population for dispersal	5/5
Necessary for maintaining genetic diversity	0/15
Near the limit of the species range	0/15
Score	5/45

4.1.3 Grey-headed Flying Fox Habitat Assessment

Assessment Methodology

The proposal results in the clearing and functional loss of 23.56 ha of vegetation that is identified as providing suitable foraging habitat for the Grey-headed Flying-fox (refer **Plan A11**). The impact and the offset sites have been assessed using a GHFF Foraging Habitat Assessment (GHFF FHA) tool developed by the Saunders Havill Group which 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 1.3 February 2020, while also integrating published scientific literature on GHFF foraging habitat.

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 40 % and site context weighted at 30 % 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.

The following section details the methodology utilised to assess the site condition, site context and species stocking rate under the GHFF FHA.

Site Condition (40 %)

Assessing site condition is an integral step in determining specific quantification of impacts, while also determining whether an offset site is suitable to establish a desired capacity to support the prescribed environmental matters being offset. The on-site condition is a key element of habitat quality and has a direct influence on the biodiversity it supports. Site condition is assessed using a suite of attributes to describe the structure and function of the vegetation community and is benchmarked against the expected range for a relatively undisturbed community.

The site condition assessment under the GHFF FHA is assessed using six condition characteristics being:

- Vegetation condition;
- Species richness (canopy trees);
- Flower scores (average);
- Timing of biological shortages;
- Quality of foraging habitat (trees >0.65 wt p*r); and
- Non-native plant cover.

Assessment methodology of the above condition characteristics is outlined below:

- *Vegetation condition* – This condition characteristic is assessed using the Queensland *Vegetation Management Act 1999* vegetation community status definition, being Category B (remnant), Category C (high-value regrowth) and Category X (non-remnant). This characteristic is scored from a desktop mapping perspective and verified on-ground during assessment. Refer to **Table 20** for the benchmark scoring values for this condition characteristic.
- *Species richness (canopy trees)* – This condition characteristic is assessed using a 100 m X 20 m plot following the contour of the land when possible. Within the plot, all canopy tree and subcanopy tree specimens are recorded. It should be noted that non-GHFF foraging species are also documented. Refer to **Table 21** for the benchmark scoring values for this condition characteristic.
- *Flower scores (average)* – This condition characteristic is assessed by analysing and cross-referencing the species recorded in the 'species richness (canopy trees)' characteristic with the published literature, specifically the information within *Ranking the feeding habitat of Grey-headed Flying-foxes for conservation management* (Eby and Law 2008) and the *Draft Recovery Plan for the Grey-headed Flying-fox* (DoEE 2017) and determining the flower score of the recorded canopy species. The individual score for each flowering GHFF foraging tree is then divided by the number of species recorded (GHFF foraging and non-GHFF foraging trees) to produce an average. The benchmark values for this condition characteristic have been derived from the findings published by Eby and Law (2008) (*Ranking the feeding habitat of Grey-headed Flying-foxes for conservation management*). Refer to **Table 22** for the benchmark scoring values for this condition characteristic.

- *Timing of biological shortages* – This condition characteristic is assessed by analysing and cross-referencing the species recorded in the 'species richness (canopy trees)' characteristic with the published literature, specifically the information within *Ranking the feeding habitat of Grey-headed Flying-foxes for conservation management* (Eby and Law 2008) and the *Draft Recovery Plan for the Grey-headed Flying-fox* (DoEE 2017) and determining the ability of the canopy species in the vegetation community to produce foraging habitat during biological shortages (food shortages, pregnancy and birthing, lactation, mating and conception, migration paths and fruit industries). It should be noted that this condition characteristic is weighted and 'food shortages' has been weighted heavier than the balance of the characteristics which are equal, as 'food shortages' is recognised as a major issue. Refer to **Table 23** for the benchmark scoring values for this condition characteristic.
- *Quality of foraging habitat* – This condition characteristic is assessed by analysing and cross-referencing the species recorded in the 'species richness (canopy trees)' characteristic with the published literature, specifically the information within *Ranking the feeding habitat of Grey-headed Flying-foxes for conservation management* (Eby and Law 2008) and the *Draft Recovery Plan for the Grey-headed Flying-fox* (DoEE 2017) and determining which canopy species recorded contain a flower score greater than 0.65 wt p*r and is recognised as a significant food plant by Eby and Law (2008). It should be noted that species recorded that are not prescribed a value by Eby and Law (2008) but are recognised as GHFF foraging trees, have been given an average weighted value of related species or, in the case of *Eucalyptus crebra* (Narrow-leaved Ironbark) been prescribed a value of 0.65 and classified as a significant food plant given its importance as a winter flowering species as acknowledged in the *Draft Recovery Plan for the Grey-headed Flying-fox* (DoEE 2017). Refer to **Table 24** for the benchmark scoring values for this condition characteristic.
- *Non-native plant cover* – This condition characteristic is assessed using a 100 m X 20 m plot following the contour of the land when possible. All non-native plant cover was assessed by estimating the cover of exotic species over the 100 m X 20 m plot. Refer to **Table 25** for the benchmark scoring values for this condition characteristic.

It should be noted that for on-ground assessment purposes, the 100 m X 20 m plot utilised for the GHFF FHA overlaps with the on-ground condition characteristics of the koala MHQA.

Site Context (30 %)

The site context assessment deals with the site and its adjacent surroundings. Site context is measured using a suite of attributes to describe the location of the habitat within the surrounding landscape and the influence of its associated threats. This assessment also considers the influence of adjacent vegetated areas and ecological corridors. Under the GHFF FHA, site context is measured using the following six characteristics (refer **Plan A13**):

- Size of patch;
- Connectedness (active GHFF roost camps in a 20 km radius);
- Context (percentage of GHFF foraging habitat in a 20 km radius);
- Ecological corridors;

- Role of site location to species overall population in the state (active GHFF national flying-fox monitoring viewer 'level 3' roost camps in a 20 km radius); and
- Threats to the species.

Assessment methodology of the above context characteristics is outlined below:

- *Size of patch* – This context characteristic is assessed using a modified version of the traditional habitat quality assessment with the directly connected patch of GHFF foraging habitat to site measured. This context characteristic is measured using GIS. Refer to **Table A26** for the benchmark scoring values for this context characteristic.
- *Connectedness* – This context characteristic is assessed by analysing the number of active GHFF roost camps (over the most recent monitoring period (15/05 – 18/05)) within a 20 km radius of the site. For consistency purposes this assessment is to utilise the data provided on the national flying-fox monitoring viewer (Australian Government). Refer to **Table A27** for the benchmark scoring values for this context characteristic.
- *Context* – This context characteristic is assessed using a modified version of the traditional habitat quality assessment with the percentage of GHFF foraging habitat within a 20 km buffer of the site measured. This context characteristic is measured using GIS. Refer to **Table A28** for the benchmark scoring values for this context characteristic.
- *Ecological corridors* – This context characteristic is assessed using the traditional habitat quality assessment methodology which involves determining the proximity of the site to state, bioregional, regional or sub-regional corridors. Refer to **Table A29** for the benchmark scoring values for this context characteristic.
- *Threats to species* – This context characteristic is assessed by analysing the published scientific literature regarding threats to GHFF and determining the number and severity of the threatening processes observed at or adjacent to the site. Refer to **Table A30** for the benchmark scoring values for this context characteristic.
- *Role of site location to species overall population in the state (active GHFF national flying-fox monitoring viewer 'level 3' roost camps in a 20 km radius)* – This context characteristic is assessed by determining the number of active GHFF roost camps level 3 or greater (over the most recent monitoring period (15/05 – 18/05)) within a 20 km radius of the site. For consistency purposes this assessment is to utilise the data provided on the national flying-fox monitoring viewer (Australian Government). Refer to **Table A31** for the benchmark scoring values for this context characteristic.

Species Stocking Rate (40 %)

The GHFF FHA incorporates species stocking rate as an attribute not discussed under the traditional terrestrial habitat assessment methodology. As discussed above, species stocking rate for GHFF associated with this proposed action is related to the density of GHFF foraging habitat at the site at the time of undertaking the survey.

Baseline GHFF foraging tree surveys were undertaken by utilising the stem count methodology provided in the *Methodology for surveying and mapping regional ecosystems and vegetation communities in Queensland (version 5.0)* (Neldner *et al.* 2019).

This methodology involves assigning the strata for canopy (T1) and subcanopy (T2) and then counting the number of individual tree specimens within the 100 m X 20 m plot (0.2 ha) that are classed as foraging species for GHFF. A tree that branches into two or more stems above 30 cm above the ground is counted as one individual. The stem density of canopy species recorded within the 0.2 ha plot is multiplied by five (5) to produce a stem density per ha. This number is then compared to the benchmark stem density per ha based on the sum of the T1 and T2 stem densities for RE12.5.4. Based on the technical descriptions, the average stem density taken as the sum of T1 and T2 is calculated as 555 per ha for RE12.5.4. Refer to **Table A33** for benchmark scoring values for species stocking rate.

The species stocking rate scoring was determined by analysing the Technical Descriptions of Regional Ecosystems of Southeast Queensland (Ryan 2019) and the stem density per hectare associated with the technical description of the regional ecosystem.

Table A20: GHFF FHA Vegetation Condition Scoring

Score	Description
5	Category X / non-remnant
10	Category C / regrowth
20	Category B / remnant

Table A21: GHFF FHA Canopy Species Richness Scoring

Score	Description
0	0 GHFF foraging species
5	1 – 3 GHFF foraging species
10	4 – 6 GHFF foraging species
20	> 6 GHFF foraging species

Table A22: GHFF FHA Flower Score (average) Scoring

Score	Description
2	0.01 – 0.25
5	0.26 – 0.50
8	0.51 – 0.75
10	0.76 – 1.00

Table A23: GHFF FHA Timing of Biological Shortages Scoring

Score	Description
2.5	Food shortages
1.5	Pregnancy and birthing
1.5	Lactation
1.5	Mating and conception
1.5	Migration paths
1.5	Fruit industries
Total (/10)	Combine total of above

Table A24: GHFF FHA Quality of Foraging Habitat (trees >0.65 wt p*r) Scoring

Score	Description
0	0 significant GHFF foraging tree species
5	1 – 3 significant GHFF foraging tree species
10	4 – 6 significant GHFF foraging tree species
20	> 6 significant GHFF foraging tree species

Table A25: GHFF FHA Non-Native Plant Cover Scoring

Score	Description
1	> 50 % non-native plant cover
5	25 – 50 % non-native plant cover
10	5 – 25 % non-native plant cover
20	< 5 % non-native plant cover

Table A26: GHFF FHA Size of Patch Scoring

Score	Description
0	< 5 hectares
2	5 – 25 hectares
5	26 – 100 hectares
7	101 – 200 hectares
10	> 200 hectares

Table A27: GHFF FHA Connectedness Scoring

Score	Description
0	< 1 active Grey-headed Flying-fox camp within a 20 km radius
3	1 – 3 active Grey-headed Flying-fox camp within a 20 km radius
6	4 – 6 active Grey-headed Flying-fox camp within a 20 km radius
10	> 6 active Grey-headed Flying-fox camp within a 20 km radius

Table A28: GHFF FHA Context Scoring

Score	Description
0	< 10 % Grey-headed Flying-fox foraging habitat within a 20 km radius
3	10 – 30 % Grey-headed Flying-fox foraging habitat within a 20 km radius
6	31 – 75 % Grey-headed Flying-fox foraging habitat within a 20 km radius
10	> 75 % Grey-headed Flying-fox foraging habitat within a 20 km radius

Table A29: GHFF FHA Ecological Corridors Scoring

Score	Description
0	Not within an ecological corridor
6	Sharing a common boundary with an ecological corridor
10	Within an ecological corridor

Table A30: Threats to species (GHFF) scoring

Score	Description
1	High level threat to the species
5	Moderate level threat to the species
10	Low level threat to the species

Table A31: Role of site location to GHFF overall population in the State scoring

Score	Description
1	1 – 2 active level 3 Grey-headed Flying-fox camp within a 20 km radius
6	2 – 4 active level 3 Grey-headed Flying-fox camp within a 20 km radius
10	> 4 active level 3 Grey-headed Flying-fox camp within a 20 km radius

Table A32: GHFF Species Stocking Rate Scoring

Score	RE12.5.4
2	0-69
4	70-301
6	302-509
8	510-543
10	544-567
8	568-601
6	602-809

Score	RE12.5.4
4	810-1041
2	>1042

Discussion

Results of the GHFF FHA using methodology detailed in **Section 4.3.3** are shown in **Table A33** (refer also **Attachment A9** for data sheets). The impact site attained a score of **5** (5.16) out of **10.**

Table A33: Grey-headed Flying-fox – Modified Habitat Quality Assessment Summary

		Maximum Score	Assessment Unit – Regional Ecosystem	
			AU 1 Remnant RE12.5.4	
Site Condition (40%)	Vegetation Condition	**20**	**20**	AU 1 is mapped as Category B
	Species Richness	**20**	**20**	T1 – 7 GHFF species T2 – 8 GHFF species T3 – 8 GHFF species Average – 7.67 GHFF species
	Flower Score	**10**	**8**	T1 – 0.611 T2 – 0.559 T3 – 0.579 Average – 0.579
	Timing of Biological Shortages	**10**	**10**	T1 – 10 T2 – 10 T3 – 10 Average – 10
	Quality of Foraging Habitat	**20**	**5**	T1 – 3 species T2 – 2 species T 3 – 3 species Average – 2.67 species
	Non-native Plant cover	**20**	**1**	T1 – 70% T2 – 80% T3 – 75 Average – 75%
	Site Condition Score	**100**	64	
	Site Condition Score – out of 4	**4.00**	2.56	
Site Context (30%)	Size of Patch	**10**	**5**	Patch size is between 26 – 100 ha
	Connectedness	**10**	**3**	3 active camps within 20km
	Context	**10**	**3**	25%
	Ecological Corridors	**10**	**0**	Not within

		Maximum Score	Assessment Unit – Regional Ecosystem	
			AU 1 Remnant RE12.5.4	
	Roles of the site location to the species overall population in the state	**10**	**0**	0 active level 3 GHFF camps within a 20km radius
	Threats to species	**10**	**5**	The site has barbed wire fencing, is not subject to bushfire controls and feral animal predators are present. A moderate threat level is prescribed
	Site Context Score	**60**	16	
	Site Context Score – out of 3	**3.00**	0.80	
Species Stocking Rate (30%)	GHFF Foraging Tree Density		**6**	T1 – 385 T2 – 340 T3 - 680 Average – 468.33
	Species Stocking Rate Score	**10**	**6**	
	Species Stocking Rate – out of 3	**3.00**	**1.8**	
	Total		**5.16**	

4.2. Indirect Impacts and Habitat Fragmentation

Item 3.1.3 of the PD request asks for '***An assessment of the impacts of habitat fragmentation in the project area and surrounding areas, including consideration of species' movement patterns***.'

The referral area is located within Bundaberg Regional Council Local Government Area in the suburb of Thabeban. The site is located approximately 3.7km kilometres south-west of Bundaberg Central and situated within an area shifting from rural land uses to residential developments and supporting town centres. Bushland is located immediately adjoining the site, while Bundaberg Ring Road intersects the lot into two parcels. Cleared open paddocks bound the site to the north and west, while retained bushland exists to the east within Bundaberg Brewed Drinks Factory land. Residential developments are located further to the north and east in the wider landscape as well as industrial allotments further to the east and town centres to the northwest. Cleared land earmarked for residential development exists immediately west of the site with Bundaberg Airport located further to the west. As such, the surrounding landscape contains a mixture of, residential development, urban infrastructure and industrial land uses with scattered retained vegetation.

Table A34 below provides an assessment of impacts of habitat fragmentation (connectivity) in the project area and surrounding areas for Koala and GHFF along with additional indirect impacts.

Table A34: Indirect Impact Analysis

Impact	Koala	Grey-headed Flying-fox
Indirect Impacts		
a. Reduction in habitat connectivity to surrounding habitats, and any potential edge effects or disturbance to surrounding habitats, including any adjacent conservation areas.	<u>Connectivity</u> Biodiversity connectivity is considered limited in its current and future form, as the site is bound on one side by disturbed vegetation to the east, and by cleared areas to the north and west. Vegetated areas exist to the south, however Bundaberg Ring Road fragments connectivity to this area from the northern portion of the site (**Plan A10**). Existing residential communities are present to the north, east and west and agricultural land uses dominate the wider landscape. The presence of the barriers to movement that bound the site to the south reduce the overall functionality of connection, resulting in poor movement opportunities for Koala. Connectivity to the east is limited due to disturbed vegetation associated with the Bundaberg Brewed Drinks Factory limiting ongoing fauna movement. In its current form, surrounding threats (i.e. roads and encroaching urban development) create physical barriers for safe Koala movement and have already increased fragmentation within the wider landscape reducing connectivity values across the referral area. Although the southern portion of the site is connected to a linear strip of vegetation to the south-east, the referral area remains unconnected to this area due to the intersecting Bundaberg Ring Road. Existing and future development will reduce safe movement opportunities for the Koala onto and within the referral area. Desirable habitat within the broader landscape is considered associated with Burrum Coast National Park, Bingera National Park, Cordalba State Forest and Elliot River State Forest to the south and west along with Littabella National Park to the northwest. These areas are all over 10 km from the site.	<u>Connectivity</u> No GHFF camps are located within or adjoining the referral area, with the nearest known roost supporting Grey-headed Flying-fox with recent records (2019) is located at North Bundaberg Botanic Gardens (585), approximately 5.85 km north-east of the site. No roosts were identified within the referral area and no individuals were observed foraging on-site or as fly-overs. The proposed action is not expected to reduce connectivity of suitable foraging habitat for the GHFF due to the highly mobile nature of the species and abundance of suitable habitat in the surrounding landscape. <u>Edge Effects and Disturbance</u> The ecological survey across the referral area ground-truthed the on-site vegetation as being moderately disturbed due to historical fire and logging. Although the referral area is dominated by remnant vegetation, no significant or unique ecological values were identified on the referral area. The proposed development will increase edge effects and disturbances, however to an already degraded area of the vegetation within the referral area.

Impact	Koala	Grey-headed Flying-fox
	Two factors have contributed to the reduced connectivity of the referral area to the broader surrounding landscape. First, encroaching urban development including roads, limit dispersal because of a complete lack of adequate Koala crossing infrastructure. Second, significant levels of clearing (past and present) in the surrounding landscape from agricultural uses has resulted in a loss of suitable habitat in areas the Koala may be able to access safely. As such, the vegetation on the referral area and wider landscape is considered fragmented. <u>Edge Effects and Disturbance</u> The ecological survey on the proposed development site ground-truthed the referral area as being moderately disturbed due to historical fire and logging. The referral area is predominantly remnant vegetation with a ground-layer dominated by introduced species. The proposed development will increase edge effects and disturbances, however to an already degraded area of the vegetation within the referral area. Furthermore, the weeds are to be removed for the development, it is not considered to significantly create or exacerbate edge effects. Future conservation has been strategically located to protect environmental values of higher significance (i.e. southern portion of the site). The proposed action has sought to avoid, minimise and mitigate impacts where practical to maintain connectivity and habitat values. <u>Weeds and Pathogens</u> This proposed development is not considered likely to increase the prevalence of weeds on the site given the current presence of exotic species. Proposed rehabilitation and regeneration activities within	

Impact	Koala	Grey-headed Flying-fox
	the retained areas are anticipated to improve the ecological value of this area and improve the quality of the habitat. Further, the proposed development is not considered likely to introduce pathogens that already occur and would negatively impact any species that utilise this area.	
b. Disturbance from increased noise, artificial light, dust, sediment generation and other relevant stressors during construction and operation of the hospital.	No evidence of this species was directly or indirectly (i.e. scats) observed utilising the site. The referral area is considered to comprise of vegetation which provide foraging habitat for this species. <u>Noise</u> Noise levels greater than existing ambient noise levels are expected during construction and operation within the referral area. Construction 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 to noise from vehicles. Noise sources during operation are likely to comprise of vehicles and hospital equipment usage. Both steady continuous and single noise events have the potential to lead to ecological impacts. Noise is expected to elicit some avoidance response from fauna including the Koala, should any be using the surrounding vegetation. Noise levels are likely to increase from current levels 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 landscaped areas will also provide a source of noise due to pedestrian traffic. However, the impact of this to any Koalas in the surrounding area is considered to be minor. <u>Artificial Light</u>	This species was not observed foraging on-site nor as fly-overs. The referral area is considered to comprise of vegetation which provide foraging habitat for this species. <u>Noise</u> Noise levels greater than existing ambient noise levels are expected during construction within the referral 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 to noise from vehicles. 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 including the GHFF, should any be using the surrounding vegetation. Road noise will be the primary source of noise impact. The establishment and use of paths through landscaped areas will also provide a source of noise due to pedestrian traffic. However, as the GHFF is a highly mobile species and the closest known active GHFF camp is approximately 5.85 km away near roads, the impact of this to any GHFF in the surrounding area is considered to be minor. <u>Artificial Light</u> Artificial light can affect both nocturnal and diurnal animals by disrupting behavioural patterns, with quality of light (e.g.

Impact	Koala	Grey-headed Flying-fox
	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 referral area will temporarily increase during the construction phase; however, night works will not be permitted. Lighting will be directed to construction areas within the referral 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 the implementation of standard mitigation measures, the project is likely to result in a negligible impact to any Koalas in the surrounding area due to the use of light pollution during construction. Additionally, light pollution during operation will also be mitigated through design and compliance with general standards in guidelines, particularly for light required within open space areas for safety. Lighting within open space areas is to face towards the hospital and away from conservation areas and vegetation within neighbouring allotments. <u>Dust and Sediment Generation</u> 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:	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 referral area will temporarily increase during the construction phase; however, night works will not be permitted. Lighting will be directed to construction areas within the referral 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 the implementation of standard mitigation measures, the project is likely to result in a negligible impact to any GHFF in the surrounding area due to the use of light pollution during construction. Additionally, light pollution during operation will also be mitigated through design and compliance with general standards in guidelines, particularly for light required within open space areas for safety. Lighting within open space areas is to face towards the hospital and away from conservation areas and vegetation within neighbouring allotments. <u>Dust and Sediment Generation</u> 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;

Impact	Koala	Grey-headed Flying-fox
	• 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 the implementation of standard dust control and mitigation measures, the project is likely to result in a temporary and minor impact to any Koalas utilising the local area due to the generation of dust.	• 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. However, as the GHFF is a highly mobile species and the closest known active GHFF camp is approximately 5.85 km away, the impact of this to any GHFF in the surrounding area is considered to be minor.
Facilitated impacts		
c. Increased vehicle strike from increased frequency of vehicle movements throughout construction and operation of the hospital.	Upon completion of the proposed action, vehicle traffic will increase compared to baseline conditions, increasing the likelihood of vehicle strike of Koalas should any occur in the area. However, the probability of fauna strike is reduced due to the fact that the site is significantly fragmented from surrounding cleared areas and residential development and most fauna will generally avoid urban areas. Given the surrounding properties to the north and northeast are currently undergoing construction or will be developed under approved development, the risk of vehicle strike within the project site will decrease further.	Upon completion of the proposed action, vehicle traffic will increase compared to baseline conditions, increasing the likelihood of vehicle strike for GHFF which may continue to forage on retained vegetation within the referral area. However, the development design avoids, where practicable, roads traversing retained vegetation, minimising potential vehicle strikes. Additionally, GHFF are not ground-dwelling species and no roosts were identified within the referral area, further reducing the risk of vehicle strike for GHFF. The retained vegetation at the southern portion of the site as shown in **Plan A01** will be accessible for highly mobiles species including the GHFF, and area therefore not considered to be lost for this species.

Impact	Koala	Grey-headed Flying-fox
	The retained vegetation as shown in **Plan A01**, will include other uses of stormwater management and rehabilitation. The retained habitat south of Bundaberg Ring Road ensures connectivity is maintained between habitats. Connections between habitats are vital for maintenance of ecological processes, including dispersal, exchange of genetics and therefore continuation of viable populations. Where roads bisect biodiversity corridors Koala-safe movement solutions will be implemented in accordance with relevant Guidelines.	
d. Introduction to and /or proliferation of weeds and pathogens, in habitat for threatened species.	The proposed action is not considered likely to increase the prevalence of weeds on the referral area given the dominance of weeds and exotic species across the referral area. Further, most of South East Queensland's Koala populations already have a high prevalence of Chlamydia infection and Koala Retrovirus (KoRV). The proposed hospital development is not considered likely to introduce pathogens that would negatively impact any Koalas that should be utilising this area.	The proposed action is not considered likely to increase the prevalence of weeds on the referral area given the dominance of weeds and exotic species across the referral area. Further, the proposed development is not considered likely to introduce pathogens that would negatively impact any GHFF that should be utilising this area.
e. The increased risk of entanglement in wire fencing or other infrastructure within, and adjacent to, the referral area.	Industry standard fauna friendly site design measures will be implemented to reduce any physical risk posed by an increase in infrastructure in this area.	Industry standard fauna friendly site design measures will be implemented across the proposed development to reduce any physical risk posed by an increase in infrastructure in this area. Existing barbed-wire fencing on-site will be removed as part of the development. Electrocution on powerlines where they occur is a risk, however, entanglement in netting and on barbed-wire is considered highly unlikely and can be managed through the implementation of mitigation measures and procedures outlined within future management documents including the VC&MP and FMP. As such, the proposed action is not considered likely to impact the recovery of this species.

Impact	Koala	Grey-headed Flying-fox
f. Changes to hydrology and water quality within, and around, the referral area, including increased siltation.	No waterways occur within the referral area. The proposed vegetated wetland stormwater management area is unlikely to cause significant changes to hydrology and water quality within and around the referral area. Although degraded in some areas, the referral area contains limited hydrological values. However, no groundwater dependent threatened communities or flora and fauna species were identified within the site. As discussed, open space and conservation areas have been strategically located across the referral area in areas identified as having greater environmental values, including the southern portion of the site. Through the implementation of stormwater management methodologies, the effects of excess rainwater flowing into catchments caused by the creation of hardstand areas will be minimised. Further, all work will be undertaken in accordance with appropriate management plans to ensure the hydrological changes across the referral area do not impact on surrounding vegetation. It is not considered that this potential indirect impact to hydrology or water quality will have a significant impact on this species.	No waterways occur within the referral area. The proposed vegetated wetland stormwater management area is unlikely to cause significant changes to hydrology and water quality within and around the referral area. Although degraded in some areas, the referral area contains limited hydrological values. However, no groundwater dependent threatened communities or flora and fauna species were identified within the site. As discussed, open space and conservation areas have been strategically located across the referral area in areas identified as having greater environmental values, including the southern portion of the site. Through the implementation of stormwater management methodologies, the effects of excess rainwater flowing into catchments caused by the creation of hardstand areas will be minimised. Further, all work will be undertaken in accordance with appropriate management plans to ensure the hydrological changes across the referral area do not impact on surrounding vegetation. It is not considered that this potential indirect impact to hydrology or water quality will have a significant impact on this species.

4.3. Timing of Impacts

Item 3.1.4 of the PD requests '***an assessment of the likely duration of impacts to protected matters as a result of the proposed action***.'

Table A35 provides a summary of the likely associated impacts and the estimated timing of the impacts.

Table A35: Timing of Direct, Indirect and Facilitated Impacts

Impact	Extent	Timing
Construction Phase		
Vegetation Clearing	Impact Area	During Construction
Habitat Removal	Impact Area	During Construction
Intensification of effects of fragmentation effects (i.e. edge effect, habitat degradation, barrier effects)	Impact Area	During Construction
Weed dispersal and establishment	Impact Area	During Construction
Vehicle movements	Impact Area	During Construction
Earthworks	Impact Area	During Construction
Light emissions during construction	Impact Area	During Construction
Noise and vibration	Impact Area	During Construction
Waste disposal	Impact Area	During Construction
Hazardous and dangerous goods	Impact Area	During Construction
Increased human presence	Impact Area	During Construction
Operational Phases		
Weed Incursion	Impact Area	Ongoing
Vehicle Strike	Impact Area	Ongoing
Noise and light pollution	Impact Area	Ongoing
Increased human presence	Impact Area	Ongoing

4.4. Likelihood of repeated impacts

Item 3.1.5 of the PD requests '***a discussion of whether any impacts are likely to be repeated, for example as part of maintenance***.'

No impacts are likely to be repeated. Any repeated impacts as part of maintenance can be managed through associated management plans (e.g. Bushfire Management Plan, Rehabilitation Management Plan, Offset Management Plan). It is noted, six (6) buildings have been included as future expansion of the hospital which

includes a future multi-deck carpark at the southern extent of the project area and a building at the eastern boundary, see **Attachment A10** for site concept plan. However, no impacts are likely to be repeated as the project clearing impact area of approximately 24.2 ha is inclusive of these future buildings.

4.5. Impacts that are likely to be unknown, unpredictable or irreversible

Item 3.1.6 of the PD requests ***'a discussion of whether any impacts are likely to be unknown, unpredictable or irreversible***.'

The implementation of precautionary measures in decision making is used where there is a threat of serious or irreversible harm and where there is scientific uncertainty as to the extent of possible environmental damage. There are a number of factors which help determine whether or not an action might cause serious or irreversible environmental damage, including:

I. The spatial scale;
II. The magnitude of possible impacts;
III. The perceived value of the threatened environment;
IV. The complexity and connectivity of possible impacts;
V. The manageability of possible impacts;
VI. The level of public concern and the rationality or scientific basis for the concern; and
VII. Reversibility of possible impacts.

Impacts to the Koala and associated habitat have been identified as the primary environmental concern on a level of National Environmental Significance. The site's ability to provide critical habitat for the Koala has been discussed in detail throughout this report. The site has been recognised with the potential to support low level Koala activity and an area of 23.56 hectares has been identified as containing habitat critical to the survival of the Koala that will be impacted by the project. Furthermore, the site contains Grey-headed Flying-fox foraging habitat within the impact area.

A number of possible impacts have been identified as a result of the project, however these are all considered to be localised impacts. The magnitude of impact is small and restricted to the referral site and immediately adjoining areas. Impacts can be summarised as those arising from the loss of habitat, barriers to movement, injury or death from vehicle strike and dispersal into hospital areas. A number of management measures will be imposed to avoid and mitigate these impacts which will be detailed within phase specific VCFMPs. The identified impacts are considered mostly to be manageable through imposition of low vehicle speeds. The impacts from the project have been identified and management measures have been subsequently developed.

4.6. Biodiversity Convention, CITES and Threat Abatement Justification

Item 3.1.7 of the PD requests to ***'justify, with supporting evidence, how the proposed action will not be inconsistent with:***

- ***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***
- ***a recovery plan or threat abatement plan.***

CITES involves the International Trade of Endangered species (Flora and Fauna), the project will not propose any trading of flora and fauna, therefore will not be inconsistent with CITES.

Apia Convention –

Article III

1. The boundaries of national parks shall not be altered so as to reduce their areas, nor shall any portions of such parks be capable of alienation, except after the fullest examination.

2. The resources of national parks shall not be subject to exploitation for commercial profit, except after the fullest examination.

3. The hunting, killing, capture or collection of specimens (including eggs and shells) of the fauna and destruction or collection of specimens of the flora in national parks shall be prohibited, except when carried out by or under the direction or control of the appropriate authorities or for duly authorised scientific investigations.

4. Provision shall be made for visitors to enter and use national parks, under appropriate conditions, for inspirational, educative, cultural and recreative purposes.

Article IV

National reserves shall be maintained inviolate, as far as practicable, it being understood that in addition to such uses as are consistent with the purposes for which a national reserve was established, permission may be given to carry out scientific investigations.

Article V

1. The Contracting Parties shall, in addition to the protection given to indigenous fauna and flora in protected areas, use their best endeavours to protect such fauna and flora (special attention being given to migratory species) so as to safeguard them from unwise exploitation and other threats that may lead to their extinction.

2. Each Contracting Party shall establish and maintain a list of species of its indigenous fauna and flora that are threatened with extinction. Such lists shall be prepared as soon as possible after this Convention has come into force and shall be communicated to the body charged with the continuing bureau duties under this Convention.

3. Each Contracting Party shall protect as completely as possible as a matter of special urgency and importance the species included in the list it has established in accordance with the provisions of the last preceding paragraph. The hunting, killing, capture or collection of specimens (including eggs and shells) of such species shall be allowed only with the permission of the appropriate authority. Such permission shall be granted only under special circumstances, in order to further scientific purposes or when essential for the maintenance of the equilibrium of the ecosystem or for the administration of the area in which the animal or plant is found.

4. Each Contracting Party shall carefully consider the consequences of the deliberate introduction into ecosystems of species which have not previously occurred therein.

UN Convention on Biological Diversity
https://www.cbd.int/doc/world/au/au-nbsap-v3-en.pdf
https://www.dcceew.gov.au/environment/biodiversity/international/un-convention-biological-diversity

Section 4.8 below discusses species specific information for impact assessment with reference to the relevant Conservation Advice and Recovery Plans for Greater Glider, Koala and Grey-headed Flying-fox.

4.6.1 Threat Abatement Plan – European Red Fox

Predation by Feral cats (*Felis catus*) and European Fox (*Vulpes vulpes*) are listed as threats to Greater Glider within the DCCEEW *Conservation Advice for Petauroides volans (greater glider (southern and central))*. During initial site surveys, European Fox were detected onsite however no Feral Cats were observed.

The Threat Abatement Plan (TAP) for predation by the European red fox aims to minimise the impact of foxes on biodiversity in Australia by protecting affected native species and preventing further species from becoming threatened.

The TAP lists five main objectives:

1. Prevent foxes occupying new areas in Australia and eradicate foxes from high-conservation-value 'islands'.
2. Promote the maintenance and recovery of native species and ecological communities that are affected by fox predation.
3. Improve knowledge and understanding of fox impacts and interactions with other species and other ecological processes.
4. Improve the effectiveness, target specificity, integration and humaneness of control options for foxes.
5. Increase awareness of all stakeholders of the objectives and actions of the TAP, and of the need to control and manage foxes.

Management of threats from invasive predators will occur within the retained vegetation onsite in accordance with the MNES Management Plan.

4.7. Construction and Operational Impact Assessment

Item 3.1.8 of the PD requests to ***'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***.'

Table A36 discusses the impacts from the construction and operation of the project on the habitat.

Table A36: Risk of Potential Impacts Assessment

Potential Impact	Discussion
i. Edge effects – including the potential for the introduction of weed species and pathogens in the referral area and adjacent environment.	<u>Connectivity</u> Biodiversity connectivity is considered limited in its current and future form, as the site is bound on one side by disturbed vegetation to the east, and by cleared areas to the north and west. Vegetated areas exist to the south, however Bundaberg Ring Road fragments connectivity to this area from the northern portion of the site (**Plan A10**). Existing residential communities are present to the north, east and west and agricultural land uses dominate the wider landscape. The presence of the barriers to movement that bound the site to the south reduce the overall functionality of connection, resulting in poor movement opportunities for Koala. Connectivity to the east is limited due to disturbed vegetation associated with the Bundaberg Brewed Drinks Factory limiting ongoing fauna movement. <u>Edge Effects and Disturbance</u> The ecological survey on the proposed development site ground-truthed the site as containing disturbance with weed infestations, such as Lantana, present across the site. As the weeds are to be removed for the development, it is not considered to significantly create or exacerbate edge effects. <u>Weeds and Pathogens</u> This proposed development is not considered likely to increase the prevalence of weeds on the site given the current presence of exotic species. Proposed rehabilitation and regeneration activities within the retained areas are anticipated to improve the ecological value of this area and improve the quality of the habitat. Further, the proposed development is not considered likely to introduce pathogens that already occur and would negatively impact any species that utilise this area.
ii. Barriers to fauna movements – including proposed Koala proof/ permeable fencing and dog proof fencing.	The proposed development will facilitate a public hospital and associated health facilities that is a logical alignment with surrounding residential areas and disturbance levels from surrounding residential and agricultural land uses. Given the lack of connectivity to the south, and cleared areas to the north and west, the proposal is not considered to significantly exacerbate existing fragmentation. Fauna friendly fencing will be installed around the edge of the site along the eastern, southern and western boundary of the retained bushland. To minimise the risk of fauna entering the hospital site and construction areas fauna exclusion fencing will be constructed along the southern boundary of the impact area at the interface of the project disturbance and the retained bushland (see **Section 5** for further details).

Potential Impact	Discussion
iii. Vehicle movement – potential increase of vehicles to strike fauna in the pre-construction, construction and operation phase of the project.	Upon completion of the development, vehicle traffic will increase compared to baseline conditions, increasing the likelihood of vehicle strike of fauna should any happen to utilise the area. The probability of fauna strike is reduced due to the fact that most fauna will generally avoid urban areas and surrounding cleared and disturbed areas. Notwithstanding, to reduce the risk of vehicular strike, Koala friendly design measures will be incorporated throughout the development.
iv. Increased presence of dogs – pre-construction, construction and operation phases have the potential to increase dog presence in the referral area and adjacent environment.	While dogs already occur within the local area, the project is unlikely to increase dog numbers in the area. The development of the hospital and associated health facilities is unlikely to increase the presence of dogs.
v. Earthworks – potential to generate dust emissions from the removal of vegetation and movement of soil in the pre-construction and construction phase of the project.	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 the implementation of standard mitigation measures, the project is likely to result in a temporary and minor impact to any fauna utilising the local area due to the generation of dust.

vi. Disturbance from increased noise, artificial noise, artificial light, sediment generation and other relevant stressors during construction and operation.

Noise

Noise levels greater than existing ambient noise levels are expected during 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 to noise from vehicles.

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 including the Koala, should any be using the surrounding vegetation. However, with consideration of the extent of habitat available in the study area, this is likely to be a temporary and negligible to minor impact.

Additionally, noise levels are likely to increase once the 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 landscaped areas will also provide a source of noise due to pedestrian traffic. However, the impact of this to fauna in the surrounding area is considered to be minor.

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 permitted. Lighting will be directed to construction areas within the project area. Some light spillages 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 fauna in the surrounding area due to the use of light pollution during construction.

Sedimentation

Through the implementation of stormwater detention technologies, the effects of excess rainwater flowing into catchments caused by the creation of hardstand areas will be minimised.

Potential Impact	Discussion
	Further, all work will be undertaken in accordance with appropriate management plans to ensure the hydrological changes across the site do not impact on surrounding vegetation. It is not considered that this potential indirect impact to hydrology or water quality will have any impact on fauna that happen to be utilising the site or local area.

4.8. Threatened Species Conservation Advice and Recovery Plans

Item 3.2 of the PD requests '***specific threatened species information for impact assessment***.' Species specific information has been limited to Greater Glider (*Petauriodes volans*), *Phascolarctos cinereus* (Koala) and *Pteropus poliocephalus* (GHFF). The updated likelihood of occurrence assessment and Significant Residual Impact Assessments for the species listed in **Section 3.1.1** demonstrates no other species or their habitat are likely to be impacted by the proposed Bundaberg Hospital Site.

The following sections detail the extent and nature of impact on listed threatened because of the proposed action.

4.8.1 Greater Glider Conservation Advice

Item 3.2.1 of the PD requests '***a discussion of the Greater Glider impact assessment with reference to the updated Conservation Advice (July 2022)***.'

The following section provides a discussion of the Greater Glider impact assessment with reference to the updated Conservation Advice (July 2022). As discussed through this report, potential habitat for Greater Glider is present onsite however, the site is surrounded by significant disturbance and habitat clearing rendering the area unconnected to larger patches of habitat in the broader region. The project is not expected to significantly exacerbate current threats to the species including inappropriate fire regimes, timber harvesting, or predation by native and invasive species.

While the project will result in habitat clearing, the site is currently substantially fragmented from surrounding larger tracts of bushland. Furthermore, barbed wire fencing will not be used in any part of the hospital development. No evidence of the Greater Glider was detected during field surveys and no recent records of the species are within close proximity to the site. An assessment against the Significant Impact Guidelines 1.1 have been included as **Attachment A8 – Greater Glider Detailed Assessment.** The proposed action is unlikely to have a significant impact on the Greater Glider. This is based on the highly fragmented nature of the site which remains unconnected to surrounding habitat patches, the moderate levels of disturbance onsite and surrounding barriers to movement (e.g. Bundaberg Ring Road and cleared areas) (refer **Plan A07 – Greater Glider Fragmentation Analysis**).

The conservation advice for *Petauroides volans* (greater glider (southern and central)) came into effect on 5th July 2022. The document combines the approved conservation advice and listing assessment for the species and provides a foundation for conservation action and further planning.

Key threats to the Greater Glider are frequent and intense bushfires, inappropriate prescribed burning, climate change, land clearing and timber harvesting. The primary conservation objective is that within the next three generations, the population size as well as the extent, quality and connectivity of habitat required to maintain the population will have increased.

Conservation and management priorities

Habitat loss, disturbance and modification (including fire)

In the wake of the recent bushfires, unburnt areas are to be protected to support population recovery. The referral area is not part of the recent bushfire impacts in question, nor was the species recorded on site. The proposal will result in retained habitat areas. It is not anticipated that prescribed burns undertaken surrounding the site or within the area would impact on hollow bearing trees.

While the site is not considered to be critical habitat for the Greater Glider, and no evidence of the species was found onsite, an offset will be delivered in accordance with the *EPBC Act Environmental Offsets Policy 2012* to account for impacts to Koala habitat and foraging habitat for the Grey-headed Flying-fox which could benefit the Greater Glider.

Climate change
The impact site is not considered to be a climate change refuge. Notably, retained habitat areas will be rehabilitated to remove weeds and improve natural microclimate resources.

Invasive species (including threats from predation, grazing, trampling)
The proposed action will not introduce threats from predation that are not already present. There is potential threats onsite from introduced predators namely, European red fox (*Vulpes vulpes*) which were observed during initial site surveys. It is not anticipated these threats from introduced predators are locally significant to the Greater Glider due to the lack of records of the species within the site and surrounding areas (refer **Plan A06**).

Ex-situ recovery actions
Translocation is not proposed in the absence of the species. Notably, connected areas of potential foraging habitat for the species will be retained and rehabilitated on site.

Stakeholder and Community Engagement
Not applicable to the proposed action.

Survey and Monitoring Priorities
Not applicable to the proposed action.

Information and Research Priorities
Not applicable to the proposed action.

Recovery Plan
There is not yet a recovery plan for the species.

Item 3.2.2 of the PD requests '***a discussion of the impacts to hollow-bearing trees (HBT) within the disturbance footprint and an estimation of how many HBT will be lost***.'

Section 3.2.2 provides a detailed analysis of the density of hollow-bearing trees (HBT) across the site. The site contains numerous hollow-bearing trees within the disturbance footprint. Surveys recorded sixty-nine (69) hollow-bearing trees in a subset area of 16ha within the project disturbance footprint. The density of hollow-bearing trees across the site is therefore estimated to be 4.31 trees

/ ha. It is estimated that approximately 104 HBT will be lost within the disturbance footprint (24.2 ha) of the hospital development.

4.8.2 Koala Conservation Advice and Recovery Plan

Item 3.2.3 of the PD requests '***a discussion of the Koala impact assessment with reference to the updated***
Recovery Plan and Conservation Advice (March 2022).

Koala (*Phascolarctos cinereus*) Conservation Advice

The *Conservation Advice for Phascolarctos cinereus (Koala) combined populations of Queensland, New South Wales and the Australian Capital Territory* (Conservation Advice) came into effect on 12 February 2022. It lists six conservation and recovery actions that are categorised into 'supporting strategies' which provide for governance to coordinate actions, led by the Australian Government in partnership with the States and Territories, and 'on-ground (direct) strategies' which relate to improving habitat quality and restoration, implemented at the site level.

The development is considered to be consistent with the on-ground strategies detailed in the Conservation Advice and recovery Plan:

- Strategy 5: Strategic habitat restoration
- Strategy 6: Active metapopulation management

Strategy 5: Strategic habitat restoration

Restoration increases the overall habitat available for Koalas and increases the connectivity between areas of habitat to contribute to ensuring the long-term survival of Koala populations. It involves restoring lost and degraded habitat to improve environmental functions.

While the development proposes to impact approximately 23.56 ha of potential Koala habitat, the habitat quality on-site is considered moderate, and connectivity is restricted with an overall habitat quality score of 5.90 out of 10. A total of approximately 41.1 ha of natural bushland to the south of the proposed development will be retained for conservation which will facilitate connectivity within the site and through adjacent reserves, especially in the patch of vegetation south of Bundaberg Ring Road. Opportunities to rehabilitate the retained patch of vegetation onsite would benefit habitat quality, particularly targeting the weed infestations of *Sporobolus pyramidalis* (Giant Rat's Tail Grass) and *Lantana camara* (Lantana) and excluding known threats to Koala, including dogs and vehicles, currently present on-site.

Strategy 6: Active metapopulation management

Metapopulation management concerns the movement of individuals and genes between populations. Consideration of metapopulation management is reflected in the design of the development, specifically the retention of bushland at the south of the development to promote connectivity and Koala movement within the landscape, and through the removal of hazards to Koala.

Retaining vegetation in the southern extent of the site and especially south of Bundaberg Ring Road, provides connectivity to marginal habitat connecting to a vegetation corridor associated with Yellow

Waterholes Creek. Fragmentation and isolation of individuals in the landscape is not considered exacerbated through the proposed action by the removal of free roaming dogs and implementation of conservation connectors such as fauna crossings and culverts under Bundaberg Ring Road, and so the removal potentially hazardous dispersal routes.

Although the proposed action will involve the removal of habitat critical to the survival of the Koala, all significant residual impacts are to be compensated through the provision of land-based offsets. Proposed offsets will be located in Koala occupied areas of connected and resilient habitat.

Koala (*Phascolarctos cinereus*) National Recovery Plan

The *National Recovery Plan for the Koala Phascolarctos cinereus (combined populations of Queensland, New South Wales and the Australian Capital Territory)* aims to coordinate a national road map for the integrated recovery effort of the Koala. Threats to Koalas include urbanisation, grazing, agriculture, transport infrastructure, mining and energy extraction; forest harvesting and altered fire regimes; droughts and heatwaves; and other direct threats such as disease and dog and vehicles. The primary goal of the National Recovery Plan is:

- To stop the trend of decline in population size of the listed Koala, by having resilient, connected, and genetically healthy metapopulations across its range, and to increase the extent, quality and connectivity of habitat occupied.

The Bundaberg Hospital project impact area has been situated in the northern extent of the site to enable the southern portion of vegetation to be retained. While no Koala's nor evidence of Koala were detected onsite, rehabilitation and retention of the southern habitat area will provide benefits to fauna. The southern portion of the retained vegetation south of Bundaberg Ring Road will retain connectivity to a linear strip of vegetation traversing south-east. The project is unlikely to exacerbate threats from disease and dog predation, and threats from vehicle use will be managed through fauna exclusion fencing into the hospital grounds and low vehicle speeds.

4.8.3 GHFF Recovery Plan

Item 3.2.4 of the PD requests '***A discussion of the Grey-headed Flying-fox impact assessment with reference to the National Recovery Plan (March 2021)***.

The purpose of the National Recovery Plan for the Grey-headed Flying-fox 2021 is to set out the management and research actions necessary to stop the decline of, and support the recovery of the Grey-headed Flying-fox over the next 10 years. The overall objectives of this Grey-headed Flying-fox recovery plan are:

- To improve the Grey-headed Flying-foxes national population trend by reducing the impact of the threats outlined in this plan on Grey-headed Flying-foxes through habitat identification, protection, restoration and monitoring; and
- To assist communities and Grey-headed Flying-foxes to coexist through better education, stakeholder engagement, research, policy and continued support to fruit growers.

The key threats facing the Grey-headed Flying-fox is the loss and degradation of foraging and roosting habitat. In addition, conflict with people, electrocution on power lines and entanglement in netting and barbed-wire fencing are also listed as potential threats. While potential foraging habitat for the Grey-headed Flying-fox will be cleared as part of the proposed hospital development, the retention and rehabilitation of habitat in the south of the project area will provide improved habitat for the species. As the species is highly mobile, it is anticipated that GHFF will be able to move from the impact area into the southern retained habitat. Further discussion of site-specific threats to GHFF are outlined below. The National Recovery Plan addresses the recovery objectives which are provided below with responses relevant to the proposed action:

Identify, protect and increase native foraging habitat that is critical to the survival of the Grey-headed Flying-fox

Although no roosts were identified on-site, the nearest known Grey-headed Flying-fox roost is located approximately 5.85 km north of the referral area at North Bundaberg, Botanic Gardens, Young Street (585). Habitat critical to the survival of the species is considered important winter and spring flowering vegetation communities. Important winter and spring vegetation communities are those that contain *Eucalyptus tereticornis, E. albens, E. crebra, E. fibrosa, E. melliodora, E. paniculata, E. pilularis, E. robusta, E. seeana, E. sideroxylon, E. siderophloia, Banksia integrifolia, Castanospermum australe, Corymbia citriodora, C. eximia, C. maculata, Grevillea robusta, Melaleuca quinquenervia* or *Syncarpia glomulifera* (Eby and Law 2008; Eby 2016; Eby et al. 2019).

Of the species listed above, *Eucalyptus tereticornis* and *Melaleuca quinquenervia* were recorded within the referral area. The Grey-headed Flying-fox is a highly mobile species and the closest known active Grey-headed Flying-fox camp is approximately 5.85 km away. As such, the proposed action will result in the unavoidable loss of 23.56 ha of potential foraging habitat for the Grey-headed Flying-fox. An offset for the loss of potential Grey-headed Flying-fox foraging habitat will be provided.

Identify, protect and increase roosting habitat of Grey-headed Flying-fox camps

No roosts were identified within the comprehensive surveys of the referral area and the nearest known active roost site located approximately, 5.85 km north of the referral area. However, this species was not observed roosting within the referral area. Preferred roosting habitat for the Grey-headed Flying-fox is poorly understood, therefore it is difficult to preserve potential roosting habitat for the species.

Determine trends in the Grey-headed Flying-fox population so as to monitor the species' national distribution, habitat use and conservation status

Not applicable. Mitigation measures will be implemented during construction and operation of the proposed action to reduce threats.

Build community capacity to coexist with flying-foxes and minimise the impacts on urban settlements from new and existing camps while avoiding interventions to move on or relocate entire camps

Not applicable. There are no observed roosts on-site, with the nearest known roost site located approximately 5.85 km north of the referral area.

Increase public awareness and understanding of Grey-headed Flying-foxes and the recovery program, and involve the community in the recovery program where appropriate
Not applicable.

Improve the management of Grey-headed Flying-fox camps in areas where interaction with humans is likely
Not Applicable. There are no observed roosts on-site, with the nearest known active roost site located approximately 5.85 km north of the referral area.

Significantly reduce levels of licenced harm to Grey-headed Flying-foxes associated with commercial horticulture
Not applicable.

Support research activities that will improve the conservation status and management of Grey-headed Flying-foxes
Not applicable.

Reduce the impact on Grey-headed Flying-foxes of electrocution on power lines, and entanglement in netting and on barbed-wire
No roosts were identified on-site and the nearest known roost site located approximately 5.85 km north of the referral area. The vegetation on-site contains two (2) of nineteen (19) important winter and spring foraging species for the Grey-headed Flying-fox. As such, it is considered that the referral area vegetation provides potential foraging habitat for this species.

The proposed action will involve the removal of 23.56 ha of potential foraging habitat within the referral area. Electrocution on powerlines where they occur is a risk, however, considered unlikely as the proposed action is for the construction of a hospital and power lines will be minimal. In addition, entanglement in netting and on barbed wire is considered highly unlikely to be located on-site during construction and operation of the proposed action and can be managed through the implementation of mitigation measures and procedures outlined within future management documents, including the VC&MP and FMP. As such, the proposed action is not considered likely to impact the recovery of this species.

5. Avoidance, Mitigation and Management

This section responds to Item 4 of the PD request which requests further details on proposed measures to avoid and mitigate impacts.

5.1. Management Plans

Item 4.1 of the PD Request asks to '***include any relevant management plans (in approved or draft format) as appendices to the preliminary documentation***.'

The following management plans have been developed as part of the proposed Bundaberg Hospital development.

- High-risk Species Management Program (HSMP): provided in **Attachment A11**
- Bushfire Management Plan (BMP): provided in **Attachment A12**
- MNES Management Plan (MMP): provided in **Attachment A13**
- Rehabilitation Management Plan (RMP): provided in **Attachment A14**

5.2. Description of Impact Avoidance & Mitigation Measures

Item 4.2 of the PD Request asks for '***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]).***

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.

All proposed measures must also be drafted to meet the 'S.M.A.R.T' principle:

- ***S – Specific (what and how)***
- ***M – Measurable (baseline information, number/value, auditable)***
- ***A – Achievable (timeframe, money, personnel)***
- ***R – Relevant (conservation advices, recovery plans, threat abatement plans)***

- ***T – Time-bound (specific timeframe to complete).'***

Item 4.2 of the PD Request asks for '***Information on the timing, frequency and duration of the proposed avoidance, mitigation and management measures to be implemented.'***

Item 4.3 of the PD Request asks for ***'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.'***

Item 4.4 of the PD Request asks for '***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.'***

The following sections describe the proposed avoidance, mitigation and management measures implemented as part of the proposed Bundaberg Hospital development. Further specific details for avoidance, mitigation and management measures are included in the MNES Management Plan (**Attachment A13**).

5.2.1 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 24.4 ha (16.8 ha for the project area itself, 1 ha for the electrical substation, 1.4 ha for Johanna Boulevard Extension and approximately 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.

5.2.2 Alternative Strategies, Plans and Measures

A number of mitigation measures are proposed to reduce identified impacts on the Greater Glider, Koala, and Grey-headed Flying-fox and their habitat and include the following:

- Implementation of the site-specific Vegetation Clearing and Fauna Management Plan (VCFMP) (See Attachment D in the MNES Management Plan - **Attachment A13**)
- Preparation of Environmental Pre-clearance Prestart Packages;
- On-site prestart meeting;
- Engagement of A DES registered fauna spotter catcher;
- Fauna-friendly fencing and design;

- Implementation of fauna friendly road design and signage where necessary; and
- Ongoing annual compliance reporting.

These measures are detailed within the following sub-sections.

Fencing

New or replacement fencing shall avoid the use of barbed wire. Fauna-friendly fencing will be implemented along the southern boundary to continue to allow the movement of fauna across the boundary. Methods to create fauna-friendly fencing include leaving a 30 – 50 cm gap under the fence, ensuring the fence is no more than 1.2 m high and using chain-wire mesh that fauna can easily climb or jump over. Specific fencing design is provided in Attachment E of the MMP (**Attachment A13**).

Stormwater Culverts

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.

Raptor Nest

The raptor nest in the northern portion of the site is located within the main development area. The nest 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). 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. A Species Management Program (SMP) has been prepared (refer **Attachment A11**) which 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.

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.

Road Signage

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.

Landscaping

A non-Koala tree landscape mix to be used in development landscaping to ensure Koalas are not encouraged to traverse areas not safe for Koala habitation or movement. The project will ensure street and park trees while being planted out with non-invasive native trees don't specifically include any primary or secondary Koala food trees. The goal of this approach is to minimise the attraction for Koalas to enter the development area.

The retained vegetation will retain Koala habitat trees. Rehabilitation works within this area will include primary or secondary Koala food trees to enhance Koala habitat. Trees used in rehabilitation plantings will be reflective of the Regional Ecosystem at the site as outlined within the RMP (**Attachment A14**).

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. The relocation and installation of natural hollows will be conducted by a suitably qualified and experienced tree climber or will utilise an elevated works platform. Installation must be undertaken before clearing commences to ensure that the animals have somewhere to go once their trees are felled. Tree hollows shall be relocated to the retained adjacent vegetation and within vegetation on the southern side of Bundaberg Ring Road. Further details on the hollow-bearing tree relocation is provided in the MMP (**Attachment A13**).

Stormwater Management

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 wetlands described above are identified as 'stormwater management area' identified in the Vegetation Clearing Plan (Concept design) Map (Figure 2, page 7) of the Ecological Assessment Report (refer **Part B**). 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. Specific details of the wetland rehabilitation is provided in the RMP (**Attachment A14**).

5.2.3 Clearance Procedures

Vegetation Clearing and Fauna Management Plan

An overarching Vegetation Clearing and Fauna Management Plan (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. The VCFMP is provided in Attachment D of the MMP (**Attachment A13**).

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;
- links to weed management and revegetation proposals;
- 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, contacts and certification; and
- specific fauna management procedures for potential or known habitat trees.

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.

<u>Fauna Management Plan and Protocols</u>

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.

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.

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.

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 FMP.
- Manage any Greater Glider identified on-site in accordance with the protocols discussed in the SBMP.
- Manage fauna habitat identified during the site inspection using the protocols discussed in the SBMP.
- 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 the developer 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 SBMP.

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 for each stage of the project. 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.

5.3. Mitigation Measure Assessment of Effectiveness

Item 4.5 of the PD Request asks for '***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.***'

Item 4.6 of the PD Request asks for '***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.***'

An evaluation of the effectiveness of mitigations measures is provided in **Table A37** and **Table A38**. Further details on 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 have been included in the MNES Management Plan (**Attachment A13**) and Rehabilitation Management Plan (**Attachment A14**).

Table A37: Construction Impacts

Impact	Avoidance and Mitigation Measures	Evaluation of the Effectiveness of Measures	Mitigation	Timeline	Risk Assessment	Corrective Actions	Milestone	Residual Impact
Loss of 23.56 ha of critical habitat for the Koala and potential foraging habitat for the Grey-headed Flying -fox.	Some significant habitat features are present as large trees and hollow-bearing trees throughout the referral area. The site contains Koala habitat trees and winter flowering tree species suitable for Grey-headed Flying-fox foraging. However, the site has undergone some disturbance due to historic logging and fire. Impacts are minimised by developing the more disturbed areas of the site and retaining areas of significant habitat value to the south. No more than 23.56 ha of vegetation identified as habitat critical to the survival of the Koala and potential foraging habitat for the Grey-headed Flying-fox, will be removed to facilitate the development and is considered unavoidable.	Ecological surveys and habitat assessments conducted across the referral area led to the precise spatial analysis of vegetation and habitat qualities. The project will result in the unavoidable loss of not more than 23.56 ha of critical habitat for the Koala and potential foraging habitat for the Grey-headed Flying-fox.	The proposed development site is comprised of moderately disturbed remnant vegetation and adjoining existing cleared areas and future urban development, avoiding another location with higher MNES values.	Works complete	The field survey applied has accurately mapped environmental values and features. The site is considered to contain habitat for MNES Koala and foraging habitat for GHFF, with potential habitat features suitable for Greater Glider.	Not applicable.	Works are to be contained within the referral area with mitigation measures outlined earlier effectively applied. The development area is cleared and developed.	**Loss of 23.56 ha of critical habitat for the Koala and potential foraging habitat for the Grey-headed Flying -fox.**
Risk of injury or mortality to Koalas and Grey-headed Flying-fox from vegetation clearing and construction.	All clearing will be undertaken in accordance with mitigation measures outlined earlier and using measures outlined in the MMP (**Attachment A13**). This will include: • Provisions for the proponent to engage a qualified Fauna Spotter Catcher to participate in all stages of vegetation clearing. The Fauna Spotter Catcher will be 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 fauna species. • 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. • Temporary fauna friendly fencing will allow fauna to safely disperse	The use of a Fauna Spotter Catcher throughout clearing is an effective tool to: 1. Identify the types of species within the referral area prior to clearing; and 2. Identify and flag habitat features that require thorough examination before clearing. 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	Fauna Spotter Sequential Clearing Temporary fauna fencing Restricted construction hours Dog prohibitions	Present at all times during clearing works At all times during clearing At all times during clearing At all times during construction At all times during construction	Fauna Spotter not present and Koala injured or killed Sequential clearing not undertaken and fragmentation induced Temporary fencing not applied and Koala are injured or killed Works outside of hours No companion and security dogs within the referral area	Cease clearing immediately and engage a fauna spotter. Cease clearing immediately and implement sequential clearing. Cease clearing immediately and construct temporary fauna fencing. Cease clearing immediately and re-commence during daylight hours.	No injury or death to Koalas during clearing Clearing completed as per sequential clearing Temporary fencing utilised at all times during the clearing process Works area completed within mandated hours Construction completed without dogs within the referral area	The use of a Fauna Spotter is mandated **No residual impact** Sequential clearing is mandated and guided by VC&MPS, pre-clearance checklists and pre-starts **No residual impact** Temporary fauna fencing is mandated and guided by FMPs and pre-clearance checklists and pre-starts **No residual impact** **No residual impact** Dog controls are mandated and guided by the FMPs. **No residual impact**

Impact	Avoidance and Mitigation Measures	Evaluation of the Effectiveness of Measures	Mitigation	Timeline	Risk Assessment	Corrective Actions	Milestone	Residual Impact
	into vegetated areas away from construction. • Temporary fauna exclusion fencing will then be erected to prevent fauna dispersing into construction areas. • Restricted construction hours where possible (i.e., daylight). • Prohibition of companion / security animals (e.g. dogs). • Restricted vehicle speeds (e.g. max 40 km) within construction areas. In addition to this, all construction 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 construction speed limits.	onerous and thorough procedures set out The Draft Code. 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. 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. Each of these measures will ensure that the risk of injury or death to Koalas or Grey-headed Flying-foxes as a result of construction are avoided and mitigated. The aim of these procedures is to support **zero injuries or death to Koalas or Grey-headed Flying-foxes** as a result of construction.	Low vehicle speeds Site inductions	At all times during construction At all times during construction	Speeds are exceeded resulting in fauna strike Induction avoided	Cease clearing immediately and remove dogs. Ensure vehicle speeds are adhered to. Ensure all staff undergo site inductions.	Construction completed without vehicle strike Construction completed without inductions being breached	Speed limits are mandated and guided by the FMPs. **No residual impact** Inductions are mandatory. **No residual impact**
Risk of disturbance to Grey-headed Flying-fox when foraging in habitat during construction.	The VCFMP includes controls to avoid, minimise and mitigate risk of disturbance to Grey-headed Flying-fox when foraging in habitat during construction, specifically: • Clearing between 6am – 6pm. • Timing vegetation clearing to minimise impacts (direct or indirect) during optimum breeding periods	Construction management and clearing controls implemented through the VCFMP are considered to be able to effectively avoid, minimise and mitigate risk of disturbance to Grey-headed Flying-fox foraging regimes during construction, and	Clearing to occur during daylight hours Vegetation clearing to avoid optimum breeding periods.	At all times during construction At all times during construction	Clearing occurring during nighttime. Clearing occurring during breeding periods.	Cease construction immediately and re-commence during daylight hours. Complete clearing outside of breeding periods.	No clearing completed during nighttime. No clearing completed during optimal breeding periods.	Clearing during daylight hours is mandated **No residual impact** Clearing outside of optimal breeding period is mandated

Impact	Avoidance and Mitigation Measures	Evaluation of the Effectiveness of Measures	Mitigation	Timeline	Risk Assessment	Corrective Actions	Milestone	Residual Impact
	(e.g. mating (March-April), birth (Oct-Nov) in accordance with the National Recovery Plan. Project schedule will avoid clearing during optimum breeding periods. • Monitoring of foraging trees by the Fauna Spotter Catcher, and including appropriate clearing controls / management where required to minimise disturbance. • Staged clearing of vegetation will allow for the gradual loss of vegetation, giving fauna time to naturally disperse away from the disturbance	allow for adaptive management where required. Limiting hours of construction and clearing to daylight hours only where possible, allows a 12 hour period for safe dispersal and foraging to occur. With appropriate monitoring of observed feed trees by the Fauna Spotter Catcher no residual impacts are expected to occur.	Fauna spotter Sequential clearing	Present at all times during clearing works At all times during clearing	Fauna Spotter not present and Koala injured or killed Sequential clearing not undertaken and fragmentation induced	Cease clearing immediately and engage a fauna spotter. Cease clearing immediately and implement sequential clearing.	No injury or death to Koalas during clearing Clearing completed as per sequential clearing	The use of a Fauna Spotter is mandated **No residual impact** Sequential clearing is mandated and guided by VC&MPS, pre-clearance checklists and pre-starts **No residual impact**
Fragmentation of habitat during construction.	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. Clearing procedures that avoid the fragmentation of vegetation will be adopted within the FMPs and informed by the Fauna Spotter Cather WHIMPs. 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: • 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; • Fauna are not left occupying an 'island' of habitat between hostile environments, such as road and cleared areas;	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 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.	Fauna not fragmented from adjoining habitat during clearing Temporary fauna fencing Stockpiling of cleared vegetation ensures safe fauna movement Safe fauna dispersal locations during construction Low vehicle speeds	Fauna are not fragmented from habitat during clearing. Sequential clearing is undertaken at all times during clearing. At all times during construction At all times during clearing At all times during construction At all times during construction	Fauna are fragmented by clearing Temporary fences are not applied Stockpiling creates a barrier to fauna Fauna strike occurs Speed limits are breached resulting in fauna strike	Engage fauna spotter to relocate fauna found in fragmented areas. Cease construction immediately and construct temporary fauna fencing. Relocate stockpiles to areas that facilitate fauna movement. Ensure vehicle speeds are adhered to.	Clearing completed without fauna being fragmented Temporary fencing utilised at all times during construction Stockpiling is undertaken as guided by VC&MP and FMP No fauna strikes during construction No speed limit breaches during construction	Sequential clearing is mandated and guided by VC&MPs, FMPs, pre-clearance checklists and pre-starts **No residual impact** Temporary fauna fencing is mandated and guided by VC&MPs, FMPs, pre-clearance checklists and pre-starts. **No residual impact** Safe stockpiling is mandated and guided by VC&MPs, FMPs, pre-clearance checklists and pre-starts **No residual impact** Fauna go slow and fencing measures are applied as per the VC&MPs, FMPs, pre-clearance checklists and pre-starts. Speed limits are mandated and guided by FMPs, pre-

Impact	Avoidance and Mitigation Measures	Evaluation of the Effectiveness of Measures	Mitigation	Timeline	Risk Assessment	Corrective Actions	Milestone	Residual Impact
	• Fauna can safely leave the referral area of clearing and relocate to adjacent habitat; • Demarcation fencing will be fauna friendly to ensure fauna are not trapped within the proposed cleared extent; and • Cleared vegetation is to be stockpiled as to not impede fauna movement. Additionally, proposed construction roads will be subject to design treatments to ensure safe fauna crossing opportunities are maintained to vegetated areas and impose low vehicle speeds within construction areas.							clearance checklists and pre-starts **No residual impact**
Disturbance to Koala and Grey-headed Flying-fox during construction. <u>Light and noise disturbance</u> Construction of the project will result in increased noise and light disturbance. These impacts may disturb fauna and disrupt foraging, reproduction or movement behaviours. 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. <u>Contamination, weeds and pathogens</u> Construction activities increase the risk of weeds, pathogens and contamination into the referral area to align with the Koala Conservation Advice and GHFF Recovery Plan. To manage these impacts, weed management is incorporated into the RMP (**Attachment 14**) and includes appropriate controls for weed and pathogen management, disposal and	The VCFMP includes controls to avoid, minimise and mitigate risk of disturbance to Koala and Grey-headed Flying-fox habitat during construction, specifically: Construction of the project will result in increased noise and light disturbance. These impacts may disturb fauna and disrupt foraging, reproduction or movement behaviours. 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. With appropriate monitoring, pre, during and post construction by the Fauna Spotter Catcher, no residual impacts are expected to occur.	Construction management and clearing controls implemented by the SBMP 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.	Minimise light and noise disturbance The risk of contamination and exacerbating weeds and pathogens is minimised Vehicle disturbance minimised- reduce number of access tracks and/or haul roads Barriers to dispersal are not created	At all times during construction At all times during construction At all times during construction At all times during construction	Light and noise impacts on fauna Contamination, weed and pathogen incursion Fauna disturbance, Injury or mortality from vehicles Vegetation clearing and stockpiling creates a barrier to fauna	Cease work during nighttime and re-commence during daylight hours. Manage in accordance with rehabilitation management plan. Manage in accordance with MNES Management Plan, VC&MP and FMP. Relocate stockpiles to areas that facilitate fauna movement.	Light and noise disturbance is limited to daylight hours Contamination and weed and pathogen incursions do not occur Fauna disturbance, Injury or mortality from vehicles does not occur Vegetation clearing and stockpiling is undertaken as guided by VC&MP and FMP	Light and noise restrictions mandate works between 6 am and 6 pm in the SBMP. **No residual impact** The VC&MP and FMP will mitigate the risk of contamination and weed and pathogen incursion **No residual impact** The VC&MP, FMP, pre-start checklist and pre-start meeting will mitigate the risk of vehicle disturbance **No residual impact** The VC&MP, FMP, pre-start checklists and pre-start meeting will mitigate the risk of dispersal barriers **No residual impact**

Impact	Avoidance and Mitigation Measures	Evaluation of the Effectiveness of Measures	Mitigation	Timeline	Risk Assessment	Corrective Actions	Milestone	Residual Impact
	monitoring. Weeds will be actively managed within the construction footprint and disposed of appropriately. No companion animals (e.g. dogs) will be allowed within construction areas.		Temporary fauna fencing	At all times during construction	Temporary fences are not applied	Cease construction immediately and construct temporary fauna fencing.	Temporary fencing utilised at all times during construction	The VC&MP, FMP, pre-start checklists and pre-starts will guide temporary fencing **No residual impact**
	<u>Vehicle disturbance</u> Reduced vehicle speeds will be implemented throughout the construction area to minimise vehicle disturbances to minimise threats to Koala from vehicle strike as outlined in the Conservation Advice. Further, proposed construction roads will be subject to design treatments to ensure safe fauna crossing opportunities are maintained to vegetated areas and impose low vehicle speeds within construction areas.		Inductions and training		Inductions avoided	Ensure all staff undergo site inductions.	All inductions are completed and records maintained	Site Inductions are mandatory **No residual impact**
			Adaptive management	At all times during construction	Adaptive management not applied	Apply adaptive management where necessary.	Adaptive management utilised if required	The VC&MP and FMP will include adaptive management strategies to avoid recurrence of adverse incidents should they occur **No residual impact**
	<u>Barriers to dispersal</u> 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 in line with the Koala Conservation Advice. 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.							
	<u>Contractor management</u> All construction 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 vegetation clearing protocols and to protect native fauna. Additional controls for Koala and Grey-headed Flying-fox will be presented in a toolbox talk.							

Impact	Avoidance and Mitigation Measures	Evaluation of the Effectiveness of Measures	Mitigation	Timeline	Risk Assessment	Corrective Actions	Milestone	Residual Impact
Hydrological changes.	Stormwater management technologies will be utilised to minimise the effects of excess rainwater flowing into catchments caused by the creation of hardstand areas. All work will be undertaken in accordance with appropriate management plans to ensure the hydrological changes across the referral area do not impact on surrounding vegetation.	The implementation of a project wide Stormwater Management Plan as designed by certified engineers ensures that hydrological change area appropriately accounted for and managed. These management measures will reduce impacts from higher levels of surface water flow caused by hardstand areas and ensures natural drainage lines continue to function as they naturally would have. Stormwater detention basins prevent localised flooding of drainage lines and waterways caused by increased runoff over hardstand areas and also contribute to maintaining water quality levels.	Hydraulic and Stormwater Management Plan	To be approved prior to works	Unforeseen hydrological changes	Management in accordance with site-based Stormwater Management Plan.	No worsening of hydrological impacts as a result of the development	The Hydraulic and Stormwater Management Plan is being compiled by Hydraulic Engineers and must be approved by the State **No residual impact**

Table A38: Operational Impacts

Impact	Avoidance and Mitigation Measures	Evaluation of the Effectiveness of Measures	Mitigation	Timeline	Risk Assessment	Corrective Actions	Milestone	Residual Impact
Risk of injury of death to Koala and Grey-headed Flying-fox from vehicle strike.	In line with the Koala Conservation Advice, a number of measures will be imposed to avoid and mitigate the risk of Koalas being hit by vehicles. Although the risk to vehicle strike is low, these measures will be concurrent for Grey-headed Flying-fox. These measures include: • Koala / Grey-headed Flying-fox food trees will not form part of the primary landscaping of the hospital so that Koalas / Grey-headed	The purpose of these avoidance and mitigation measures is to minimise the risk of injury or death to Koalas from vehicle strike. These measures will also mitigate risks for Grey-headed Flying-fox. It will be important to minimise the incentive for Koalas and Grey-headed Flying-foxes to enter the hospital area by restricting the availability of habitat in these areas. As such, any planting within the hospital grounds will not be planted with suitable Koala / Grey-headed Flying-fox	Exclusion of native fauna from within the hospital grounds through development location, design and landscape embellishments. Delivery of development in sequence with surrounding approved urban development. No roads bisect ecological corridors.	To be delivered with adjoining development To be delivered with adjoining urban development Completion of construction On construction of roads	Timeline and sequence not followed Timeline and sequence not followed N/A - no ecological corridors within development area Vehicles speeding	Engage a fauna spotter-catcher to remove and relocate Koala outside of the hospital area. Ensure vehicle signage is in place and compliance with road speeds.	No Koalas isolated within hospital site No Koalas isolated within urban area Construction completion No Koala deaths from vehicle strike	**No residual impact** **No residual impact** **No residual impact** Vehicle speeds and slow points will be signed and enforced as for public roads

Impact	Avoidance and Mitigation Measures	Evaluation of the Effectiveness of Measures	Mitigation	Timeline	Risk Assessment	Corrective Actions	Milestone	Residual Impact
	Flying-fox are not enticed to enter hospital areas • Imposition of low vehicle speeds to reduce the risk of collisions. Vehicle speed limits are restricted to 50km/h on built up residential roads. • Installation of traffic calming devices, fauna movement solutions and wildlife crossing awareness signage where roads cross waterways.	habitat, which will in turn encourage Koalas to stay away from the development area. Fauna-exclusion fencing along the southern boundary of the hospital interface with the bushland. Importantly, low vehicle speeds will be imposed along roads, minimising the risk of high-speed vehicle strikes which were identified in the literature review as accounting for a large proportion of vehicle related deaths. In addition, awareness signage will ensure motorists are aware that Koalas have potential to occur in the area, making them more conscious of potentially dispersing Koalas and encouraging them to maintain a low vehicle speed. The purpose of these measures is to enable the objective of no injury or death to Koalas as a result of vehicle strike. These measures will also be effective for reducing risk of vehicle strike to Grey-headed Flying-fox. No residual impacts can be identified.	Low vehicle speeds Fauna-exclusion fencing Awareness signage	On-maintenance On-maintenance	Fencing fauna-friendly Signs not installed	Construct fauna-exclusion fencing along the southern boundary of the hospital.	No Koalas isolated within hospital site Signs installed	**No residual impact** Koala awareness signage to be installed where necessary throughout operation. **No residual impact**

Impact	Avoidance and Mitigation Measures	Evaluation of the Effectiveness of Measures	Mitigation	Timeline	Risk Assessment	Corrective Actions	Milestone	Residual Impact
Creation of barriers to dispersal/ Fragmentation of Habitat.	The referral area adjoins cleared areas to the north and west, and industrial area to the east. To ensure no native fauna, particularly the Koala, are isolated within the referral area the proposed development will be constructed in sequence with surrounding development guiding fauna to disperse to intact bushland habitat. Native fauna will largely be excluded from the proposed development and associated threats. Highly mobile fauna (i.e. Grey-headed Flying-fox) is not considered to be impacted by the creation of physical barriers created through the development of the referral area. Mitigating impacts from fragmentation of habitat by excluding fauna from within the hospital grounds aligns with Koala and GHFF Conservation Advice and Recovery Plans respectively. • Wildlife awareness signage	The development of the hospital will create barriers to movement in the form of fences, roads and other infrastructure. As noted, the hospital will be largely void of native fauna as surrounding urban development commences. Development of the referral area will reduce the risk of individuals becoming isolated within the referral area.	Exclusion of Koalas from the hospital site.	At construction	Construction mitigation measures (*i.e.,* fauna spotter catcher, sequential clearing) not implemented. Development timeline and sequence not followed	Engage fauna spotter during construction and implement sequential clearing.	No Koalas within the referral area at construction completion	**No residual impact**

6. Rehabilitation Requirements

Item 5.1 of the PD requests '***the details of any rehabilitation activities proposed to be undertaken, including any activities required through other Commonwealth, State and/or local government approvals***.

All commitments must be drafted using committal language (e.g., 'will' and 'must') when describing the proposed activities.'

Item 5.2 of the PD requests '***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***.'

Item 5.3 of the PD requests to ***'provide detailed mapping of the project site that clearly identifies areas to be rehabilitated.***'

Item 5.4 of the PD requests '***information on the timing, frequency and duration of proposed rehabilitation activities to be implemented, including anticipated time to completion***.'

Item 5.5 of the PD requests '***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.'

Item 5.6 of the PD requests '***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.'***

Rehabilitation actions will be undertaken within the retained vegetation to the south to improve *in situ* ecological values and function as fauna movement corridors. These areas contain a variety of weed species, particularly along patch edges (including species lists as Restricted (Category 3) matter under the Qld Biosecurity Act 2014). Rehabilitation efforts will be undertaken with a focus on enhancing habitat suitable in continuing potential support for target species. Rehabilitation works will involve removal of introduced flora and fauna species from the retained areas.

A Rehabilitation Management Plan (**Attachment A14**) has been developed in association with the MNES Management Plan (**Attachment A13**) which includes the details of proposed rehabilitation activities. The RMP includes details of final landform and rehabilitation completion criteria along with mapping of areas to be rehabilitated. The MMP contains information regarding the timing, frequency, and duration of proposed

rehabilitation activities to be implemented, monitoring activities and corrective actions. A summary of rehabilitation activities outlined in the MMP to be implemented is provided in the sections below.

The RMP is subject to approval and prepared in accordance with the SEQ Ecological Restoration Guidelines (SEQRF). The RMP includes information on:

- Rehabilitation details of species' specific habitat;
- Details of proposed rehabilitation works including proposed species and planting palette;
- Planting modules to demonstrate planting densities;
- All weeding works required, including a full list of known weeds on site and how each weed can adequately be managed;
- The required ongoing management / maintenance regimes, including:
    - Plans indicating maintenance areas / zones;
    - Schedules of works including frequency and tasks;
    - Allocation of labour and resources to perform tasks;
    - Nomination of key performance indications / criteria for monitoring purposes (e.g. all revegetation areas, minimum 90% weed free etc.);
    - Time allocated to performance various tasks (e.g. top up mulch, pruning, topdressing etc);
    - Defects liability for materials such as replacement of dead plant species of equivalent species and vigour;
    - Coordination of services such as irrigation repair or civil infrastructure maintenance (such as stormwater) that may impact on the landscape establishment and maintenance periods;
    - Management of bushfire hazard (where approved);
    - Management of domestic farm / feral animals (if appropriate);
    - Management of public access and / or restricted access areas;
    - Tree management procedures;
    - Management and maintenance of regimes for sediment and erosion control devices, and irrigation;
    - Proposed future need for infrastructure, including public facilities; and
    - Management and control of declared plants and recognised environmental weeds.

The RMP also contains details specifically for revegetation works within the proposed constructed wetlands and vegetated swales.

6.1.1 Proposed Management Actions

Rehabilitation actions aim to ensure that native remnant vegetation contained within the retained bushland is enhanced and preserved over the life of the project by 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 camara*), 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**). The RMP outlines five (5) management zones within the retained bushland vegetation which are outlined in **Table A39**.

Table A39: Management zone rehabilitation actions for the retained bushland area.

Management Zone	Total Area	Plant Density	Rehabilitation Actions
Management Zone 1 – Existing Vegetation (Natural Regeneration)	306, 500 m^2	Vegetation Allowance for minor disturbances – 15,000 m^2	• Existing native trees, shrubs and groundcovers to be protected and retained. • Weed management to entire zone to encourage natural regeneration by reducing competition. • Appropriate (sensitive) weed management methodology within this zone to minimize any native vegetation damage / losses. • Revegetation using tube stock installation including a diversity of tree, shrub and groundcover species to match regional ecosystem mapping for the site where minor disturbances occur.
Management Zone 2 – General Revegetation / Rehabilitation (Reconstruction)	6,500 m^2	1 plant min per m^2	• Weed management to entire zone to encourage natural regeneration by reducing competition. • Any existing/ occurring regrowth of native trees, shrubs and groundcovers to be protected and retained. • All bare / denuded areas to be appropriately cultivated, topsoiled and blanket mulched (100mm depth) or tec matting (1:3 batters and locations prone to erosion) as required. All jute netting to be installed to manufacturer's recommendations. • Reconstruction of natural environment to be undertaken via tube stock installation including a diversity of tree, shrub and groundcover species to match regional ecosystem mapping for site.
Management Zone 3 – Swale Rehabilitation (Reconstruction)	13,150 m^2	3 plants min per m^2	
Management Zone 4 – Detention Revegetation (Reconstruction)	7,700 m^2	3 plants min per m^2	
Management Zone 5 – Basin / Wetland Revegetation (Reconstruction)	800 m^2	6 plants min per m^2	

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% if 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 Mahogony)
- *Eucalyptus tereticornis* (Forest Red Gum)
- *Lophostemon confertus* (Brush Box)
- *Lophostemon suaveolens* (Swamp Box)

6.1.2 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 bear 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 A10**.

Table A40: Management Action 2 Timing

Timing	Preliminary Completion Criteria
Year 1	Establish photo point monitoring and protocols.
Year 1 – 5	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.
Year 6 – 10	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.
Year 10	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.

6.1.3 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.

7. Proposed Offsets

7.1. Significant Residual Impact summary

Item 6.1 of the PD requests ***'an assessment of the likelihood of residual significant impacts occurring on relevant protected matters, after avoidance, mitigation and management measures have been applied'.***

The assessment of construction and operational impacts shows that, while much of the identified impacts can be avoided and mitigated through retained areas and management measures, residual impacts will be created from the unavoidable loss of 23.56 hectares habitat critical to the survival of the Koala and potential GHFF foraging habitat. The management measures described throughout this Preliminary Documentation submission sufficiently mitigate the risk of increased injury or mortality to Koalas and GHFF (and Greater Glider should they occur) and the provision of the conservation areas will ensure that habitat and connectivity is maintained through the landscape, facilitating the long-term persistence and dispersal of target species. Further details on the likelihood of residual significant impacts occurring to Koalas and GHFF is provided above in **Table A37** and **Table A38** in **Section 5.3**.

Overall, the proposed hospital development will see the direct removal of 23.56 hectares of critical habitat for the Koala and foraging habitat for the GHFF. As such, the residual impacts on the Koala as a result of the development will be the loss of 23.56 hectares of critical habitat with a MHQA score of 5.90 (rounded to a **6)**, the residual impact on the GHFF as a result of the development will be the loss of 23.56 hectares of foraging habitat with a GHFF FHA score of 5.16 (rounded to a **5**).

Residual Impacts on Koala: **Removal of 23.56 hectares of critical habitat at a MHQA score of 5.90 (rounded to 6)**

Residual Impacts on GHFF: **Removal of 23.56 hectares of foraging habitat at a GHFF FHA score of 5.16 (rounded to 5)**

The proposed action is expected to have a significant residual impact on the Koala and potential GHFF foraging habitat, requiring compensatory works in the form of land-based offsets under the EPBC Act and EPBC Offsets Policy. The offset proposal is discussed in the following section.

Item 6.2 of the PD requests ***'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 EPBC Environmental Offsets Policy(2012)'.***

Item 6.3 of the PD requests ***'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: www.environment.gov.au/epbc/publications/epbc-actenvironmental-offsets-policy'.***

Item 6.4 of the PD requests ***'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 Appendix B.1, and must be prepared by a suitably qualified ecologist and in accordance with the department's Environmental Management Plan Guidelines (2014), available at: 10 www.environment.gov.au/epbc/publications/environmental-management-planguidelines'.***

Item 6.5 of the PD requests ***'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 Appendix B.2'.***

An offset to acquit residual impacts will be delivered in accordance with DCCEEW's *EPBC Act Environmental Offsets Policy (2012)* for the provision of Koala (*Phascolarctos cinereus*) and GHFF (*Pteropus poliocephalus*) habitat offset. Queensland Health are committed to securing a suitable offset site and ensuring the area is managed to deliver a conservation gain in accordance with offset policy requirements. An Offset Strategy has been prepared in a separate cover to provide specific detail of the potential offset area/s and actions to compensate for the residual impacts of the proposed action on relevant protected matters.

Refer to **Attachment A15 – Preliminary Land-based Offset Strategy**

Desktop assessment is underway to identify potential suitable offset sites for the project in preparation for acquisition and securing of the final site. Criteria used to identify potential suitable sites include:

- Species occurrence records (Koala and GHFF);
- QLD Regional Ecosystem Mapping;
- Location of the site and proximity to impact;
- Connectivity to impact site (if relevant) and surrounding remnant vegetation patches;
- Opportunities for revegetation and;
- Potential for the site to deliver a conservation gain.

Once the site is selected and approved, the site will be legally secured via a Voluntary Declaration under the *Qld Vegetation Management Act*).

An Offset Management Plan will be prepared at a later date to summarise existing habitat quality for the Koala (*Phascolarctos cinereus*) and GHFF (*Pteropus poliocephalus*) within the offset area and to provide management actions designed to achieve the targets stipulated for the chosen offset site.

The OMP will identify outcomes focused management actions pursuant the EPBC Act, for the provision of Koala (*Phascolarctos cinereus*) and GHFF (*Pteropus poliocephalus*) habitat offset. The management objectives for the offset area, in alignment with the EOP will:

- Deliver an overall conservation outcome that improves the viability of habitat for the Koala and GHFF.
- Provide a direct offset that is in proportion to the level of statutory protection that applies to Koala habitat and GHFF foraging habitat.
- Be of a size and scale proportionate to the residual impacts on Koala habitat and GHFF foraging habitat.
- Effectively account for and manage the risks of the offset not being successful within the required management timeframe.
- Provide a conservation gain additional to what is already required by a duty of care or to any environmental planning laws at any level of Government.
- Be efficient, effective, timely, transparent, scientifically robust and reasonable with appropriate transparent governance arrangements in place for measuring, monitoring, auditing and enforcing the management of the offset area.

When the offset site has been chosen, baseline surveys for Koala and GHFF habitat scores will follow methods outlined in **Sections 3.1.2** and **4.8.**

8. Ecologically Sustainable Development

Item 7.1 of the PD requests ***'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 principles of ecologically sustainable development:***

- ***decision making processes should effectively integrate both long term and short term economic, environmental, social and equitable considerations;***
- ***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;***
- ***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;***
- ***the conservation of biological diversity and ecological integrity should be a fundamental consideration in decision making improved valuation, pricing and incentive mechanisms should be promoted.***
- ***improved valuation, pricing and incentive mechanisms should be promoted.***

The *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act) has a key objective to '*promote ecologically sustainable development through the conservation and ecologically sustainable use of natural resource,'* (EPBC Act section 3). Ecologically Sustainable Development (ESD) is defined within the Commonwealth Government's National Strategy for Ecologically Sustainable Development as *'using, conserving and enhancing the community's resources so that ecological processes, on which life depends, are maintained, and the total quality of life, now and in the future, can be increased'*.

The goal of the National Strategy for Ecologically Sustainable Development is:

> *Development that improves the total quality of life, both now and in the future, in a way that maintains the ecological processes on which life depends.*

The core objectives include:

- to enhance individual and community well-being and welfare by following a path of economic development that safeguards the welfare of future generations
- to provide for equity within and between generations
- to protect biological diversity and maintain essential ecological processes and life-support systems

Table A41 assesses the capacity for this project to meet the principles of ESD, as defined in section 3A of the EPBC Act.

Table A41: Principles of ESD defined under EPBC Act Section 3A

Principles of ecologically sustainable development defined under Section 3A of the EPBC Act

1. Decision-making processes should effectively integrate both long-term and short-term economic, environmental, social and equitable considerations.

The design of the project has taken both long-term and short-term economic, environmental, social and equitable considerations into account. The New Bundaberg Hospital is one of Queensland Government's high priority infrastructure projects and will provide a significant expansion to health capacity and capability in the Wide Bay region.

The project will enhance equitable local access to services for the local community along with service efficiency and sustainability. It will also enable the state government to better respond to the current and projected demand for health services by a growing and ageing population, which has significantly higher levels of socio-economic disadvantage and complex chronic disease than the Queensland population.

The project will benefit individuals and the community as a whole by providing a range of healthcare services. The proposed action has been designed to provide a patient centric environment that also provides visual amenity sensitive to the local environment.

Ecological values both within and adjacent the referral area, have been taken into account during the design of the proposed action. Areas containing significant ecological values or functions protected and buffered by the strategic placement of retained areas (refer to **Section 5.2**). Reviewing the above, the project will safeguard the needs of future generations.

It is imperative that QH plan early to strengthen the public healthcare system, to ensure it can adequately accommodate the changing and growing healthcare needs of the Wide Bay community.

As a summary, the proposed scope of works involves the delivery of a new hospital, that involves the following:

- More beds and treatment spaces across medical, surgical, intensive care, coronary care, paediatric and mental health
- Additional operating theatres
- Additional emergency department (ED) treatment spaces
- Additional outpatient consult area
- Expansion of medical imaging, pharmacy and pathology; and
- Expansion of education and training area, and facility support services.

By increasing capacity and capability, QH will reduce wait times and enable more people to receive care closer to home. Modern and culturally appropriate facilities, amenities and equipment will also support the delivery of enhanced care and patient wellbeing. The new facility will have a flexible design with spaces that can be repurposed in the future to meet the changing healthcare needs of the community. The design will also have a clear strategy for future expansion, if and when needed.

The retention of the vegetation in the south will ensure short and long-term protection of environmental values and open space areas will provide ongoing community access. Open space areas will enhance the visual amenity of the hospital, whilst facilitating dispersal of wildlife and provide habitat to a range of fauna species. The retention of vegetation will contribute to the retention of biodiversity in the local area.

2. 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.

The implementation of precautionary measures in decision making is used where there is a threat of serious or irreversible harm and where there is scientific uncertainty as to the extent of possible environmental damage. There are a number of factors which help determine whether an action might cause serious or irreversible environmental damage, including:

- The spatial scale;
- The magnitude of possible impacts;
- The perceived value of the threatened environment;
- The complexity and connectivity of possible impacts;
- The manageability of possible impacts;
- The level of public concern and the rationality or scientific basis for the concern; and
- Reversibility of possible impacts.

The referral area has been subject to comprehensive environmental surveys and reporting. The ecological values of the referral area have been identified and recorded. The referral area is comprised of remnant vegetation subject to moderate disturbance from onsite and surrounding land uses. Impacts to these MNES values are minimised by the design of the designation of future land use precincts and reducing disturbances.

The proposed action has sought to avoid, minimise and mitigate impacts to maintain essential ecological processes. A large parcel of natural bushland comprising a total of 41.1 ha will be retained to the south and the patient rooms, terraces and other spaces overlooking will benefit from this view (refer to **Attachment A16 – Project Area and Disturbance Footprint**).

Impacts to the Koala and GHFF and associated habitat have been identified as the primary environmental concern on a level of National Environmental Significance. The impact site's utilisation by Koalas and GHFF and its ability to provide critical habitat for the Koala and potential foraging habitat for the other species has been discussed in detail throughout this report.

Several potential impacts as a result of the project have been identified which include loss of habitat, barriers to movement and injury or death from vehicle strike. A number of management measures will be imposed to avoid and mitigate these impacts. In addition, the retained southern vegetation will be rehabilitated through weed removal in degraded areas to compensate for the loss of habitat. This will increase the ecological functions of currently degraded areas and will improve the overall value of the retained vegetation corridors. The identified impacts are considered mostly to be manageable through the imposition of low vehicle speeds. The impacts from the project have been identified and management measures have been subsequently developed.

The proposed action is not considered to pose a threat of serious or irreversible damage to the local Koala population or the broader environment. Potential impacts have been considered and management plans will be in place to ensure that any impacts are minimised and offset.

3. 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.

The proposed action will safeguard the needs of future generations while meeting the demands of current generations.

Measures will be implemented to avoid and mitigate potential impacts (refer **Section 5.2**). Offsets in accordance with DCCEEW's *EPBC Act Environmental Offsets Policy (2012)* **will be provided** to account for residual impacts on MNES.

The development has taken into account the diverse needs of the community by proposing a range of specialised hospital and allied health services and integrates with the surrounding residential developments in close proximity to the new hospital site. This will ensure that appropriate allied medical care and visual amenity is available and maintained for current and future generations.

4. The conservation of biological diversity and ecological integrity should be a fundamental consideration in decision-making.

The proposed action has sought to avoid, minimise and mitigate impacts to maintain essential ecological processes. The referral area has been subject to comprehensive environmental surveys and reporting. The ecological values of the referral area have been identified and recorded. The referral area is comprised of predominantly remnant vegetation. Impacts to these MNES values are minimised by the design and located of the hospital at the northern portion of the site.

Overall, the project has a disturbance footprint of approximately 24.2 ha (refer to **Attachment A16 – Project Area and Disturbance Footprint**). The total vegetation clearing 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 Johanna Boulevard Extension and approximately 5 ha for the proposed East – West connection road to Kay McDuff Drive). This clearing impact area represents approximately 28% of the total patch area of 76.3 ha. Approximately 19.9 ha of the total impact area comprises good-quality remnant vegetation. Consolidation of the development footprint to the northern portion of the site

has reduced additional clearing for the bushfire asset protection zone and maximised the setback from Bundaberg Ring Road thereby removing the need for an acoustic barrier which would otherwise require additional vegetation clearing.

A large parcel of natural bushland comprising a total area of 41.1 ha will be retained to the south, and the patient rooms, terraces and other spaces overlooking will benefit from this view. Careful planning for natural overland flow drainage and detention ponds, taking into consideration the existing trees, will be a focal point of the continued design.

Although not considered to provide primary habitat, the proposed action will result in the loss of approximately 23.56 ha of potential Koala habitat and Grey-headed Flying-fox foraging habitat. Direct impacts to the environmental values external the referral area have been avoided through careful planning and design. Indirect impacts to these values will be managed through the implementation of measures detailed in **Section 5**.

5. Improved valuation, pricing and incentive mechanisms should be promoted.

The proposed action supports the Bundaberg Region wider economy through supporting the provision of essential healthcare services. The relationship between economic development and environmental protection has been continuously identified within international agreements and national policies. In particular, the Kuznets Curve shows a link between economic development and environmental protection, whereby once a society reaches a particular level of development, it starts to recognise and invest in environmental conservation.

Economic development and prosperity allow for a greater financial resource base to be dedicated to conservation outcomes. This can be demonstrated at global, national and localised scales. Individual landholders are not generally in a position to be undertaking significant rehabilitation projects on their land. This project presents an important opportunity to support safe fauna connectivity in a north-south direction through retained vegetation south of the project area.

Vegetation within the retained southern extent, will be rehabilitated with native flora species. The proposal has incorporated environmental protection through site selection and the design of the proposed action.

This project has considered best practice, and relevant guidelines and policies. To account for significant residual impact to MNES values, an offset will be provided in accordance with the EPBC Act Offsets Policy to provide the cost-effective analysis of proposed offsets.

9. Economic and Social Matters

This section responds to Item 8 of the PD request which requests further details on economic and social matters, as outlined in the following sections.

9.1. Economic and Social Impacts

Item 8.1 of the PD Request advises the response must provide '***An analysis of the economic and social impacts of the action, both positive and negative***.'

9.1.1 Economic Impacts

The incremental economic impacts of the New Bundaberg Hospital have been assessed using standard Cost Benefit Analysis (CBA) techniques and health infrastructure specific guidance. Capital and ongoing cost requirements were estimated for both the base case (i.e., without the Project) and the reference project to determine the total net cost. The CBA estimates the net economic impact to the community of the Project relative to the base case.

The key findings from the analysis are:

- The project delivers a positive net benefit to community (measured over 30 years from 2020/21)
- This result is reflected in a positive Benefit Cost Ratio (BCR).

The positive economic results are primarily due to the increased ability of a redeveloped Bundaberg Hospital to treat patients, including patients currently unable to receive treatment at the existing facility and those who must travel to other areas for treatment.

A qualitative assessment was undertaken to capture impacts that were unable to be monetised. On balance, a majority of the impacts identified would lead to higher benefits in the economic assessment if they were able to be monetised.

The economic impacts focus on the opportunities for training/education and research, the outcomes of an increased workforce required for the hospital, the potential for growth and investment, and the opportunities for local businesses.

The opportunity to increase course offerings to support medical, healthcare and allied health services will contribute to the sustainability and growth of educational institutions including CQUni, TAFE, UQ RCS and James Cook University. There will be enhanced training, education and work placement opportunities for a locally grown workforce and from across the Wide Bay Hospital and Health Service (WBHHS) region.

Allied to the proposed increase in the number of level 5 services offered at the new hospital, there will be improved career growth opportunities for clinical and nursing staff. This will improve staff attraction and retention capability as well as providing opportunities for greater job satisfaction.

Aside from retention of WBHHS workforce, a larger hospital delivering higher levels and a wider range of healthcare improves the area's attractiveness, inspiring regional population retention and growth. This will increase inward investment opportunities for Bundaberg and the region beyond the hospital, with more

companies attracted to the area due to the availability of improved medical and healthcare services. This drawcard effect for employment both within and outside the WBHHS has the potential for additional economic benefit of attracting into the region spouses and families with new skills and the flow-on economic contribution that can provide.

The increase in operational workforce to service a larger hospital with more higher-level offerings and new sub-specialties provides additional flow-on economic impacts from increased spending in the community by a skilled healthcare workforce who have higher levels of disposable income. During project implementation, the area will benefit from increased spending in the community by the construction workforce. A larger hospital will provide more opportunity for local businesses to expand to meet service delivery needs.

Patients throughout the region will experience reduced financial burden from being able to access more healthcare services locally.

9.1.2 Social Impacts

The social impact evaluation has been undertaken on the basis of extensive community and stakeholder engagement. The analysis indicates that the project will have a positive net social impact across the key stakeholders identified. Most importantly, the project will deliver improved health outcomes for patients. The economic assessment also shows a significant economic benefit to a healthier population with a lower burden of disease.

There is significant support for the project within the community and the project has the potential to deliver significant economic benefits to the region, which to be realised to their full extent, require early and considered planning in partnership with major stakeholders throughout the region.

The social impact evaluation for the Bundaberg Hospital was conducted in line with Building Queensland's Social Impact Evaluation Guide, which is a supplement to the Queensland Business Case Development Framework.

The key inputs to the social impact evaluation were:

- Stakeholder reference group meetings
- Community and staff survey
- Stakeholder impact survey
- Desktop research and data reports
- Impact workshop with advisors
- Engagement with various project team advisors, in particular economics and fincom.

The anticipated impacts of the New Bundaberg Hospital were analysed in terms of the change that each stakeholder group is likely to experience, where the following stakeholder groups were considered in the analysis:

- Patients and their families
- Aboriginal and Torres Strait Islander peoples
- General community
- Staff
- Volunteers
- Education and training institutions
- Private healthcare providers
- Local businesses

The impacts have been defined under the following categories: community, cultural, economic, environment, health, intergenerational, quality of life.
The most significant positive impacts of the project relate to:

- improved health outcomes for patients
- flow-on economic benefits of an increased health workforce
- opportunities for expanded education, training, and research
- career growth for staff
- growth and economic development in the region
- reduction in patients having to go outside the region for healthcare; and
- improved car parking situation

Mitigation measures have been proposed for all impacts, and these are largely within the scope of Queensland Health and the Wide Bay Hospital and Health Service to implement, such as workforce planning, change management, stakeholder engagement and collaboration.

There are opportunities to enhance the positive impacts including: improving outcomes for Aboriginal and Torres Strait Islander patients through transition planning and health promotion; creating a premium education, research and training facility in conjunction with local providers; and engaging with Council and tourism bodies to attract people to the region as part of the workforce plan.

9.2. Stakeholder Consultation

Item 8.2 of the PD Request advises the response must *provide '**Details of any public consultation activities undertaken and their outcomes**.'*

The referral area is located within the *Bundaberg Regional Council Planning Scheme 2015*. During the public consultation period for the Ministerial Infrastructure Designation (MID), the submission from the Bundaberg Regional Council identified the need for local precinct planning. The Department of State Development, Infrastructure, Local Government and Planning (DSDILGP) has recommended a local precinct master planning meeting to discuss planning for the hospital site and the surrounding area.

Queensland Health intends to schedule a workshop with DSDILGP, Bundaberg Regional Council and other key stakeholders to:

- discuss further land use and infrastructure planning for the broader site and surrounding area (particularly surrounding greenfield land).
- consider how surrounding land can be protected from inconsistent or undesirable development that would be in conflict with a new land use vision for this area.

A MID submission was lodged to DSDILGP on 23 December 2022 for community supporting infrastructure that can be designated are set out in Schedule 5 of the Planning Regulation 2017 (PR 2017). The proposed MID for the new Bundaberg Hospital comprises the following infrastructure types as described in Schedule 5, Part 2: Infrastructure type Proposed activities, 12 Hospitals and health care services. The primary purpose of the site is for a hospital and health care services.

As part of the MID process, the proponents were required to engage in public consultation which involved the notification of the proposed action to seek public comment.

The public consultation process ended on 28 April 2023 and State Interest Review has been completed. Queensland Health are awaiting draft conditions from DSDILGP by the end of July 2023 with a decision expected mid-late August 2023.

Community, consumer and First Nations Representatives will be engaged during the design process to provide a deeper understanding of the project and incorporate patient centric design features into the hospital.

Refer to **Attachment A17 – Annexure A – Consultation Strategy Extract from the Ministerial Assessment Report** for the new Bundaberg Hospital, the subject of a Ministerial Infrastructure Designation (MID-1222-0662) process being undertaken with DSDILGP with a Ministerial Decision expected mid to end August 2023.

A public consultation period ran from 21 March 2023 to 28 April 2023. In accordance with the community engagement plan, the consultation included:

- A copy of a public notice published in the Courier Mail;
- Installation of one (1) public notice sign to the site frontages;
- Upload of document and plan contents to department website
- Distribution of letters to relevant stakeholders; and
- Copies of the materials included as part of the public consultation for proposed MID.

As part of the public consultation process the MID proposal received five (5) submissions in total, with one (1) submission from an elected representative, one (1) submission from Council and three (3) submissions from the public.

Submission from Bundaberg Regional Council included planning (land use and local precinct planning), utilities infrastructure (stormwater, water, sewer), transport, environment, other matters such as building design and setbacks, car parking, landscaping, connecting infrastructure, further expansion, and partnership opportunities.

Responses:
Queensland Health intends to schedule a workshop with DSDILGP, Bundaberg Regional Council and other key stakeholders regarding land use and future precinct planning. The workshop will be to:

- discuss further land use and infrastructure
- planning for the broader site and surrounding area (particularly surrounding greenfield land) for the future; and
- consider how surrounding land can be protected from inconsistent or undesirable development that would be in conflict with a new land use vision for the area.

The hospital will be delivered over the next five years. The aim is for construction of the new hospital project to commence by late 2023, subject to approval of the MID and any *EPBC Act 1999* approvals. Construction is anticipated to be completed and the hospital operational by late 2027.

It is acknowledged the project will need to deliver external road infrastructure works as part of the scope of works to ensure appropriate connections and access to the site is achieved. QH is committed to ongoing liaison with BRC in relation to the development of roads and associated infrastructure.

An initial flood access strategy was undertaken as part of the Concept Design and Flood Impact Assessment. The access strategy varies slightly depending upon the source of flooding and its impact on existing roads within the region. The access strategy focused on providing connectivity to key roads within proximity of the new Bundaberg Hospital.

Queensland Health referred the project (Application Ref: 2022/09397) to the Commonwealth DCCEEW for a determination in line with the ecologist recommendation that it was best practice for sites that are of higher ecological value. The project has since been determined a Controlled Action. QH will undertake obligations as required under the EBPC Act and per the decision from DCCEEW.

Other matters such as building design and setbacks, car parking, landscaping, connecting infrastructure will all be dealt with during further design development, noting that all connecting infrastructure works outside of the MID and EPBC Controlled Action boundaries will be subject to necessary approvals and processes and will be undertaken by Queensland Health accordingly.

Submission from an elected representative - the State member for Burnett raised issues relating to the aging population, speciality services and AMD private partnerships.

Public Submission 1 provided support for New Bundaberg Hospital and sought clarity regarding the MID and EPBC Controlled Action, future expansion and partnership opportunities, Cultural Heritage Assessment, unknown noise impacts and master planning.

Public Submission 2 raised issues around noise disturbance

Public Submission 3 raised issues around:

- the stormwater and flood impact studies as submitted for the MID process
- the expansion of the external road network and comprising the upgrade and extension of Johanna Boulevard to the north that will extend south and provide access alongside the northern portion to the western boundary of the site and the delivery of a new East-West Connector Road, which will link the newly formed Johanna Boulevard from the west through to a proposed signalised intersection at Kay McDuff Drive to the east.

Additional responses in relation to all submissions:

The new Bundaberg hospital project proposes to provide a comprehensive range of care across medical, surgical, emergency, acute mental health, outpatient and diagnostic fields, in line with the projected health service demand for the Wide Bay catchment. This includes treating more complex cases (that is, more Level 5 services) and higher patient volumes locally, where it is safe and sustainable to do so.

The Master plan for the new hospital identifies an expansion zone for future development of related facilities. Timing yet to be determined. The new Bundaberg Hospital itself is not being delivered through a public private partnership.

The main hospital building along with the master plan will allow for continued growth of services in the foreseeable future. Bundaberg Hospital already has strong university affiliations. It provides teaching placements for medical students, interns, junior doctors and registrars. Nursing and allied staff are also supported by a range of teaching and education opportunities.

The new hospital will only enhance these affiliations, expand our teaching capabilities and increase our research commitments, through the ability to treat more complex cases.

Operational costs associated with delivering services across the new hospital and the existing hospital were considered throughout the planning phase.

Further acoustic assessment will be undertaken prior to construction and mitigation measures will be included in a construction environmental.

Issues around the Stormwater Management and Flood Impacts for the new hospital and the expansion of the external road network and the stormwater impact will be further addressed during the further design process for this project and in accordance with all statutory approvals.

QH will continue to engage with neighbouring landowners as design progresses.

The MID and EPBC Controlled Action will be subject to necessary approvals and processes and Queensland Health will undertake its obligations as required under Planning Act 2016 and under the EBPC Act and as per the decisions from DSDILGP and DCCEEW respectively.

9.3. Indigenous Stakeholder Consultation

Item 8.3 of the PD Request advises the response must provide '***details of any consultation with Indigenous stakeholders.'***

Engaging First Nations peoples and communities
Identify existing or potential native title rights and interests, including any areas and objects that are of significant significance to First Nations peoples and communities, that could be impacted by the proposed action and the potential for managing those impacts.

Describe any First Nations consultation that has been undertaken, or will be undertaken, in relation to the proposed action and their outcomes.

The department considers the best practice consultation, in accordance with the Interim Engaging with First Nations People and Communities on Assessments and Approvals under the Environment Protection and Biodiversity Conservation Act 1999 (2023) includes:

- ***ensuring cultural safety by protecting the cultural identify, wants and needs of First Nation peoples and communities***
- ***building and maintaining trust by investing in ongoing relationships and partnerships and demonstrating cultural awareness and competence***
- ***engaging early and often, ideally directly with the relevant First Nations peoples, communities, groups and organisations who may be affected by the proposed project.***
- ***negotiating suitable timeframes in consideration of cultural obligations of First Nations peoples and communities***
- ***negotiating suitable submission formats that reflect the communication needs and preferences of First Nations peoples and communities. 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.***

Queensland Health continues to engage respectfully with the Port Curtis Coral Coast (PCCC) Trust native title claim group (representing the Bailai, Gurang, Gooreng Gooreng and Taribelang Bunda peoples) regarding its heritage and how it relates to the New Bundaberg Hospital site.

Queensland Health engaged PCCC to complete a cultural heritage inspection of the new hospital site, which identified several confirmed and potential cultural heritage finds, predominantly in the form of scarred trees throughout the site. PCCC has since engaged an archaeologist to inspect and provide further technical advice and certainty on several cultural finds – early verbal advice to date indicates only one tree of cultural significance to be within proximity to the impact area. The project team will apply an appropriate buffer zone to the design once it receives the archaeologist's formal report.

Queensland Health recently released design principles which provide an agreed set of principles and a clear and efficient pathway for stakeholders to agree on the form and function of infrastructure design. These principles are separated into four key themes: People, Value, Place and Technology. Within 'People' sits 'Culturally Appropriate', and Queensland Health commits to the following principled approach:

- Initiate contact early in the project lifecycle
- Properly Identify and learn about the local the First Nations people of the region
- Involve First Nations people in the planning and design process
- Create a positive and real Impact through design decisions.

In alignment with these principles, Queensland Health is involving First Nations peoples in the design process for the new Bundaberg Hospital. Local First Nations hospital staff will continue to be invited to each design user group workshops. The project team also intends to convene an Aboriginal and Torres Strait Islander Working Group at key stages of the project to provide an interface for cultural input, views and memories to help shape the planning and design of the new hospital and to co-design model of care pathways. The project team will also present regular project updates and invite opportunities to provide feedback through the already established Wide Bay Hospital and Health Service Aboriginal and Torres Strait Islander Health Advisory Council.

Queensland Health is currently negotiating a Cultural Heritage Agreement with the Port Curtis Coral Coast (PCCC) Trust native title claim group (representing the Bailai, Gurang, Gooreng Gooreng and Taribelang Bunda peoples). This plan will capture all processes relating to cultural heritage, on site works and finds processes ensuring that any heritage on site (both found and any potential finds) will be protected. It will also include PCCC partnering with Qld Health through the ground disturbance process in order that any heritage finds are located and protected. It will also have clear education and mitigation measures for contractors who may be involved in finds.

The Cultural Heritage Agreement (CHA) has been in discussions between the Department of Health and the First Nations Bailai, Gurang, Gooreng Gooreng, Taribelang Bunda People Aboriginal Corporation RNTBC (Port Curtis Coral Coast Corporation) since September 2022. Actual negotiations on the CHA commenced in March. As per the Tied Work Guidelines Queensland Health engaged Crown Law to provide legal guidance and document preparation for development of the CHA. The CHA provides for the protection of Aboriginal Cultural Heritage (both known and unknown) and provides a process for both parties through the development of the new hospital on how to manage and protect heritage.

Information on further engagement with the PCCC Trust native title claim group to discuss the findings of the archaeologist and the reduced number of cultural finds after re-inspection of possible culturally modified and significant trees at the proposed new Bundaberg Hospital site on 9th June 2023 is presented within **Attachment 17 – Annexure A – NBHS CMT Inspection Final.** Detailed mapping of the confirmed and potential cultural heritage finds from the cultural heritage inspection with the PCCC Trust native title

claim group, including the tree identified by the archaeologist to be of cultural significance is included in **Attachment 18 – Annexure B – 301050442 – Cultural Heritage Investigation Sketch 230518**.

9.4. Economic Costs and Benefits

Item 8.4 of the PD request asks to provide '***projected economic costs and benefits of the project, including the basis for the estimate through cost/benefit analysis or similar studies***.'
The government has made a capital commitment of $1.2 billion to this project that has the potential to deliver significant economic benefits to the region, which to be realised to their full extent, require early and considered planning in partnership with major stakeholders throughout the region.

The most significant positive impacts of the reference project relate to improved health outcomes for patients, flow-on economic benefits of an increased health workforce, opportunities for expanded education, training and research, career growth for staff, growth and economic development in the region and reduction in patients having to go outside the region.

The incremental economic impacts of the New Bundaberg Hospital have been assessed using standard Cost Benefit Analysis (CBA) techniques and health infrastructure specific guidance. Capital and ongoing cost requirements were estimated for both the base case (i.e., without the Project) and the reference project to determine the total net cost. The CBA estimates the net economic impact to the community of the Project relative to the base case.

The key findings from the analysis are:

- The project delivers a positive net benefit to community (measured over 30 years from 2020/21)
- This result is reflected in a positive Benefit Cost Ratio (BCR).

The positive economic results are primarily due to the increased ability of a redeveloped Bundaberg Hospital to treat patients, including patients currently unable to receive treatment at the existing facility and those who must travel to other areas for treatment.

A qualitative assessment was undertaken to capture impacts that were unable to be monetised. On balance, a majority of the impacts identified would lead to higher benefits in the economic assessment if they were able to be monetised.

9.5. Employment Opportunities

Item 8.5 of the PD Request advises the response must provide '***Employment opportunities expected to be generated by the project (including construction and operational phases).***

The project provides the impetus to recruit and retain high calibre staff by providing new opportunities in medical, nursing and allied health staff through significantly improved working environment, career opportunities in a more efficient, aesthetic and safer facility.

There are opportunities to enhance the positive impacts including improving outcomes for Aboriginal and Torres Strait Islander patients through transition planning and health promotion, creating a premium education, research and training facility in conjunction with local providers and engaging with BRC and tourism bodies to attract people to the region as part of the workforce plan.

Construction of the new hospital will also provide a major boast to the local economy in the Bundaberg region, creating approximately 2,887 jobs during construction.

There are no operational phase numbers available until the Workforce plan is complete.

10. Environmental Record

Item 9.1 of the PD requests to '***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:***

- ***the person proposing to take the action***
- ***for an action for which a person has applied for a permit, the person making the application***
- ***if the person is a body corporate—the history of its executive officers in relation to environmental matters***
- ***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.'***

Queensland Health understands and recognises it has a duty of care to the environment. The company's (or related companies') environmental management record does not include any instances of contraventions or non-compliances with development approval conditions. The proponent has not had any past or present proceedings under Commonwealth, State of Territory laws for the protection of the environment.

Site specific management plans to mitigate the potential for adverse impacts on environmental matters will be developed for the project as required under existing approvals.

Queensland Health is not involved in any proceedings under a Commonwealth, State or Territory law for the protection of the environment or the conservation and sustainable use of natural resources.
Queensland Health has a satisfactory record of responsible environment management and sustainability at State and Federal levels. It has worked closely with community as well as local and state authorities to ensure to ensure site responsible outcomes.

Queensland Health has developed *Health Consideration – Environmental Impact Statement Guidelines for Proponents* to:

- ensure that a proponent identifies relevant environmental hazards that impact in human health and wellbeing
- provide guidance to proponents on how to demonstrate that risks to human health have been minimised.

Refer to **Attachment A20 – Annexure B – Queensland Health Environ-Impact-Statement Guidelines**.

Queensland Health has a satisfactory record of responsible environmental management. Queensland Health is a State Government agency that ensures all projects undertake the required environmental obligations. This is standard practice and Queensland Health has appropriate checklists and measures in

place to identify and include responsible environmental management practises. This process from Queensland Health generally involves:

- Engage town planners to undertake planning and environmental assessment, or due diligence reporting, of the site;
- Undertake recommendations as identified in the planning and environmental assessment, or due diligence reporting, and where necessary;
- Engage relevant specialist consultants (i.e. ecological) to prepare technical reports; and
- Review technical reports and undertake recommendations and actions as identified in those reports.

11. Conclusion

The Saunders Havill Group (SHG) act on behalf of Queensland Health in the coordination and production of the response to the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) Controlled Action Determination assessment on Preliminary Documentation (PD) for the proposed land located at Bundaberg Ring Road, Thabeban, Queensland (EPBC Reference: 2023/09397). The site is located within the Thabeban area and is comprised of 1 lot north of Bundaberg Ring Road described as Lot 23 on SP212513.

On the 3rd February 2023 the proposed action 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

This 'Preliminary Documentation' Report provides information requested by the Department to assist the assessment manager in determining whether or not the proposed action should be approved. As detailed in previous referral documentation an offset will be delivered in accordance with the EPBC Act Environmental Offsets Policy.

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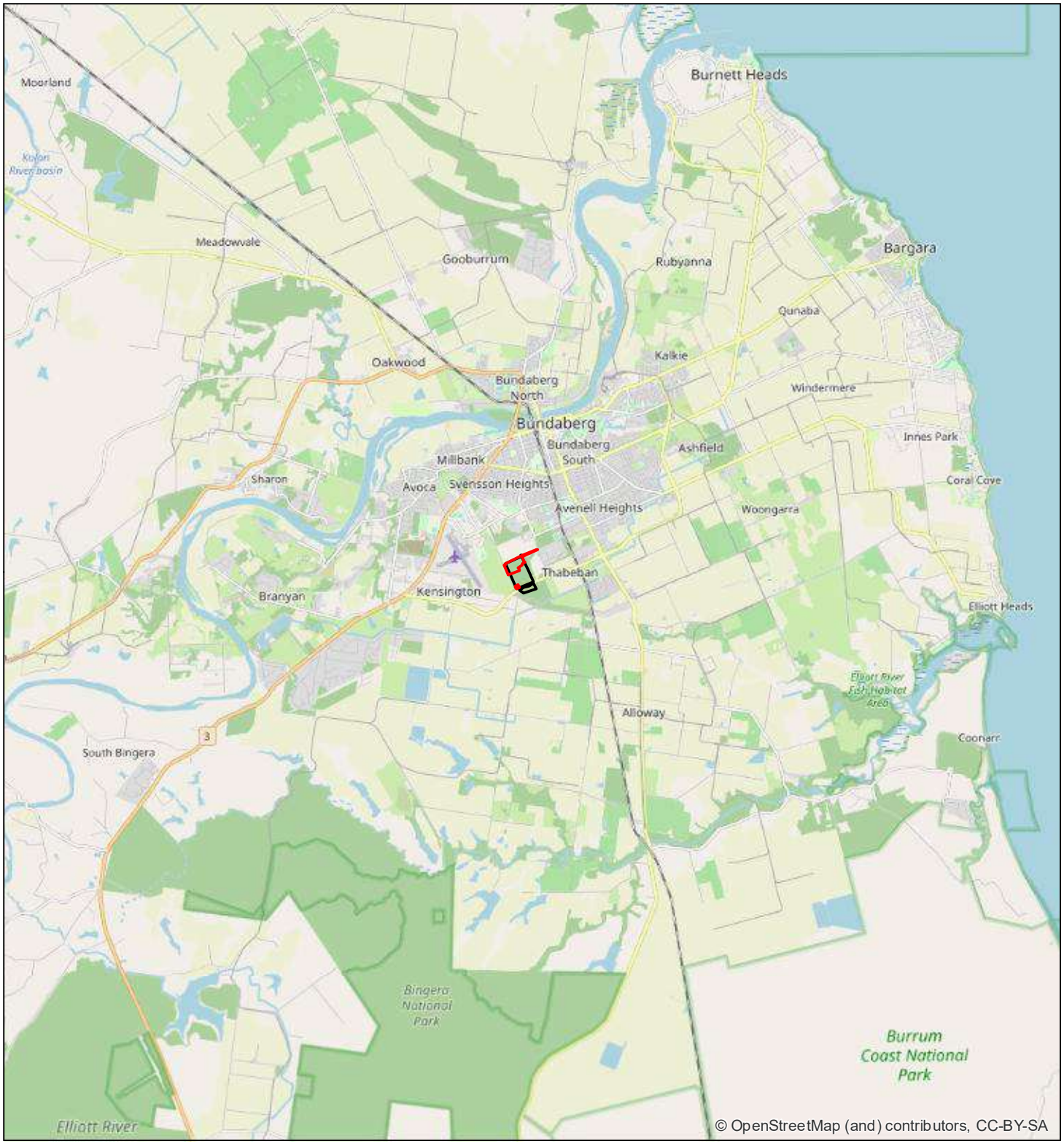
13. Figures and Plans



Legend

- Site DCDB
- Project Disturbance Footprint

Figure A1

Site Context

Queensland Government
Queensland Health

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

0 1 2 3 4 5 km

N

Scale (A4): 1:175,000 [GDA 2020 MGA Z56]

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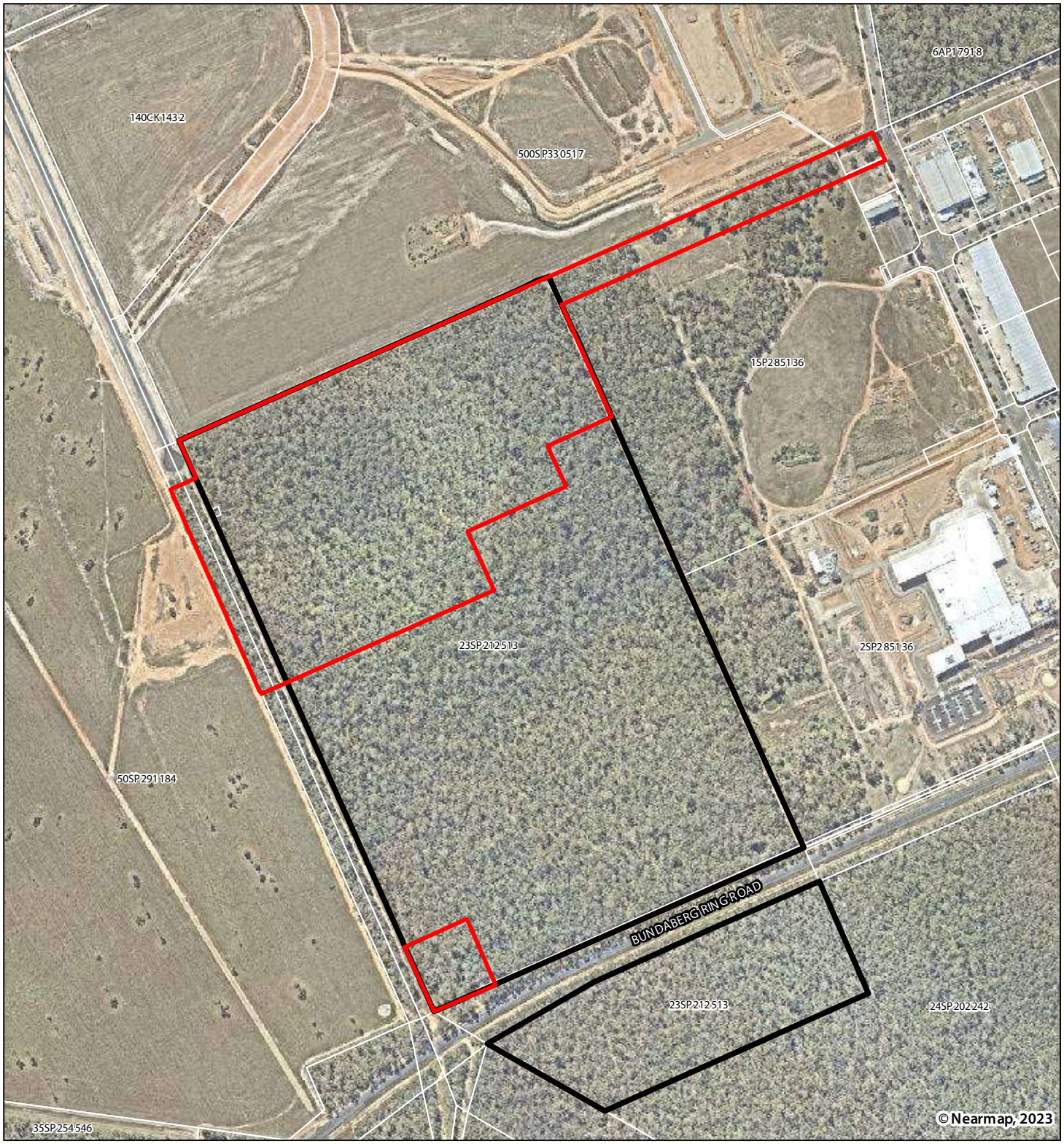
Layer Source: © State of Queensland 2023



Legend

- Qld DCDB
- Site DCDB
- Project Disturbance Footprint

Figure A2

Site Aerial

Queensland Government
Queensland Health

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

0 50 100 150 200 250 m

N

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

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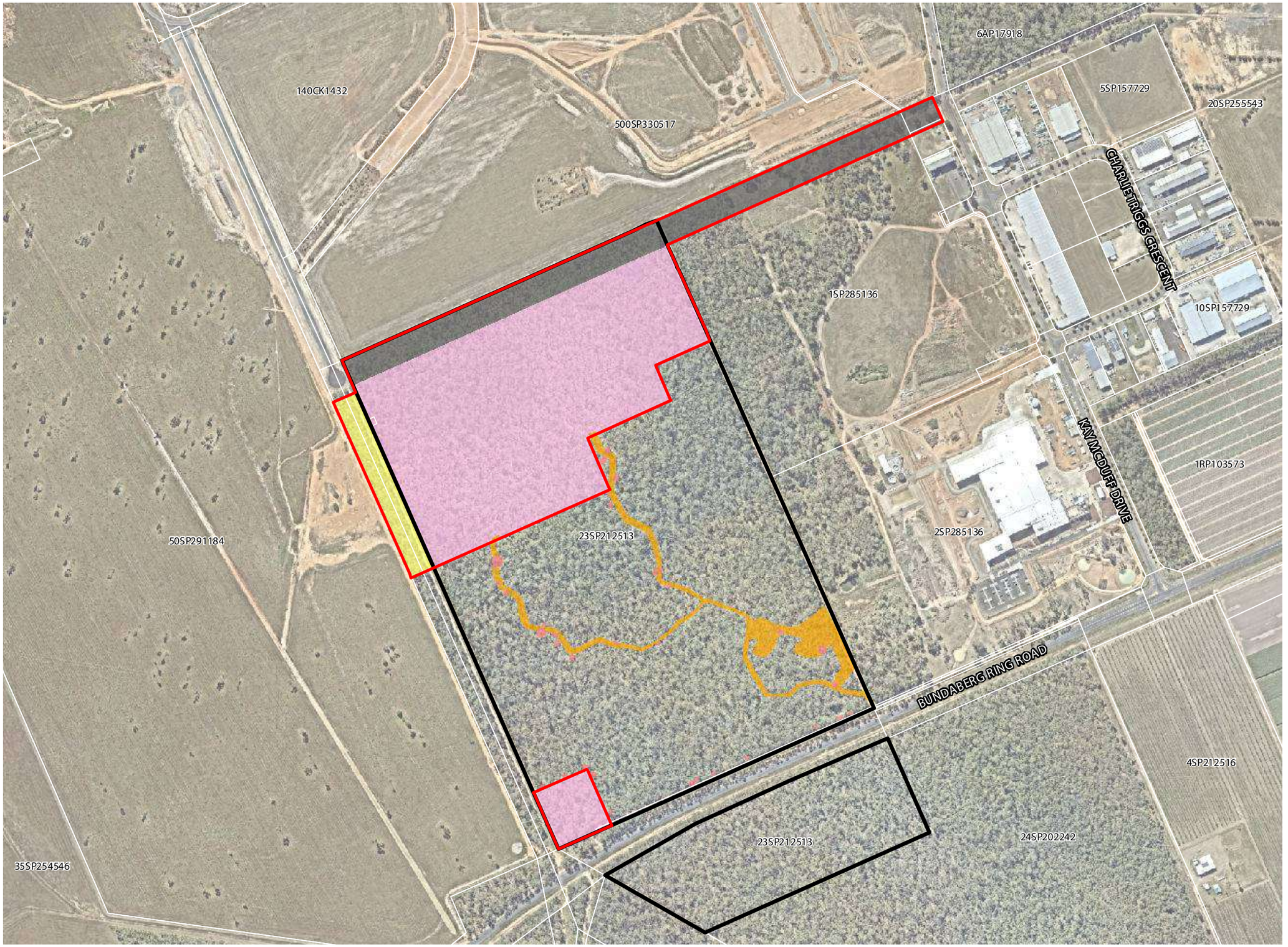
Layer Source: © State of Queensland 2023

A01. Development Footprint



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Legend

- Qld DCDB
- Site DCDB
- Project Disturbance Footprint [24.2 ha]
- Proposed East-West Connection Road [5 ha]
- Johanna Boulevard Extension [1.4 ha]
- Development Area [17.8 ha]
- Stormwater Management Area [2.1 ha]
- Additional temporary impact [0.26 ha]

Issue	Date	Description	Drawn	Checked
A	26/10/2023	Preliminary	TF	KH

0 50 100 150 200 m

Transverse Mercator | GDA 2020 | Zone 56 | 1:6,500 @ A3

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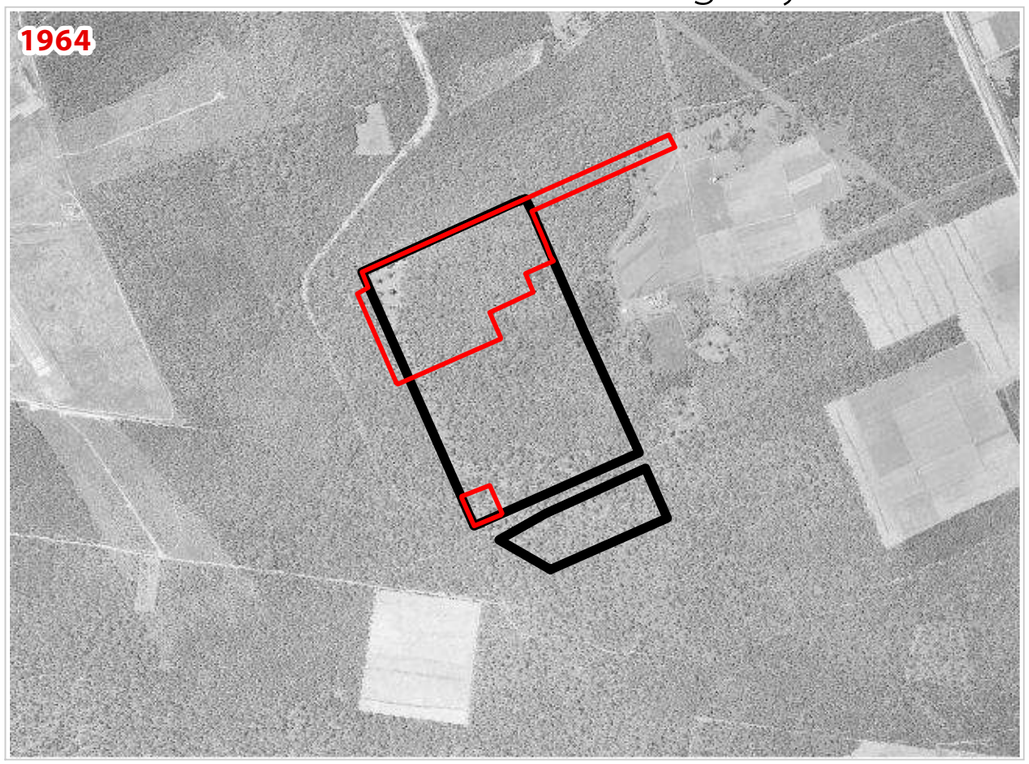
Queensland Government
Queensland Health

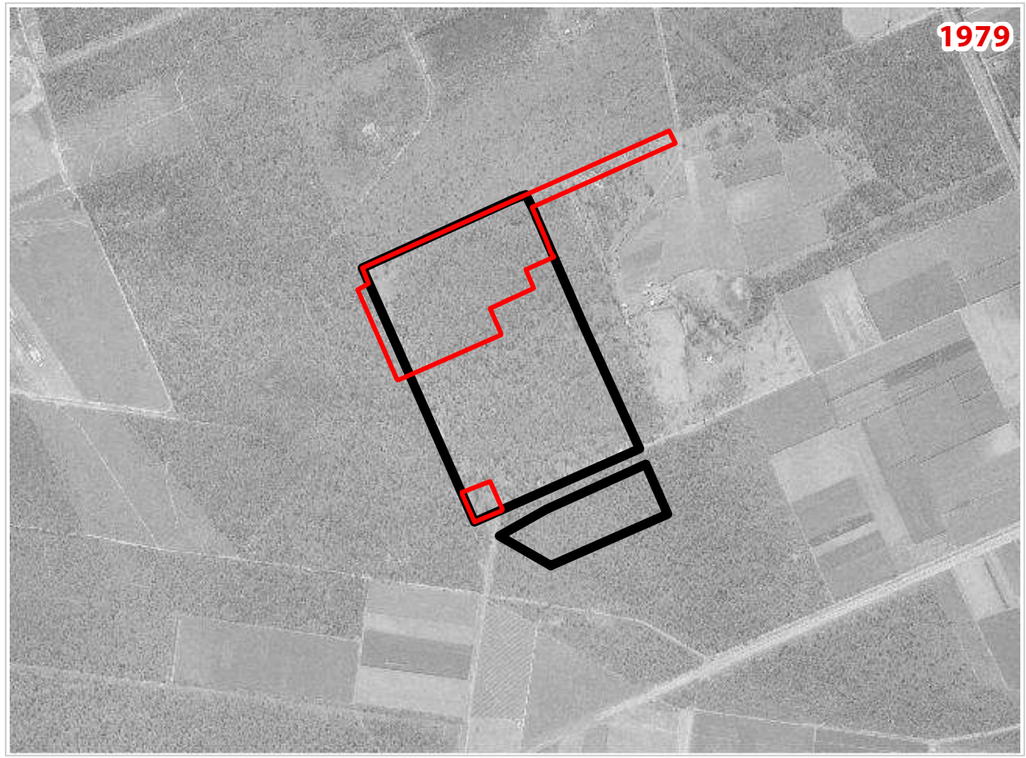
Bundaberg Hospital

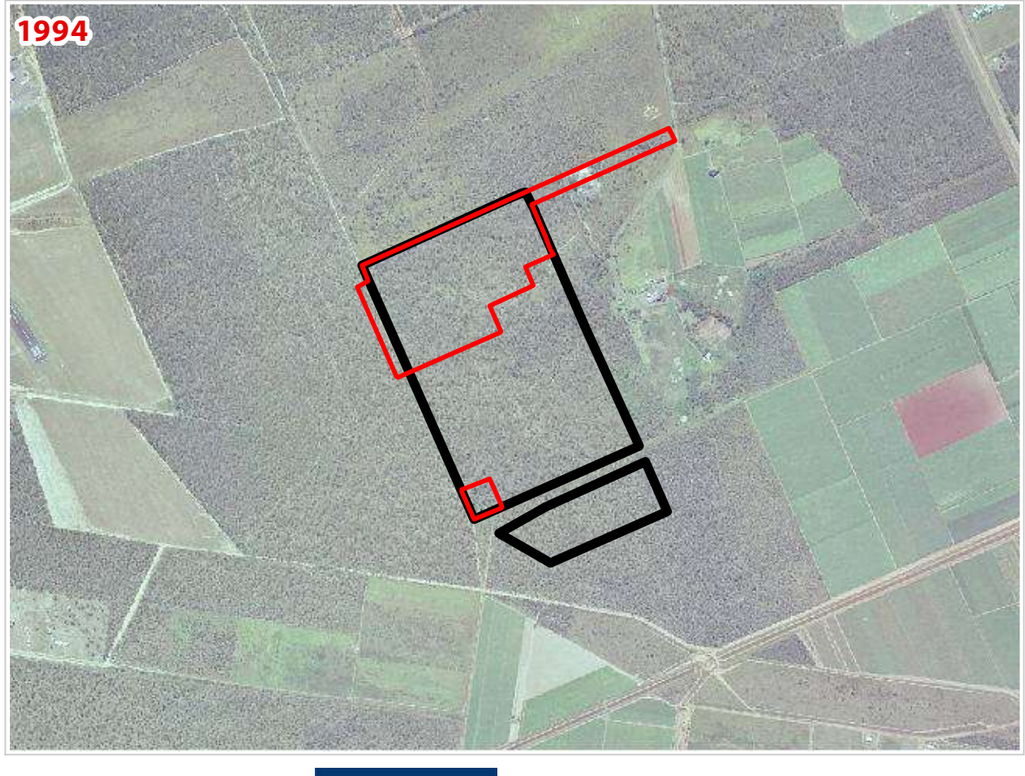
Address / RPD: Bundaberg Ring Road, Thabeban

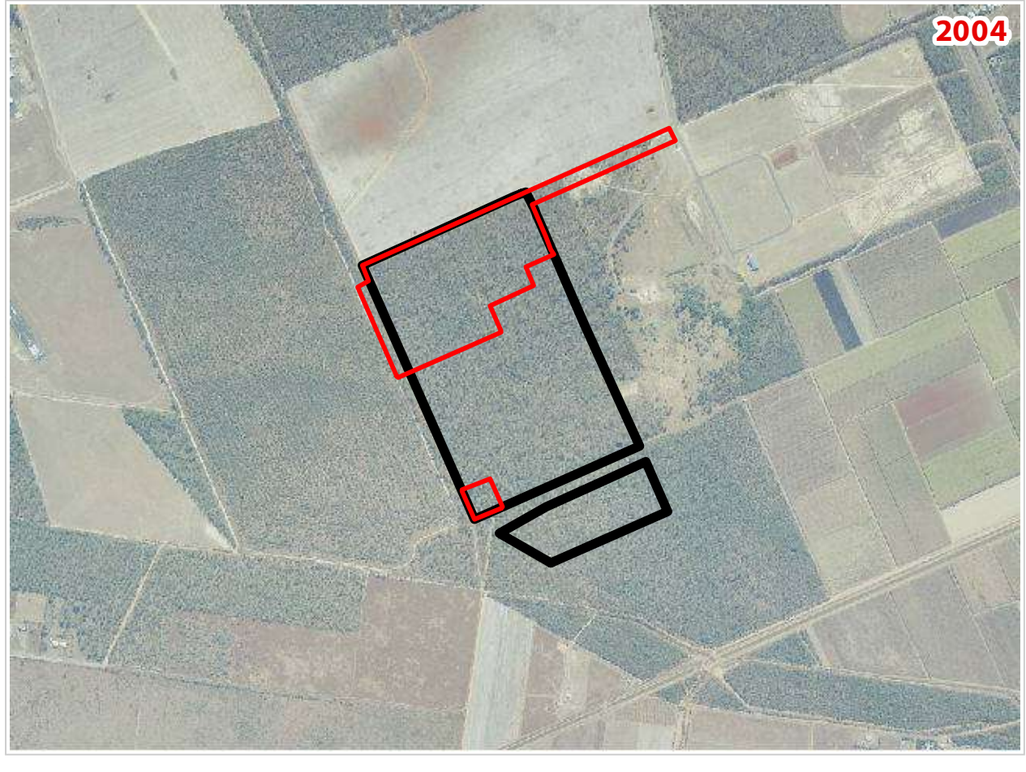
26/10/2023 | 11612 E A01 Development Footprint A

A02. Historical Aerial Imagery









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Legend

- Site DCDB
- Project Disturbance Footprint

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

0 100 200 300 400 500 m

Transverse Mercator | GDA 2020 | Zone 56 | 1:20,000 @ A3

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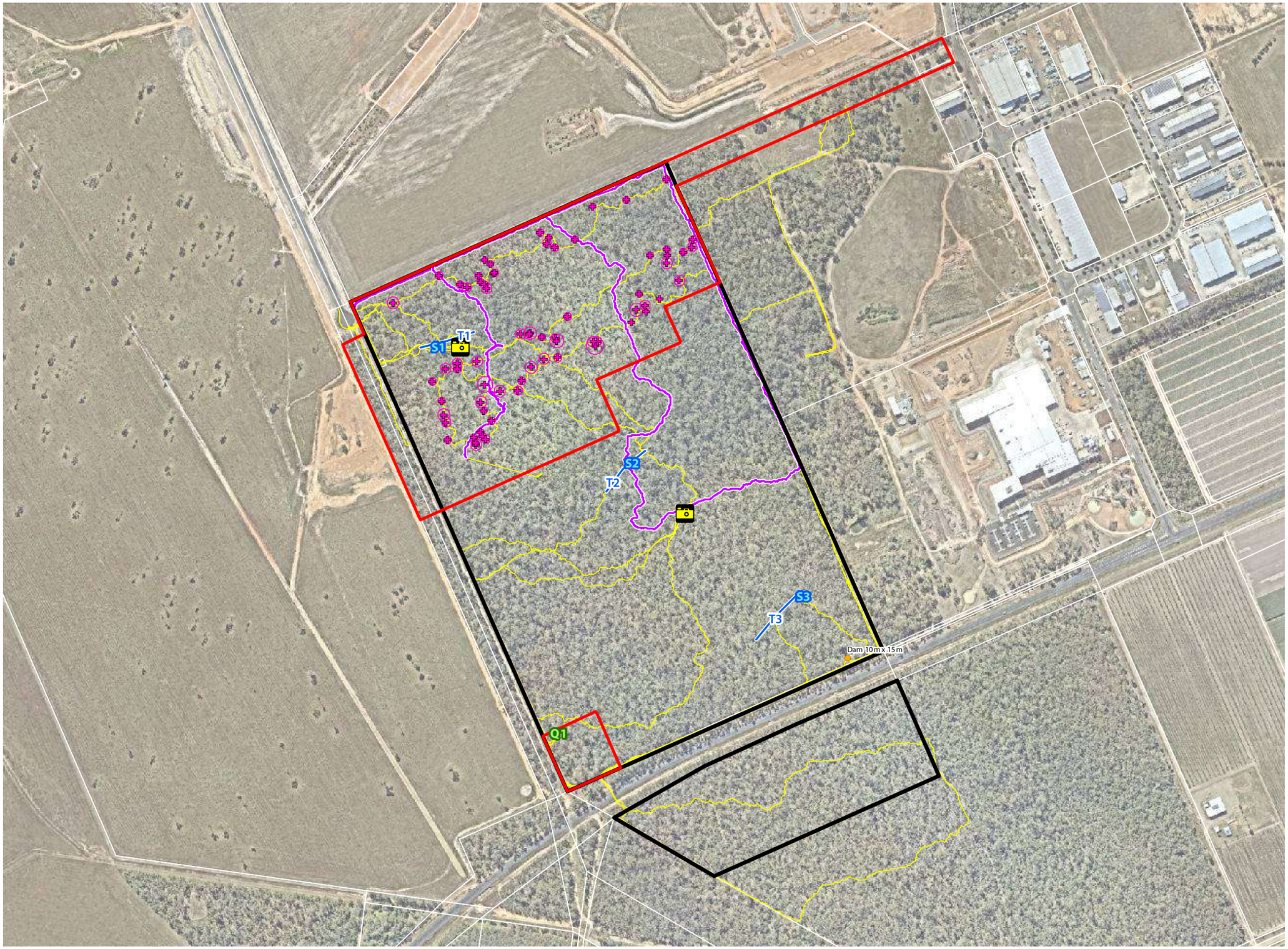
Queensland Government
Queensland Health

Bundaberg Hospital

Address / RPD: Bundaberg Ring Road, Thabeban

25/10/2023 | 11612 E A02 Aerial History A

A03. Field Survey Effort



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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

0 50 100 150 200 m

Transverse Mercator | GDA 2020 | Zone 56 | 1:6,500 @ A3

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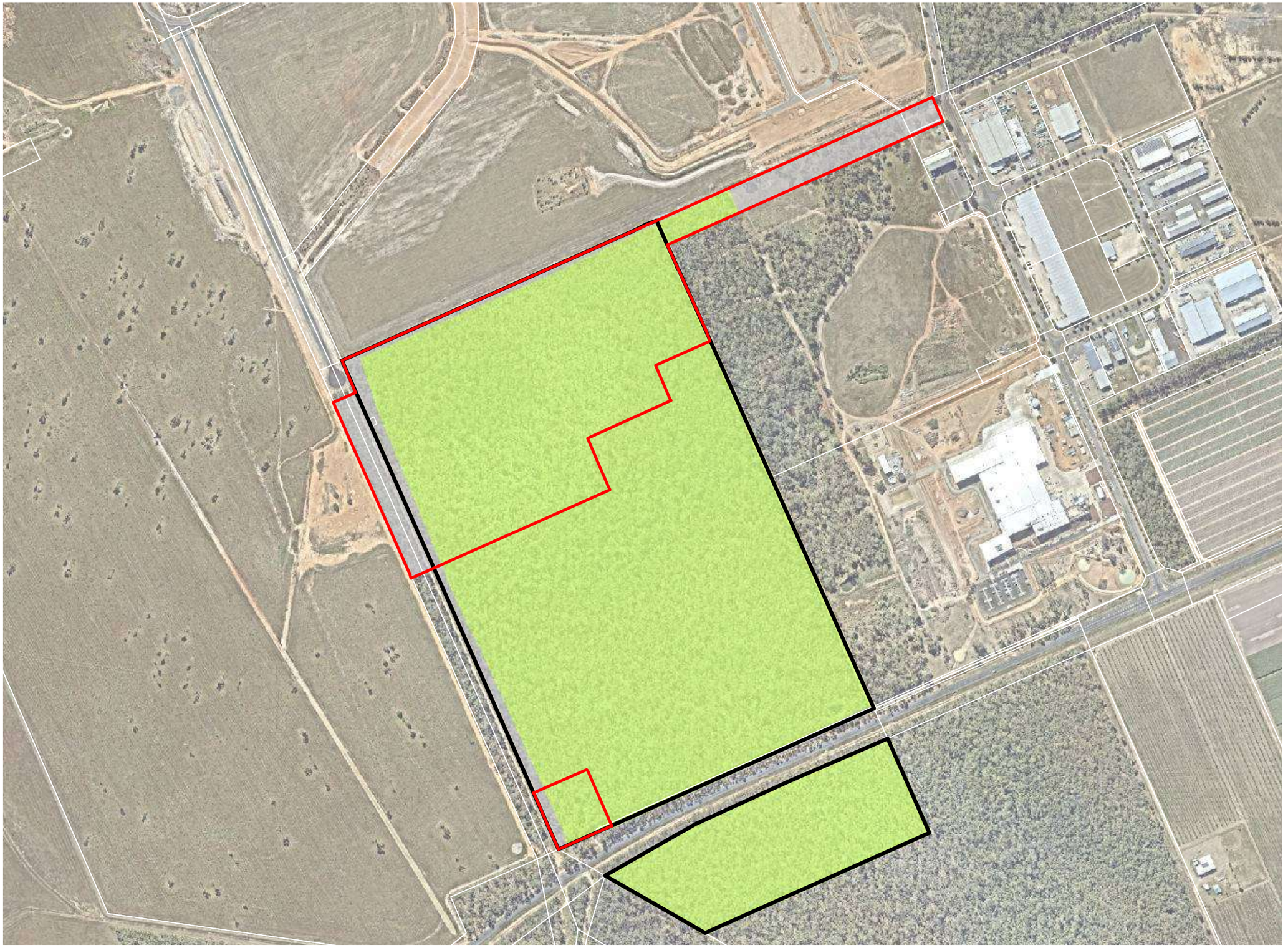
Queensland Health

Bundaberg Hospital

Address / RPD: Bundaberg Ring Road, Thabeban

25/10/2023 | 11612 E A03 Field Survey Effort A

A04. Assessment Units



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Legend

- Qld DCDB
- Site DCDB
- Project Disturbance Footprint
- Non-remnant Vegetation

Assessment Units

- **AU 1:** Remnant Regional Ecosystem 12.5.4 [64 ha]

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

0 50 100 150 200 m

Transverse Mercator | GDA 2020 | Zone 56 | 1:6,500 @ A3

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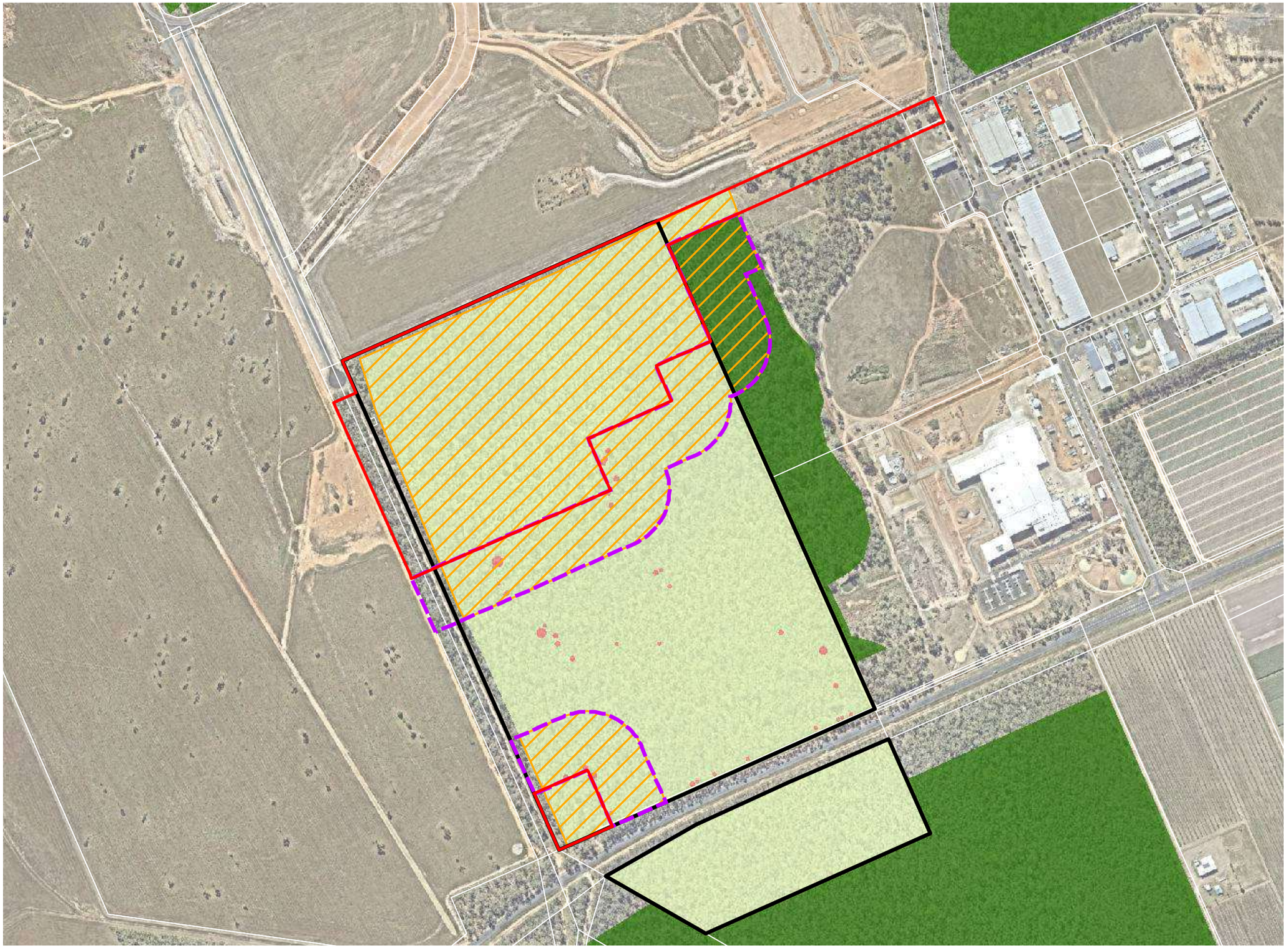
Bundaberg Hospital

Address / RPD: Bundaberg Ring Road, Thabeban

25/10/2023 | 11612 EA04 Assessment Units A

A05. Potential Greater Glider Habitat and Impact



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Legend

- Qld DCDB
- Site DCDB
- Project Disturbance Footprint
- 100 Metre Disturbance Footprint Buffer
- Potential Greater Glider Habitat
- Potential Greater Glider Habitat On-site [60.3 ha]
- Potential Greater Glider Habitat Impacted
- Additional temporary impact [0.26 ha]

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

0 50 100 150 200 m

Transverse Mercator | GDA 2020 | Zone 56 | 1:6,500 @ A3

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Bundaberg Hospital

Address / RPD: Bundaberg Ring Road, Thabeban

25/10/2023 | 11612 E A05 GG Habitat Impact A

A06. Greater Glider Records

Notes:
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Legend

- Site DCDB
- Project Disturbance Footprint
- 5KM Site Buffer
- 20KM Site Buffer
- Potential Greater Glider Habitat within 20km of site - 21%
- Greater Glider Records (0 within 5KM of site, 3 within 20KM of site)

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

0 1 2 3 4 5 km

Transverse Mercator | GDA 2020 | Zone 56 | 1:185,000 @ A3

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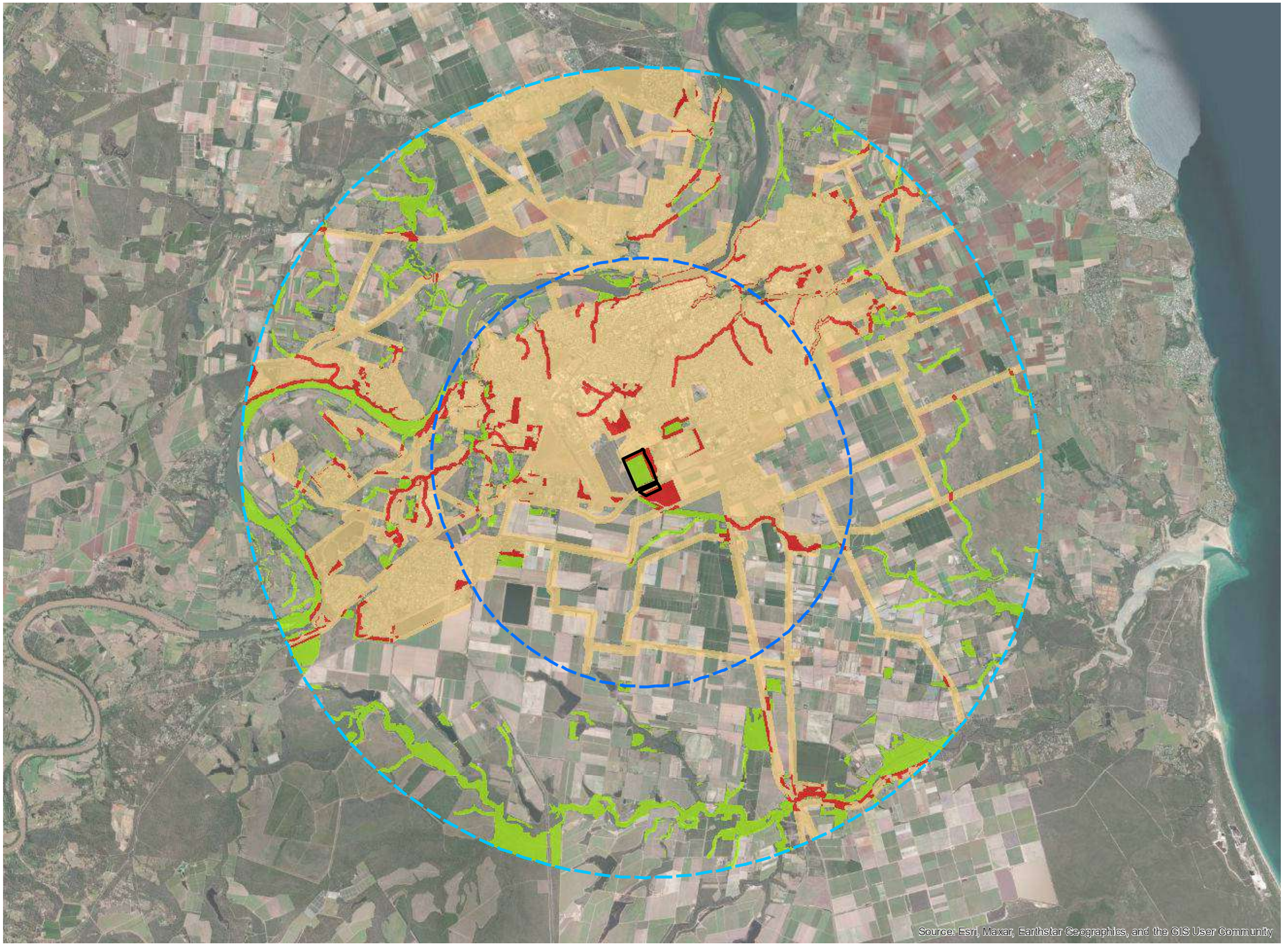
Queensland Health

Bundaberg Hospital

Address / RPD: Bundaberg Ring Road, Thabeban

25/10/2023 | 11612 E A06 GG Records A

A07. Greater Glider Fragmentation Analysis



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Legend

- Site DCDB
- Site 5KM Buffer
- Site 10KM Buffer

Fragmentation Analysis

- Potential and Known Greater Glider Habitat within 10KM of site - 9.3%
- Existing Impact Areas (With 100m Buffer)
- Potential and Known Greater Glider Habitat Impacted by Existing Infrastructure - 955 ha

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

0 1 2 3 4 km

Transverse Mercator | GDA 1994 | Zone 56 | 1:100,000 @ A3

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Queensland Health

Bundaberg Hospital

Address / RPD: Bundaberg Ring Road, Thabeban

25/10/2023 | 11612 E A07 GG Fragmentation A

A08. Potential Koala Habitat and Impact

Notes:
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Legend

- Qld DCDB
- Site DCDB
- Project Disturbance Footprint
- Potential Koala Habitat
- Potential Koala Habitat On-site [64.4 ha]
- Potential Koala Habitat Impacted [23.3 ha]
- Additional temporary impact [0.26 ha]

Issue	Date	Description	Drawn	Checked
A	25/10/2023	Preliminary	TF	KH
B	7/12/2023	Department Updates	TF	KH

0 50 100 150 200 m

Transverse Mercator | GDA 2020 | Zone 56 | 1:6,500 @ A3

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Queensland Government
Queensland Health

Bundaberg Hospital

Address / RPD: Bundaberg Ring Road, Thabeban

7/12/2023 | 11612.E.A08.Koala Habitat Impact B

A09. Koala Records

Notes:
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Legend

- Site DCDB
- Project Disturbance Footprint
- 5KM Site Buffer
- 20KM Site Buffer
- Potential Koala Habitat within 20KM of site - 25%
- Koala Records (1 within 5KM of site, 2 within 20KM of site)

Issue	Date	Description	Drawn	Checked
A	25/10/2023	Preliminary	TF	KH
B	7/12/2023	Department Updates	TF	KH

0 1 2 3 4 5 km

Transverse Mercator | GDA 2020 | Zone 56 | 1:185,000 @ A3

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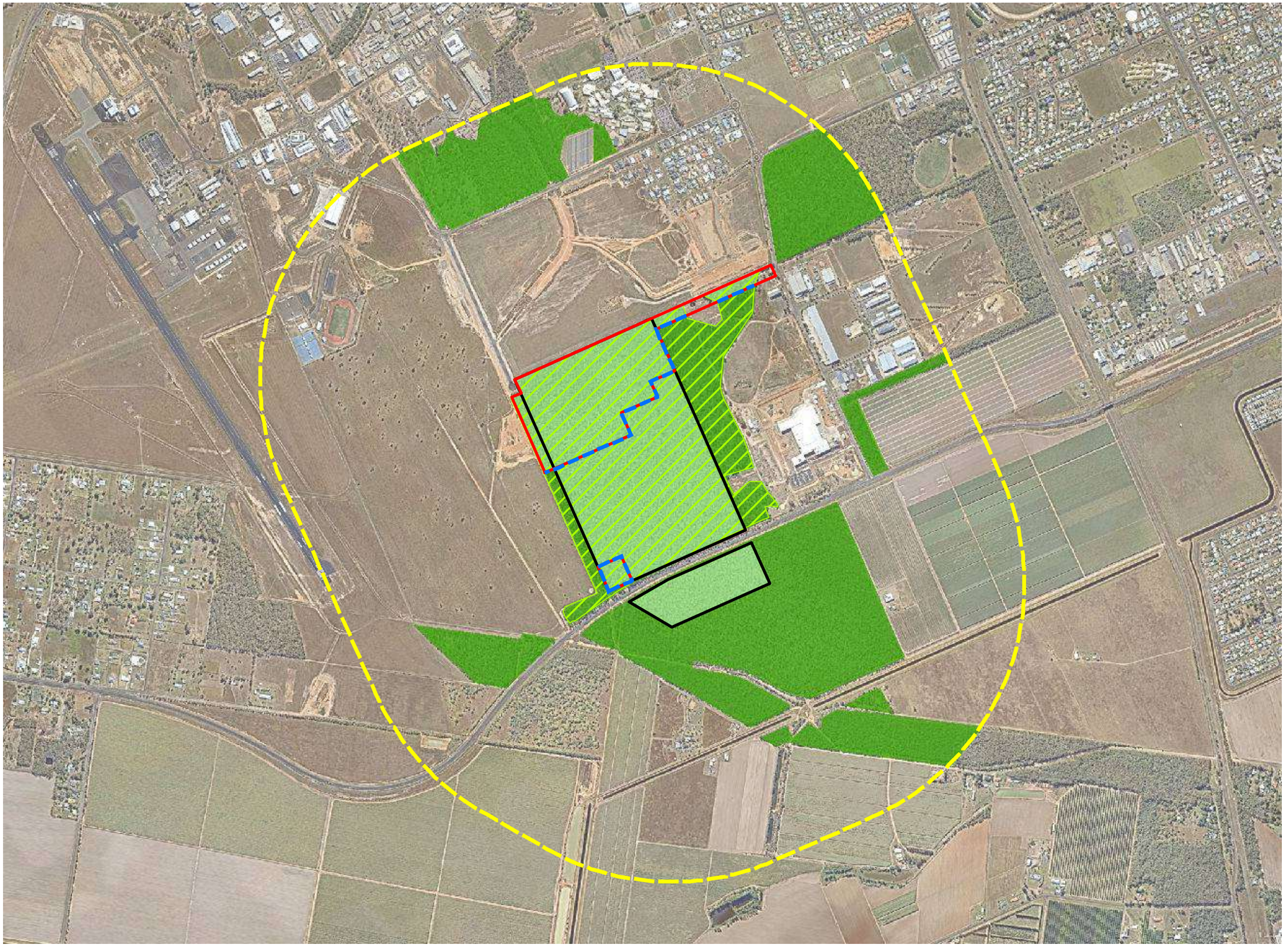
Queensland Government
Queensland Health

Bundaberg Hospital

Address / RPD: Bundaberg Ring Road, Thabeban

7/12/2023 | 11612E A09 Koala Records B

A10. Koala Context Assessment



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Legend

- Site DCDB
- Project Disturbance Footprint
- 1KM Site Buffer Extent
- Koala critical habitat on site
- Percentage of project disturbance footprint length supporting a koala critical habitat connection off and on site - 49%
- Percentage of Koala Critical habitat within 1km of impact site (21%)
- Size of Koala critical habitat patch adjoining impact site (74 ha)

Statewide Corridor Buffer

- Regional Significance
- State Significance

Issue	Date	Description	Drawn	Checked
A	25/10/2023	Preliminary	TF	KH
B	7/12/2023	Department Updates	TF	KH

0 100 200 300 400 500 m

Transverse Mercator | GDA 1994 | Zone 56 | 1:15,000 @ A3

saunders havill group

Queensland Government
Queensland Health

Bundaberg Hospital

Address / RPD: Bundaberg Ring Road, Thabeban

7/12/2023 | 11612.E.A10 Koala Context Assessment B

A11. Potential Grey-headed Flying Fox Habitat and Impact

Notes:
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Legend

- Qld DCDB
- Site DCDB
- Project Disturbance Footprint
- Potential Grey-headed Flying Fox Foraging Habitat
- Potential Grey-headed Flying Fox Foraging Habitat On-site [64.4 ha]
- Potential Grey-headed Flying Fox Foraging Habitat Impacted [23.3 ha]
- Additional temporary impact [0.26 ha]

Issue	Date	Description	Drawn	Checked
A	25/10/2023	Preliminary	TF	KH
B	7/12/2023	Department Updates	TF	KH

0 50 100 150 200 m

Transverse Mercator | GDA 2020 | Zone 56 | 1:6,500 @ A3

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Queensland Government
Queensland Health

Bundaberg Hospital

Address / RPD: Bundaberg Ring Road, Thabeban

7/12/2023 | 11612.E.A11.GHFF.Habitat.Impact.B

A12. Grey-headed Flying Fox Records

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.

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Legend

- Site DCDB
- Project Disturbance Footprint
- 5KM Site Buffer
- 20KM Site Buffer
- Potential Grey-headed Flying Fox Habitat within 20km of site - 25%
- Grey-headed Flying Fox Records (16 within 5KM of site, 2 within 20KM of site)

Issue	Date	Description	Drawn	Checked
A	25/10/2023	Preliminary	TF	KH
B	7/12/2023	Department Updates	TF	KH

0 1 2 3 4 5 km

Transverse Mercator | GDA 2020 | Zone 56 | 1:185,000 @ A3

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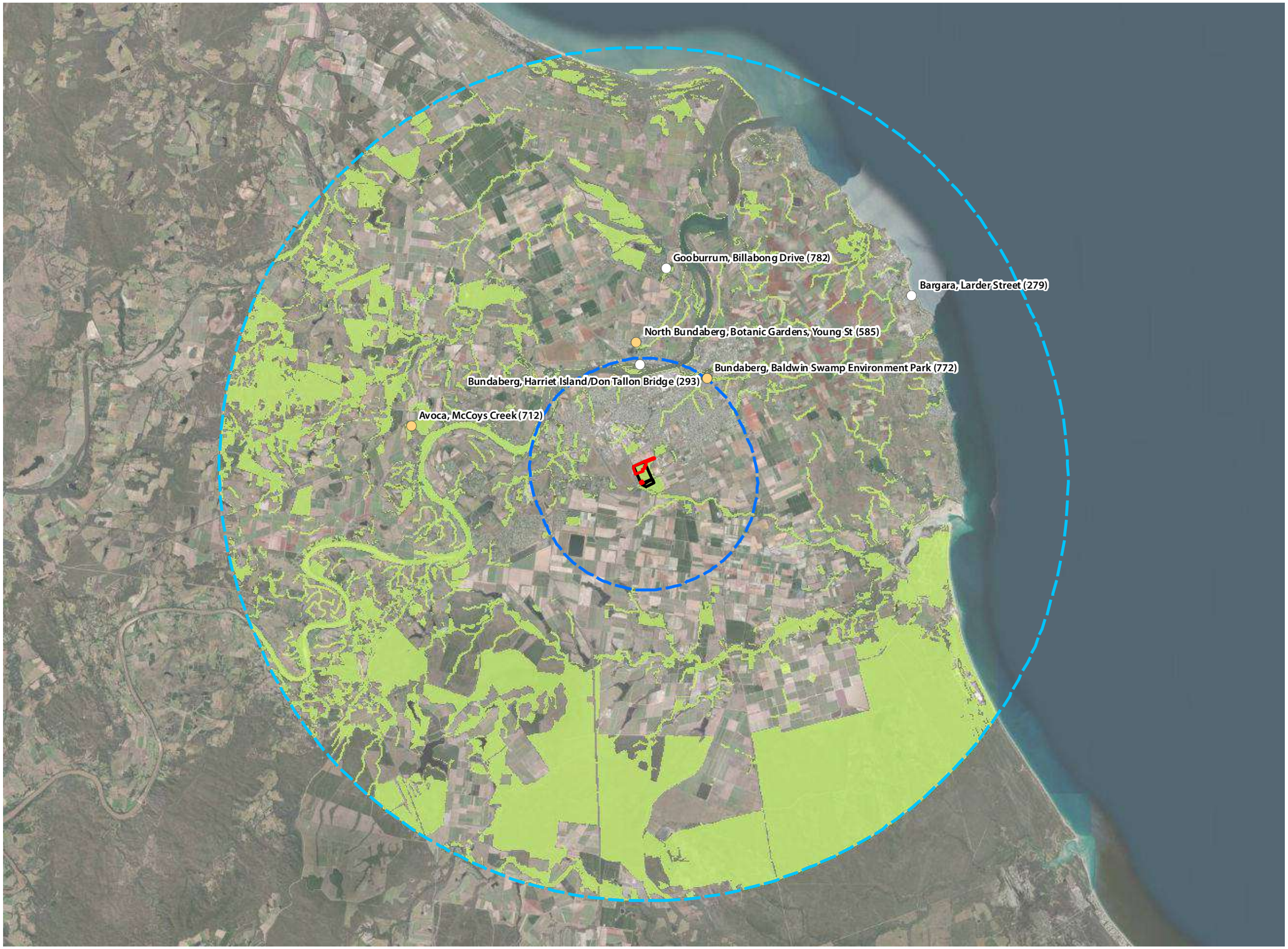
Queensland Health

Bundaberg Hospital

Address / RPD: Bundaberg Ring Road, Thabeban

7/12/2023 | 11612E A12 GHFF Records B

A13. Grey-headed Flying Fox Context Assessment



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.

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Legend

- Site DCDB
- Project Disturbance Footprint
- Site 20km Buffer
- Site 5km Buffer
- Potential and Know Grey-headed Flying-fox Foraging Habitat - 25%

Fed. GHFF monitoring program, 2023 data

- Grey-headed Flying-fox surveyed camp location with no population recorded since 2018 [3 within 20km]
- Grey-headed Flying-fox surveyed camp location with a population recorded from 2019 to present [3 within 20km]
- Nationally important Grey-headed Flying-fox surveyed camp location with a population recorded from 2019 to present [0 within 20km]
- Grey-headed Flying-fox surveyed camp location with a population size of greater than 2,500 recorded from 2019 to present (Population level 3 or higher) [0 with 20km]

Issue	Date	Description	Drawn	Checked
A	25/10/2023	Preliminary	TF	KH
B	7/12/2023	Department Updates	TF	KH

0 1 2 3 4 5 km

Transverse Mercator | GDA 1994 | Zone 56 | 1:185,000 @ A3

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Queensland Government
Queensland Health

Bundaberg Hospital

Address / RPD: Bundaberg Ring Road, Thabeban

7/12/2023 | 11612.E.A13.GHFF.Context.Assessment.B

14. Attachments

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PD Additional Information Request

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Attachment A4

PMST Results

Attachment A5

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Wildnet search Results

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Site Concept Plan

Attachment A11

Species Management Program

Attachment A12

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MNES Management Plan

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Attachment A21

Fauna Survey Raw Data-sheet

Attachment A1

EPBC Act Controlled Action Decision Notice

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)

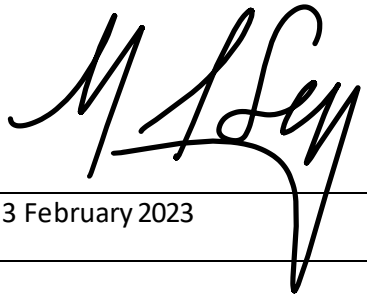
Referral decision: controlled action

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 A2

PD Additional Information Request

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	Provide detailed mapping of suitable habitat (within, adjacent to and downstream of the project site, where relevant) for all listed threatened species, which: • is specific to the habitat assessment undertaken for each listed threatened species (i.e., does not only illustrate relevant Queensland Regional Ecosystems); • includes an overlay of the project disturbance footprint (including the wetlands); • includes known records of individuals derived from desktop analysis and field surveys; and • is provided separately as attachments in JPEG format.
2.1.4	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.
2.1.5	Attach all relevant ecological surveys referenced in the referral and preliminary documentation as supporting documents to the preliminary documentation.

2.2 Species specific information

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

Information required	
Greater Glider (southern and central) (*Petauroides volans*) – Endangered	
2.2.1	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.
2.2.2	State the total number of records (individuals and evidence of presence) within and/or adjacent to the project site identified during surveys.
2.2.3	Identification of all areas of Eucalypt forest and woodland within and adjacent to the project site which contain hollow-bearing trees.
2.2.4	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.
2.2.5	A detailed discussion of potential foraging habitat in Eucalypt forest and woodland adjacent to areas of Eucalypt forest and woodland which contain tree hollows.

2.2.6	A discussion of habitat and habitat use requirements (e.g., foraging, dispersal, shelter, etc.) in line with the updated Conservation Advice for the Greater Glider (July 2022).
2.2.7	The total area (in hectares) of Greater Glider habitat, including foraging habitat.
Koala (*Phascolarctos cinereus*) (combined populations of Qld, NSW and the ACT) – Endangered	
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 Conservation Advice and National Recovery Plan for the Koala (March 2022).
2.2.10	The total area (in hectares) of each identified habitat type (e.g., foraging, dispersal, shelter, etc.)
Grey-headed Flying-fox (*Pteropus poliocephalus*) – Vulnerable	
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 National Recovery Plan for the Grey-headed Flying-fox (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)	Habitat critical to survival for the greater glider (southern and central) relevant to this project includes but is not limited to: • 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 • smaller or fragmented habitat patches connected to larger patches of habitat, that can facilitate dispersal of the species and/or that enable recolonization. Note: The presence of trees with basal diameter >30 cm can be used as a proxy measure for tree hollows used by Greater Gliders in Queensland. 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.

		For the full definition refer to: *Conservation Advice for* Petauroides volans *(greater glider (southern and central))* (2022).
2.3.2	Koala (combined populations of Qld, NSW and the ACT)	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. Note: Habitat critical to the survival of the species includes habitat occupied and habitat currently unoccupied. For the full definition refer to: *Conservation Advice for* Phascolarctos cinereus *(Koala) combined populations of Queensland, New South Wales and the Australian Capital Territory* (2022) *National Recovery Plan for the Koala* Phascolarctos cinereus *(combined populations of Queensland, New South Wales and the Australian Capital Territory)* (2022).
2.3.3	Grey-headed Flying-fox	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. Important winter and spring vegetation communities are those that contain *Eucalyptus tereticornis*, *E. albens*, *E. crebra*, *E. fibrosa, E. melliodora, E. paniculata, E. pilularis, E. robusta, E. seeana, E. sideroxylon, E. siderophloia, Banksia integrifolia, Castanospermum australe, Corymbia citriodora citriodora, C. eximia, C. maculata, Grevillea robusta, Melaleuca quinquenervia* or *Syncarpia glomulifera*. 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: • 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) • contain native species used for foraging and occur within 20 km of a nationally important camp as identified on the Department's interactive flying-fox web viewer, or • contain native and or exotic species used for roosting at the site of a nationally important Grey-Headed Flying-Fox camp

		as identified on the Department's interactive flying-fox web viewer For the full definition refer to: *National Recovery Plan for the Grey-headed Flying-fox* Pteropus poliocephalus (2021).

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[1] 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.

[1] 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: • 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 • a recovery plan or threat abatement plan.
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

Greater Glider (southern and central) (*Petauroides volans*) – Endangered	
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.
Koala (Phascolarctos cinereus) (combined populations of Qld, NSW and the ACT) – Endangered	
3.2.3	A discussion of the Koala impact assessment with reference to the updated Recovery Plan and Conservation Advice (March 2022)
Grey-headed Flying-fox (*Pteropus poliocephalus*) – Vulnerable	
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.

Information required in Management Plans	
4.1	Include any relevant management plans (in approved or draft format) as appendices to the preliminary documentation.
4.2	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]). 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. All proposed measures must also be drafted to meet the 'S.M.A.R.T' principle: • S – Specific (what and how) • M – Measurable (baseline information, number/value, auditable) • A – Achievable (timeframe, money, personnel) • R – Relevant (conservation advices, recovery plans, threat abatement plans)

	• T – Time-bound (specific timeframe to complete).
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.

Information required	
5.1	The details of any rehabilitation activities proposed to be undertaken, including any activities required through other Commonwealth, State and/or local government approvals. All commitments must be drafted using committal language (e.g., 'will' and 'must') when describing the proposed activities.
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.

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 *EPBC Environmental Offsets Policy* (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: www.environment.gov.au/epbc/publications/epbc-act-environmental-offsets-policy.
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 Appendix B.1, and must be prepared by a suitably qualified ecologist and in accordance with the department's *Environmental Management Plan Guidelines* (2014), available at:

	www.environment.gov.au/epbc/publications/environmental-management-plan-guidelines.
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 Appendix B.2.

7. ECOLOGICALLY SUSTAINABLE DEVELOPMENT (ESD)

Information required	
7.1	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 ***principles of ecologically sustainable development***: • decision making processes should effectively integrate both long term and short term economic, environmental, social and equitable considerations • 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 • 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 • the conservation of biological diversity and ecological integrity should be a fundamental consideration in decision making • improved valuation, pricing and incentive mechanisms should be promoted.

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	Details of any consultation with Indigenous stakeholders. **Engaging First Nations peoples and communities** 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. Describe any First Nations consultation that has been undertaken, or will be undertaken, in relation to the proposed action and their outcomes. The department considers that best practice consultation, in accordance with the *Interim Engaging with First Nations People and Communities on Assessment and Approvals under the Environment Protection and Biodiversity Conservation Act 1999* (2023) includes:

	• ensuring cultural safety by protecting the cultural identity, wants and needs of First Nations peoples and communities • building and maintaining trust by investing in ongoing relationships and partnerships and demonstrating cultural awareness and competence • engaging early and often, ideally directly with the relevant First Nations peoples, communities, groups and organisations who may be affected by the proposed project • negotiating suitable timeframes in consideration of cultural obligations of First Nations peoples and communities • negotiating suitable submission formats that reflect the communication needs and preferences of First Nations peoples and communities. 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.
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	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: • the person proposing to take the action • for an action for which a person has applied for a permit, the person making the application • if the person is a body corporate—the history of its executive officers in relation to environmental matters • 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.

APPENDIX A: Preliminary documentation content, style and formatting requirements

A1. Content requirements	
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: • the source and date of the information; • how the reliability of the information was tested; • the uncertainties (if any) in the information; and • the guidelines, plans, and/or policies considered.
A2. Format and style requirements	
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.
A3. Ecological data provision	
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 *Guidelines for biological survey and mapped data* (2018) using the department's Species observation data template. Sensitive ecological data must be identified and treated in accordance with the department's *Sensitive Ecological Data – Access and Management Policy V1.0* (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.

B1. Minimum Requirements for a draft Offset Management Plan: 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.	
B1.1	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). For this project, the department recommends that habitat quality data within the impact site be collected following the method described in B1.6.
B1.2	A description of the offset area/s, including location, size, condition, environmental values present and surrounding land uses.
B1.3	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: www.environment.gov.au/epbc/publications/epbc-act-environmental-offsets-policy.
B1.4	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).
B1.5	Baseline data and other supporting evidence that documents the presence of the relevant protected matter/s within the offset area/s.
B1.6	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: • time over which loss is averted (max. 20 years); • time until ecological benefit; • risk of loss (%) without offset; • risk of loss (%) with offset; and • confidence in result (%). Please note, 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.

	Provide the inputs and calculations used for the Offsets Assessment Guide for all triggered species.
B1.7	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. 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. 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 *How to use the Offset Assessment Guide* and the *EPBC Environmental Offset Policy* (2012). 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 *Guide to determining terrestrial habitat quality: A toolkit for assessing land-based offsets under the Queensland Environmental Offsets Policy.* Provide all the calculations done with the MHQA spreadsheet if this method is chosen. Note: It is important to avoid confounding the presence of threats at a site *that might affect the future state of a site*, with those affecting its *current* 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.
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	Details of the management measures, and timeframes for implementation, to be carried out to meet the offset completion criteria. All proposed management measures must be written using committed language (e.g., 'will' and 'must').
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	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. All proposed corrective actions must be written using committed language (e.g., 'will' and 'must').
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.
B2. Minimum Requirements for a draft Offset Strategy: 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.	
B2.1	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: • total area of habitat (in hectares); and • habitat quality 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. 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 *How to use the Offset Assessment Guide* and the *EPBC Environmental Offsets Policy* (2012). 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 *Guide to determining terrestrial habitat quality: A toolkit for assessing land-based offsets under the Queensland Environmental Offsets Policy.* Provide all the calculations done with the MHQA spreadsheet if this method is chosen. It is important to avoid confounding the presence of threats at a site *that might affect the future state of a site*, with those affecting its *current* 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.
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 *EPBC Act Environmental Offsets Policy* (2012) (Offsets Policy), available at: www.environment.gov.au/epbc/publications/epbc-act-environmental-offsets-policy.
B2.5	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: • time over which loss is averted (max. 20 years); • time until ecological benefit; • risk of loss (%) without offset; • risk of loss (%) with offset; and • confidence in result (%). Please note, 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. Provide the inputs and calculations used for the Offsets Assessment Guide, for all triggered species.
B2.6	Evidence that the relevant protected matter, and/or their habitat, can be present in the potential offset area/s.

Attachment A3

CPB Preliminary Swale, Basin and Bunding Methodology

Constructing our future together

New Bundaberg Hospital

Memo

Attention	Mike O'Donnell
From	Travis Dawson
Subject	Preliminary Southern Swale, Basin and Bunding Construction Methodology – Rev A
Date	31/10/23
Copy	Steve Jenkins, Wayne Jackson
From	Travis Dawson

Introduction

CPB Contractors (CPB has been appointed Managing Contractor (MC) for Stage 1 of the New Bundaberg Hospital. Stage 1 includes developing the design and on-site early works.

As part of its early works, the MC is required to carry out civil earth works that include the establishment of drainage swales, a detention/filtration basin and bunding from the Hospital Buildings area at the north or the site to the south east corner of the site as described in the graphic below.

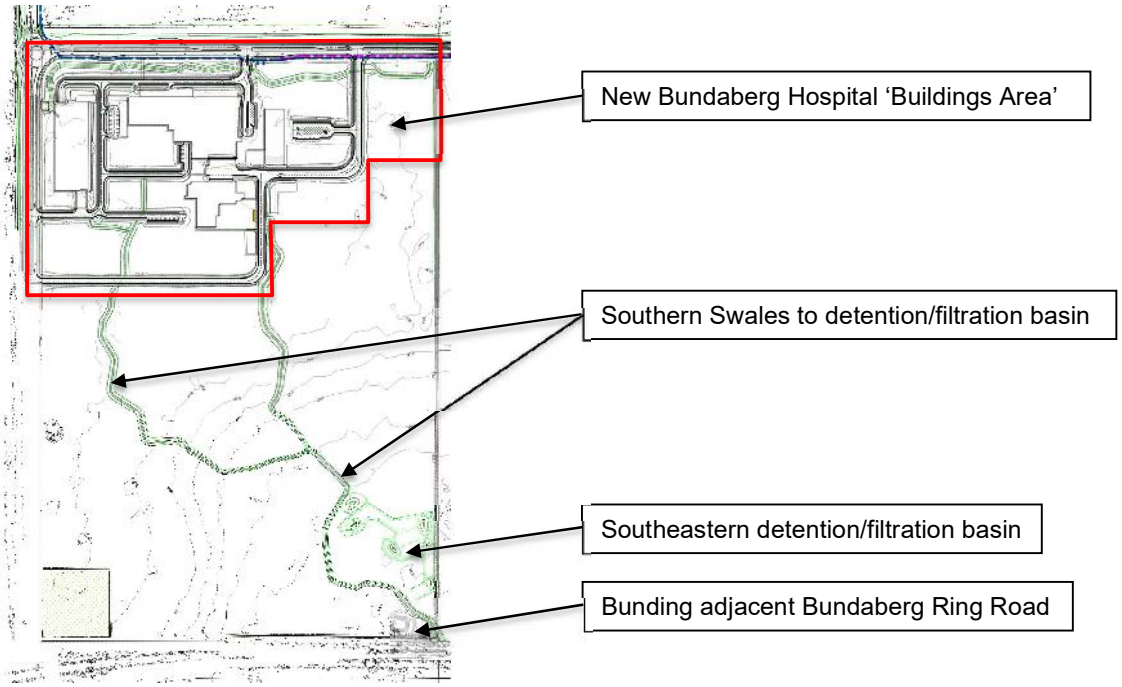


Figure 1: NBH – Scope of work diagram

The Project and its Site is subject to EPBC and MID approvals. At the time of authoring this Memo, the conditions of these approvals are continuing to be coordinated and confirmed.

Queensland Health (inc. HCD/HHS) chaired and coordinated a meeting which included the PM, MC and Saunders Havill on Wednesday 11 October 2023 to discuss the works and the EPBC approval process. To assist Queensland Health in its approvals, it requested a preliminary construction methodology from the MC for the southern swales, south-eastern detention/filtration basin and bunding. In response to that request, the MC offers the following information.

Approvals:

The MC understands the following is required for approval of the swale, basin and bunding works:

- QLD Health/Project Approval: The PM on behalf of the Queensland Health (including HCD and WBHHS) are to provide approval to the MC to proceed with the works.
- PCCC: The PM and WBHHS are coordinating the works with this organisation. It is the MC's understanding that this includes seeking PCCC acceptance of the works.
- Bundaberg Regional Council: The MC understands that Queensland Health and the PM are coordinating any approvals for these specific works with BRC. The MC can notify BRC when the works is commencing and of progress if/as required.
- Culture and Heritage: An investigation has taken place that identified significant trees, these trees are to be protected and not to be damaged. Note, the only tree currently understood to be significant is the Birthing Tree.
- Flora and Fauna: An investigation has taken place. Possible fauna that maybe encountered include koala's, micro bats and sugar gliders. Mature trees i.e. taller than 4m and/or with a trunk of 300mm diameter are flora to be avoided if possible. It is noted that some mature trees will be removed in these works.
- Arborist: An investigation has taken place and akin to the above investigations, it identifies culturally significant trees that are to be protected/not damaged.
- A significant (mature) tree survey was undertaken in 2020. The trees picked up in survey and affected by the works (removed) are identified in this memo.

Given this is a preliminary methodology, the MC welcomes any other information on approvals and/or information that may impact on the works.

Works Team

- **Client:** Queensland Health (inc HCD and WBHHS)
- **Project Manager/Clients Representative:** Jonstaff Projects
- **Managing Contractor:** CPB Contractors
- **Cultural Management:** PCCC (coordinate via PM)
- **Civil Works:** Subcontractor TBC
- **Landscape Works:** Subcontractor TBC
- **Flora and Fauna Management:** Biodiverse Environmental
- **Arborist and Tree Management:** Active Tree Fellas
- **Surveyor:** InsiteSJC

Methodology

Programme:

Pending approval, the works are currently proposed to be undertaken between 05/12/23 and 15/07/24 (starting with the clearing works for the 'buildings area').

Supervision:

The MC will supervise the works. It will utilise its standard work pack approach which will be specifically tailored to the early works activities. This includes:

- Requirements for establishing the work site as a whole and separate work areas. This includes fencing, other barriers and/or identification existing elements to be protected and/or visible hazards e.g. culturally significant trees and existing overhead power,
- Prestart process and check lists for personnel, plant and the works proposed each day.
- Requirements for managing and reporting on the works including general safety, works specific SWMS, environmental, technical, time and cost.

Survey:

The MC has engaged InsiteSJC to undertake survey works, this includes:

- Locating the site boundaries and setout of all the civil and building works. For these works, the setout will include the centerline of the swales/bunding and a 10m working zone each side of the centerline (20m wide total). It will also include the extremities of the basin and a 10m working zone to the basin. Note, a 10m zone may not be possible on the southern side of the bunding adjacent the ring road.
- Locating culturally significant tree(s). A barrier will be established at an approx. 20m radius to the trunk of the Birthing Tree, 10m to other trees if identified or to 1m wider than the canopy (whichever is larger). Entry or work within the barrier will need to be approved by the MC and Arborist.
- Provision of reports and drawings that record the works.

Spotters:

The below personnel will form the 'Spotter Team'.

- Cultural: As described in the investigations undertaken to date, the site contains trees which are of cultural significance. Therefore, it is understood that the representatives will be made available from the PCCC during the time the plant/equipment traversing undisturbed site areas and during the first 1m of excavation of the swales and basin.
- Flora/Fauna and Arborist: Biodiverse Environmental and Active Tree Fellas has undertaken previous investigations on behalf of the Project as described in the approval section above. Therefore, the MC has also engaged these organisations. They will be on-site and used as Spotters/Guides during the time the plant/equipment are introduced to and traversing undisturbed site areas and in the removal and/or management of existing flora and fauna.

Respecting Existing Culture, Flora and Fauna:

The MC Team is coordinating the proposed works 'as best possible' with the existing culture, flora and fauna by:

- Reviewing the existing tree survey, cultural and flora and fauna reporting.
- Reviewing the above information against existing on-site conditions.

- Coordinating the swale path, basin and bunding extent/works to minimise the impacts on existing mature/significant trees including the root balls (root ball extent as established by the Landscape Architect or Arborist).
- Traversing equipment throughout the works in accordance with advice given by the 'Spotter Team'.

Site Facilities:

The MC will establish suitable site facilities that includes offices, parking, storage, meal, toilet and other facilities as required by the works.

Site Access:

All plant, equipment and personnel will enter Project Site via northern end of the new Johanna Blvd access road (established by Roadtek). Access to the southern swales, basin area and bunding will be via the 'buildings area' as described later in this methodology.

Other access points maybe established during the works if/as required given the extent of fill required for lifting the site above the required flood levels.

Works Setout:

In setting out the works including the areas affected, the MC Team propose to:

- Identification of Existing Features: Prior to early works commencing, investigations will be undertaken to establish any existing features i.e. in or above ground services, culturally significant trees to be protected and mature trees to be removed. These will also be identified to the Subcontractors prior to commencing works and as part of the inductions/daily prestart process if/as required.
- Establishing the Work Area: The swales, basin area/zone and bunding will be identified by bunting (flagging). The centerline of the swale and extremity of the basin and bunding will be established by the Surveyor and the offsets by the MC site personnel.
- Cultural, Flora and Fauna Investigation: The area within the bunting will be walked by the 'Spotter Team' as described above. During the walk, any observations will be investigated, and appropriate action taken i.e. if a nest is discovered, the Fauna Spotter will direct the team on the necessary actions.

Perform the Works:

The MC will engage with experienced Civil and Landscape Subcontractor(s) in the establishment of a detailed works methodology. However, and for the purposes of informing approvals, the above and following preliminary methodology can be used to summarise and describe the works.

In the physical performance of the work, the MC Team will access the swales, basin area and bunding from the 'buildings area' of the site. There will be access required from the Bundaberg Ring Road when undertaking the bunding and drain interface with that Road however this will be minimised and coordinated at a later time with the relevant Stakeholders.

The 'buildings area' will have been previously cleared and civil works for the cut/fill of that area and the surrounding road network will be underway.

From the southern end of the 'buildings area' the MC Team proposes the following (note, the Spotter Team will supervise the works as/when required as part of the MC Team):

1. Skid Steer machine(s) (bob cat) equipped with bucket, mulcher and spreader fittings will clear the works area i.e. a CAT D3 Series. It is small and maneuverable such that it will

only remove/mulch/spread minor vegetation, it should not impact any of the mature trees.

The works area cleared by the skid steer is within the bunding (flagging) area established along the path of the two southern swales, basin area and bund along the Bundaberg Ring Road. It will be minimised where possible.

2. Once the works area is cleared, from the 'buildings area' a 20T Excavator i.e. a CAT 320 will traverse the area and remove the trees that have been tagged/identified for removal.
3. Once the trees are removed, a suitable surface will be established for the continue tracking of equipment to/from the 'buildings area' to the southeastern corner of the site.
4. From the southern end of the site, the excavator, skid steer (when required) and tipper trucks (2 or 3 axel/10 to 40T) will commence the excavation and shaping of the detention basin. Progressively during this works, either permanent or temporary erosion control/mitigation measures will be installed.
5. Working from the detention basin, the above equipment will progressively excavate, shape, remove the cut/spoil from the work areas and install temporary erosion control/mitigation measures (permanent erosion measures along the swales can be considered pending impact from other works).
6. When a suitable length of swale is cut/trimmed, a concrete team will form and pour the concrete strip drain as the base of the swales. This will be undertaken by a 6 or 8 wheel concrete truck carrying between 5 and 8m3 of concrete. A mini concrete truck can be considered if needed due to spatial requirements in some locations.
7. Upon completion of a suitable amount of concrete works, landscape works can commence to the swales, basin and bund which includes the rehabilitation of the areas affected by the works i.e. the works within the 20m zone established for the swales and 10m zone around the basin.

Note: Top soil will be stripped and reused, all cut (if found suitable) will be used to fill the 'buildings area' and all vegetation removed will be mulched and reused in landscape and rehabilitation works.

As the MC Team needs to manage stormwater run off and overland flow during the 3 to 4 year construction period, it is planned to undertake these works as early (as Early Works) so it can be used as per its intent. It will also allow the landscaping and rehabilitated areas to mature during the main construction works.

Attached Information

Civil Works:

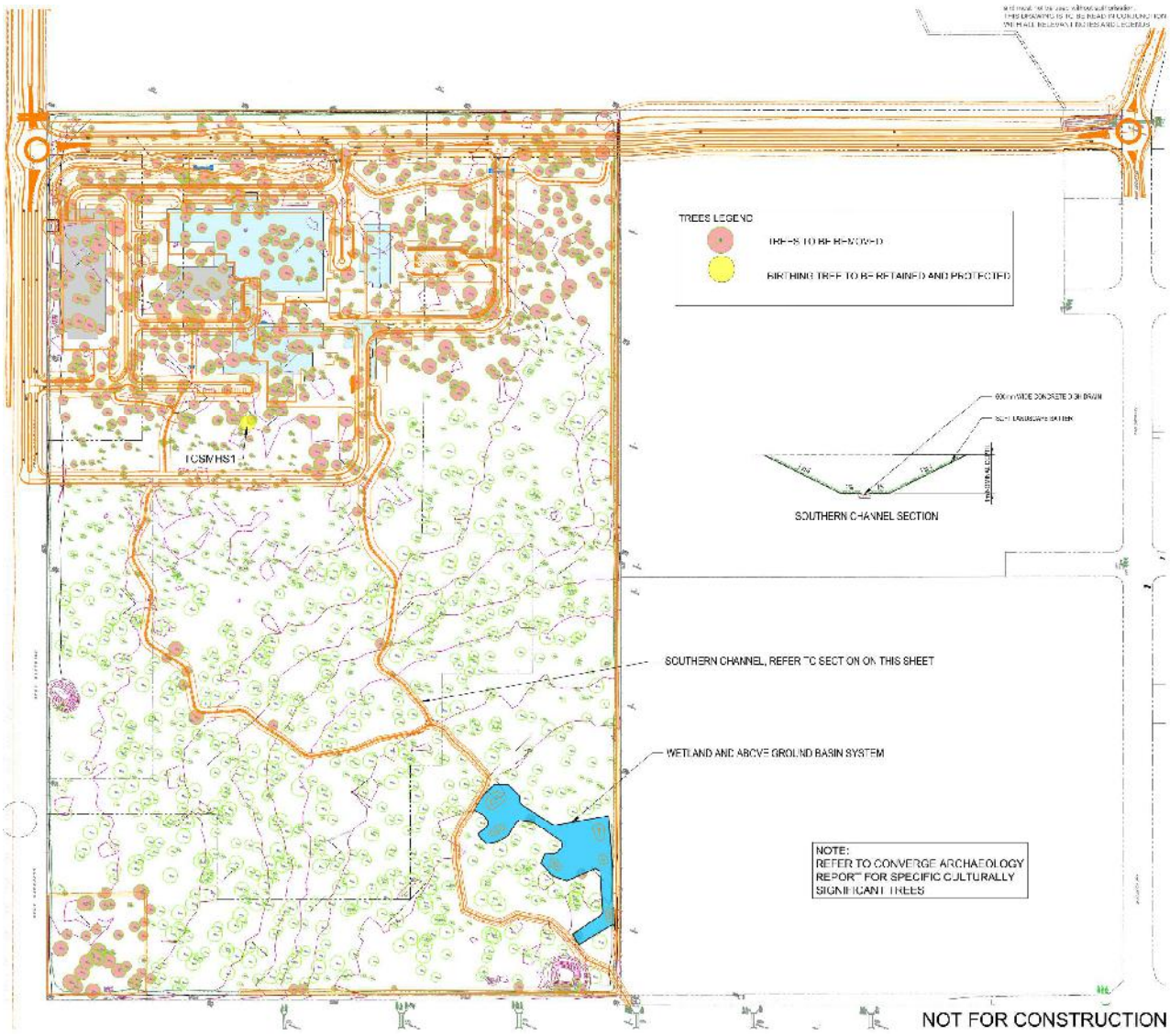
Attached is a sketch from TTW that describes the scope of works for the 'buildings area', the southern swales, southeastern basin and bund adjacent the ring road. This Memo focuses on the swales, basin and bund. It includes:

- The extent of the swales that head from south from the northern 'buildings area' and thus the extent on which the MC Team will be undertaking the works described in this Memo.
- The Approx 20 trees that are being removed as part of the swale, basin and bund works. The review of the sketch may need to zoom in to the swale areas to see a number of the trees.
- An indicative/typical section through the swale.

Landscape Works:

Also attached are images from Wild Studios, the Landscape Architect. These are aspirational type images intended to inform the review of what will be proposed within the landscape architecture once that design information is developed.

Attachment 1: TTW Sketch of the proposed works.



Attachment 2: Wild Studios aspirational images of the landscape intent.

Swales/Bund: Planting with jute matting for bank stablisation/erosion control. The below image was taken upon completion of this work.

Detention/Filtration Basin: Selected planting with jute matting and rocks for bank stablisation and erosion control. The below image was taken one year after establishment.

Note: The NBH site is mapped as RE 12.5.4 and BVG9g and the appropriate species would likely include a mix of *eucalyptus, corymbia, lophostemon, melaleuca, banksia*, *acacia, themeda, lepidosperma, dianella, goodenia, lomandra and patersonia*.

Attachment A4

PMST Results

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Please see the caveat for interpretation of information provided here.

Report created: 17-Apr-2023

Summary

Matters of National Environment Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance (Ramsar	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	4
Listed Threatened Species:	54
Listed Migratory Species:	43

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at https://www.dcceew.gov.au/parks-heritage/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Lands:	3
Commonwealth Heritage Places:	1
Listed Marine Species:	42
Whales and Other Cetaceans:	1
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have

State and Territory Reserves:	None
Regional Forest Agreements:	None
Nationally Important Wetlands:	None
EPBC Act Referrals:	5
Key Ecological Features (Marine):	None
Biologically Important Areas:	None
Bioregional Assessments:	None
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

Listed Threatened Ecological Communities [Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.
Status of Vulnerable, Disallowed and Ineligible are not MNES under the EPBC Act.

Community Name	Threatened Category	Presence Text	Buffer Status
Coastal Swamp Oak (Casuarina glauca) Forest of New South Wales and South East Queensland ecological community	Endangered	Community may occur within area	In feature area
Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland	Endangered	Community may occur within area	In feature area
Lowland Rainforest of Subtropical Australia	Critically Endangered	Community likely to occur within area	In feature area
Subtropical eucalypt floodplain forest and woodland of the New South Wales North Coast and South East Queensland bioregions	Endangered	Community likely to occur within area	In feature area

Listed Threatened Species [Resource Information]

Status of Conservation Dependent and Extinct are not MNES under the EPBC Act.
Number is the current name ID.

Scientific Name	Threatened Category	Presence Text	Buffer Status
BIRD			
Botaurus poiciloptilus Australasian Bittern [1001]	Endangered	Species or species habitat may occur within area	In feature area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area	In buffer area only
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Cyclopsitta diophthalma coxeni Coxen's Fig-Parrot [59714]	Critically Endangered	Species or species habitat likely to occur within area	In feature area
Erythrotriorchis radiatus Red Goshawk [942]	Endangered	Species or species habitat likely to occur within area	In feature area
Falco hypoleucos Grey Falcon [929]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Geophaps scripta scripta Squatter Pigeon (southern) [64440]	Vulnerable	Species or species habitat may occur within area	In feature area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area	In feature area
Limosa lapponica baueri Nunivak Bar-tailed Godwit, Western Alaskan Bar-tailed Godwit [86380]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In buffer area only
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Pachyptila turtur subantarctica Fairy Prion (southern) [64445]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Thalassarche cauta Shy Albatross [89224]	Endangered	Species or species habitat may occur within area	In buffer area only
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Turnix melanogaster Black-breasted Button-quail [923]	Vulnerable	Species or species habitat likely to occur within area	In feature area
FISH			
Neoceratodus forsteri Australian Lungfish, Queensland Lungfish [67620]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Thunnus maccoyii Southern Bluefin Tuna [69402]	Conservation Dependent	Species or species habitat likely to occur within area	In buffer area only
MAMMAL			
Dasyurus hallucatus Northern Quoll, Digul [Gogo-Yimidir], Wijingadda [Dambimangari], Wiminji [Martu] [331]	Endangered	Species or species habitat likely to occur within area	In feature area
Macroderma gigas Ghost Bat [174]	Vulnerable	Species or species habitat may occur within area	In feature area
Nyctophilus corbeni Corben's Long-eared Bat, South-eastern Long-eared Bat [83395]	Vulnerable	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Petauroides volans](#)			
Greater Glider (southern and central) [254]	Endangered	Species or species habitat likely to occur within area	In feature area
[Petaurus australis australis](#)			
Yellow-bellied Glider (south-eastern) [87600]	Vulnerable	Species or species habitat may occur within area	In buffer area only
[Phascolarctos cinereus (combined populations of Qld, NSW and the ACT)](#)			
Koala (combined populations of Queensland, New South Wales and the Australian Capital Territory) [85104]	Endangered	Species or species habitat likely to occur within area	In feature area
[Pteropus poliocephalus](#)			
Grey-headed Flying-fox [186]	Vulnerable	Roosting known to occur within area	In feature area
[Xeromys myoides](#)			
Water Mouse, False Water Rat, Yirrkoo [66]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
PLANT			
[Acacia attenuata](#)			
[10690]	Vulnerable	Species or species habitat likely to occur within area	In feature area
[Cossinia australiana](#)			
Cossinia [3066]	Endangered	Species or species habitat may occur within area	In buffer area only
[Cryptostylis hunteriana](#)			
Leafless Tongue-orchid [19533]	Vulnerable	Species or species habitat may occur within area	In buffer area only
[Cupaniopsis shirleyana](#)			
Wedge-leaf Tuckeroo [3205]	Vulnerable	Species or species habitat known to occur within area	In feature area
[Dichanthium setosum](#)			
bluegrass [14159]	Vulnerable	Species or species habitat likely to occur within area	In feature area
[Eucalyptus hallii](#)			
Goodwood Gum [20433]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Fontainea venosa [24040]	Vulnerable	Species or species habitat may occur within area	In feature area
Macadamia integrifolia Macadamia Nut, Queensland Nut Tree, Smooth-shelled Macadamia, Bush Nut, Nut Oak [7326]	Vulnerable	Species or species habitat likely to occur within area	In buffer area only
Macrozamia lomandroides cycad [55406]	Endangered	Species or species habitat likely to occur within area	In feature area
Macrozamia pauli-guilielmi Pineapple Zamia [5712]	Endangered	Species or species habitat likely to occur within area	In feature area
Samadera bidwillii Quassia [29708]	Vulnerable	Species or species habitat likely to occur within area	In feature area
REPTILE			
Caretta caretta Loggerhead Turtle [1763]	Endangered	Congregation or aggregation known to occur within area	In buffer area only
Chelonia mydas Green Turtle [1765]	Vulnerable	Congregation or aggregation known to occur within area	In buffer area only
Delma torquata Adorned Delma, Collared Delma [1656]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area	In buffer area only
Egernia rugosa Yakka Skink [1420]	Vulnerable	Species or species habitat known to occur within area	In feature area
Elseya albagula Southern Snapping Turtle, White-throated Snapping Turtle [81648]	Critically Endangered	Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Furina dunmalli Dunmall's Snake [59254]	Vulnerable	Species or species habitat may occur within area	In feature area
Hemiaspis damelii Grey Snake [1179]	Endangered	Species or species habitat likely to occur within area	In feature area
Lepidochelys olivacea Olive Ridley Turtle, Pacific Ridley Turtle [1767]	Endangered	Species or species habitat may occur within area	In buffer area only
Natator depressus Flatback Turtle [59257]	Vulnerable	Congregation or aggregation known to occur within area	In buffer area only
SHARK			
Pristis zijsron Green Sawfish, Dindagubba, Narrowsnout Sawfish [68442]	Vulnerable	Breeding may occur within area	In buffer area only
Sphyrna lewini Scalloped Hammerhead [85267]	Conservation Dependent	Species or species habitat likely to occur within area	In buffer area only

Listed Migratory Species		[Resource Information]	
Scientific Name	Threatened Category	Presence Text	Buffer Status
Migratory Marine Birds			
Anous stolidus Common Noddy [825]		Species or species habitat known to occur within area	In buffer area only
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area	In feature area
Calonectris leucomelas Streaked Shearwater [1077]		Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Fregata ariel Lesser Frigatebird, Least Frigatebird [1012]		Species or species habitat likely to occur within area	In buffer area only
Fregata minor Great Frigatebird, Greater Frigatebird [1013]		Species or species habitat likely to occur within area	In buffer area only
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In buffer area only
Phaethon lepturus White-tailed Tropicbird [1014]		Species or species habitat may occur within area	In buffer area only
Thalassarche cauta Shy Albatross [89224]	Endangered	Species or species habitat may occur within area	In buffer area only
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Thalassarche salvini Salvin's Albatross [64463]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Migratory Marine Species			
Anoxypristis cuspidata Narrow Sawfish, Knifetooth Sawfish [68448]		Species or species habitat may occur within area	In buffer area only
Caretta caretta Loggerhead Turtle [1763]	Endangered	Congregation or aggregation known to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Chelonia mydas Green Turtle [1765]	Vulnerable	Congregation or aggregation known to occur within area	In buffer area only
Crocodylus porosus Salt-water Crocodile, Estuarine Crocodile [1774]		Species or species habitat likely to occur within area	In feature area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area	In buffer area only
Eretmochelys imbricata Hawksbill Turtle [1766]	Vulnerable	Species or species habitat known to occur within area	In buffer area only
Lamna nasus Porbeagle, Mackerel Shark [83288]		Species or species habitat may occur within area	In buffer area only
Lepidochelys olivacea Olive Ridley Turtle, Pacific Ridley Turtle [1767]	Endangered	Species or species habitat may occur within area	In buffer area only
Mobula alfredi as Manta alfredi Reef Manta Ray, Coastal Manta Ray [90033]		Species or species habitat may occur within area	In buffer area only
Mobula birostris as Manta birostris Giant Manta Ray [90034]		Species or species habitat may occur within area	In buffer area only
Natator depressus Flatback Turtle [59257]	Vulnerable	Congregation or aggregation known to occur within area	In buffer area only
Orcaella heinsohni Australian Snubfin Dolphin [81322]		Species or species habitat known to occur within area	In buffer area only
Pristis zijsron Green Sawfish, Dindagubba, Narrowsnout Sawfish [68442]	Vulnerable	Breeding may occur within area	In buffer area only

Migratory Terrestrial Species

Scientific Name	Threatened Category	Presence Text	Buffer Status
Cuculus optatus Oriental Cuckoo, Horsfield's Cuckoo [86651]		Species or species habitat known to occur within area	In feature area
Hirundapus caudacutus White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area	In feature area
Monarcha melanopsis Black-faced Monarch [609]		Species or species habitat known to occur within area	In feature area
Myiagra cyanoleuca Satin Flycatcher [612]		Species or species habitat known to occur within area	In feature area
Rhipidura rufifrons Rufous Fantail [592]		Species or species habitat known to occur within area	In feature area
Symposiachrus trivirgatus as Monarcha trivirgatus Spectacled Monarch [83946]		Species or species habitat known to occur within area	In feature area
Migratory Wetlands Species			
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat known to occur within area	In feature area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area	In buffer area only
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Gallinago hardwickii Latham's Snipe, Japanese Snipe [863]		Species or species habitat known to occur within area	In feature area
Limnodromus semipalmatus Asian Dowitcher [843]		Species or species habitat may occur within area	In buffer area only
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area	In buffer area only
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Pandion haliaetus Osprey [952]		Species or species habitat known to occur within area	In buffer area only
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area	In feature area

Other Matters Protected by the EPBC Act

Commonwealth Lands [Resource Information]

The Commonwealth area listed below may indicate the presence of Commonwealth land in this vicinity. Due to the unreliability of the data source, all proposals should be checked as to whether it impacts on a Commonwealth area, before making a definitive decision. Contact the State or Territory government land department for further information.

Commonwealth Land Name	State	Buffer Status
Defence		
Defence - BUNDABERG TRAINING DEPOT [30181]	QLD	In buffer area only
Defence - BUNDABERG TRAINING DEPOT [30182]	QLD	In buffer area only
Defence - BUNDABERG TRAINING DEPOT [30180]	QLD	In buffer area only

Commonwealth Heritage Places [Resource Information]

Name	State	Status	Buffer Status
Historic			

Name	State	Status	Buffer Status
Bundaberg Post Office	QLD	Listed place	In buffer area only

Listed Marine Species [Resource Information]

Scientific Name	Threatened Category	Presence Text	Buffer Status
Bird			
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area	In feature area
Anous stolidus Common Noddy [825]		Species or species habitat known to occur within area	In buffer area only
Anseranas semipalmata Magpie Goose [978]		Species or species habitat may occur within area overfly marine area	In feature area
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area overfly marine area	In feature area
Bubulcus ibis as Ardea ibis Cattle Egret [66521]		Breeding likely to occur within area overfly marine area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]		Species or species habitat known to occur within area	In feature area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area overfly marine area	In buffer area only
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area overfly marine area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat known to occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Calonectris leucomelas](#) Streaked Shearwater [1077]		Species or species habitat may occur within area	In buffer area only
[Charadrius leschenaultii](#) Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat likely to occur within area	In feature area
[Fregata ariel](#) Lesser Frigatebird, Least Frigatebird [1012]		Species or species habitat likely to occur within area	In buffer area only
[Fregata minor](#) Great Frigatebird, Greater Frigatebird [1013]		Species or species habitat likely to occur within area	In buffer area only
[Gallinago hardwickii](#) Latham's Snipe, Japanese Snipe [863]		Species or species habitat known to occur within area overfly marine area	In feature area
[Haliaeetus leucogaster](#) White-bellied Sea-Eagle [943]		Species or species habitat known to occur within area	In feature area
[Hirundapus caudacutus](#) White-throated Needletail [682]	Vulnerable	Species or species habitat known to occur within area overfly marine area	In feature area
[Limnodromus semipalmatus](#) Asian Dowitcher [843]		Species or species habitat may occur within area overfly marine area	In buffer area only
[Limosa lapponica](#) Bar-tailed Godwit [844]		Species or species habitat known to occur within area	In buffer area only
[Macronectes giganteus](#) Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Merops ornatus](#) Rainbow Bee-eater [670]		Species or species habitat may occur within area overfly marine area	In feature area
[Monarcha melanopsis](#) Black-faced Monarch [609]		Species or species habitat known to occur within area overfly marine area	In feature area
[Myiagra cyanoleuca](#) Satin Flycatcher [612]		Species or species habitat known to occur within area overfly marine area	In feature area
[Numenius madagascariensis](#) Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat known to occur within area	In feature area
[Pachyptila turtur](#) Fairy Prion [1066]		Species or species habitat likely to occur within area	In buffer area only
[Pandion haliaetus](#) Osprey [952]		Species or species habitat known to occur within area	In buffer area only
[Phaethon lepturus](#) White-tailed Tropicbird [1014]		Species or species habitat may occur within area	In buffer area only
[Rhipidura rufifrons](#) Rufous Fantail [592]		Species or species habitat known to occur within area overfly marine area	In feature area
[Rostratula australis as Rostratula benghalensis (sensu lato)](#) Australian Painted Snipe [77037]	Endangered	Species or species habitat known to occur within area overfly marine area	In feature area
[Symposiachrus trivirgatus as Monarcha trivirgatus](#) Spectacled Monarch [83946]		Species or species habitat known to occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Thalassarche cauta](#) Shy Albatross [89224]	Endangered	Species or species habitat may occur within area	In buffer area only
[Thalassarche impavida](#) Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area	In buffer area only
[Thalassarche melanophris](#) Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area	In buffer area only
[Thalassarche salvini](#) Salvin's Albatross [64463]	Vulnerable	Species or species habitat may occur within area	In buffer area only
[Thalassarche steadi](#) White-capped Albatross [64462]	Vulnerable	Species or species habitat may occur within area	In buffer area only
[Tringa nebularia](#) Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area overfly marine area	In feature area
Reptile			
[Caretta caretta](#) Loggerhead Turtle [1763]	Endangered	Congregation or aggregation known to occur within area	In buffer area only
[Chelonia mydas](#) Green Turtle [1765]	Vulnerable	Congregation or aggregation known to occur within area	In buffer area only
[Crocodylus porosus](#) Salt-water Crocodile, Estuarine Crocodile [1774]		Species or species habitat likely to occur within area	In feature area
[Dermochelys coriacea](#) Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area	In buffer area only
[Eretmochelys imbricata](#) Hawksbill Turtle [1766]	Vulnerable	Species or species habitat known to occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Lepidochelys olivacea Olive Ridley Turtle, Pacific Ridley Turtle [1767]	Endangered	Species or species habitat may occur within area	In buffer area only
Natator depressus Flatback Turtle [59257]	Vulnerable	Congregation or aggregation known to occur within area	In buffer area only

Whales and Other Cetaceans			[Resource Information]
Current Scientific Name	Status	Type of Presence	Buffer Status
Mammal			
Orcaella heinsohni as Orcaella brevirostris Australian Snubfin Dolphin [81322]		Species or species habitat known to occur within area	In buffer area only

Extra Information

EPBC Act Referrals				[Resource Information]
Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
New Bundaberg Hospital	2022/09397		Assessment	In feature area
Not controlled action				
Belleden Estate, Greathead Road, Ashfield	2007/3429	Not Controlled Action	Completed	In buffer area only
Bundaberg Ring Road	2005/2384	Not Controlled Action	Completed	In feature area
Improving rabbit biocontrol: releasing another strain of RHDV, sthrn two thirds of Australia	2015/7522	Not Controlled Action	Completed	In feature area
Residential subdivision, Greatheads Road	2006/2571	Not Controlled Action	Completed	In buffer area only

Caveat

1 PURPOSE

This report is designed to assist in identifying the location of matters of national environmental significance (MNES) and other matters protected by the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) which may be relevant in determining obligations and requirements under the EPBC Act.

The report contains the mapped locations of:

- World and National Heritage properties;
- Wetlands of International and National Importance;
- Commonwealth and State/Territory reserves;
- distribution of listed threatened, migratory and marine species;
- listed threatened ecological communities; and
- other information that may be useful as an indicator of potential habitat value.

2 DISCLAIMER

This report is not intended to be exhaustive and should only be relied upon as a general guide as mapped data is not available for all species or ecological communities listed under the EPBC Act (see below). Persons seeking to use the information contained in this report to inform the referral of a proposed action under the EPBC Act should consider the limitations noted below and whether additional information is required to determine the existence and location of MNES and other protected matters.

Where data are available to inform the mapping of protected species, the presence type (e.g. known, likely or may occur) that can be determined from the data is indicated in general terms. It is the responsibility of any person using or relying on the information in this report to ensure that it is suitable for the circumstances of any proposed use. The Commonwealth cannot accept responsibility for the consequences of any use of the report or any part thereof. To the maximum extent allowed under governing law, the Commonwealth will not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance

3 DATA SOURCES

Threatened ecological communities

For threatened ecological communities where the distribution is well known, maps are generated based on information contained in recovery plans, State vegetation maps and remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species

Threatened, migratory and marine species distributions have been discerned through a variety of methods. Where distributions are well known and if time permits, distributions are inferred from either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc.) together with point locations and described habitat; or modelled (MAXENT or BIOCLIM habitat modelling) using

Where little information is available for a species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc.).

In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More detailed distribution mapping methods are used to update these distributions

4 LIMITATIONS

The following species and ecological communities have not been mapped and do not appear in this report:

- threatened species listed as extinct or considered vagrants;
- some recently listed species and ecological communities;
- some listed migratory and listed marine species, which are not listed as threatened species; and
- migratory species that are very widespread, vagrant, or only occur in Australia in small numbers.

The following groups have been mapped, but may not cover the complete distribution of the species:

- listed migratory and/or listed marine seabirds, which are not listed as threatened, have only been mapped for recorded
- seals which have only been mapped for breeding sites near the Australian continent

The breeding sites may be important for the protection of the Commonwealth Marine environment.

Refer to the metadata for the feature group (using the Resource Information link) for the currency of the information.

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact us page.

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Attachment A5

Likelihood of Occurrence Assessment

Likelihood of occurrence assessment

Likelihood of occurrence	Assessment criteria
Unlikely	No previous records of the species within the locality and one or more of the following criteria is met: • Not previously recorded on the referral area and surrounds and the referral area is beyond the current known geographic range; or • Dependent on specific habitat types or resources that are not present on the referral area; or • Considered extinct in the wild.
Low	No previous records of the species within the locality and one or more of the following criteria is met: • Site and local connectivity contains marginal habitat excluding suitable/critical habitat attributes; • Lack of recent records exist in a regional context (use 1980 as a delineation); or • Potential for vagrant or individual of the species to survive short-term;
Moderate	Species previously recorded within the locality and one or more of the following criteria is met: • Previously recorded in proximity to the referral area (*i.e.,* vagrant individuals); or • Potential habitat typologies or resources are present on the referral area.
High	Species previously recorded within the locality and one or more of the following criteria is met: • Previously recorded on the referral area; • Dependent on habitats or habitat resources that are available on the referral area; or • Suitable habitats are available on the referral area that are capable of supporting a resident population or individuals of the species.
Known	Flora species or ecological community positively identified during field surveys within the referral area. Fauna species positively recorded during field surveys within the referral area or adjacent habitats.

Matters of National Environmental Significance						
Name	**Status**	**Type of presence**	**Description of the community/preferred habitat**	**Likelihood of Occurrence Analysis**	**Desktop Likelihood of occurrence (on-site)**	**Field Survey Confirmed Likelihood of occurrence (on-site)**
Threatened Ecological Communities						
Coastal Swamp Oak (*Casuarina glauca*) Forest of New South Wales and South East Queensland ecological community	E	Community may occur within area	In Queensland, this ecological community coincides with two regional ecosystem communities including Of Concern RE12.1.1 (*Casuarina glauca* +/- mangroves woodland) as well as areas where the canopy is dominated by *Casuarina glauca* within 12.3.20 (*Melaleuca quinquenervia, Casuarina glauca +/- Eucalyptus tereticornis, Eucalyptus siderophloia* open forest on low coastal alluvial plains).	Desktop analysis and field surveys confirmed that regional ecosystem (RE) 12.1.1 and 12.3.20 do not occur on-site. No specimens of *Casuarina glauca* were recorded onsite during field surveys.	Low	Unlikely
Coastal Swamp Sclerophyll Forest of New South Wales and South East Queensland	E	Community may occur within area	This threatened ecological community occurs in coastal catchments, typically within 20km of the coast and below 20m above seas level, on low lying coastal alluvial areas such as swamps, floodplain pockets, depressions, alluvial flats, back-barrier flats, fans, terraces and behind fore dunes. The canopy is dominated by *Melaleuca sp.* and / or *Eucalyptus robusta*, with other Eucalyptus species tolerant of inundation present but not dominant. In Queensland this TEC is represented by RE12.2.7, RE12.3.4/12.3.4a, RE12.3.5, RE12.3.6, and RE 12.3.20.	Desktop analysis and field surveys confirmed that regional ecosystem RE12.2.7, RE12.3.4/12.3.4a, RE12.3.5, RE12.3.6, and RE 12.3.20 do not occur on-site.	Low	Unlikely
Lowland rainforest of	CE	Community likely to occur within area	This TEC occurs mainly on basalt and alluvial soils and is characteristic of a low abundance of *Eucalyptus, Melaleuca* and *Casuarina* species. Specimens with buttress roots and a diversity	Desktop analysis and field surveys confirmed that regional ecosystem 12.3.1, 12.5.13, 12.8.3,	Low	Unlikely

subtropical Australia			of vines are common throughout this TEC. This community is usually associated with REs 12.3.1 (more recently mapped as 12.3.16), 12.5.13, 12.8.3, 12.8.4, 12.8.13, 12.11.1, 12.11.10, 12.12.1, and 12.12.16.	12.8.4, 12.8.13, 12.11.1, 12.11.10, 12.12.1, and 12.12.1 do not occur on-site. The only mapped RE present onsite is 12.5.4 which is confirmed to be present from field surveys.		
Subtropical eucalypt floodplain forest and woodland of the New South Wales North Coast and South East Queensland bioregions	E	Community likely to occur within area	This ecological community is found on alluvial landforms, including floodplains, the riparian zones of parent rivers and other order tributaries, alluvial flats, floodplain/alluvial terraces and periodically flooded depressions. The structure of this TEC varies from tall open forest to woodland. The canopy is dominated by eucalypts and/or other myrtaceous trees, (specifically from *Angophora*, *Corymbia*, *Lophostemon* and *Syncarpia* genera). A mid-layer or sub-canopy of small trees may be present – with scattered to dense shrubs. For example, Melaleuca, Leptospermum and related genera may form dense thickets beneath the main canopy, or in gaps between canopy trees. Typical examples of tree species include *Corymbia intermedia* (Pink Bloodwood), *Eucalyptus bancroftii* (Bancroft's Red Gum), *E. moluccana* (Grey Box), *E. grandis* (Flooded Gum), *E. siderophloia* (Grey Ironbark), and *E. tereticornis* (Forest Red Gum). In Queensland *Syncarpia glomulifera* (Turpentine) may also dominate, or co-dominate. Regional Ecosystems generally associated with this TEC where key diagnostic characteristics are met include RE 12.3.2, 12.3.2a, 12.3.3, 12.3.3a, 12.3.3b, 12.3.3d, 12.3.4a, 12.3.7, 12.3.7c, 12.3.7d, 12.3.10, 12.3.11, 12.3.11a, 12.3.11b, 12.3.12, 12.3.14a, 12.3.15, 12.3.19.	Desktop analysis and field surveys confirmed that regional ecosystem 12.3.2, 12.3.2a, 12.3.3, 12.3.3a, 12.3.3b, 12.3.3d, 12.3.4a, 12.3.7, 12.3.7c, 12.3.7d, 12.3.10, 12.3.11, 12.3.11a, 12.3.11b, 12.3.12, 12.3.14a, 12.3.15, 12.3.19 do not occur on-site. The only mapped RE present onsite is 12.5.4 which is confirmed to be present from field surveys.	Low	Unlikely

Scientific name	**Common name**	**Listing Status***		**EPBC code**	**Habitat and Distribution**	**Likelihood of Occurrence Analysis**	**Desktop Likelihood of occurrence (on-site)**	**Field Survey Confirmed Likelihood of occurrence (on-site)**
		EPBC Act	**NC Act**					
Birds								
Botaurus poiciloptilus	Australasian Bittern	E	-	1001	The Australasian Bittern occurs in terrestrial wetlands and, rarely, estuarine habitats, mainly in the temperate south-east and south-west. It favours wetlands with tall dense vegetation, where it forages in still, shallow water up to 0.3 m deep, often at the edges of pools or waterways, or from platforms or mats of vegetation over deep water. It favours permanent and seasonal freshwater habitats, particularly those dominated by sedges, rushes and / or reeds or cutting grass growing over muddy or peaty substrate. The Australasian Bittern occurs in the far south-east of Queensland; it has been reported North to Baralaba and West to Wyandra, although in most years it is probably confined to a few coastal swamps. It is rarely recorded in Queensland, and possibly survives only in protected areas such as the Cooloola and Fraser regions.	This site is mapped with RE12.5.4 which contains Palustrine wetlands. However, no records of the Australasian Bittern are present onsite from BioMaps and Atlas of Living Australia (ALA). Upon field assessment at the subject site, no wetland vegetation dominated by sedges, rushes or reeds was present. A medium dam is located in the south-eastern corner of the site however it is not considered to contain habitat for the Australasian Bittern.	Low	Unlikely
Calidris canutus	Red Knot	E	E	855	In Australasia the Red Knot mainly inhabit intertidal mudflats, sandflats and sandy beaches of sheltered coasts, in estuaries, bays, inlets, lagoons and harbours; sometimes on	No suitable foraging or breeding habitat occurs on-site. Recent records (2019, 2015) of this species have been	Low	Unlikely

Scientific name	Common name	Listing Status*		EPBC code	Habitat and Distribution	Likelihood of Occurrence Analysis	Desktop Likelihood of occurrence (on-site)	Field Survey Confirmed Likelihood of occurrence (on-site)
		EPBC Act	NC Act					
					sandy ocean beaches or shallow pools on exposed wave-cut rock platforms or coral reefs. They are occasionally seen on terrestrial saline wetlands near the coast, such as lakes, lagoons, pools and pans, and recorded on sewage ponds and salt works, but rarely use freshwater swamps. They rarely use inland lakes or swamps. The Red Knot usually forage in soft substrate near the edge of water on intertidal mudflats or sandflats exposed by low tide.	recorded on ALA, approximately 15 km to the east of the site at Elliot Heads.		
Calidris ferruginea	Curlew Sandpiper	CE	E	856	Curlew Sandpipers mainly occur on intertidal mudflats in sheltered coastal areas, such as estuaries, bays, inlets and lagoons, and also around non-tidal swamps, lakes and lagoons near the coast, and ponds in saltworks and sewage farms. They are also recorded inland, though less often, including around ephemeral and permanent lakes, dams, waterholes and bore drains, usually with bare edges of mud or sand. They occur in both fresh and brackish waters. In Queensland, scattered records occur in the Gulf of Carpentaria, with widespread records along the coast south of Cairns.	No suitable foraging or breeding habitat occurs on-site. Records of the Curlew Sandpiper are present on ALA from 2015, located approximately 5 km north and another record 15 km north-east of the site. A medium dam is located at the south-eastern corner of the site however it is not considered to contain habitat for the Curlew Sandpiper. It is possible vagrant individuals may occur as fly-overs at the subject site but it is unlikely the Curlew Sandpiper would use the site as foraging or breeding habitat.	Low	Low

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		EPBC Act	NC Act					
Charadrius lechenaultii	Greater Sand Plover	V	V	877	In the non-breeding grounds in Australasia, the Greater Sand Plover is almost entirely coastal, inhabiting littoral and estuarine habitats. They mainly occur on sheltered sandy, shelly or muddy beaches with large intertidal mudflats or sandbanks, as well as sandy estuarine lagoons. They seldom occur at shallow freshwater wetlands.	No suitable foraging or breeding habitat occurs on-site. Records of the Greater Sand Plover are present on ALA from 2015, located approximately 15 km north-east of the site. It is possible vagrant individuals may occur as fly-overs at the subject site but it is unlikely the Greater Sand Plover would use the site as foraging or breeding habitat.	Low	Unlikely
Cyclopsitta diophthalma coxeni	Coxen's Fig Parrot	CE	CE	59714	The Coxen's Fig Parrot occurs in rainforest habitats including subtropical rainforest, dry rainforest, littoral and developing littoral rainforest, and vine forest. Food is mainly taken from figs however other species fruit have been recorded in their diet including *Elaeocarpus grandis, Syzygium corynanthum, Litsea reticulata* and *Grevillea robusta.*	This site does not contain any rainforest habitat, or species represented in this species diet. Specimens of *Elaeocarpus grandis, Syzygium corynanthum, Litsea reticulata* and *Grevillea robusta* were not found on the subject site during field surveys.	Unlikely	Unlikely
Erythrotriorchis radiatus	Red Goshawk	V	V	942	A wide ranging and highly mobile species generally observed over eucalypt habitats. This species prefers forest and woodland with a mosaic of vegetation types, large prey populations (birds) and permanent water. The vegetation types include eucalypt woodland, open forest, tall open forest, gallery rainforest, swamp sclerophyll forest and rainforest	This site does not contain the mosaic of vegetation types that this species favours. There is no evidence of permanent residence, and due to the scarcity of this species and lack of recent local records, its occurrence is highly unlikely.	Low	Unlikely

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		EPBC Act	NC Act					
					margins. Habitat has to be open enough for fast attack and manoeuvring in flight, but provide cover for ambushing of prey.			
Falco hypoleucos	Grey Falcon	V	V	929	The Grey Falcon is a medium-sized, compact, pale falcon with a heavy, thick-set, deep-chested appearance. Usually restricted to shrubland, grassland and wooded watercourses of arid and semi-arid regions, although it is occasionally found in open woodlands near the coast. Also occurs near wetlands where surface water attracts prey. The nests chosen are usually in the tallest trees along watercourses, particularly River Red Gum (*Eucalyptus camaldulensis*) and Coolibah (*E. coolabah*).	No suitable foraging or breeding habitat occurs on-site. Due to the lack of recent local records and no habitat present onsite, its occurrence is considered highly unlikely.	Low	Unlikely
Geophaps scripta scripta	Squatter Pigeon (southern)	V	V	64440	This species inhabits open grasslands and woodlands typically with a native understorey although may occur in artificial pasture.	This site does not contain suitable habitat, with the majority of the site vegetated with *Eucalypt* species and no open grasslands present. The understorey of the subject site is dominated by exotic *Sporobolus pyramidalis* (Giant Rat's Tail Grass) with few areas containing native understorey vegetation. Due to the lack of recent local records this species is not expected to occur onsite.	Low	Unlikely

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Hirundapus caudacutus	White-throated Needletail	V	V	682	Although they occur over most types of habitat, they are probably recorded most often above wooded areas, including open forest and rainforest, and may also fly between trees or in clearings, below the canopy, but they are less commonly recorded flying above woodland. They also commonly occur over heathland, but less often over treeless areas, such as grassland or swamps.	Wooded areas cover the majority of the project area which provides potential habitat for the White-throated Needletail. Records from 2019 of the species have been recorded approximately 5 km north of the site. It is possible this species may occur as a fly-over above the subject site, although site surveys did not record the presence of the species.	Moderate	Moderate
Limosa lapponica baueri	Alaskan Bar-tailed Godwit	V	V	86380	The Alaskan Bar-tailed Godwit is found mainly in coastal habitats such as large intertidal sandflats, banks, mudflats, estuaries, inlets, harbours, coastal lagoons and bays. It is found often around beds of seagrass and, sometimes, in nearby saltmarsh.	No suitable foraging or breeding habitat occurs on-site. Recent local records of this species are lacking in proximity to the site.	Unlikely	Unlikely
Macronectes giganteus	Southern Giant Petrel	E	E	1060	The Southern Giant-petrels range widely throughout the southern oceans. In summer they occur predominantly below 60° S in sub-Antarctic to Antarctic waters.	No suitable foraging or breeding habitat occurs on-site.	Unlikely	Unlikely
Numenius madagascariensis	Eastern Curlew	CE	E	847	The Eastern Curlew is most commonly associated with sheltered coasts, especially estuaries, bays, harbours, inlets and coastal lagoons, with large intertidal mudflats or sandflats, often with beds of seagrass.	While no suitable foraging or breeding habitat occurs on-site, a recent record of the Eastern Curlew was recorded in 2020 5 km north of the site. No suitable habitat or habitat features were found	Low	Unlikely

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					Occasionally, the species occurs on ocean beaches (often near estuaries), and coral reefs, rock platforms, or rocky islets. The birds are often recorded among saltmarsh and on mudflats fringed by mangroves, and sometimes use the mangroves. The birds are also found in saltworks and sewage farms.	on the subject site therefore the Eastern Curlew is considered unlikely to occur onsite.		
Pachyptila turtur subantarctica	Fairy Prion	V		64445	This marine species apparently occurs mainly offshore but may move inshore during stormy weather. The Fairy Prion (southern) breeds on Macquarie Island and a number of other subantarctic islands outside of Australia. Digs burrows among rocks or low vegetation in which to nest. Burrows may be dug below mat forming herbs.	No suitable foraging or breeding habitat occurs on-site. This species is also known to occur almost exclusively offshore.	Unlikely	Unlikely
Rostratula australis	Australian Painted-snipe	E	V	77037	The Australian Painted Snipe is usually found in shallow inland wetlands, either freshwater or brackish, that are either permanently or temporarily filled. The species has a scattered distribution throughout many parts of Australia, with a single record from Tasmania.	This site is mapped with RE12.5.4 which contains Palustrine wetlands. Upon field assessment at the subject site, no freshwater or brackish wetland vegetation was present onsite. It is unlikely that this species will occur.	Low	Unlikely
Thalassarche cauta cauta	Shy Albatross	E	V	82345	The Shy Albatross is the only albatross to breed in Australian waters and breed only within the Australasian region. Wanders from subtropical to sub-Antarctic oceans, often	No suitable foraging or breeding habitat occurs on-site.	Unlikely	Unlikely

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					visiting shallower waters on the shelf and around waters. Comes close inshore, entering bays and harbours extending offshore beyond the shelf edge; is scarce further out over pelagic depths.			
Thalassarche impavida	Campbell Albatross	V	-	64459	The Campbell Albatross is a non-breeding visitor to Australian waters. Non-breeding birds are most commonly seen foraging over the oceanic continental slopes off Tasmania, Victoria and New South Wales. This species is a marine sea bird inhabiting sub-Antarctic and subtropical waters from pelagic to shelf-break water habitats. The Campbell Albatross breed on Campbell Island. They make their nests on tussock-covered ledges and terraces of cliffs, slopes and hills, overlooking the sea or valleys, and on the summits of rocky islets.	No suitable foraging or breeding habitat occurs on-site.	Unlikely	Unlikely
Thalassarche melanophris	Black-browed Albatross	V	-	66472	This species uses wide range of marine habitats from inshore shallows, bays and channels to the edge of the continental shelf and beyond to pelagic ocean environs.	No suitable foraging or breeding habitat occurs on-site.	Unlikely	Unlikely
Thalassarche salvini	Salvin's Albatross	V	-	64463	Salvin's Albatross is a marine species occurring in subantarctic and subtropical waters, reaching the tropics in the cool Humboldt Current, off South America. Birds have been	No suitable foraging or breeding habitat occurs on-site.	Unlikely	Unlikely

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		EPBC Act	NC Act					
					noted in shelf-waters around breeding islands and over adjacent rises. During the non-breeding season, the species occurs over continental shelves around continents. It occurs both inshore and offshore and enters harbours and bays. Salvin's Albatross nest's on level or gently sloping ledges, summits, slopes and caves of rocky islets and stacks, usually in broken terrain with little soil and vegetation.			
Thalassarche steadi	White-capped Albatross	V		64462	The geographical range of *T. steadi* is confounded by its resemblance to other albatross species that share its range, mainly *T. cauta*. Although information is limited, during the breeding season *T. steadi* is thought to forage mainly within New Zealand's EEZ, including around the Chatham Islands and south of Auckland Islands. Additionally, chick-rearing birds utilise areas off the south-east coast of Australia and around Tasmania.	No suitable foraging or breeding habitat occurs on-site.	Unlikely	Unlikely
Turnix melanogaster	Black-breasted Button Quail	V	V	923	Typical habitat occurs in dry rainforest and vegetation immediately adjacent to rainforest. However, the species has also been recorded in a variety of low coastal heathlands around Fraser Island and nearby mainland. Deep leaf litter in which the species can forage appears to be particularly favoured.	The site does not contain dry rainforest or vegetation immediately adjacent to rainforest, and no heathlands are present. Recent records of the species within proximity to the site are lacking. Deep leaf litter is also absent over the	Unlikely	Unlikely

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		EPBC Act	NC Act					
						majority of the site. It is unlikely that this species will occur.		
Fish								
Neoceratodus forsteri	Australian Lungfish	V	-	67620	The Australian Lungfish requires still or slow-flowing, shallow, vegetated pools with clear or turbid water in which to spawn and feed. The species is restricted to areas of permanent water and cannot live in saline waters or migrate through sea water. Emergent or submerged vegetation are essential for successful deposition of eggs and for providing refuges for juveniles. It occurs naturally in the Burnett and Mary River systems although has been introduced into other rivers and reservoirs in south-eastern Queensland.	No suitable riverine habitat to support this species occurs on-site. Records of the species are present north and west of the subject site, within 5 km, in the Burnett River. However, it is considered highly unlikely this species would occur onsite because there are no connecting waterways, watercourses or drainage features present within or adjacent to the subject site.	Unlikely	Unlikely
Mammals								
Dasyurus hallucatus	Northern Quoll	E	-	331	The Northern Quoll occupies a diversity of habitats across its range which includes rocky areas, eucalypt forests and woodlands, rainforests, sandy lowlands and beaches, shrubland, grassland and desert. Northern Quoll habitat generally encompasses some form of rocky area for denning purposes with surrounding vegetated habitats used for	No suitable denning habitat to support this species occurs on-site, or in the nearby vicinity. A record of the species on BioMaps from 2018 occurs 20 km west of the site, however habitat present on site is not considered suitable to support this species and no	Low	Unlikely

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					foraging and dispersal. Eucalypt forest or woodland habitats usually have a high structural diversity containing large diameter trees, termite mounds or hollow logs for denning purposes. Dens are made in rock crevices, tree holes or occasionally termite mounds. Surveys in Queensland suggest that Northern Quolls are more likely to be present in high relief areas that have shallower soils, greater cover of boulders, less fire impact and were closer to permanent water.	rocky outcrops were found within the subject area.		
Macroderma gigas	Ghost Bat	V	E	174	Ghost bats are known to inhabit large complex caves and old mineshafts.	No suitable habitat in the form of caves or old mineshafts occurs on-site. There are no recent records within proximity to the subject site.	Unlikely	Unlikely
Nyctophilus corbeni	Corben's Long-eared Bat	V	V	83395	In Queensland and New South Wales it inhabits a variety of vegetation types but it is distinctly more common in box / ironbark / cypress-pine vegetation that occurs in a north-south belt along the western slopes and plains of New South Wales and southern Queensland. In Victoria most records are from *Eucalyptus gracilis* mallee, Buloke and black box woodlands while in South Australia it is confined to tall mallee shrublands.	No suitable habitat occurs on-site. There are no recent records within proximity to the subject site.	Unlikely	Unlikely

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Petauroides volans (NCA listed *Petauroides armillatus*)	Central Greater Glider	E	E	254	The Greater Glider is an arboreal nocturnal marsupial that is mostly restricted to eucalypt forests and woodlands, although it occurs in highest abundance in taller, montane, moist eucalypt forests with abundant (large) hollow-bearing trees for shelter and a variety of eucalypt species for feeding. Diet consists of eucalypt leaves, and occasionally flowers. Small home ranges and low dispersability make this species sensitive to clearing and fragmentation, with low persistence in small forest fragments.	Eucalypt vegetation is present over the entire site, with dominate species including *Eucalyptus latinensis* (White Mahogany), *Eucalyptus exerta* (Queensland Peppermint), *Corymbia intermedia* (Pink Bloodwood), *Corymbia trachyphlioa* (Brown Bloodwood) and *Eucalyptus tereticornis* (Forest Red Gum). There were a number of large mature and hollow-bearing trees identified onsite to provide suitable shelter habitat, although historic disturbances of logging and fire throughout the site mean there are relatively few large trees. An ALA record of the species has been recorded within 10 km north of the project area. Suitable shelter habitat in the form of some large and hollow bearing trees exists on site however the site is largely disconnected from surrounding vegetation, which would likely limit the Greater Glider dispersal.	Low - Moderate	Low

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		EPBC Act	NC Act					
						The species was not recorded despite targeted searches.		
Petaurus australis australis	Yellow-bellied Glider	V	V	87600	Occur in tall mature eucalypt forest generally in areas with high rainfall and nutrient rich soils. Forest type preferences vary with latitude and elevation; mixed coastal forests to dry escarpment forests in the north; moist coastal gullies and creek flats to tall montane forests in the south. Den, often in family groups, in hollows of large trees. Very mobile and occupy large home ranges between 20 to 85 ha to encompass dispersed and seasonally variable food resources.	Eucalypt vegetation is present over the entire site. No recent records of the species have been documented within proximity to the project area. The site contains Eucalypt vegetation with some hollow-bearing trees although the lack of recent records of the species and limited connectivity to surrounding vegetation suggests a low likelihood that the Yellow-bellied Glider would occur onsite.	Low	Low
Phascolarctos cinereus	Koala	E	E	85104	The Koala is found in a range of habitats, from coastal islands and tall eucalypt forests to low woodlands inland.	Eucalypt vegetation is present over the entire site, with dominate species including *Eucalyptus latinensis* (White Mahogany), *Eucalyptus exerta* (Queensland Peppermint), *Corymbia intermedia* (Pink Bloodwood), *Corymbia trachyphlioa* (Brown Bloodwood) and *Eucalyptus tereticornis* (Forest Red Gum). Online databases show a record of a Koala occurrence approximately 4 km north west of the site in 2011.	Moderate	Moderate

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		EPBC Act	NC Act					
						Although connectivity to surrounding vegetation is limited, due to suitable Eucalypt vegetation covering the area, it is considered a moderate likelihood that the Koala would utilise the habitat onsite. Site surveys did not observe Koala within the subject site and surveys using Koala scat detection dogs did not detect the presence of Koalas within the site.		
Pteropus poliocephalus	Grey-headed Flying-fox	V	-	186	Species generally roosts in camps in trees adjacent to larger permanent watercourse. The Grey-headed flying fox requires foraging resources and roosting sites. It is a canopy-feeding frugivore and nectarivore, which utilises vegetation communities including rainforests, open forests, closed and open woodlands, Melaleuca swamps and Banksia woodlands. It also feeds on commercial fruit crops. The primary food source is blossom from Eucalyptus and related genera.	Suitable foraging vegetation occurs on-site with the area being entirely covered by Eucalypt dominated vegetation. Records of the Grey-headed Flying-fox have been documented approximately 5 km north of the site in 2011. The nearest known roost site is located in Baldwin Swamp Conservation Park (772), approximately 5 km northeast of the site. With a Grey-headed Flying Fox category of 1 (1-499 individuals) recorded in 2019.	Moderate	Moderate
Xeromys myoides	Water Mouse	V	V	66	The Water mouse requires mangroves and the associated saltmarsh, sedgelands, clay pans,	This site is mapped with RE12.5.4 which contains Palustrine wetlands,	Unlikely	Unlikely

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		EPBC Act	NC Act					
					heathlands and freshwater wetlands. Essential habitat for this species is generally recorded within land zone 1 and land zone 2.	however no mangrove vegetation or habitat on land zone 1 or 2 is present onsite. No records of the Water Mouse are present onsite or within proximity to the site from BioMaps and Atlas of Living Australia (ALA).		
Plants								
Acacia attenuata		V	V	10690	*Acacia attenuata* inhabits flat, coastal lowland plains, at altitudes lower than 30m above sea level. It occurs in seasonally waterlogged areas of wet heathland or heathland margin open forest and woodland communities, on sandy poorly drained soils or infertile peat swamps.	Suitable habitat in the form of coastal lowland plains and waterlogged areas does not occur onsite. A record from 2007 was documented approximately 10 km north of the subject site.	Low	Unlikely
Cossinia australiana	Coissinia	E	E	3066	Cossinia is known from fragmented relict patches of Araucarian vine forests or vine thickets on fertile soils in central and southern Queensland. The species' distribution is from Rockhampton to Kingaroy, east of the Great Dividing Range, a distance of approximately 300 km. At most sites it is recorded as uncommon, usually as scattered individuals.	Araucarian vine forests and vine thicket habitat for this species is not present on the subject site. Most recent record of the species from online databases occurs approximately 45 km south west of the site which was recorded in 1992.	Unlikely	Unlikely
Cryptostylis hunteriana	Leafless Tongue-orchid	V	-	19533	Leafless tongue-orchid habitats include wet heath, sedgeland, grasstree plains and in woodland with scribbly gum, silvertop ash, red bloodwood and black she-oak.	Suitable wet heath, sedgeland and grasstree plains are absent from the subject site. No recent records of the Leafless Tongue-orchid have been	Unlikely	Unlikely

Scientific name	Common name	Listing Status*		EPBC code	Habitat and Distribution	Likelihood of Occurrence Analysis	Desktop Likelihood of occurrence (on-site)	Field Survey Confirmed Likelihood of occurrence (on-site)
		EPBC Act	NC Act					
						documented in proximity to the subject site.		
Cupaniopsis shirleyana	Wedge-leaf Tuckeroo	V	V	3205	The Wedge-leaf Tuckeroo occurs in a variety of dry rainforest vegetation types, including vine thicket communities on hillsides, stream beds and along riverbanks at altitudes up to 550 m above sea level. This species is also likely to occur on the margins of native vegetation in scrubby urbanised areas. Predominately found on dark brown sandy loams and sandy clay loams (pH 5-7.5) and rocky scree slopes. Generally, these soils have formed from volcanic parent materials (mainly granites and granodiorites, basalt and andesitic flows, and pyroclastics).	Dry rainforest vegetation types and vine thicket communities are absent from the subject site. A record of the Wedge-leaf Tuckeroo was documented in 2022 approximately 10 km north-east of the subject site and in 2013 approximately 6 km north-east of the subject site. Although potential habitat in the form of native vegetation is located onsite, field surveys did not identify this species within the referral area therefore it is considered to have a low likelihood of occurrence.	Moderate	Low
Dichanthium setosum	Bluegrass	V	-	14159	In Queensland, bluegrass has been reported from the Leichhardt, Morton, North Kennedy and Port Curtis regions. *Dichanthium setosum* is associated with heavy basaltic black soils and stony red-brown hardsetting loam with clay. It can be found in moderately disturbed areas such as cleared woodland, grassy roadside remnants, grazed land and highly disturbed pasture. The extent to which this species tolerates disturbance is unknown.	There are no local records of this species within the Queensland Wildlife Online sightings data. This species is unlikely to occur on-site due to lack of suitable conditions.	Unlikely	Unlikely

Scientific name	Common name	Listing Status*		EPBC code	Habitat and Distribution	Likelihood of Occurrence Analysis	Desktop Likelihood of occurrence (on-site)	Field Survey Confirmed Likelihood of occurrence (on-site)
		EPBC Act	NC Act					
Eucalyptus hallii	Goodwood Gum	V	NT	3160	Goodwood Gum is known from the coastal lowlands between Bundaberg and Maryborough, Queensland. The number of populations and the total number of plants is unknown. This species occurs within the Burnett Mary (Queensland) Natural Resource Management Region. The species grows in woodland or open forest with a number of other eucalypts, notably *Eucalyptus latisinensis*, Brown Bloodwood (*Corymbia trachyphloia*) and Smooth-barked Apple (*Angophora leiocarpa*), on flat or gently undulating terrain (Queensland Herbarium, 2008). Soils are grey, sandy to silty in texture with an acidic reaction and derived from tertiary sedimentary rocks (Halford, 1998).	Potential habitat occurs on-site in the mapped Category B (RE12.5.4) vegetation containing *Eucalyptus latisinensis* and *Corymbia trachyphloia* woodlands. Records of the species have been documented in proximity to the subject site approximately 8 km south-west in 2003. No evidence of this species was found onsite and although there is potential habitat located within the referral area it is considered a low likelihood of occurring onsite.	Moderate	Low
Fontainea venosa	-	V	V	24040	Occurs in notophyll vine forest and vine thicket with a mean annual rainfall of 1000-1100 mm on soils derived from and containing abundant andesitic rocks, often on rocky outcrops or along creeks.	Suitable habitat in the form of notophyll vine forest and vine thicket is not present on the subject site. A lack of local recent records suggests this species is unlikely to occur on site.	Unlikely	Unlikely
Macadamia integrifolia	Macadamia Bush	V	V	7326	The Macadamia Nut grows in remnant rainforest. It prefers to grow in mild frost-free areas with reasonably high rainfall. Vegetation communities range from notophyll mixed forest, extremely tall closed forest, simple	No suitable habitat to support this species occurs on-site in the form of rainforest and notophyll mixed forest. A lack of local recent records suggests this species is unlikely to occur on site.	Unlikely	Unlikely

Scientific name	Common name	Listing Status*		EPBC code	Habitat and Distribution	Likelihood of Occurrence Analysis	Desktop Likelihood of occurrence (on-site)	Field Survey Confirmed Likelihood of occurrence (on-site)
		EPBC Act	NC Act					
					notophyll mixed very tall closed forest to simple microphyll-notophyll mixed mid-high closed forest with Araucaria and Argyrodendron emergents.			
Macrozamia lomandroides	Cycad	E	E	55406	Cycad occurs south of Bundaberg between the Elliot and Isis Rivers, in banksia or eucalypt dominated woodlands (wallum) or open forest, on coastal plains or hill slopes in sandy and loamy soil.	Potential habitat for the Cycad is present on the subject site within Eucalypt dominated vegetation. Records of the species from 2006 have been recorded within 10 km of the subject site and there is a record from 1993 approximately 5 km east of the site. No cycad specimens were found within the subject site during the field survey therefore it is considered	Moderate	Low
Macrozamia pauli-guilielmi	Pineapple Zamia	E	E	5712	Pineapple Zamia occurs in lowland open forest or woodland (wallum) dominated by Banksias or Eucalypts, or in shrub land or heath land, generally on established dunes.	Potential habitat for the Cycad is present on the subject site within Eucalypt dominated vegetation. However, the species has not been recorded within 5km of the subject site.	Low	Low
Rhodamnia dumicola	Rid-fruited Malletwood	-	E	-	Shrub or small dry rainforest tree ±5 metres. Prefers moist, well drained soils in full or filtered sun; tolerates mild frosts. This very attractive plant with dark glossy leaves occurs in Queensland only, north of the Beenleigh	The species has been recorded within 10 km of the subject site, however potential dry rainforest habitat is not present across the site.	Low	Low

Scientific name	Common name	Listing Status*		EPBC code	Habitat and Distribution	Likelihood of Occurrence Analysis	Desktop Likelihood of occurrence (on-site)	Field Survey Confirmed Likelihood of occurrence (on-site)
		EPBC Act	NC Act					
					district, in dry rainforest and as a remnant species in cleared scrubby areas.			
Samadera bidwillii	Quassia	V	V	29708	Quassia commonly occurs in lowland rainforest or on rainforest margins, but it can also be found in other forest types, such as open forest and woodland. Quassia is commonly found in areas adjacent to both temporary and permanent watercourses in locations up to 510 m altitude. The species occurs on lithosols, skeletal soils, loam soils, sands, silts and sands with clay subsoils.	This species favours lowland rainforest or rainforest margins which are absent from the site. Records of Quassia from 1992 have been recorded approximately 25 km south-west of the subject site.	Low	Unlikely
Reptiles								
Caretta caretta	Loggerhead Turtle	E	E		The Loggerhead Turtle is a species of oceanic turtle distributed throughout the world. The Loggerhead Turtle is found in the Atlantic, Pacific and Indian Oceans and species most of its life in saltwater and estuarine habitats with females briefly coming ashore to lay eggs.	No suitable habitat or breeding habitat are present within the subject site. Records of the species have been recorded along the coast and offshore approximately 15 km east of the subject site. In addition, a record of the species from 2018 has been documented 5 km north of the site in the Burnett River. Due to the lack of potential habitat or breeding habitat for the species it is considered unlikely to occur onsite.	Unlikely	Unlikely

Scientific name	Common name	Listing Status*		EPBC code	Habitat and Distribution	Likelihood of Occurrence Analysis	Desktop Likelihood of occurrence (on-site)	Field Survey Confirmed Likelihood of occurrence (on-site)
		EPBC Act	NC Act					
Chelonia mydas	Green Turtle	V	V	1765	Green turtles occur in seaweed-rich coral reefs and inshore seagrass pastures in tropical and subtropical areas of the Indo-Pacific region.	No suitable habitat or breeding habitat are present within the subject site. Records of the species have been recorded along the coast and offshore approximately 15 km east of the subject site. Due to the lack of potential habitat for the marine reptile on-site it is considered unlikely to occur.	Unlikely	Unlikely
Delma torquata	Collared Delma	V	V	1656	In general, the species occurs on rocky hillsides on basalt and lateritic soils supporting open eucalypt and Acacia woodland with a sparse understorey of shrubs and tussocks or semi-evergreen vine thicket.	Suitable habitat is not present within the assessment area, with no rocky hillsides present on site. Records of the species have been recorded in 1997 approximately 40 km south west of the subject site.	Low	Unlikely
Dermochelys coriacea	Leatherback Turtle	E	E	1768	The Leatherback Turtle is found in all tropical and subtropical oceans. The species nest on beaches throughout the Atlantic, Pacific and Indian Ocean regions.	No suitable habitat or breeding habitat are present within the subject site. Records of the species have been recorded along the coast and offshore approximately 15 km east of the subject site. Due to the lack of potential habitat for the marine reptile on-site it is considered unlikely to occur.	Unlikely	Unlikely

Scientific name	Common name	Listing Status*		EPBC code	Habitat and Distribution	Likelihood of Occurrence Analysis	Desktop Likelihood of occurrence (on-site)	Field Survey Confirmed Likelihood of occurrence (on-site)
		EPBC Act	NC Act					
Egernia rugosa	Yakka Skink	V	V	1420	The Yakka Skink is found in open dry sclerophyll forest or woodland. This species will often take refuge among dense ground vegetation, large hollow logs, cavities in soil-bound root systems of fallen trees and beneath rocks. They typically excavate burrow systems within soil mounds or soil among low vegetation or below logs. A latrine is often used by members of each burrow system and can be an indicative sign of the species.	Potential habitat for the Yakka Skink occurs onsite in the form of dry sclerophyll forest. A record of the species has been documented within 15 km of the subject site to the north. The site contains woodland habitat for the Yakka skink however no evidence of the species was found onsite and a lack of records in proximity to the site suggests a low likelihood of occurrence.	Low	Low
Elseya albagula	White-throated Snapping Turtle	CE	CE	81648	The white-throated snapping turtle occurs in the Fitzroy, Mary and Burnett Rivers and associated smaller drainages in south-eastern Queensland. It mostly inhabits sections of stream with permanent water and habitat features that provide shelter, such as undercut banks, overhanging riparian vegetation, moderate to high densities of submerged boulders and/or log jams, and macrophyte beds.	No suitable habitat for the White-throated Snapping Turtle occurs onsite. Records of the species have been documented within 5 km of the assessment area in the Burnett River. No permanent water sources and riverine areas are present within the subject site. It is considered highly unlikely this species would occur onsite because there are no connecting waterways, watercourses or drainage features present within or adjacent to the subject site.	Unlikely	Unlikely
Ertmochelys imbricata	Hawksbill Turtle	V	E	1766	Hawksbill sea turtles have a wide range, found predominantly in tropical reefs of the Indian,	No suitable habitat or breeding habitat is present within the subject site.	Unlikely	Unlikely

Scientific name	Common name	Listing Status*		EPBC code	Habitat and Distribution	Likelihood of Occurrence Analysis	Desktop Likelihood of occurrence (on-site)	Field Survey Confirmed Likelihood of occurrence (on-site)
		EPBC Act	NC Act					
					Pacific, and Atlantic Oceans. Of all the sea turtle species, *E. imbricata* is the one most associated with warm tropical waters.	Records of the species have been recorded along the coast and offshore approximately 15 km east of the subject site. Due to the lack of potential habitat for the marine reptile on-site it is considered highly unlikely to occur.		
Furina dunmalli	Dunmall's Snake	V	V	59254	Dunmall's Snake has been found in a broad range of habitats, including forests and woodlands on black alluvial cracking clay and clay loams dominated by Brigalow other Wattles, native Cypress or Bull-oak, and various Blue Spotted Gum, Ironbark, White Cypress Pine and Bull oak open forest and woodland associations on sandstone derived soils. Dunmall's Snake occurs primarily in the Brigalow Belt region in the south-eastern interior of Queensland. Records indicate sites at elevations between 200–500 m above sea level. The snake is very rare or secretive with limited records existing. It has been recorded at Archokoora, Oakey, Miles, Glenmorgan, Wallaville, Gladstone, Lake Broadwater, Mount Archer, Exhibition Range National Park, roadside reserves between Inglewood and	Potential habitat for Dunmall's Snake is present onsite in the form of Eucalypt woodland covering the subject site. Records of the species have been documented over 40 km north of the subject site. However, vegetation characterised by Brigalow other Wattles, native Cypress or Bull-oak, and various Blue Spotted Gum, Ironbark, White Cypress Pine and Bull oak open forest and woodland associations on sandstone derived soils were not found onsite during field surveys.	Low	Low

Scientific name	Common name	Listing Status*		EPBC code	Habitat and Distribution	Likelihood of Occurrence Analysis	Desktop Likelihood of occurrence (on-site)	Field Survey Confirmed Likelihood of occurrence (on-site)
		EPBC Act	NC Act					
					Texas, Rosedale, Yeppoon and Lake Broadwater Conservation Park.			
Hemiaspis damelii	Grey Snake	E	E	1179	The grey snake is a relatively small, venomous, front-fanged (proteroglyphous) snake. In Queensland, grey snake habitat is Brigalow *Acacia harpophylla* and Belah *Casuarina cristata* woodlands on heavy, dark brown to black cracking clay soils, particularly in association with water bodies, areas with small gullies and ditches, and floodplain environments where the species shelters beneath logs, rocks and soil cracks.	Habitat attributes to support this species are not present on-site. Recent local records are lacking for the species. Field surveys confirm Brigalow *Acacia harpophylla* and Belah *Casuarina cristata* woodlands are not present on the subject site.	Unlikely	Unlikely
Lepidochelys olivacea	Olive Ridley Turtle	E	E	1767	The olive ridley turtle has a circumtropical distribution, living in tropical and warm waters of the Pacific and Indian Oceans from India, Arabia, Japan, and Micronesia south to southern Africa, Australia, and New Zealand. In the Atlantic Ocean, it has been observed off the western coast of Africa and the coasts of northern Brazil, Suriname, Guyana, French Guiana, and Venezuela.	No suitable habitat or breeding habitat are present within the subject site. Records of the species have been recorded along the coast and offshore approximately 15 km east of the subject site. Due to the lack of potential habitat for the marine reptile on-site it is considered unlikely to occur.	Unlikely	Unlikely
Natator depressus	Flatback Turtle	V	V	59257	The Flatback Turtle occurs in the Eastern Indian Ocean, South West Pacific Ocean and coastal waters of the continental shelf of Northern Australia.	No suitable habitat or breeding habitat are present within the subject site. Records of the species have been recorded along the coast and offshore	Unlikely	Unlikely

Scientific name	Common name	Listing Status*		EPBC code	Habitat and Distribution	Likelihood of Occurrence Analysis	Desktop Likelihood of occurrence (on-site)	Field Survey Confirmed Likelihood of occurrence (on-site)
		EPBC Act	NC Act					
						approximately 15 km east of the subject site. Due to the lack of potential habitat for the marine reptile on-site it is considered unlikely to occur.		
Sharks								
Pristis pristis	Green Sawfish	V	-	68442	The preferred habitat of the Freshwater Sawfish is mud bottoms of rivers embayment and estuaries, but they are also found well upstream. They are not found near riparian vegetation. They are usually found in turbid channels of large rivers over soft mud bottoms more than 1m deep, but they will move into shallow waters when travelling upstream or while hunting prey. Freshwater Sawfish are often associated with deeper sections of rivers adjacent to a sand or silt shallow, such as a sandbar or shallow backwater.	No suitable habitat or breeding habitat are present within the subject site. No recent local records of the species is present on or within proximity to the assessment area.	Unlikely	Unlikely
Sphyrna lewini	Scalloped Hammerhead	CD	-	85267	This coastal pelagic species, is often found near continental and insular shelves as well as neighbouring deep water.	No suitable habitat or breeding habitat are present within the subject site. Records of the species have been recorded along the coast and offshore approximately 15 km east of the subject site. Due to the lack of potential habitat for this pelagic	Unlikely	Unlikely

Scientific name	Common name	Listing Status*		EPBC code	Habitat and Distribution	Likelihood of Occurrence Analysis	Desktop Likelihood of occurrence (on-site)	Field Survey Confirmed Likelihood of occurrence (on-site)
		EPBC Act	NC Act					
						species on-site it is considered unlikely to occur.		

**Status abbreviations are as follows: CE = Critically Endangered, E = Endangered, V = Vulnerable, NT = Near Threatened, C = Least Concern, SL = Special Least Concern, - = Not Listed.*

Listed migratory species (not listed above)

Scientific name	**Common name**	**EPBC code**	**Habitat and Distribution**	**Likelihood of Occurrence Analysis**	**Desktop Likelihood of Occurrence (on-site)**	**Field Survey Confirmed Likelihood of Occurrence (on-site)**
Migratory marine birds						
Anous stolidus	Common Noddy	825	During the breeding season, the Common Noddy usually occurs on or near islands, on rocky islets and stacks with precipitous cliffs, or on shoals or cays of coral or sand. During the non-breeding period, the species occurs in groups throughout the pelagic zone (open ocean).	No suitable habitat to support this species occurs on-site. Records of the species have been recorded off the coast of Bargara approximately 15 km east of the subject site.	Unlikely	Unlikely
Apus pacificus	Fork-tailed Swift	678	This species is almost exclusively aerial and mostly occur over inland plains but sometimes above foothills or in coastal areas.	No suitable habitat to support this species occurs on-site. Records of the species occur within proximity to the subject site, it is possible this species may occur as a fly-over or vagrant individual and may forage over the site. Given that this species does not breed in Australia, it is unlikely to use the subject site for breeding purposes. The species is almost exclusively aerial and is therefore not likely to directly interact with site vegetation for roosting.	Low	Low
Calonectris leucomelas	Streaked Shearwater	1077	Streaked shearwaters breed on islands off the southern Russian Far East, and Japan, east China, Korea and Taiwan. In the non-breeding season they migrate to waters off New Guinea and northern Australia and the South China Sea.	No suitable habitat to support this species occurs on-site.	Unlikely	Unlikely
Fregata ariel	Lesser Frigatebird	1012	The Lesser Frigatebird breeds on small, remote tropical and sub-tropical islands, in mangroves or bushes, and even on bare ground.	No suitable habitat to support this species occurs on-site.	Unlikely	Unlikely

Scientific name	Common name	EPBC code	Habitat and Distribution	Likelihood of Occurrence Analysis	Desktop Likelihood of Occurrence (on-site)	Field Survey Confirmed Likelihood of Occurrence (on-site)
Fregata minor	Greater Frigatebird	1013	The Greater Frigatebird breeds on small, remote tropical and sub-tropical islands, in mangroves or bushes and occasionally on bare ground.	No suitable habitat to support this species occurs on-site.	Unlikely	Unlikely
Phaethon lepturus	White-tailed Tropicbird	1014	The white-tailed tropicbird breeds on tropical islands, laying a single egg directly onto the ground or a cliff ledge. It disperses widely across the oceans when not breeding, and sometimes wanders far.	No suitable habitat to support this species occurs on-site.	Unlikely	Unlikely

Migratory marine species (not listed above)

Scientific name	Common Name	EPBC Act	NC Act	EPBC Code	Description of community / habitat	Likelihood of occurrence Analysis		
Anoxypristis cuspidata	Narrow Sawfish	-	-	68448	Found inshore, often in river deltas and estuaries; penetration well up rivers needs confirmation. Common in sheltered bays with sandy bottoms. More active swimmer than other sawfishes.	No suitable habitat to support this species occurs on-site.	Unlikely	Unlikely
Crocodylus porosus	Saltwater Crocodile	-	V	1774	The Saltwater Crocodile mostly occurs in tidal rivers, coastal floodplains and channels, billabongs and swamps up to 150 km inland from the coast. Salt-water Crocodiles usually inhabits the lower (estuarine) reaches of rivers, while the upper reaches are inhabited by Fresh-water Crocodiles. In Queensland, this species is usually restricted to coastal waterways and floodplain wetlands.	No suitable habitat to support this species occurs on-site.	Unlikely	Unlikely
Lamna nasus	Mackerel Shark	-		83288	The porbeagle or porbeagle shark is a species of mackerel shark in the family Lamnidae,	No suitable habitat to support this species occurs on-site.	Unlikely	Unlikely

Scientific name	Common name	EPBC code	Habitat and Distribution	Likelihood of Occurrence Analysis	Desktop Likelihood of Occurrence (on-site)	Field Survey Confirmed Likelihood of Occurrence (on-site)
			distributed widely in the cold and temperate marine waters of the North Atlantic and Southern Hemisphere. In the North Pacific, its ecological equivalent is the closely related salmon shark.			
Mobula alfredi	Reef Manta Ray	- -	90033 A benthopleagic species found in large aggregations inshore from tidal zone across inner continental shelf to ca. 65 m	No suitable habitat to support this species occurs on-site.	Unlikely	Unlikely
Manta birostris	Giant Manta Ray	- -	90034 The giant oceanic manta ray, giant manta ray, or oceanic manta ray is a species of ray in the family Mobulidae, and the largest type of ray in the world. It is circum-global and is typically found in tropical and subtropical waters, but can also be found in temperate waters.	No suitable habitat to support this species occurs on-site.	Unlikely	Unlikely
Orcaella heinsohni	Australian Snubfin Dolphin	- -	81322 Australian snubfin dolphins are dominant predators of fish and cephalopod species in coastal areas of Australia and Indonesia. There is little else known about their ecosystem roles.	No suitable habitat to support this species occurs on-site.	Unlikely	Unlikely
Migratory terrestrial species						
Cuculus optatus	Oriental Cuckoo	86651	Non-breeding habitat only: monsoonal rainforest, vine thickets, wet sclerophyll forest or open Casuarina, Acacia or Eucalyptus woodlands. Frequently at edges or ecotones between habitat types	Habitat in the form of Eucalyptus woodlands is present on site however the site lacks monsoonal rainforest, vine thickets and wet sclerophyll forests. Records of the species have been recorded approximately 10 km north of the site from 2004. It is possible this species may occur as a fly-over or vagrant individual but is unlikely to use the subject site for breeding purposes as the	Moderate	Low

Scientific name	Common name	EPBC code	Habitat and Distribution	Likelihood of Occurrence Analysis	Desktop Likelihood of Occurrence (on-site)	Field Survey Confirmed Likelihood of Occurrence (on-site)
				species does not breed in Australia. The species use of the site is likely restricted to occasionally foraging.		
Monarcha melanopsis	Black-faced Monarch	609	The Black-faced Monarch mainly occurs in rainforest ecosystems, including semi-deciduous vine thickets, complex notophyll vine forests, tropical (mesophyll) rainforest, subtropical (notophyll) rainforest, mesophyll (broadleaf) thicket/shrubland, warm temperate rainforest, dry (monsoon) rainforest and occasionally cool temperate rainforest.	No suitable rainforest habitat to support this species occurs on-site.	Unlikely	Unlikely
Myiagra cyanoleuca	Satin Flycatcher	612	Satin Flycatchers inhabit heavily vegetated gullies in eucalypt dominated forests and taller woodlands, and on migration occur in coastal forests, woodlands, mangroves and drier woodlands and open forests.	No suitable habitat to support this species occurs on-site. Records of the species are present north of the site however it is possible this species may occur as a fly-over or vagrant individual but is unlikely to use the subject site for breeding purposes.	Low	Low
Rhipidura rufifrons	Rufous Fantail	592	The Rufous fantail mainly inhabits wet sclerophyll forests, often in gullies dominated by Eucalypts such as *Eucalyptus microcorys*, *Eucalyptus pilularis*, *Eucalyptus resiniferia* and a number of other Eucalyptus species.	Eucalypt woodland dominates much of the site however is not considered to be wet sclerophyll forests suitable to support this species.	Low	Low
Symposiachrus trivirgatus as Monarcha trivirgatus	Spectacled Monarch	83946	The Spectacled Monarchs natural habitats are subtropical or tropical moist lowland forests, subtropical or tropical mangrove forests, and subtropical or tropical moist montane forests. Its preference is for thick understorey areas.	No suitable habitat to support this species occurs on-site.	Unlikely	Unlikely
Migratory wetland species						

Scientific name	Common name	EPBC code	Habitat and Distribution	Likelihood of Occurrence Analysis	Desktop Likelihood of Occurrence (on-site)	Field Survey Confirmed Likelihood of Occurrence (on-site)
Actitis hypoleucos	Common Sandpiper	59309	The Common Sandpiper utilises a wide range of coastal wetlands and some inland wetlands, including estuaries and deltas of streams, banks farther upstream; around lakes, pools, billabongs, reservoirs, dams and clay pans, and occasionally piers and jetties. They are mostly found in shallow water, around muddy margins or rocky shores and sometimes in muddy areas littered with rocks or snags. The species commonly utilises mangroves for foraging and roosting but is rarely seen on mudflats.	No suitable foraging or breeding habitat occurs on-site.	Unlikely	Unlikely
Calidris acuminata	Sharp-tailed Sandpiper	874	In Australia, the Sharp-tailed Sandpiper prefers muddy edges of shallow fresh or brackish wetlands, with inundated or emergent sedges, grass, saltmarsh, and beach cast algae / seaweed or other low vegetation. This includes lagoons, swamps, lakes and pools near the coast, and dams, waterholes, soaks, bore drains and bore swamps, saltpans and hypersaline salt lakes inland. They also occur in salt works and sewage farms. They use flooded paddocks, sedgelands and other ephemeral wetlands, but leave when they dry. They use intertidal mudflats in sheltered bays, inlets, estuaries or seashores, and also swamps and creeks lined with mangroves.	No suitable foraging or breeding habitat occurs on-site.	Unlikely	Unlikely
Calidris melanotos	Pectoral Sandpiper	858	The Pectoral Sandpiper prefers shallow fresh to saline wetlands. The species is found at coastal lagoons, estuaries, bays, swamps, lakes, inundated grasslands, saltmarshes, river pools, creeks, floodplains and artificial wetlands. Occasionally found further inland.	No suitable foraging or breeding habitat occurs on-site.	Unlikely	Unlikely

Scientific name	Common name	EPBC code	Habitat and Distribution	Likelihood of Occurrence Analysis	Desktop Likelihood of Occurrence (on-site)	Field Survey Confirmed Likelihood of Occurrence (on-site)
Gallinago hardwickii	Latham's Snipe	863	Latham's Snipe occurs in permanent and ephemeral wetlands. They usually inhabit open, freshwater wetlands with low, dense vegetation.	This site is mapped with RE12.5.4 which contains Palustrine wetlands. Upon field assessment at the subject site, no open freshwater wetlands with low, dense vegetation was present.	Low	Unlikely
Limnodromus semipalmatus	Asian Dowitcher	843	The Asian Dowitcher occurs in sheltered coastal Environments, such as embayments, coastal lagoons, estuaries and tidal creeks. They are known to frequent shallow water and exposed mudflats or sandflats.	No suitable foraging or breeding habitat occurs on-site.	Unlikely	Unlikely
Limosa lapponica	Bar-tailed Godwit	844	The Bar-tailed Godwit is found mainly in coastal habitats such as large intertidal sandflats, banks, mudflats, estuaries, inlets, harbours, coastal lagoons and bays. It is found often around beds of seagrass and, sometimes, in nearby saltmarsh. It has been sighted in coastal sewage farms and saltworks, saltlakes and brackish wetlands near coasts, sandy ocean beaches, rock platforms, and coral reef-flats.	No suitable foraging or breeding habitat occurs on-site.	Unlikely	Unlikely
Pandion haliaetus	Osprey	952	Eastern Ospreys occur in littoral and coastal habitats and terrestrial wetlands of tropical and temperate Australia and offshore islands. They are mostly found in coastal areas but occasionally travel inland along major rivers.	It is possible that this species may periodically fly over the site given the proximity to the coast however no suitable foraging or breeding habitat occurs on-site and the species was not observed during field surveys.	Low	Low
Tringa nebularia	Common Greenshank	832	The Common Greenshank is found in a wide variety of inland wetlands and sheltered coastal habitats of varying salinity. The species is known to forage at the edges of wetlands in soft mud or mudflats.	No suitable foraging or breeding habitat occurs on-site.	Unlikely	Unlikely

Attachment A6

Wildnet search Results

Queensland Government

WildNet species list

Search Criteria: Species List for a Specified Point
Species: All
Type: Native
Queensland status: Rare and threatened species
Records: Confirmed
Date: Since 1980
Latitude: -24.9085
Longitude: 152.3398
Distance: 5
Email: madelinedooley@saundershavill.com
Date submitted: Thursday 27 Apr 2023 13:52:55
Date extracted: Thursday 27 Apr 2023 14:00:03

The number of records retrieved = 3

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	mammals	Phascolarctidae	*Phascolarctos cinereus*	koala		E	E	1
plants	land plants	Myrtaceae	*Rhodamnia dumicola*	rib-fruited malletwood		E		2/2
plants	land plants	Sapindaceae	*Cupaniopsis shirleyana*	wedge-leaf tuckeroo		V	V	1/1

CODES

I - Y indicates that the taxon is introduced to Queensland and has naturalised.

Q - Indicates the Queensland conservation status of each taxon under the *Nature Conservation Act 1992.*
The codes are Extinct (EX), Extinct in the Wild (PE), Critically Endangered (CR), Endangered (E), Vulnerable (V), Near Threatened (NT), Special Least Concern (SL) and Least Concern (C).

A - Indicates the Australian conservation status of each taxon under the *Environment Protection and Biodiversity Conservation Act 1999.*
The values of EPBC are Extinct (EX), Extinct in the Wild (XW), Critically Endangered (CE), Endangered (E), Vulnerable (V) and Conservation Dependent (CD).

Records - The first number indicates the total number of records of the taxon (wildlife records and species listings for selected areas).
This number is output as 99999 if it equals or exceeds this value. A second number located after a / indicates the number of specimen records for the taxon.
This number is output as 999 if it equals or exceeds this value.

Attachment A7

Field Data Species Lists

Flora Species List Table

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

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

Fauna Species List Table

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

Attachment A8

Greater Glider Detailed Assessment

Significant Impact Assessment

The Significant Impact Guidelines 1.1 provides specific definitions for '*a population of a species'* and '*habitat critical to the survival of a species or ecological community*'. This definition is a key consideration when conducting significant impact assessments for a threatened species or ecological community listed under the EPBC Act. The definitions are presented below.

Population of a Species

A 'population of a species' is defined by the Significant Impact Guidelines 1.1 as:
"An occurrence of the species in a particular area. In relation to critically endangered, endangered or vulnerable threatened species, occurrences include but are not limited to:

- *A geographically distinct regional population, or collection of local populations*
- *A population, or collection of local populations, that occurs within a particular bioregion.*

Habitat Critical to the Survival of the Species

The Significant Impact Guidelines provide the following definition for '*habitat critical to the survival of a species'*
"Habitat critical to the survival of a species or ecological community' refers to areas that are necessary:

- *For activities such as foraging, breeding, roosting or dispersal*
- *For the long-term maintenance of the species or ecological community (including the maintenance of species essential to the survival of the species or ecological community, such as pollinators)*
- *To maintain genetic diversity and long-term evolutionary development*
- *For the reintroduction of populations or recovery of the species or ecological community.*

Such habitat may be, but is not limited to:

- *Habitat identified in a recovery plan for the species or ecological community as habitat critical for that species or ecological community*
- *Habitat listed on the Register of Critical Habitat maintained by the minister under the EPBC Act.*

Significant Impact Assessment

For potential impacts to threatened species and ecological communities of the proposed New Bundaberg Hospital, an assessment against the Significant Impact Guidelines 1.1 has been conducted for one (1) threatened fauna species identified as having a moderate likelihood of occurring onsite or having potential foraging habitat. This species was:

- *Petauroides volans* (Greater Glider)

The following sections outline the assessment for this threatened species.

Greater Glider (*Petauroides volans*)

Assessment against the Significant Impact Guidelines 1.1 for the Greater Glider

EPBC Act, Greater Glider populations are listed as Endangered, effective from 5 July 2022. The species is listed under Queensland Nature Conservation Act 1992 (Qld) (NCA) as Vulnerable. As such, the Federal Significant Impact Guidelines can be utilised to determine if a significant impact on Greater Glider may occur as a result of the proposed action. The assessment methodology included site surveys and consideration of Commonwealth, State and Local Government environmental database searches.

Greater Glider Significant Impact Assessment

Conservation Status – The Greater Glider is listed as Endangered under the EPBC Act.

Description – Greater Gliders (*Petauroides volans*) are arboreal nocturnal marsupials with white or cream fur below and varies from dark grey, dusky brown through to light mottled grey and cream fur above.

Distribution – The Greater Glider is distributed across eastern Australia from around Proserpine in Queensland, south through NSW and ACT, to Wombat State Forest in central Victoria. It occurs across an elevational range of 0–1200 m above sea level. The distribution may be patchy even in continuous areas of habitat.

Habitat – The Greater Glider is mostly restricted to eucalypt forests and woodlands, although it occurs in highest abundance in taller, montane, moist eucalypt forests with abundant (large) hollow-bearing trees for shelter and a variety of eucalypt species for feeding. Diet consists of eucalypt leaves, and occasionally flowers. Small home ranges (approximately 1 – 4 ha) and a poor ability to disperse make this species sensitive to clearing and fragmentation, with low persistence in small forest fragments. The Greater Glider shelters in tree hollows during the day with a particular presence for large hollows with a diameter > 10cm in large, old trees. Tree species Greater Glider show presence for in south-eastern Queensland include *Eucalyptus acmenoides* (broad-leaved white mahogany), *E. fibrosa* (red ironbark) and *E. tereticornis* (forest red gum).

Threats – Frequent and intense bushfires, inappropriate prescribed burning, climate change, land clearing and timber harvesting are key threats to the Greater Glider, where loss and fragmentation of habitat has already occurred in many areas of the species range.

To determine whether the proposed action is likely to have a significant impact on the Greater Glider, an assessment against the *EPBC Significant Impact Guidelines 1.1* is provided in **Table 7.1** below.

Table 7.1- EPBC Significant impact criteria for critically endangered and endangered species – Greater Glider

Significant Impact Criteria	Assessment	Impact
An action is likely to have a significant impact on a critically endangered or endangered species if there is a real chance or possibility that it will:		
1. Lead to a long-term decrease in the size of a population	The Greater Glider is mostly restricted to eucalypt forests and woodlands, although it occurs in highest abundance in taller, montane, moist eucalypt forests with abundant (large) hollow-bearing trees for shelter and a variety of eucalypt species for feeding. A variety of eucalypt species occur within and adjacent to the Bundaberg Hospital site, however some areas of the Category B vegetation have been disturbed from logging and historic fire, along with significant weed incursion at the ground layer. The vegetation onsite is characterized by a canopy of Eucalypt species including *Eucalyptus exserta* (Queensland Peppermint), *Corymbia trachyphloia* (Brown Bloodwood) and *Angophora leiocarpa* (Smooth-barked Apple). Preferred Greater Glider feed trees *Corymbia intermedia* (Pink Bloodwood), *Eucalyptus latisinensis* (White Mahogany) and *E. tereticornis* (Forest Red Gum) are also present throughout the site. The site has been subjected to disturbance from historic clearing along the boundaries of the subject site for the creation of vehicle tracks. No evidence of Greater Glider was observed during targeted field surveys onsite and they are highly susceptible to existing disturbance. The site is bound in the north by cleared land earmarked for residential development, cleared land used as the Bundaberg Airport to the west, the Bundaberg Drinks Factory to the east, and Bundaberg Ring Road to the south, beyond which is a patch of remnant vegetation. 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 (**Plan A07 – Greater Glider Fragmentation Analysis**). The proposed action is unlikely to reduce the size of the population because the site will be fragmented as a result of surrounding development and does not currently display evidence of Greater Glider usage. It is considered highly unlikely that the removal of vegetation within the referral area would affect the viability or size of any Greater Glider populations in the area.	**A significant impact is not likely**
2. Reduce the area of occupancy of the species	Field surveys confirmed the presence of hollow bearing trees within the site however no individuals were recorded during field surveys. No records of Greater Glider occur within 15 km of the site, while one (1) record of the Greater Glider is present within 20 km of the site. In addition, a search of Atlas of Living Australia using a 10 km search radius from the site returned no recent records of Greater Glider, although two records without a date are located within 5 km north of the site and are suspected to be record errors. It is noted significant barriers exist between the site and this record in the form of residential developments, main roads and cleared agricultural land. Other surrounding records pre-date the year 2001, with the most recent record (2016) approximate 40 km north-west of the site. According to the Queensland BioMaps recent local records for the species are lacking. Notably, on review it is considered by the Department that edge effects from development and threats can encroach within 100 m to potential habitat areas deterring Greater Glider persistence (refer Conservation Advice). The proposed	**A significant impact is not likely**

Significant Impact Criteria	Assessment	Impact
	Bundaberg Hospital is already highly fragmented and disturbed by past clearing, both within the site and in adjoining cleared development areas. This includes the Bundaberg Airport and the Bundaberg Drinks Facility which are utilized by vehicles creating noise, light and dust. The relative disturbance levels surrounding the proposed Hospital site suggest that the area is unlikely to be suitable for the Greater Glider as per the Conservation Advice. In addition, surrounding impact from earmarked development is likely to restrict the extent of habitat for Greater Glider and connectivity to the referral area will be largely isolated from other Greater Glider habitat (**Plan A07 – Greater Glider Fragmentation Analysis**). While the proposed action will remove potential Greater Glider habitat, the impact is focused on a site that will be inaccessible to Greater Glider and adjoin a major road and residential development. Therefore, due to the above considerations combined it is anticipated that the removal of vegetation on-site is not considered to reduce the area of occupancy for Greater Gliders.	
3. Fragment an existing population into two or more populations	The site is currently subject to significant fragmentation to the west with cleared land within the Bundaberg Airport and existing land uses for residential and agricultural purposes to the east (**Plan 1**). Land directly to the north is earmarked for residential development, which will further fragment Greater Glider habitat within the site. In the wider landscape, significant fragmentation currently exists to the north, east and west, with residential development in these areas and agricultural land uses dominate to the south of the site. Vehicle disturbance on Bundaberg Ring Road to the south further fragments potential habitat onsite. Field surveys confirmed the presence of hollow bearing trees within the Hospital site however no individuals were recorded during field surveys. Due to the disturbance from logging and fire, significant fragmentation and the modification of surrounding habitat it is considered low quality habitat for the Greater Glider. Connectivity to vegetation is limited with cleared areas to the north and west and modified in the south and east. While the southern portion of the site retains some connectivity to a thin strip of vegetation to the south east, the site is already fragmented from this area by Bundaberg Ring Road intersecting the site. Notably, this southern portion of the subject site is proposed to be retained as part of the Bundaberg Hospital (**Plan A01 – Development Footprint).** Online databases show Greater Glider presence within 20 km of the site, in patches of intact bushland to the southwest and northwest, however these species are known to have small home ranges between 1 – 4 ha. In addition, the referral area is surrounded by land that will be impacted by future residential development and removal of the potential habitat is unlikely to fragment any existing populations (**Plan A07 – Greater Glider Fragmentation Analysis).**	**A significant impact is not likely**
4. Adversely affect habitat critical to the survival of a species	The Significant Impact Guidelines provide the following definition for '*habitat critical to the survival of a species*'. *"Habitat critical to the survival of a species or ecological community' refers to areas that are necessary:* ▪ *For activities such as foraging, breeding, roosting or dispersal*	**A significant impact is not likely**

Significant Impact Criteria	Assessment	Impact
	▪ *For the long-term maintenance of the species or ecological community (including the maintenance of species essential to the survival of the species or ecological community, such as pollinators)* ▪ *To maintain genetic diversity and long-term evolutionary development* ▪ *For the reintroduction of populations or recovery of the species or ecological community.* Responses to the definition of *habitat critical to the survival of a species'* follows below: • The referral site shows no evidence of current Greater Glider usage and will not be accessible for Greater Glider to use for foraging, breeding, roosting or dispersing as a result of the future development to the north existing fragmenting factors on all sides. • Detailed studies utilising both direct and indirect survey methods did not detect any evidence of Greater Glider within the referral area, suggesting the vegetation on-site is not utilised by Greater Glider. The referral area is therefore unlikely to contribute to genetic diversity of the species. • The referral area is presently isolated from other Greater Glider habitat due to surrounding barriers including the Bundaberg Drinks Facility, Bundaberg Airport and Bundaberg Ring Road. In addition, significant current threats exist within and surrounding the referral area including wild dogs, vehicle use, weed encroachment, historic fire and the main road to the south. The referral site is not considered suitable for the reintroduction of Greater Glider nor will it be able to aid in the recovery of the species. • Logging is evident throughout the referral area, however some large mature hollow-bearing trees remain which provide potential habitat for the Greater Glider. Due to fragmentation to bushland to the south, moderate disturbance levels and a lack of local records, it is considered a low likelihood that these hollow-bearing trees are being utilised by Greater Glider. • While hollow bearing trees are present throughout the referral area, Greater Glider preferentially select large tree hollows in mature forests. The referral area is moderately disturbed throughout, unlikely to present suitable mature forest vegetation. The referral site is, therefore, not considered to be critical to the survival of the species.	
5. Disrupt the breeding cycle of a population	Detailed studies utilising both direct and indirect survey methods did not detect any evidence of Greater Glider within the referral area, suggesting the vegetation on-site is not utilised by Greater Glider. It is not considered that the proposed action would disrupt the breeding cycle of a population of Greater Glider as there is a lack of indication of breeding population on-site. Greater Glider do not have specific habitat requirements of breeding and the removal of the potential habitat in the relatively small area of the referral site is unlikely to disrupt the breeding cycle of the population. Further, connectivity to the retained southern portion of the site will be facilitated by the provision of best-practice fauna passage.	**A significant impact is not likely**

Significant Impact Criteria	Assessment	Impact
6. Modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline	The referral area is subject to disturbance and modification from logging, historic fire and weed incursion. Further, the surrounding residential areas and Bundaberg Ring Road includes existing power lines that present a potential additional fragmenting factor and threat. It is unlikely that Greater Glider are utilising the hollow-bearing trees onsite as these are fragmented from the existing bushland and there was no evidence of Greater Glider detected onsite. It is not considered that the proposed action will impact the habitat on-site to the extent that the species is likely to decline.	**A significant impact is not likely**
7. Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat	The proposed action is unlikely to exacerbate the introduction of invasive species.	**A significant impact is not likely**
8. Introduce disease that may cause the species to decline, or	The project is unlikely to introduce disease into the area.	**A significant impact is not likely**
9. Interfere substantially with the recovery of the species.	Detailed studies did not detect any evidence of Greater Glider within the referral area, suggesting the vegetation on-site is not utilised by Greater Glider. In addition, cleared areas to the north and northeast are earmarked for future residential development. The referral area is largely isolated from other Greater Glider habitat (**Plan A07 – Greater Glider Fragmentation Analysis**). The referral site is not suitable for the reintroduction of Greater Glider nor will it be able to aid in the recovery of the species. Refer below for a response to the Conservation Advice.	**A significant impact is not likely**

The conservation advice for *Petauroides volans* (greater glider (southern and central)) came into effect on 5th July 2022. The document combines the approved conservation advice and listing assessment for the species and provides a foundation for conservation action and further planning.

Key threats to the Greater Glider are frequent and intense bushfires, inappropriate prescribed burning, climate change, land clearing and timber harvesting. The primary conservation objective is that within the next three generations, the population size as well as the extent, quality and connectivity of habitat required to maintain the population will have increased.

Conservation and management priorities

Habitat loss, disturbance and modification (including fire)

In the wake of the recent bushfires, unburnt areas are to be protected to support population recovery. The referral area is not part of the recent bushfire impacts in question, nor was the species recorded on site. The proposal will result in retained habitat areas. It is not anticipated that prescribed burns undertaken surrounding the site or within the area would impact on hollow bearing trees.

While the site is not considered to be critical habitat for the Greater Glider, and no evidence of the species was found onsite, an offset will be delivered in accordance with the *EPBC Act Environmental Offsets Policy 2012* to account for impacts to Koala habitat and foraging habitat for the Grey-headed Flying-fox which could benefit the Greater Glider.

Climate change

The impact site is not considered to be a climate change refuge. Notably, retained habitat areas will be rehabilitated to remove weeds and improve natural microclimate resources.

Invasive species (including threats from predation, grazing, trampling)

The proposed action will not introduce threats from predation that are not already present. Notably, dogs will be excluded from retained habitat areas.

Ex-situ recovery actions

Translocation is not proposed in the absence of the species. Notably, connected areas of potential foraging habitat for the species will be retained and rehabilitated on site.

Stakeholder and Community Engagement

Not applicable to the proposed action.

Survey and Monitoring Priorities

Not applicable to the proposed action.

Information and Research Priorities

Not applicable to the proposed action.

Recovery Plan

There Is not yet a recovery plan for the species.

Attachment A9

Koala MHQA and GHFF FHA Raw Data

Habitat Quality Assessment Unit Score Sheet

Part A - Administrative

Transect ID	Transect 1	Job Number / Property	11612

Part B - Site Data

Recorders	KH & MD	Date	16/05/2023

Assessment Unit:	Assessment Unit Area (ha)	RE	Bioregion Number
1	61.74	12.5.4	12

Site description and Location (including details of discrete polygons within the assessment unit)
Eucalyptus exserta dominated open woodland with *Eucalyptus latisinensis* and *Corymbia intermedia. Lophostemon suaveolens* dominates the subcanopy and *Sporobolus pyramidalis* dominates the groundlayer.

Part C - Native Species Richness: (*list species below)

Tree species richness:				
Total number of species	10			EDL / Dom / R
Scientific Name	*Eucalyptus exserta*	Common Name	Queensland Peppermint	EDL / Dom
Scientific Name	*Eucalyptus latisinensis*	Common Name	White Mahogany	EDL / R
Scientific Name	*Corymbia intermedia*	Common Name	Pink Bloodwood	EDL / R
Scientific Name	*Corymbia trachyphloia*	Common Name	Brown Bloodwood	EDL
Scientific Name	*Lophostemon suaveolens*	Common Name	Swamp Box	
Scientific Name	*Acacia leiocalyx*	Common Name	Early-flowering Black Wattle	
Scientific Name	*Acacia disparrima*	Common Name	Hickory Wattle	
Scientific Name	*Alphitonia excelsa*	Common Name	Soap Tree	
Scientific Name	*Melaleuca quinquenervia*	Common Name	Broad-leaved Paperbark	
Scientific Name	*Eucalyptus tereticornis*	Common Name	Forest Red Gum	EDL
Scientific Name		Common Name		

Shrub species richness:			
Total number of species	4		
Scientific Name	*Eucalyptus latisinensis*	Common Name	White Mahogany
Scientific Name	*Alphitonia excelsa*	Common Name	Soap Tree
Scientific Name	*Acacia leiocalyx*	Common Name	Early-flowering Black Wattle
Scientific Name	*Cupaniopsis anacardioides*	Common Name	Tuckeroo
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	

Grass species richness:			
Total number of species	4		
Scientific Name	*Entolasia stricta*	Common Name	Wiry Panic
Scientific Name	*Cymbopogon refractus*	Common Name	Barbed-wire Grass
Scientific Name	*Eriachne pallescens*	Common Name	Wanderrie Grass
Scientific Name	*Eragrostis brownii*	Common Name	Brown's Love Grass
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	

Forbs and others (non grass ground) species richness:			
Total number of species	3		
Scientific Name	*Dianella caerulea*	Common Name	Blue Flax-lilly
Scientific Name	*Trema tomentosa*	Common Name	Poison Peach
Scientific Name	*Dianella longifolia*	Common Name	Pale Flax-lilly
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	

Part D - Non-Native Plant Cover: (*list species below)

Total percentage cover within plot	70.00%		
Scientific Name	*Passiflora suberosa*	Common Name	Corky Passionflower
Scientific Name	*Lantana camara*	Common Name	Lantana
Scientific Name	*Sporobolus pyramidalis*	Common Name	Giant Rat's Tail Grass
Scientific Name	*Praxelis clematidea*	Common Name	Praxelis
Scientific Name	*Passiflora foetida*	Common Name	Stinking Passionfruit

Scientific Name	*Sida cordifolia*	**Common Name**	Flannel Weed
Scientific Name	*Emilia sonchifolia*	**Common Name**	Emilia
Scientific Name		**Common Name**	
Scientific Name		**Common Name**	
Scientific Name		**Common Name**	

Part E - Coarse Woody Debris: (*list lengths of individual logs in meters)

Total Length of Course Woody Debris (Meters per hectare)	**283.00**		
1	4.50	**8**	3.00
2	2.00	**9**	2.50
3	1.50	**10**	0.70
4	0.50	**11**	1.40
5	2.50	**12**	2.00
6	0.70	**13**	2.00
7	2.00	**14**	3.00

Part F - Native perennial grass cover, organic litter: (*provide percentage cover within each quadrat, and provide average cover)

Ground Cover	**Quadrat 1**	**Quadrat 2**	**Quadrat 3**	**Quadrat 4**	**Quadrat 5**	**Average**
Native perennial grass cover	0%	0%	75%	5%	0%	16%
Native other grass						
Native forbs and other species	0%	0%	5%	10%	0%	3%
Native shrubs	10%	1%	0%	0%	10%	4%
Non-native grass	90%	0%	5%	20%	60%	35%
Non native forbs and shrubs	0%	0%	0%	20%	0%	4%
Litter	0%	90%	15%	45%	30%	36%
Rock						
Bare Ground	0%	9%	0%	0%	0%	2%
Cryptogram						
Total	100%	100%	100%	100%	100%	100%

Part G- Number of large trees , tree canopy height, recruitment of woody perennial species:

Eucalypt Large tree DBH benchmark used :	420	**Number of large eucalypt trees:**	*C. trachyphloia* - 430, *E. latisinensis* - 430, 520 *E. exserta* - (270,500, 490), 495, 600, 710, 450 *E. tereticornis* - 590
Non- Eucalypt Large tree DBH benchmark used:	N/A	**Number of large non eucalypt trees:**	N/A
Total number of large trees recorded:	9		
Total Number Large Trees per ha:	18		

Median Tree Canopy Height Measurements	**Canopy:**	18	**Sub-canopy:**	10	**Emergent:**	NA

Percentage of ecologically dominant layer species regenerating:	**40**

Part H - Tree canopy cover, Shrub canopy cover

Tree canopy cover %	**Canopy:**	24.8%	**Sub-canopy:**	45.00%	**Emergent:**	
Shrub canopy cover %	20.30%					

Layer	**Start**	**End**	**Interval**	**Layer**	**Start**	**End**	**Interval**
T1 - *Corymbia intermedia* - 15m	21.1	25.6	4.5	**T2 -** *L. suaveolens*	0.0	0.8	0.8
T1 - *Corymbia intermedia* - 17m	25.7	32.2	6.5	**T2** - *A. excelsa*	0.8	1.1	0.3
T1 - *Eucalyptus exserta* - 19m	32.2	37.8	5.6	**T2 -** *L. suaveolens*	4.6	10.0	5.4
T1 - *Eucalyptus latisinensis* - 17m	64.6	72.8	8.2	**T2 -** *L. suaveolens*	10.7	13.8	3.1
T1			0.0	**T2 -** *L. suaveolens*	13.9	18.1	4.2
T1			0.0	**T2** - *A. disparrima*	23.9	27.7	3.8
T1			0.0	**T2 -** *M. quinquenervia*	39.9	40.9	1.0
T1			0.0	**T2 -** *L. suaveolens*	43.7	47.0	3.3
T1			0.0	**T2 -** *L. suaveolens*	47.0	52.2	5.2
T1			0.0	**T2 -** *L. suaveolens*	52.3	55.6	3.3
T1			0.0	**T2** - *A. excelsa*	55.6	59.1	3.5
T1			0.0	**T2 -** *L. suaveolens*	59.1	63.3	4.2
T1			0.0	**T2 -** *L. suaveolens*	63.3	64.5	1.2
T1			0.0	**T2** - *A. excelsa*	64.6	66.5	1.9
T1			0.0	**T2 -** *L. suaveolens*	76.2	80.0	3.8
T1			0.0	**T2** - *A. excelsa*	80.3	83.3	3.0
T1			0.0	**T2 -** *E. latisinensis*	83.3	84.8	1.5
T1			0.0	**T2** - *A. excelsa*	84.8	87.3	2.5
T1			0.0	**T2 -** *L. suaveolens*	87.4	90.0	2.6
T1			0.0	**T2** - *A. excelsa*	90.2	93.0	2.8
T1			0.0	**T2 -** *A. leiocalyx*	96.4	98.0	1.6
T8			0.0	**T2 -** *L. suaveolens*	99.3	100.0	0.7

Layer	**Start**	**End**	**Interval**	**Layer**	**Start**	**End**	**Interval**
Shrub - *A. leiocalyx*	2.0	2.3	0.3	Shrub - *A. excelsa*	35.6	36.1	0.5
Shrub - *A. excelsa*	6.2	6.5	0.3	Shrub - *A. leiocalyx*	40.0	40.7	0.7
Shrub - *A. leiocalyx*	7.4	7.6	0.2	Shrub - *A. leiocalyx*	54.4	55.5	1.1
Shrub - *A. excelsa*	8.4	8.9	0.5	Shrub - *A. excelsa*	57.6	58.4	0.8
Shrub - *A. excelsa*	14.9	15.2	0.3	Shrub - *A. leiocalyx*	58.5	59.1	0.6
Shrub - *A. excelsa*	24.5	25.7	1.2	Shrub - *A. excelsa*	60.0	61.2	1.2
Shrub - *A. excelsa*	27.7	28.0	0.3	**Shrub** - *A. excelsa*	66.5	68.6	2.1
Shrub - *A. sp. 1*	28.7	29.6	0.9	**Shrub** - *A. excelsa*	69.2	72.3	3.1
Shrub - *A. disparrima*	32.2	37.3	5.1	**Shrub** - *A. excelsa*	98.2	99.0	0.8
Shrub - *A. excelsa*	34.1	34.4	0.3				0.0

Note: Only assess Emergent (E) or Subcanopy (S) layers if the benchmark document stipulates that layers are present *If trees are in the same layer and continuous along the transect you can group them

Part I: GHFF Stem Count

Species Name	Stem Count
Lophostemon suaveolens	43
Alphitonia excelsa	5
Corymbia intermedia	10
Eucalyptus latisinensis	7
Eucalyptus exserta	5
Acacia leiocalyx	2
Melaleuca quinquenervia	2
Acacia disparrima	3
Total	77

Part J: SAT Survey Results

SAT Survey ID	1			
Tree Number	**Scientific Name**	**Common Name**	**DBH**	**Scat (Y/N)**
1	*E. exserta*	Qld Peppermint	400	N
2	*C. intermedia*	Pink Bloodwood	300	N
3	*C. intermedia*	Pink Bloodwood	180	N
4	*C. intermedia*	Pink Bloodwood	170	N
5	*L. suaveolens*	Swamp Box	210	N
6	*L. suaveolens*	Swamp Box	100	N
7	*L. suaveolens*	Swamp Box	230	N
8	*C. intermedia*	Pink Bloodwood	120	N
9	*M. quinquenervia*	Paperbark	130	N
10	*C. intermedia*	Pink Bloodwood	180	N
11	*E. exserta*	Qld Peppermint	520	N
12	*L. suaveolens*	Swamp Box	160	N
13	*L. suaveolens*	Swamp Box	170	N
14	*L. suaveolens*	Swamp Box	200	N
15	*E. tereticornis*	Forest Red Gum	280	N
16	*E. latisinensis*	White Mahogany	450	N
17	*L. suaveolens*	Swamp Box	450	N
18	*L. suaveolens*	Swamp Box	120	N
19	*L. suaveolens*	Swamp Box	190	N
20	*L. suaveolens*	Swamp Box	250	N
21	*L. suaveolens*	Swamp Box	100	N
22	*L. suaveolens*	Swamp Box	190	N
23	*A. disparrima*	Hickory Wattle	150	N
24	*C. intermedia*	Pink Bloodwood	100	N
25	*A. excelsa*	Soap Tree	100	N
26	*A. excelsa*	Soap Tree	100	N
27	*A. excelsa*	Soap Tree	100	N
28	*L. suaveolens*	Swamp Box	130	N
29	*L. suaveolens*	Swamp Box	130	N
30	*L. suaveolens*	Swamp Box	120	N
Total				0/30

Part K: Greater Glider Results

Scientific Name	Alive / Dead	DBH	Hollows
Corymbia intermedia	Alive	400	
Corymbia intermedia	Alive	300	
Corymbia intermedia	Alive	360	
Eucalyptus latisinensis	Alive	320	
Eucalyptus latisinensis	Alive	320	
Eucalyptus latisinensis	Alive	520	Y - 1 Small
Eucalyptus latisinensis	Alive	400	
Eucalyptus latisinensis	Alive	355	
Eucalyptus tereticornis	Alive	340	
Eucalyptus tereticornis	Alive	350	
Eucalyptus tereticornis	Alive	590	Y - 1 Small
Eucalyptus exserta	Alive	270, 500, 490	Y - 2 Medium
Eucalyptus exserta	Alive	495	
Eucalyptus exserta	Alive	600	
Eucalyptus exserta	Alive	710	Y - 1 Medium
Eucalyptus exserta	Alive	450	
Corymbia trachyphloia	Alive	430	
Lophostemon suaveolens	Alive	300	

Attach Landscape Photos Here

North

South

East

West

Habitat Quality Assessment Unit Score Sheet

Part A - Administrative

Transect ID	Transect 2	Job Number / Property	11612

Part B - Site Data

Recorders	KH & MD	Date	16/05/2023

Assessment Unit:	Assessment Unit Area (ha)	RE	Bioregion Number
1	61.74	12.5.4	12

Site description and Location (including details of discrete polygons within the assessment unit)
Corymbia intermedia dominated open woodland with *Eucalyptus latisinensis* and *Eucalyptus exserta* . Shrub layer dominated by dense *Lantana camara* infestation.

Part C - Native Species Richness: (*list species below)

Tree species richness:				
Total number of species	12			EDL / Dom / R
Scientific Name	*Corymbia trachyphloia*	Common Name	Brown Bloodwood	EDL
Scientific Name	*Corymbia intermedia*	Common Name	Pink Bloodwood	EDL / Dom / R
Scientific Name	*Eucalyptus latisinensis*	Common Name	White Mahogany	EDL / R
Scientific Name	*Eucalyptus exserta*	Common Name	QLD Peppermint	EDL
Scientific Name	*Eucalyptus siderophloia*	Common Name	Northern Grey Ironbark	EDL
Scientific Name	*Corymbia henryii*	Common Name	Large-leaved Spotted Gum	EDL
Scientific Name	*Angophora leiocarpa*	Common Name	Smooth-barked Apple	
Scientific Name	*Alphitonia excelsa*	Common Name	Soap Tree	
Scientific Name	*Lophostemon suaveolens*	Common Name	Swamp Box	
Scientific Name	*Greveilla banksii*	Common Name	Greveilla	
Scientific Name	*Acacia leiocalyx*	Common Name	Early-flowering Black Wattle	
Scientific Name	*Acacia disparrima*	Common Name	Hickory Wattle	

Shrub species richness:			
Total number of species	4		
Scientific Name	*Acacia flavescens*	Common Name	Red Wattle
Scientific Name	*Alphitonia excelsa*	Common Name	Soap Tree
Scientific Name	*Acacia leiocalyx*	Common Name	Early-flowering Black Wattle
Scientific Name	*Ficus coronata*	Common Name	Sandpaper Fig
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	

Grass species richness:			
Total number of species	4		
Scientific Name	*Imperata cylindrica*	Common Name	Blady Grass
Scientific Name	*Oplismenus aemulus*	Common Name	Basket Grass
Scientific Name	*Panicum decompositum*	Common Name	Native Millet
Scientific Name	*Cymbopogon refractus*	Common Name	Barbed-wire Grass
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	

Forbs and others (non grass ground) species richness:			
Total number of species	8		
Scientific Name	*Lobelia purpurascens*	Common Name	White Root
Scientific Name	*Dianella caerulea*	Common Name	Blue Flax-lilly
Scientific Name	*Lomandra multiflora*	Common Name	Many-flowered Matrush
Scientific Name	*Geitonoplesium cymosum*	Common Name	Scrambling Lilly
Scientific Name	*Glycine clandestina*	Common Name	Slender Glycine
Scientific Name	*Cheilanthes distans*	Common Name	Bristle Cloak Fern
Scientific Name	*Convolvulus angustissimus*	Common Name	Slender Binweed
Scientific Name	*Parsonsia straminea*	Common Name	Monkey Rope
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	

Part D - Non-Native Plant Cover: (*list species below)

Total percentage cover within plot	80.00%		
Scientific Name	*Passiflora suberosa*	Common Name	Corky Passion

Scientific Name	*Sporobolus pyramidalis*	Common Name	Giant Rat's Tail Grass
Scientific Name	*Praxelis clematidea*	Common Name	Praxelis
Scientific Name	*Desmodium intortum*	Common Name	Greenleaf Desmodium
Scientific Name	*Lantana camara*	Common Name	Lantana
Scientific Name	*Urena lobata*	Common Name	Urena Burr
Scientific Name	*Sida cordifolia*	Common Name	Flannel weed
Scientific Name		Common Name	
Scientific Name		Common Name	
Scientific Name		Common Name	

Part E - Coarse Woody Debris: (*list lengths of individual logs in meters)

Total Length of Course Woody Debris (Meters per hectare)	215.00		
1	0.50	7	2.00
2	1.00	8	1.50
3	5.00	9	1.00
4	2.00	10	3.50
5	2.00	11	2.00
6	1.00	12	

Part F - Native perennial grass cover, organic litter: (*provide percentage cover within each quadrat, and provide average cover)

Ground Cover	Quadrat 1	Quadrat 2	Quadrat 3	Quadrat 4	Quadrat 5	Average
Native perennial grass cover	10%	0%	0%	0%	20%	6%
Native other grass						
Native forbs and other species	20%	0%	0%	15%	40%	15%
Native shrubs						
Non-native grass	0%	70%	80%	75%	0%	45%
Non native forbs and shrubs	10%	10%	15%	10%	30%	15%
Litter	60%	20%	5%	0%	10%	19%
Rock						
Bare Ground						
Cryptogram						
Total	100%	100%	100%	100%	100%	100%

Part G- Number of large trees , tree canopy height, recruitment of woody perennial species:

Eucalypt Large tree DBH benchmark used :	420	Number of large eucalypt trees:	*Corymbia trachyphloia* - 690, 620, 420, 450, 790, 735, 645, 770, 620 *Eucalyptus latisinensis* - (430, 400), 460, 590
Non- Eucalypt Large tree DBH benchmark used:	N/A	Number of large non eucalypt trees:	N/A
Total number of large trees recorded:	12		
Total Number Large Trees per ha:	24		

Median Tree Canopy Height Measurements	Canopy:	19	Sub-canopy:	8	Emergent:	NA

Percentage of ecologically dominant layer species regenerating:	33.00

Part H - Tree canopy cover, Shrub canopy cover

Tree canopy cover %	Canopy:	54.8%	Sub-canopy:	44.50%	Emergent:	N/A
Shrub canopy cover %	6.90%					

Layer	Start	End	Interval	Layer	Start	End	Interval
T1 - *Eucalyptus latisinensis* - 16m	0.0	2.1	2.1	**T2** - *A. excelsa*	1.4	4.0	2.6
T1 - *Corymbia intermedia* - 18m	17.1	25.2	8.1	**T2** - *E. latisinensis*	2.3	3.4	1.1
T1 - *Corymbia henryii* - 16m	30.7	35.6	4.9	**T2** - *E. latisinensis*	12.2	16.0	3.8
T1 - *Eucalyptus exserta* - 17m	36.0	38.3	2.3	**T2** - *E. tereticornis*	16.3	19.0	2.7
T1 - *Eucalyptus siderophloia* - 17m	38.5	45.0	6.5	**T2 -** *A. excelsa*	20.2	21.5	1.3
T1 - *Corymbia intermedia* - 17m	52.0	58.7	6.7	**T2** - *C. intermedia*	21.5	24.9	3.4
T1 - *Corymbia intermedia* - 18m	58.7	65.1	6.4	**T2 -** *A. excelsa*	26.6	27.4	0.8
T1 - *Corymbia intermedia* - 18m	69.8	77.5	7.7	**T2 -** *A. excelsa*	32.1	33.0	0.9
T1 - *Eucalyptus latisinensis* - 18m	88.4	95.4	7.0	**T2** - *E. exserta*	33.4	34.2	0.8
T1 - *Eucalyptus latisinensis* - 18m	96.9	100.0	3.1	**T2 -** *A. excelsa*	34.3	36.2	1.9
				T2 - *A. excelsa*	36.3	37.0	0.7
				T2 - *E. latisinensis*	38.1	42.3	4.2
				T2 - *C. intermedia*	43.6	46.0	2.4
				T2 - *A. excelsa*	46.1	47.6	1.5
				T2 - *A. excelsa*	59.8	61.2	1.4
				T2 - *E. latisinensis*	63.8	64.0	0.2
				T2 - *C. intermedia*	65.0	66.6	1.6
				T2 - *A. excelsa*	68.0	68.5	0.5
				T2 - *C. intermedia*	68.5	70.0	1.5
				T2 - *C. intermedia*	75.5	76.3	0.8
				T2 - *C. intermedia*	76.3	77.4	1.1
				T2 - *C. intermedia*	78.7	80.3	1.6
				T2 - *A. excelsa*	80.3	80.5	0.2
				T2 - *C. intermedia*	84.3	85.3	1.0
				T2 - *A. leiocalyx*	86.5	89.5	3.0
				T2 - *C. intermedia*	90.5	92.2	1.7
				T2 - *C. intermedia*	94.6	96.4	1.8

Layer	Start	End	Interval	Layer	Start	End	Interval

Shrub - *A. excelsa*	4.3	5.8	1.5	**Shrub** - *L. camara*	51.8	57.4	5.6
Shrub - *E. tereticornis*	21.4	21.7	0.3	**Shrub** - *A. leiocalyx*	58.9	59.0	0.1
Shrub - *A. excelsa*	29.6	29.7	0.1	**Shrub** - *A. excelsa*	77.5	78.4	0.9
Shrub - *A. excelsa*	29.9	30.4	0.5	**Shrub** - *F. coronata*	85.3	86.2	0.9
Shrub - *A. excelsa*	33.6	33.7	0.1	**Shrub** - *A. excelsa*	91.9	92.3	0.4
Shrub - *A. excelsa*	48.1	48.4	0.3	**Shrub** - *A. excelsa*	95.8	96.5	0.7
Shrub - *A. excelsa*	48.9	49.6	0.7	**Shrub** - *A. excelsa*	98.9	99.3	0.4

Note: Only assess Emergent (E) or Subcanopy (S) layers if the benchmark document stipulates that layers are present *If trees are in the same layer and continuous along the transect you can group them

Part I: GHFF Stem Count

Species Name	Stem Count
Corymbia intermedia	39
Eucalyptus latisinensis	21
Eucalyptus exserta	1
Corymbia henryii	1
Eucalyptus siderophloia	3
Angophora leiocarpa	1
Eucalyptus tereticornis	1
Alphitonia excelsa	1
Total	68

Part J: SAT Survey Results

SAT Survey ID	2			
Tree Number	**Scientific Name**	**Common Name**	**DBH**	**Scat (Y/N)**
1	*C. henryii*	Spotted Gum	200	N
2	*C. intermedia*	Pink Bloodwood	140	N
3	*E. latisinensis*	White Mahogany	290	N
4	*E. latisinensis*	White Mahogany	280	N
5	*E. siderophloia*	Grey Ironbark	280	N
6	*C. intermedia*	Pink Bloodwood	100	N
7	*C. intermedia*	Pink Bloodwood	800	N
8	*A. leiocarpa*	Smooth-bark Apple	100	N
9	*C. intermedia*	Pink Bloodwood	290	N
10	*C. intermedia*	Pink Bloodwood	240	N
11	*C. intermedia*	Pink Bloodwood	280	N
12	*E. latisinensis*	White Mahogany	120	N
13	*E. latisinensis*	White Mahogany	200	N
14	*E. latisinensis*	White Mahogany	220	N
15	*C. intermedia*	Pink Bloodwood	120	N
16	*A. leiocarpa*	Smooth-bark Apple	100	N
17	*E. latisinensis*	White Mahogany	100	N
18	*C. intermedia*	Pink Bloodwood	100	N
19	*C. intermedia*	Pink Bloodwood	300	N
20	*C. intermedia*	Pink Bloodwood	180	N
21	*E. latisinensis*	White Mahogany	120	N
22	*E. latisinensis*	White Mahogany	340	N
23	*E. latisinensis*	White Mahogany	160	N
24	*C. intermedia*	Pink Bloodwood	150	N
25	*E. latisinensis*	White Mahogany	250	N
26	*E. tereticornis*	Forest Red Gum	100	N
27	*C. intermedia*	Pink Bloodwood	320	N
28	*C. intermedia*	Pink Bloodwood	100	N
29	*C. intermedia*	Pink Bloodwood	140	N
30	*C. intermedia*	Pink Bloodwood	280	N
Total				0/30

Part K: Greater Glider Results

Scientific Name	Alive / Dead	DBH	Hollows
Corymbia intermedia	Alive	340	
Corymbia intermedia	Alive	390	
Corymbia intermedia	Alive	390	
Corymbia intermedia	Alive	340	
N/A	Dead	360	
Eucalyptus latisinensis	Alive	490	
Eucalyptus latisinensis	Alive	590	
Eucalyptus latisinensis	Alive	460	
N/A	Alive	530	Y - 4 Medium
Corymbia trachyphloia	Alive	690	
Corymbia trachyphloia	Alive	620	Y - 2 small
Corymbia trachyphloia	Alive	420	
Corymbia trachyphloia	Alive	450	
Corymbia trachyphloia	Alive	790	
N/A	Alive	630	
N/A	Alive	490	1 hollow
Corymbia trachyphloia	Alive	735	Y - 2 small
Corymbia trachyphloia	Alive	645	
Corymbia trachyphloia	Alive	620	
Corymbia trachyphloia	Alive	770	Y - 1 small
N/A	Alive	630	Y - 3 small

Attach Landscape Photos Here

North

South