Compliance Report

Coomera Connector Stage 1 - EPBC 2020/8646, 18 March 2024 – 17 March 2025



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Declaration of Accuracy

In making this declaration, I am aware that sections 490 and 491 of the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act) make it an offence in certain circumstances to knowingly provide false or misleading information or documents. The offence is punishable on conviction by imprisonment or a fine, or both. I declare that all the information and documentation supporting this compliance report is true and correct in every particular. I am authorised to bind the approval holder to this declaration and that I have no knowledge of that authorisation being revoked at the time of making this declaration.

Signed	Andrew Wheeler 2025.05.29 17:40:52 +10'00'	
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Document control

Date	Version	Position	Change	Reason for Change
17 March 2025	1	Environmental Adviser (CCS1)	Document created	New report
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Acronym definitions

Acronym	Definition
Biodiversity Assessment and Management	BAAM
Brisbane City Council	BCC
Coomera Connector Stage 1	CCS1
Central Queensland University	CQU
Currumbin Wildlife Sanctuary	CWS
Department of Climate Change Energy and the Environment	DCCEEW
Department of Environment, Science and Innovation	DESI
Department of Transport and Main Roads	TMR
Endeavour Veterinary Ecology	EVE
Environment Protection and Biodiversity Conservation Act 1999	EPBC Act
Fulton Hogan/Hull/Mclllwain Joint Venture	FHHMJV
Greenridge Offset Area	GOA
Griffith University	GU
International Union for Conservation of Nature	IUCN
Koala Management Plan	KMP
Offset Area Management Plan	OAMP
Population Viability Analysis	PVA
Public Environmental Report	PER
Queensland Institute of Medical Research	QIMR
Queensland University of Technology	QUT
Rapid Antigen Test	RAT
Regional Ecosystem	RE
Revised Action Management Plan	RAMP
Tabooba Offset Area	ТОА
Threatened Ecological Community	TEC
University of Southern Queensland	USQ
University of Sunshine Coast	USC
University of Sydney	USYD
University of Queensland	UQ
Water Quality Management Plan	WQMP

1. Description of activities

1.1 Background

The Coomera Connector will be a future six-lane motorway extending for approximately 45 kilometres from the Pacific Motorway (M1) / Logan Motorway (M6) interchange at Loganholme to Nerang-Broadbeach Road, Nerang (in proximity to the current Exit 71 on the M1). The Coomera Connector represents a significant investment for the Australian and Queensland governments; and is seen as a program investment to be delivered over 10-to-20-year timeframe. Queensland Department of Transport and Main Roads (TMR) is planning to deliver the Coomera Connector in discrete and stand-alone sections which:

- contribute to the overall objectives for the Coomera Connector,
- suit the traffic demands and the availability of funding.

The highest priority section is a 16-kilometre section between Shipper Drive, Coomera and Nerang-Broadbeach Road, Nerang which is known as *Coomera Connector Stage 1, Queensland* (EPBC 2020/8646) (The Project).

The Australian and Queensland governments have jointly committed to building the initial aspects of the Project. The initial works comprises the construction of a four/six-lane divided motorway (future capacity for 6-lanes) between Coomera and Nerang with grade-separated connections to the local road network and an adjacent shared use path with connections to the local footpath network and the heavy and light rail stations. The Project has funding of \$3.03 billion at time of writing. The EPBC 2020/8646 approval date was 17 March 2023 and TMR has commenced main construction of the road as of 27 March 2023.

1.2 EPBC Act approval requirements

This compliance report has been prepared in accordance with condition 44 of the EPBC Act approval (2020/8646) which outlines all project conditions identified in the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) referral determination (EPBC 2020/8646) for the Coomera Connector Stage 1 and currently employed measures and evidence to demonstrate compliance with each of these conditions. On 17th February 2025, the Delegate of the Minister approved a variation to the EPBC Act Approval (2020/8646) which amended Condition 1 and resulted in the inclusion of condition 5A. The purpose of the variation was to amend the PER Boundary to allow for connections to existing infrastructure and public utilities.

Note that under condition 47e of these conditions, sensitive ecological data is to be excluded or redacted from compliance reports published on the website or otherwise provided to a member of the public, and therefore will not be included in this document.

Management plan conditions pertaining to environmental offsets and water quality management will be covered in sections 3 and 4 respectively.

The reporting period presented in this document is from 18 March 2024 to 17 March 2025.

2. Approval conditions

As per the Coomera Connector Stage 1, Queensland (2020/8646) EPBC Referral, the following section identifies approval conditions and current measures demonstrating compliance with the approval.

Table 1 EPBC approval conditions compliance table

Condition number	Condition	Is the project compliant with this condition?	Evidence/comments
1	The approval holder must not clear or construct outside of the development area as part of this Action	Compliant	Entirety of corridor has not yet been cleared. Current clearing areas are within the development area.
2	Within the development area, the approval holder must not clear or cause the functional loss of more than:		
2(a)	73.8 ha of koala habitat	Compliant	Vegetation retained on site. Significant storm event occurred on 25 December 2023 which resulted in damage to vegetation on and close to site which is still evident in 2025 (see Appendix A).
2(b)	68.756 ha of Grey-headed Flying-fox habitat	Compliant	Vegetation retained on site. Significant storm event occurred on 25 December 2023 which resulted in damage to vegetation on and close to site which is still evident in 2025 (see Appendix A).
2(c)	15.928 ha of Coastal Swamp Oak TEC	Compliant	Vegetation retained on site. Significant storm event occurred on 25 December 2023 which resulted in damage to vegetation on and close to site which is still evident in 2025 (see Appendix A).
3	To minimise the risk of injury or death to the Koala and Grey- headed Flying-fox within the development area, the approval holder must:		
3(a)	ensure that a suitably qualified fauna spotter catcher who is given sufficient authority to delay and/or cease any clearing and construction is present during all clearing, to ensure Koalas and Grey-headed Flying-foxes have safely vacated the area of works before the Koala habitat and Grey-headed Flying-fox habitat is cleared	Compliant	All fauna spotter/catchers working on the project are suitably qualified. Procedures are in place to ensure procedures are adhered to.
3(b)	clear only in accordance with the Nature Conservation (Koala) Conservation Plan 2017 (Qld), so as to allow Koalas to safely relocate out of any area to be cleared and into nearby appropriate areas of remaining Koala habitat, or be translocated as a last resort to areas of suitable Koala habitat	Compliant	Procedures are in place to ensure processes are adhered to. Koala Management Plan ensures all koalas within any area to be cleared are actively dispersed/relocated/translocated prior to clearing.
3(c)	install temporary or permanent Koala exclusion fencing around all areas of construction proposed within 150 metres of remaining Koala habitat, prior to the commencement of construction in that area, so as to prevent Koalas entering any area where construction is taking place	Compliant	Detailed in Environmental Management Plans and evidenced per internal inspection program.
3(d)	ensure temporary Koala exclusion fencing remains in place around any construction area that is within 150 metres of remaining Koala habitat, until all construction activities within that fenced area are completed, or until permanent Koala exclusion fencing is installed	Compliant	Detailed in Environmental Management Plans and evidenced per internal inspection program.

3(e)	implement safe movement solutions during construction, to ensure that the speed of all vehicles on construction roads in the development area where Koalas are likely to be present is no greater than 40 km/h at any time (except in an emergency and on existing roads), so as to minimise the risk to Koalas from vehicle strike	Compliant	Detailed in Environmental Management Plans and evidenced per internal inspection program.
3(f)	implement the Koala-sensitive Design Guidelines in all parts of the development area that are within 150 metres of remaining Koala habitat	Compliant	Detailed in Environmental Management Plans and Environmental Design Reports and evidenced per internal inspection program.
3(g)	ensure that any clearing or construction within 50 meters of a Grey-headed Flying-fox camp is conducted consistently with the Grey-headed Flying-fox mitigation standards	Compliant	One Grey-headed Flying-fox camp was located within 50m to the Central Package. However, regular monitoring of the camp by a Suitably Qualified Person identified that the camp was unused. No camps identified within 50m of the North package.
3(h)	prohibit people bringing dogs into the development area during clearing and construction, except where the dog is brought into the development area by the approval holder for the purposes of construction in a way that maintains the protection of the Koala	Compliant	Dogs are prohibited at all construction sites. Procedures are in place to ensure processes are adhered to.
4	To maintain Koala habitat connectivity so that Koalas can move through the development area and maintain breeding patterns, the approval holder must ensure that:		
4(a)	safe movement solutions or temporary safe movement solutions are implemented during construction, where their implementation during construction does not pose a risk to the Koala	Compliant	Koalas are excluded from site through the installation and maintenance of fauna exclusion fencing which undergo a rigorous approval process prior to their implementation. Additional safe movement solutions are not yet required during construction.
4(b)	any area of Koala movement as identified by the review required under condition 14(a) is only fragmented by construction for a maximum period of 2 Koala breeding seasons	Compliant	Two breeding seasons have not yet passed.
4(c)	safe movement solutions that facilitate Koala movement required by condition 14(d) are installed and accessible to Koalas on or before the maximum period of 2 Koala breeding seasons in any area of Koalas movement where construction is being undertaken	Compliant	Two breeding seasons have not yet passed.
4(d)	at minimum, all safe movement solutions required by condition 14(d) are installed and accessible to Koalas prior to opening the corresponding road for public access within the development area as part of this Action	Compliant	Roads have not been opened to the public.
5	To ensure the ongoing health and viability of the East- Coomera Koala Population and Parkwood-Coombabah Koala Population, the approval holder must:		
5(a)	fund and commence the Koala research within 2 years of the approval decision, and	Compliant	All proposed Koala research paid in full in June 2024.

5(b)	include in each Compliance Report a summary of the progress	Compliant	Summary of research progress can be viewed in Appendix B
	and any findings of each project of the Koala research at least until the end of year 10.		Detailed reports on all unpublished findings have been provided to DCCEEW and redacted from public viewing.
5A)	To mitigate the impact of earthworks and bridge construction on the Nerang River floodplain, the approval holder must:		
5A) a)	undertake mitigation measures, including landform reinstatement and rehabilitation of the rehabilitation area	Not applicable	No works have commenced within the rehabilitation area.
5A) b)	monitor water quality in the Nerang River downstream of any mitigation measures involving earthworks prior to, during and after any earthworks being conducted,	Not applicable	No works have commenced within the rehabilitation area.
5A) c)	implement erosion and sediment controls to ensure there are no measurable impacts to water quality of the Nerang River or the Moreton Bay Ramsar wetland arising from the Action or mitigation measures, and	Not applicable	No works have commenced within the rehabilitation area.
5A) d)	ensure that all revegetation plantings use local native plant species that improve habitat quality and habitat connectivity for protected matters.	Not applicable	No works have commenced within the rehabilitation area.
6	To maintain the quality of retained Coastal Swamp Oak TEC within 30 m of clearing and/or construction as a result of this Action, the approval holder must:		
6(a)	Ensure that the quality and/or extent of retained Coastal Swamp Oak TEC within 30 m of clearing and/or construction does not degrade due to impacts attributable to this Action	Compliant	Vegetation retained on site. Construction Contractor's Environmental Management Plans are implemented during construction to manage indirect impacts. Significant storm event occurred on 25 December 2023 which resulted in damage to vegetation on and close to site and is still evident in 2025 (see Appendix A).
6(b)	engage an independent suitably qualified expert to:		
6(bi)	assess and document the quality and extent of Coastal Swamp Oak TEC to be retained within 30 m of clearing and/or construction, prior to the commencement of clearing and/or construction within 30 m of Coastal Swamp Oak TEC.	Compliant	Report completed by BAAM on 05/04/2023 - "Coastal Swamp Oak TEC condition Monitoring February 2023 Coomera Connector Stage 1". See Appendix E.
6(bii)	at least once each calendar year following the commencement of clearing and/or construction within 30 m of retained Coastal Swamp Oak TEC, and continuing for at least two calendar years after clearing and/or construction within 30 m of retained Coastal Swamp Oak TEC, assess and document:	Compliant	Annual assessment undertaken in May – August 2024. Report completed by Ausecology on 30/08/2024 – "Coomera Connector - Threatened Ecological Community Assessments ". See Appendix E.
	• the quality and extent of retained Coastal Swamp Oak TEC within 30 m of clearing and/or construction, and		
	• any degradation in quality and/or extent of retained Coastal Swamp Oak TEC within 30 m of clearing and/or construction, that is attributable to this Action.		

6(biii)	provide a report of the assessment required by condition 6(b)(ii) to the approval holder by 1 February of each calendar year following the undertaking of such assessment.	Compliant	Annual assessment submitted to TMR on 30 th August 2024
7	If a report by the independent suitably qualified expert documents any degradation in the quality and/or extent of retained Coastal Swamp Oak TEC that is attributable to this Action, within 20 business days of receiving the report required by 6(b)(iii), write to the department noting the outcome and providing a copy of the report to the department.	Not applicable	No degradation in quality and/or extent in retained Coastal Swamp Oak TEC has been attributed to the Project. Significant storm event occurred on 25 December 2023 which resulted in damage to vegetation on and close to site (see Appendix A).
8	To compensate for any additional significant residual impact to the Coastal Swamp Oak TEC identified in condition 7, within 6 months of receiving the report required by 6(b)(iii), the approval holder must submit to the department for the Minister's approval a revised OAMP-TOA&GOA that identifies an additional environmental offset(s) that meets the requirements of the EPBC Act Environmental Offsets Policy to the satisfaction of the Minister.	Not applicable	No additional significant residual impacts to Coastal Swamp Oak TEC have been attributed to the Project.
9	To compensate for the loss of up to 73.8 ha of Koala habitat, up to 15.928 ha of Coastal Swamp Oak TEC and up to 68.756 ha of Grey-headed Flying-fox habitat, the approval holder must:		
9(a)	Legally secure a minimum of 313.38 ha of land within the Tabooba offset area and 77.7 ha of Coastal Swamp Oak TEC, 45.35 ha of Koala and Grey-headed Flying-fox offsets within the Greenridge offset area within 12 months of this approval decision.	Compliant	Voluntary Declaration received on 15 March 2024.
9(b)	Within 20 business days of legally securing the areas within the Tabooba offset area and Greenridge offset area specified in condition 9(a), provide the department with:		
9(bi)	Written evidence demonstrating that the areas within the Tabooba offset area and Greenridge offset area specified in condition 9(a), have been legally secured	Compliant	Voluntary Declaration received on 15 March 2024 and notification provided in writing to DCCEEW on 21 March 2024.
9(bii)	Shapefiles and offset attributes of the areas within the Tabooba offset area and Greenridge offset area specified in condition 9(a).	Compliant	Voluntary Declaration received on 15 March 2024 and notification provided in writing to DCCEEW on 21 March 2024.
9(c)	Achieve all the habitat quality uplift outcomes within the timeframes specified.	Not applicable	Timeframes have not yet been reached, OAMP activities are ongoing.

10	Within 6 months of this approval decision, the approval holder must submit an Offset Area Management Plan for the Tabooba offset area and Greenridge Offset area (OAMP- TOA&GOA) to the department for the Minister's approval. The OAMP-TOA&GOA must meet the requirements of the Environmental Offsets Policy, the Environmental Management Plan Guidelines and meet the requirements specified in Attachment F to the satisfaction of the Minister.	Compliant	OAMP-TOA&GOA submitted on 16 May 2023. Email sent to DCCEEW titled 2020/8646 Stage 1 Coomera Connector - submission of OAMP sent on 16 May 2023. Email acknowledgement by DCCEEW received on 17 May 2023.
11	If the Minister writes to the approval holder stating that he/she considers that the OAMP-TOA&GOA, required under condition 10 is not likely to achieve the outcomes required under condition 9(c), the approval holder must cease all clearing and/or construction at the development area within 2 months of receiving such a notice, or as otherwise directed by the Minister. Clearing and/or construction may only restart after the Minister notifies the approval holder that the Minister has approved the revised OAMP-TOA&GOA, or otherwise with the Minister's written direction.	Not applicable	Has not occurred, OAMP was approved on the 22 August 2024.
12	The approval holder must implement the OAMP-TOA&GOA as approved by the Minister until the expiry of this approval.	Compliant	OAMP-TOA&GOA was approved on 22 August 2024. Refer to Appendix F for current update of OAMP implementation.
13	For the ongoing protection and viability of the Koala populations within the development area, the approval holder must implement the Koala Management Plan until the expiry of this approval.	Compliant	Implementation of current approved KMP, defined as Appendix 14 of the PER, is ongoing. A revised version of the revised Koala Management Plan was submitted to DCCEEW for approval on 14 th December 2023, and further revised version submitted 12 August 2024.
14	To ensure the ongoing effectiveness of the Koala Management Plan, the approval holder must, within 9 months of this approval decision submit to the department for approval by the Minister a revised Koala Management Plan consistent with the Environmental Management Plan Guidelines, that includes:	Compliant	Implementation of current approved KMP, defined as Appendix 14 of the PER, is ongoing. A revised version of the revised Koala Management Plan was submitted to DCCEEW for approval on 14 th December 2023, and further revised version submitted 12 August 2024.
14(a)	a review completed by a suitability qualified Koala ecologist of:		
14(ai)	baseline Koala movement, prior to any clearing and construction associated with this Action, within and adjacent to the development area	Compliant	Completed by Endeavour Veterinary Ecology, review completed by Wattle Eco. Submitted as part of the revised KMP on 12 August 2024, awaiting DCCEEW assessment.
14(aii)	safe movement solutions to be installed by the approval holder to maintain baseline Koala movement within and adjacent to the development area, with reference to Koala sensitive design guidelines and the Queensland's wildlife signing guidelines	Compliant	Completed by Endeavour Veterinary Ecology, review completed by Wattle Eco. Submitted as part of the revised KMP on 12 August 2024, awaiting DCCEEW assessment.
14(aiii)	modelled sea level rise from climate change, and whether the safe movement solutions proposed will at least maintain baseline Koala movement until at least 2100	Compliant	Incorporated into the Koala Movement Solutions, Appendix C to the revised KMP submitted for approval on 12 August 2024. Supplied by the Project Designers and completed by Endeavour Veterinary Ecology, review completed by Wattle Eco.

14(b)	a peer-review by an independent suitability qualified Koala ecologist of all findings made, as required under condition 14(a)	Compliant	Provided to DCCEEW on 12 August 2024 as Appendix D of the revised KMP.
14(c)	all peer review comments and recommendations made by the independent suitably qualified Koala ecologist required under condition 14(b) and a statement from the independent suitably qualified Koala ecologist that they are independent and carried out the peer review to evaluate the adequacy of all findings made, as required under condition 14(a)	Compliant	Provided to DCCEEW on 12 August 2024 as Appendix D of the revised KMP.
14(d)	the exact locations, dimensions and maintenance intervals of safe movement solutions to be implemented within the development area, and an explanation of how the safe movement solutions proposed are consistent with or diverge from the recommendations made in respect of condition 14)a) and 14)c), and how they will maintain or enhance Koala movement	Compliant	Incorporated into the Koala Movement Solutions, Appendix C to the revised KMP submitted for approval on 12 August 2024. Supplied by the Project Designers and completed by Endeavour Veterinary Ecology, review completed by Wattle Eco.
14(e)	procedures to ensure safe movement solutions are installed prior to opening any road as part of this Action to public motorists	Compliant	Provided to DCCEEW on 12 August 2024 as Appendix E of the revised KMP and awaiting assessment.
14(f)	a Koala translocation plan consistent with the IUCN translocations guideline and Environmental Management Plan Guidelines.	Compliant	Provided to DCCEEW on 12 August 2024 as Appendix B of the revised KMP.
15	Include in each Compliance Report in respect of each year in which any Koala translocation and/or monitoring of translocated koalas was undertaken, details of:		
15(a)	all Koalas that have been translocated and the history and current status of each translocated Koala since its translocation	Compliant	See Appendix C
15(b)	what alternatives to translocation were considered and/trialled prior to each translocation, and why translocation was necessary for each individual	Compliant	See Appendix C
15(c)	alternative measures that will be undertaken in the event that translocation resulted in the death of a Koala.	Compliant	No deaths as a result of translocation have occurred. Measures recorded in Koala Translocation Plan included in revised KMP (awaiting assessment by DCCEEW).
16	The approval holder must complete and publish a population viability analysis for each of the East-Coomera Koala Population and Parkwood-Coombabah Koala Population within 2 years of opening any road as part of this Action to public motorists within the East-Coomera Koala Population and Parkwood-Coombabah Koala Population	Not applicable	No road has yet been opened as a part of this Action.

17	If either population viability analysis shows that this Action has resulted in impacts to the Parkwood Coombabah Koala Population and/or East-Coomera Koala Population to the extent that either population is or will become non-viable as a result of this Action, the approval holder must submit within 3 months of the publication of the population viability analyses, a revised version of the Koala Management Plan to the department for the Minister's approval. The revised Koala Management Plan must include measures to achieve the viability of the affected Koala population(s) within 12 months of the publication	Not applicable	Population viability analyses have not yet commenced.
18	If the Koala tagging and monitoring program specified within the Koala Management Plan shows that any safe movement solution required under condition 4 does not achieve Koala movement equivalent to or greater than the Koala movement determined by the baseline studies required by condition 14(a), the approval holder must submit a revised version of the Koala Management Plan to the department for the Minister's approval within 18 months of opening any road to public motorists within 25 metres of any safe movement solution associated with the reduction in Koala movement as part of this Action. The revised Koala Management Plan must include measures to restore baseline Koala movement, and a minimum 12-month period of monitoring to determine the effectiveness of the measures	Not applicable	Has not occurred.
19	If the Minister approves a Koala Management Plan revised in accordance with condition 14, and within 2 years of the approval of the revised Koala Management Plan the monitoring in accordance with condition 18 find the measures proposed in the revised Koala Management Plan have not achieved baseline Koala movement, the approval holder must submit a revised version of the OAMP-TOA&GOA to the Minister for approval within 30 months. The revised OAMP- TOA&GOA must identify additional environmental offset(s) to compensate for the additional functionally lost Koala habitat as a result of this Action, that meets the requirements of the EPBC Act Environmental Offsets Policy to the satisfaction of the Minister.	Not applicable	Has not occurred.

20	If the Minister writes to the approval holder stating that he/she considers that a revised Koala Management Plan, submitted in accordance with condition 14, 17 or 18 is not likely to achieve the ongoing protection and viability of the Koala populations within the development area, all clearing and construction must cease at the development area within 2 months of receiving such a notice, or as otherwise directed by the Minister. The approval holder must not recommence clearing and/or construction after the Minister notifies the approval holder in writing that the Minister has approved the revised Koala Management Plan, or otherwise with the Minister's written direction.	Not applicable	Has not occurred.
21	The approval holder must implement the version of the Koala Management Plan most recently approved by the Minister until the expiry of this approval.	Compliant	Implementation of current approved KMP, defined as Appendix 14 of the PER, is ongoing. A revised version of the revised Koala Management Plan was submitted to DCCEEW for approval on 14 th December 2023, and further revised version submitted 12 August 2024.
22	The approval holder must ensure that this Action does not result in:		
22(a)	a substantial and measurable change in the hydrological regime of the Moreton Bay Ramsar Wetland	Compliant	Has not occurred.
22(b)	the habitat or lifecycle of native species, including invertebrate fauna and fish species, dependent upon the Moreton Bay Ramsar Wetland being seriously affected	Compliant	Has not occurred.
22(c)	a substantial and measurable change in the water quality of the Moreton Bay Ramsar Wetland	Compliant	Has not occurred.
23	Prior to commencing any clearing or construction within 50 metres of the Moreton Bay Ramsar Wetland at Coombabah Lake and Coombabah Creek, the approval holder must submit to the department for approval by the Minister a Water Quality Management Plan. The Water Quality Management Plan must:	Compliant	The WQMP for Coomera Connector Central was submitted to DCCEEW on 21 December 2023. WQMP for North was submitted to DCCEEW on 9 November 2023. All clearing reviewed for the purposes of this audit was undertaken between 18 th March 2024 and 17 th March 2025, post submission of the WQMPs.
23(a)	specify how the approval holder will meet the requirements of condition 22	Compliant	Implementation of approved Water Quality Management Plans - Condition 23 (awaiting approval from DCCEEW at time of writing).
23(b)	be consistent with the Environmental Management Plan Guidelines and National Water Quality Guidelines	Compliant	Documented through internal inspection program.
23(c)	meet the requirements specified in Attachment H	Compliant	Documented through internal inspection program.
23(d)	include all the comments of a peer-review of the Water Quality Management Plan by an independent suitably qualified hydrologist and a statement by the suitably qualified hydrologist that they independently completed the evaluation of the adequacy of the monitoring, mitigation and management measures proposed to achieve the requirements of condition 22	Compliant	Completed by Water Technology.

24	If the Minister writes to the approval holder stating that he/she considers that the Water Quality Management Plan required under condition 23 is not likely to achieve the outcomes required under condition 22, all clearing and/or construction must cease at the development area within 2 months of receiving such a notice, or as otherwise directed by the Minister. The approval holder must not recommence clearing and/or construction unless the Minister has notified the approval holder in writing that the Minister has approved the revised Water Quality Management Plan, or otherwise with the Minister's written direction.	Not applicable	Has not occurred.
25	The approval holder must implement the Water Quality Management Plan as approved by the Minister.	Not applicable	WQMP are being implemented, awaiting approval by DCCEEW at time of writing.
26	The approval holder may, at any time, apply to the Minister for a variation to an action management plan approved by the Minister or as subsequently revised in accordance with these conditions, by submitting an application in accordance with the requirements of section 143A of the EPBC Act. If the Minister approves a revised action management plan (RAMP) then, from the date specified, the approval holder must implement the RAMP in place of the previous Action management plan.	Not applicable	Has not occurred.
27	The approval holder may choose to revise an action management plan approved by the Minister under condition 13, or as subsequently revised in accordance with these conditions, without submitting it for approval under section 143A of the EPBC Act, if the taking of this Action in accordance with the RAMP would not be likely to have a new or increased impact.	Not applicable	Has not occurred.
28	If the approval holder makes the choice under condition 27 to revise an action management plan without submitting it for approval, the approval holder must:	Not applicable	Has not occurred.
28(a)	Notify the department electronically that the approved action management plan has been revised and provide the department with:	Not applicable	Has not occurred.
28(ai)	An electronic copy of the RAMP.	Not applicable	Has not occurred.
28(aii)	An electronic copy of the RAMP marked up with track changes to show the differences between the approved action management plan and the RAMP.	Not applicable	Has not occurred.
28(aiii)	An explanation of the differences between the approved action management plan and the RAMP	Not applicable	Has not occurred.
28(aiv)	The reasons the approval holder considers that taking this Action in accordance with the RAMP would not be likely to have a new or increased impact.	Not applicable	Has not occurred.

28(av)	Written notice of the date on which the approval holder will implement the RAMP (RAMP implementation date), being at least 20 business days after the date of providing notice of the revision of the Action management plan, or a date agreed to in writing with the department	Not applicable	Has not occurred.
28(b)	Subject to condition 30, implement the RAMP from the RAMP implementation date.	Not applicable	Has not occurred.
29	The approval holder may revoke its choice to implement a RAMP under 27 at any time by giving written notice to the department. If the approval holder revokes the choice under condition 27, the approval holder must implement the action management plan in force immediately prior to the revision undertaken under condition 27	Not applicable	Has not occurred.
30	If the Minister gives a notice to the approval holder that the Minister is satisfied that the taking of this Action in accordance with the RAMP would be likely to have a new or increased impact, then:	Not applicable	Has not occurred.
30(a)	Condition 27 does not apply, or ceases to apply, in relation to the RAMP	Not applicable	Has not occurred.
30(b)	The approval holder must implement the action management plan specified by the Minister in the notice	Not applicable	Has not occurred.
31	At the time of giving the notice under condition 30, the Minister may also notify that for a specified period of time, condition 27 does not apply for one or more specified Action management plans	Not applicable	Has not occurred.
32	The approval holder must submit all plans required by these conditions electronically to the department.	Compliant	All required plans submitted to DCCEEW within timeframes required or as specified elsewhere within this report.
33	Unless otherwise agreed to in writing by the Minister, the approval holder must publish each plan on the website within 15 business days of the date:		
33(a)	of this approval, if the version of the plan to be implemented is specified in these conditions; or	Compliant	Offset Area Management was approved on 22 August 2024 and published within 15 business days. The Koala Management Plan (as part of the Public Environmental Report) was published online 11 October 2022. Revised KMP as per condition 14 is awaiting approval by DCCEEW; WQMP is awaiting approval by DCCEEW.
33(b)	the plan is approved by the Minister in writing, if the plan requires the approval of the Minister; or	Compliant	Offset Area Management was approved on 22 August 2024 and published within 15 business days. The Koala Management Plan (as part of the Public Environmental Report) was published online 11 October 2022. Revised KMP as per condition 14 is awaiting approval by DCCEEW; WQMP is awaiting approval by DCCEEW.

33(c)	the plan is submitted to the department in accordance with a requirement of these conditions, if the plan does not require the approval of the Minister; or	Not applicable	Plans within these conditions require approval by DCCEEW.
33(d)	the plan is approved by a state/territory government official as required under a state/territory government condition	Not applicable	Plans within these conditions require approval by DCCEEW.
34	The approval holder must keep all published plans required by these conditions on the website until the expiry date of this approval.	Compliant	All approved plans are currently available online, and remaining plans are awaiting approval by DCCEEW.
35	The approval holder is required to exclude or redact sensitive ecological data from plans published on the website or otherwise provided to a member of the public.	Compliant	Sensitive information within the approved OAMP has been redacted prior to publishing. Has not been included in any plan that is published online. The WQMPs and revised KMP are currently awaiting approval by DCCEEW.
36	If sensitive ecological data is excluded or redacted from a plan in accordance with condition 35, the approval holder must notify the department in writing what exclusions and redactions have been made in the version published on the website.	Compliant	Sensitive information has been redacted from the OAMP prior to publishing. Notification was provided to DCCEEW 18 February 2025 that TMR is undertaking further review of the sensitive information within the OAMP, with consideration to underacting sections of information are already publicly available through the PER and Coomera Connector EPBC Offset Strategy. The WQMPs and revised KMP are currently awaiting approval by DCCEEW.
37	The approval holder must notify the department electronically of the date of commencement of the Action, within 5 business days of commencement of the Action.	Compliant	Email titled " 2020/8646 Coomera Connector - Commencement of Action" sent to DCCEEW on 22 March 2023 stating that the date of commencement of the Action was to be 22 March 2023. Email acknowledgement received on 30 May 2023.
38	If the commencement of the Action does not occur within 5 years from the date of this approval, then the approval holder must not commence the Action without the prior written agreement of the Minister.	Not applicable	Has not occurred.
39	The approval holder must maintain accurate and complete compliance records.	Compliant	All records retained within project documentation and internal inspection systems
40	If the department makes a request in writing, the approval holder must provide electronic copies of compliance records to the department within the timeframe specified in the request.	Not applicable	Has not occurred.
41	The approval holder must ensure that any monitoring data (including sensitive ecological data), surveys, maps, and other spatial and metadata required under the conditions of this approval are prepared in accordance with the department's Guidelines for biological survey and mapped data (2018), or any subsequent official version or as otherwise specified by the Minister in writing.	Compliant	Surveys and monitoring data have been undertaken by a suitably qualified person and is in accordance with applicable guidelines.

42	The approval holder must ensure that any monitoring data (including sensitive ecological data), surveys, maps, and other spatial and metadata required under the conditions of this approval are prepared in accordance with the department's Guide to providing maps and boundary data for EPBC Act projects (2021), or any subsequent official version or as otherwise specified by the Minister in writing.	Compliant	Surveys and ecological data have been undertaken by a suitably qualified person and is in accordance with applicable guidelines.
43	The approval holder must submit all monitoring data (including sensitive ecological data), surveys, maps, other spatial and metadata and all species occurrence record data (sightings and evidence of presence) electronically to the department within 12 months of the approval or in accordance with the requirements of the Koala Management Plan and the OAMP-TOA&GOA.	Compliant	Sent to DCCEEW on 15 March 2024
44	The approval holder must prepare a compliance report for each 12-month period following the date of this approval, or as otherwise agreed to in writing by the Minister.	Compliant	This report.
45	Each compliance report must be consistent with the department's Annual Compliance Report Guidelines (2014), or any subsequent official version	Compliant	This report.
46	Each compliance report must include:		
46(a)	Accurate and complete details of compliance and any non- compliance with the conditions and the plans, and any incidents.	Compliant	This table.
46(b)	One or more shapefile showing all clearing of any protected matters, and/or their habitat, undertaken within the 12-month period at the end of which that compliance report is prepared.	Compliant	Sent to DCCEEW on 17 March 2025 as per condition 43.
46(c)	A schedule of all plans in existence in relation to these conditions and accurate and complete details of how each plan is being implemented.	Compliant	See Appendix D
47	The approval holder must:		
47(a)	Publish each compliance report on the website within 60 business days following the end of the 12-month period for which that compliance report is required.	Compliant	Annual Compliance Report 2024 published to the website within 60 business days.
47(b)	Notify the department electronically, within 5 business days of the date of publication that a compliance report has been published on the website.	Compliant	DCCEEW notified within 5 business days of publishing.
47(c)	Provide the weblink for the compliance report in the notification to the department.	Compliant	DCCEEW notified within 5 business days of publishing and weblink provided.
47(d)	Keep all published compliance reports required by these conditions on the website until the expiry date of this approval.	Not applicable	Action is ongoing.

48(e)	Exclude or redact sensitive ecological data from compliance reports published on the website or otherwise provided to a member of the public.	Compliant	Online report has redacted sensitive ecological data.
47(f)	If sensitive ecological data is excluded or redacted from the published version, submit the full compliance report to the department within 5 business days of its publication on the website and notify the department in writing what exclusions and redactions have been made in the version published on the website.	Compliant	Full compliance report is submitted to DCCEEW first, before redacting and published to the website.
48	The approval holder must notify the department electronically, within 2 business days of becoming aware of any incident and/or potential non-compliance and/or actual non-compliance with the conditions or commitments made in a plan.	Compliant	No incidents, potential non-compliances and/or actual non-compliances were identified during this reporting period, 18 March 2024 to 17 March 2025.
49	The approval holder must specify in the notification:		
49(a)	Any condition or commitment made in a plan which has been or may have been breached.	Not applicable	Has not occurred during this reporting period, 18 March 2024 to 17 March 2025.
49(b)	A short description of the incident and/or potential non- compliance and/or actual non-compliance.	Not applicable	Has not occurred during this reporting period, 18 March 2024 to 17 March 2025.
49(c)	The location (including co-ordinates), date, and time of the incident and/or potential non-compliance and/or actual non-compliance.	Not applicable	Has not occurred during this reporting period, 18 March 2024 to 17 March 2025.
50	The approval holder must provide to the department in writing, within 12 business days of becoming aware of any incident and/or potential non-compliance and/or actual non- compliance, the details of that incident and/or potential non- compliance and/or actual non-compliance with the conditions or commitments made in a plan. The approval holder must specify:	Not applicable	Has not occurred during this reporting period, 18 March 2024 to 17 March 2025.
50(a)	Any corrective action or investigation which the approval holder has already taken	Not applicable	Has not occurred during this reporting period, 18 March 2024 to 17 March 2025.
50(b)	The potential impacts of the incident and/or non-compliance and/or non-compliance	Not applicable	Has not occurred during this reporting period, 18 March 2024 to 17 March 2025.
50(c)	The method and timing of any corrective action that will be undertaken by the approval holder	Not applicable	Has not occurred during this reporting period, 18 March 2024 to 17 March 2025.
51	The approval holder must ensure that an independent audit of compliance with the conditions is conducted for every three- year period following the commencement of the Action until this approval expires, unless otherwise specified in writing by the Minister.	Not applicable	Timeframe has not yet reached three years.
52	For each independent audit, the approval holder must:		

52(a)	Provide the name and qualifications of the nominated independent auditor, the draft audit criteria, and proposed timeframe for submitting the audit report to the department prior to commencing the independent audit.	Not applicable	Has not occurred.
52(b)	Only commence the independent audit once the nominated independent auditor, audit criteria and timeframe for submitting the audit report have been approved in writing by the department.	Not applicable	Has not occurred.
52(c)	Submit the audit report to the department for approval within the timeframe specified and approved in writing by the department.	Not applicable	Has not occurred.
52(d)	Publish each audit report on the website within 15 business days of the date of the department's approval of the audit report.	Not applicable	Has not occurred.
52(e)	Keep every audit report published on the website until this approval expires.	Not applicable	Has not occurred.
53	Each audit report must report for the three-year period preceding that audit report.	Not applicable	Has not occurred.
54	Each audit report must be completed to the satisfaction of the Minister and be consistent with the department's Environment Protection and Biodiversity Conservation Act 1999 Independent Audit and Audit Report Guidelines (2019), or any subsequent official version.	Not applicable	Has not occurred.
55	The approval holder must notify the department electronically 60 business days prior to the expiry date of this approval, that the approval is due to expire.	Not applicable	Has not occurred.
56	Within 20 business days after the completion of the Action, and, in any event, before this approval expires, the approval holder must notify the department electronically of the date of completion of the Action and provide completion data.	Not applicable	Has not occurred.

3. Attachment H: Water Quality Management Plan requirements

In addition to any requirements of the conditions of approval, the Water Quality Management Plan for approval by the Minister must include:

- a) the objectives of the Water Quality Management plan
- b) characterisation of soil, pedology and any contaminants within the development area that are at risk of dispersal as a result of the action, to inform the likely impacts from their dispersal to the Moreton Bay Ramsar Wetland at Coombabah Lake and Coombabah Creek, and any required monitoring and mitigation measures
- c) details of all likely stormwater discharge points from the Action that are at risk of releasing contaminants or adverse water quality into the Moreton Bay Ramsar Wetland at Coombabah Lake and Coombabah Creek, with respect to any changes during clearing, construction and operation
- water quality objectives to be achieved at all stormwater discharge points from the Action that are at risk of releasing contaminants or adverse water quality into the Moreton Bay Ramsar Wetland at Coombabah Lake and Coombabah Creek, with respect to the sensitivity of the receiving environment, seasonal trends and weather events
- e) details of a monitoring program that is sufficient to determine the baseline water quality, baseline erosion and sediment deposition within all catchments upstream and downstream of the development area, that are within or feed into the Moreton Bay Ramsar Wetland at Coombabah Lake and Coombabah Creek. The monitoring program must consider seasonal trends and weather events, and include location details of all monitoring sites and at reference/control monitoring sites. The monitoring program must achieve:
- a) at minimum 24 months of baseline surface water quality data measured at quarterly intervals
- b) ii) surface Water Quality Objectives informed by the baseline surface water quality data, to be achieved during construction and for 3 years after opening the nearest road to the surface-water monitoring site as part of this Action to public motorists
- c) iii) at minimum 12 months of baseline ground-water quality data measured at quarterly intervals
- d) iv) ground-Water Quality Objectives informed by the baseline ground-water quality data, to be achieved during construction and for 3 years opening the nearest road to the ground-water monitoring site as part of this Action to public motorists.
- f) the methods used to determine baseline water quality, erosion and sediment deposition, with justification for the selection of all monitoring sites and the reference/control monitoring sites with respect to the potential impacts of the Action on the Moreton Bay Ramsar Wetland at Coombabah Lake and Coombabah Creek
- g) details of ongoing monitoring of surface and ground-water quality objectives, including locations, sampling frequency and the parameters to be monitored, including the scientific basis for the selection of all the parameters to be monitored
- early warning indicators and trigger thresholds for all monitored parameters for detecting changes to surface and ground-water quality to avoid potential impacts to the Moreton Bay Ramsar Wetland at Coombabah Lake and Coombabah Creek
- limits for all monitored parameters, derived with respect to baseline values which, if reached or exceeded, indicate that impacts to the Moreton Bay Ramsar Wetland at Coombabah Lake and Coombabah Creek is likely to occur
- j) management actions, contingency measures and additional monitoring to be implemented in the event that early warning indicators, trigger thresholds or limits are reached

- k) steps to report any triggering of limits for all monitored parameters, or non-achievement of Water Quality Objectives to the department within 5 business days of receiving the monitoring results, and
- I) procedures to make the Water Quality Objectives and monitoring results publicly available on the website for 12 months after each monitoring result.

Compliance

Compliant

Evidence

WQMP for Coomera Connector Stage 1 North (*31CIDD00 Coomera Connector – Drainage Water Quality Management Plan*, Revision 3) submitted to DCCEEW on 10 November 2023 and was awaiting approval at the time of writing this report. WQMP for Coomera Connector Stage 1 Central (*Coomera Connector – Helensvale Road to Smith Street Water Quality Management Plan*, Revision 3A) was submitted to DCCEEW on 21 December 2023 and was awaiting approval at the time of writing this report. Comments were received from DCCEEW on 28/03/24 and an update to the WQMPs is currently being undertaken at the time of writing this report.

4. Appendix A: Storm damage

4.1 Christmas day storm 2023

On 25 December 2023, the Gold Coast experienced a severe weather event (tornado and large storm) that resulted in extensive damage to homes and vegetation between Ormeau and Molendinar. This storm passed directly over the Coomera Connector Stage 1 site including North Central and South packages.

Assessments were made in early January to determine the level of damage to construction sites. These assessments will be discussed below.

4.1.1 Stage 1 North package

The North package experienced vegetation damage south of Helensvale Road both within, and outside of the corridor. Images of before and after the storm below show the extent of damage.



Figure 1: Aerial view of Helensvale Road before storm



Figure 2: Aerial view of Helensvale Road after storm



Figure 3: Aerial view of Helensvale Road vegetation damage zoomed in

4.1.2 Stage 1 Central package

The Central package experienced vegetation damage north of Gold Coast Highway, both within and outside of the corridor. Images after the storm below (28 December 2023) show the extent of damage.



Figure 4: Aerial view of Gold Coast Highway vegetation damage zoomed in



Figure 5: Post-storm damage to fencing/vegetation, Ridgevale Drive, north side



Figure 6: Post-storm vegetation damage on site, Ridgevale Drive north side



Figure 7: Post-storm vegetation damage on site, Ridgevale Drive south side

Compliance Report – Coomera Connector Stage 1 - EPBC 2020/8646, 18 March 2024 – 17 March 2025



Figure 8: post-storm vegetation damage on site, Ridgevale Drive north side.

4.1.3 Stage 1 South package

No visible storm damage was recorded across the South Package following the December 28th severe storm event that impacted the Gold Coast Region.

4.2 Cyclone Alfred impact - March 2025

4.2.1 Stage 1 North and South Package

No major visible vegetation damage was recorded across the Coomera Connector Stage 1 North construction package and South Early Works package following Cyclone Alfred disaster event in March 2025.

4.2.2 Stage 1 Central Package



Figure 1: Post cyclone Alfred vegetation damage and temporary koala fencing damage near Helensvale Road.



Figure 2; Post cyclone Alfred evidence of fallen vegetation near Ridgevale Drive. Compliance Report – Coomera Connector Stage 1 - EPBC 2020/8646, 18 March 2024 – 17 March 2025

5. Appendix B: Koala research updates

Condition 5(b): include in each Compliance Report a summary of the progress and any findings of each project of the Koala research at least until the end of year 10.

Updates on each research project is provided below.

5.1 Chlamydia Vaccine Trial – University of Sunshine Coast

Coomera Connector Koala vaccine project, Summary report January 2024 - University of the Sunshine Coast (Professor Peter Timms and Dr Samuel Phillips).

Aim 1: Provide further evidence to the koala *Chlamydia* vaccine therapeutic response by vaccinating koalas with mild ocular and urogenital disease without antibiotic intervention and observe infection loads over three – six weeks.

Aim 2: Determine the longevity of protection koalas generate from *Chlamydia* vaccination and understanding immunological boosting effects due to subsequent infections post vaccination.

Measure any boosting effects of humoral immune responses in vaccinated koalas by natural infection post vaccination.

Determine the longevity of the vaccine induced immune response over a four-year period.

Identify risk factors that contribute to changes in vaccine specific immune responses.

February 2025 Coomera Report

A total of 4,052 samples were received from EVE, 1,727 of them were swab samples and the remaining 2,325 samples were of blood origin. Of the swab samples, 797 ocular swabs were collected, 909 urogenital swabs were collected, 15 urine sediment swab samples, 3 rectal swabs and 4 oropharyngeal swabs.

As of February 2025, 92% of the collected swab samples had been processed. These samples represented 320 individual koalas, with 42.2% (135/320) of the koala's male, 54.1% (173/320) female and 3.7% (12/320) unknown gender.

Screening for *C. pecorum* DNA from swab samples revealed a 21.6% (344/1,589) overall prevalence, 18.3% (63/344) from ocular sites, 80.8% (278/344) from the urogenital site and the remaining 0.9% (3/344) from urine sediment. When assessed for individual koalas the overall prevalence increased to 45% (144/320) prevalence. Of the infected koalas, 43.7% (63/144) were male, 51.4% (74/144) were female and 4.9% (7/144) were of unknown gender.

In total, 42.8% (137/320) of the sampled koalas were vaccinated, of which 43.8% (60/137) were male, and 56.2% (77/137) were female. When *C. pecorum* infection was assessed within the vaccinated koalas a decrease in prevalence was observed every six months for the next two years following vaccination, from 23% at vaccination, 20% at six months, 13% at 12 months, 8% at 18 months and 2% at 24 months. Furthermore, no infections have been observed in koalas vaccinated greater than 24 months (although this only included two koalas).



Proportion of C. pecorum Positive and Negative Koalas After Vaccination

5.2 Chlamydia RAT Development – University of Sunshine Coast



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Report on CPEC RAPID Test Development

Prepared by: John Li, Radetec

Date: 18/02/2025

Project Overview:

The objective of this project is to develop a highly sensitive and specific lateral flow assay (LFA) for CPEC detection using the Loop-Mediated Isothermal Amplification (LAMP) method. The project progressed through three key stages, with continuous optimisation of reagents, materials, and protocols. Despite various modifications, challenges persist, particularly false positives and weak signals in real positive samples.

Stage 1: Initial Development Using QDs conjugates in Solution

LAMP amplification products were detected using quantum dots (QDs) conjugated to detection amplicons in solution.

The conjugate was directly applied to the sample pad before running the test.

The test was performed on a lateral flow strip, and signals were recorded.

Results:

The assay produced an acceptable signal in some cases. However, false positives were observed intermittently. Weak signals in real positive samples indicated an issue with either the LAMP reaction efficiency, antigen binding efficiency, or detection sensitivity.



Cost by Radetec: Master mix: 1500 AUD



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Issues Identified:

Inconsistent LAMP product detection, possibly due to inefficient hybridization with detection probes. Potential aggregation or instability of QD conjugates in the sample mixture. Non-specific interactions between LAMP amplicons and the detection system.

Stage 2: Drying QD Conjugates onto Conjugate Pad

Modifications and Improvements to the test design:

The QD conjugates were dried onto the conjugate pad rather than being applied in solution in order to make the product more ready. Systematic changes were made to the antibodies (seven different suppliers were tested), in order to find the best one can be dried onto the conjugate pad.

A new supplier for the master mix was selected to optimise the LAMP reaction as well. This supplier also able to dry the primers into the master mix, that allows one step (adding the sample solution into the master mix) to prepare the reaction mixture.

Results:

After contacting a few companies and learning the method to dry the conjugates. The production method finally established. However, it did not significantly improve the signal intensity. And false positives persisted despite changing multiple antibody suppliers.

Positive sample detection remained weak, indicating a fundamental issue in the sensitivity of the LFA-LAMP detection system.



Issues Identified:

Drying the QD conjugates may have affected their stability or bioactivity.

The quality of antibodies and LAMP reaction components remained critical, but changing suppliers did not resolve the issue.



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The master mix composition was modified, but the core problem of weak positive signals remained.

Cost by Radetec:



Stage 3: Transition to Gold Nanoparticle (AuNP) LFA

Modifications:

To address potential QD-related issues may cause all the issues, a manufacturer was engaged to produce gold nanoparticle (AuNP)-based LFA strips for LAMP product detection. In this study, it will eliminate all the production error by Radetec as well.

The AuNP-based system was tested using the same LAMP reaction conditions, antibody pairs, and test setup. The master mix composition was finalised and remained constant.

Results:

The AuNP-based assay produced similar results to the QD-based assay. Low signal in positive samples persisted. False positives continued to appear in some cases, suggesting non-specific interactions.



Conclusion:



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Since the issue persisted even after switching to gold nanoparticles, the problem likely does not lie with QDs but rather with the LAMP-LFA integration. Non-specific binding of LAMP products to the test line. Interference from the sample matrix, affecting specificity and signal intensity.

Cost by Radetec:

Master mix: AUD Strips production: AUD

Next Steps

The development of the CPEC RAPID Test using the LAMP method integrated with lateral flow detection has undergone multiple refinements across three stages, with persistent challenges in sensitivity and specificity. The results suggest that the root cause may not be the type of nanoparticles used (QDs vs. AuNPs), but rather LAMP reaction efficiency, non-specific binding, or matrix effects.

We decided to use LAMP method only, but make the test much easy to do compare to current LAMP test and much cheaper. A new reader will be made cheaper than current device. Much cheaper to the consumables total less than dollars, and able to run 1 test per run. The testing protocol also need to be simpler, such as: Swap the sample > dissolve into lysis buffer > add to the dry mix > put it into the device and run.



5.3 Refinement of Mitigation – Koala Egress – Endeavour Veterinary Ecology/University of Queensland

Koala Egress Trials- April 2025 Update

Urban koala populations in Queensland face significant risks from drownings in swimming pools, domestic dog attack and vehicle collisions as they navigate increasingly fragmented habitats. These barriers not only threaten an individual koala's survival but compromise long-term population viability by restricting gene flow and safe movement through the landscape to other areas of habitat.

Since 2021, comprehensive trials at Endeavour Veterinary Ecology's Toorbul facilities have evaluated the effectiveness of structures designed to facilitate safe koala movement across roadways. Three structures were trialled: the koala escape pole, Koala Valve and a push-under Fauna Escape Hatch (FEH). The Phase 1 findings released in mid-2024 revealed that while koalas showed no device preference, the Fauna Escape Hatch) had a 100% success rate use whenever encountered by koalas. Notably, these studies confirmed that the standard FEH successfully accommodate female koalas carrying back-riding joeys (Figure 1).



Figure 1. Female and back rider joey koalas demonstrating movement through the traditional fauna escape hatch (360mm x 1200mm)

These findings demonstrated that the device is a promising addition to existing koala road egress solutions across our road networks. Based on these findings, the devices have been manufactured for deployment in the field by local councils, initially undertaking further in-field trials in conjunction with motion-activated camera monitoring. Camera footage demonstrated the effectiveness of the 'one-way' design, with koalas approaching the FEH from the bushland but failing to manoeuvre through the structure onto the road, preventing koalas and other medium sized animals from accessing the road corridor.

The research team continues to expand this work, with additional trials investigating complementary technologies such as virtual fencing, with results scheduled for 2025. These ongoing studies aim to develop an integrated system of wildlife movement solutions to mitigate the impacts of habitat fragmentation on vulnerable koala populations.

These findings provide evidence-based guidance for wildlife management authorities implementing koala conservation measures. The demonstrated effectiveness of the FEH design supports its integration into comprehensive wildlife movement solutions across urban and peri-urban landscapes.
5.4 Chlamydia Vaccine Trial (Queensland University of Technology)

Kenneth W Beagley

Professor of Immunology

Side by side comparison of 1-shot versus 2-shot chlamydial vaccine in a wild population.

The study includes samples from 18 animals in the single-shot vaccine group and 20 animals in the 2-shot vaccine group. Most animals have been sampled at the 6 and 12-month post vaccination time points (see table 1). All animals remain LAMP-negative at 12 months.

Samples were analysed by ELISA for IgG anti-MOMP antibodies against the 3 MOMP genotypes (G/A/F) in the vaccines (See figure 1) at 6 and 12-months post-vaccination. At the 12-month time-point, the levels of antibody against all MOMP types appear to be dropping off in the single shot vaccine group. The 18 and 24-month samples are being collected and will be analysed shortly.

Table 1: Chlamydia status of koalas at 6 and 12-months post-vaccination. Urogenital swabs were collected from Koalas vaccinated with Single shot (Triadj) and Double shot (Iscomatrix) vaccines. *Chlamydia* status

Name	Sex	L L	ult	
Single shot		Pre-		12-
		Vaccine	6-month	month
Aphrodite	Female	Negative	Negative	Negative
Ariel	Female	Negative	Negative	Negative
Barbie	Female	Negative	Negative	Negative
Beckenham	Female	Negative	Negative	Negative
Cambridge	Male	Negative		
Cannon	Male	Negative	Negative	Negative
Cedar	Male	Negative	Negative	Negative
Dartford	Female	Negative	Negative	Negative
Flower	Female	Negative	Negative	Negative
Gaspel	Female	Negative	Negative	Negative
Gunnersbury	Male	Negative	Negative	
Hatton	Male	Negative	Negative	Negative
Jack-Jack	Male	Negative		
Lucius	Male	Negative	Negative	Negative
Purfleet	Female	Negative	Negative	Negative
Shoreditch	Male	Negative	Negative	Negative
Whitechapel	Female	Negative	Negative	Negative
Zazu	Male	Negative	Negative	Negative

determined by LAMP assay (EVE labs).

Name	Sex	LAMP UGT Result				
Double shot						
Abuela	Female	Negative	Negative	Negative		
Anerley	Female	Negative	Negative	Negative		
Athena	Female	Negative	Negative	Negative		
Bonnie	Female	Negative	Negative	Negative		
Catford	Male	Negative	Negative	Negative		
Chatford.	Female	Negative				
Cheam	Female	Negative	Negative	Negative		
Duke	Male	Negative	Negative	Negative		
Elmer	Female	Negative	Negative	Negative		
Epsom	Male	Negative	Negative	Negative		
Farringdon	Female	Negative	Negative	Negative		
Finsbury	Female	Negative	Negative	Negative		
Hamm	Male	Negative	Negative	Negative		
Harold	Male	Negative	Negative			
Natting	Male	Negative	Negative	Negative		
Penny	Female	Negative	Negative	Negative		
Squishy	Male	Negative	Negative	Negative		
Sutton	Female	Negative	Negative	Negative		
Swanley	Female	Negative	Negative	Negative		
Wallington	Male	Negative	Negative	Negative		



Figure 1. The figures to the left depict detection of IgG using an indirect ELISA. ELISA performed using *C. pecorum* MOMP A, G and F as coating antigens. Differences between groups were determined by assessing MOMP specific IgG titres using koala serum from wild koalas as samples. Significant differences were determined using Mixed-effects model with the Geisser-Greenhouse correction as sphericity was not assumed. Tukey's multiple comparisons tests was also performed (p < 0.05). Graph and statistical analysis were generated using GraphPad Prism (v10). α = 0.05 (* p < 0.05, ** p < 0.025, *** p < 0.001, **** p < 0.0001).

5.4.1 Drivers and biomarkers of disease and success in wild koalas

University of Sydney - Endeavour Veterinary Ecology

Researcher: Yasmine Muir

The following key findings comprise elements of a manuscript under preparation for publication in a PhD thesis and a peer reviewed journal.

Drivers and biomarkers of disease and success in wild koalas

University of Sydney - Endeavour Veterinary Ecology

The long-term impacts and outcomes of koala rehabilitation are not well understood nor are the populationspecific factors that might influence these outcomes. It is important that we determine this to optimise treatment and rehabilitation methods and guide the development of new protocols. Chlamydiosis is the main infectious disease affecting koala welfare and conservation but advances in its treatment and management are held back by our limited understanding of the role played by several co-infecting agents and the many host, pathogen, and environmental factors with potential to affect outcomes. Research on this has been limited due to the difficulties in acquiring long-term monitoring data on rehabilitated and released koalas and conducting multivariate analyses on small sample sizes. The koala monitoring project led by Endeavour Veterinary Ecology (EVE) and supported by the Coomera Connector project [Queensland Transport and Main Roads] provided the opportunity to bridge these gaps in the current knowledge.

To meet the need for long-term, post-treatment monitoring studies, this study monitored 221 koalas originating from two neighbouring populations over a 2-year period. This study investigated the relationships between survival, frequency of disease, and treatment outcomes in two populations with differences in general morbidity and mortality; based on preliminary analyses, koalas located north of the Coomera River were categorized as the "high morbidity" population, and those to the south were classified as the "low morbidity" population. Using multivariate analysis, this study showed that immunological variation among koalas may be an important indicator of individual and population health. The research identified a range of adaptive immune markers associated with better outcomes and longer survival and innate immune and retroviral markers associated with mortality. Cohort specific co-infection status and morbidity rates effected the relationship between detection of circulating *Chlamydia* and survival in koalas. Collectively, this study demonstrates the importance of population specific co-infection strategies should be tailored to regional variations, and infectious and immunological markers should be further developed to aid individual and whole population health monitoring in both wildlife management and clinical settings.

5.5 TMR and City of Gold Coast - Data sharing collaboration

Note: This research collaboration is addition to research proposed in the PER.

TMR received a data sharing request on Friday 7th February from the City of Gold Coast (CoGC) to support their ongoing koala management in the east-Coomera area. The Coomera Connector North package (Foxwell Road to Helensvale Road) interfaces with the CoCG study area. As a result, TMR are progressing a data sharing agreement to support CoGC on their study to ensure strategic planning of koala habitat in this area of the Gold Coast.

Specifics of the study area and data request are as follows:

The **PROJECT**:

CoGC are undertaking a project to gain a better understanding of the koalas remaining in isolated patches of vegetation surrounded by road, rail, river or new development in the East Coomera area. Refer to *Figure 1*.

The primary purpose of this project is as follows:

Stage 1 – Scoping study: Undertake a review and analysis of the status of the koala population within the project area (see attached) using existing data and knowledge, desktop assessments, and ground truthing where necessary. Guided by this review and analysis, prepare high-level advice and recommendations for the management of koalas in the project area to ensure their safety now and into the future.

Stage 2 – Koala Management Plan: Develop a comprehensive Koala Management Plan (KMP) for this specific koala sub-population.

CoGC information supplied:

Figure 1 Project area – Proposed Locations For High Risk Koalas: Coomera-Pimpama

The DATA:

Koala movement/location data - derived from in-field tracking events and GPS data from Endeavour Veterinary Ecology's (EVE) K-Tracker biotelemetry tags utilised on Coomera Connector Stage 1.

This data provides information relating to habitat use, dispersal and movement paths in that landscape.

The extent of this dataset shared as part of this agreement is limited to all koalas within the **Proposed** Locations For High Risk Koalas: Coomera-Pimpama. Refer to as Attachment B of this agreement.

Koala population data (age/sex, disease status/health, reproductive status, causes of mortality) – derived from veterinary exams and in-field observations.

This data provides information on population demographics, population viability (all diseased and not viable population will gradually reduce and become locally extinct, or healthy breeding population requiring dispersal/movement options, age of koalas to determine why individuals moved e.g. SA dispersal event, when looking at the movement/location data).

Koala survey data – derived from initial surveys carried out by EVE along the Coomera Connector project corridor and any thermal drone koala surveys in the *Proposed Locations For High Risk Koalas: Coomera Pimpama*.

This data will add to the dataset in the areas within and adjacent to the study area to provide information on population health, distribution, and density.



Figure 1: City of Gold Coast Proposed Study Area

6. Appendix C: Koala Translocation Status



COOMERA CONNECTOR- STAGE 1 Koala Translocation Program ANNUAL REPORT MARCH 2025





Document control

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Cover image: "Purley," a heterochromic female koala distinguished by one blue and one brown eye, was translocated to the Pimpama River Conservation Area in August 2023.



"Liverpool," a resident female koala from the Pimpama River Conservation Area, was diagnosed with chlamydial reproductive disease and underwent an ovariohysterectomy to remove her reproductive tract in October 2023.

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"Diamond", a male juvenile koala from the PRCA, in March 2025.

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1 Program overview

The Coomera Connector – Stage 1 (CC-1) is a critical infrastructure project in Queensland, involving the construction of a multi-lane motorway spanning approximately 16 kilometres. The project traverses vital koala habitat and connectivity corridors, necessitating the development of a scientifically robust *Koala Translocation Plan* as part of the program designed to mitigate the impacts on koalas.

A key component of this plan was the selection of the *Pimpama River Conservation Area* (PRCA) as the recipient site for translocated koalas. This decision was based on the site's suitability, its conservation management status, and its capacity to support a growing koala population. The *Koala Translocation Program* began at the PRCA in August 2021, initially focusing on the identification, capture, and veterinary management of the resident koala population, which was suffering from a high prevalence of chlamydial infection and disease—making the site an ideal location for targeted intervention.

As part of the broader health management strategy, a *Chlamydia* vaccine trial was also conducted at the PRCA, involving both vaccinated and control animals. This trial aimed to assess the vaccine's effectiveness under real-world conditions and contribute to long-term disease management in koala populations.

As of March 2025, the ongoing management efforts, spanning intensive veterinary care to translocation and monitoring, have yielded promising results. Notably, the prevalence of chlamydial infection has been reduced, and reproductive success has increased within the resident koala population, thanks in part to the translocation of healthy, fecund females. The program has demonstrated that, when executed with careful planning and management, translocation can contribute significantly to population recovery.

Key Statistics (as of 31st March 2025):

Resident Koalas:

- 143 resident koalas have been recruited at the PRCA
- **80** koalas are currently under monitoring.
- **58** koalas have died.
- **5** koalas have been removed from monitoring due to dispersal away from the PRCA.

Translocated Koalas:

- 34 translocated koalas have been moved into the PRCA.
- **30** translocated koalas are currently being monitored.
- 3 translocated koalas have died.
- 1 translocated koala is presumed dead, based on circumstantial evidence.

Interim monitoring results indicate that, when supported by robust site selection, veterinary care, and post-release monitoring, translocation is more likely to be successful and can contribute to population stability.

Throughout the program, health interventions have led to the successful recovery of a significant number of koalas within the PRCA. The health of the koalas has been actively managed through the capture and treatment of chlamydial disease. Additionally, translocated koalas have shown positive reproductive outcomes, contributing to the overall fecundity of the koala population.

Mortality among both resident and translocated koalas has occurred, primarily due to disease, natural predation, and extreme weather events. These risks are consistent with those faced by wild koala populations more broadly and highlight the importance of ongoing monitoring and adaptive management at the site.

The CC-1 *Koala Translocation Program* (KTP) provides an important case study in science-led, welfare-oriented translocation. A final program report, due in early 2026, will present long-term outcomes and further inform conservation strategies for koalas in fast-developing regions.



"Zoolander", the first male koala tagged and monitored by EVE in the Pimpama River Conservation Area.

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2 Introduction

The Coomera Connector - Stage 1 (CC-1) is a major infrastructure project in Queensland, delivering a multi-lane motorway running generally parallel to, and east of the M1 Motorway between Nerang-Broadbeach Road, at its southern extent, and Shipper Drive, at its northern extent. It traverses significant remnant patches of koala habitat and transects several important koala habitat connectivity corridors over its approximately 16 km length.

A comprehensive *Koala Management Plan* (KMP) was developed during the planning phase of the project, based on a detailed *Koala Conservation Strategy* (KCS) developed by Endeavour Veterinary Ecology (EVE) in 2020. Implementation of pre-impact components of the plan commenced in August 2021: specifically, investigation of the koala populations living in habitat likely to be impacted by the project, and investigation of the proposed koala translocation recipient site and its resident koala population at East Coomera.

The CC-1 project was approved under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) on 17 March 2023 (approval number 2020/8646). Conditions of approval included the implementation of the KMP in full and development of an updated revision of the KMP, including, specifically, a *Koala Translocation Plan*. Condition 14 of the approval is as follows:

14) To ensure the ongoing effectiveness of the Koala Management Plan, the approval holder must, within 9 months of this approval decision submit to the department for approval by the Minister a revised Koala Management Plan consistent with the Environmental Management Plan Guidelines, that includes:

f) a Koala translocation plan consistent with the IUCN translocation guideline and Environmental Management Plan Guidelines.

A translocation plan was subsequently developed for the revised KMP and EPBC condition 14 in December 2023.

This document forms part of the annual compliance reporting for the EPBC approval, specifically dealing with the *Koala Translocation Program* (KTP). A final report on the translocation program will be prepared in early 2026, closing out the reporting requirements for that program.

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3 Selection and management of koala translocation recipient site

The *Pimpama River Conservation Area* (PRCA) was chosen by EVE as the preferred of two potential recipient sites (the other was the *Lower Beechmont Conservation Area*) for koalas translocated from the Coomera Connector – Stage 1 (CC-1) project for several reasons:

- 1. It met the criteria outlined in section 10.5.1 of the *Koala Conservation Strategy* (KCS).
- 2. It was well-bounded by natural and anthropogenic barriers, facilitating a wholeof-population koala management approach.
- 3. It bordered offset land recently acquired by the Queensland *Department of Transport and Main Roads* (TMR).
- 4. Its location and accessibility made it logistically practical and therefore costeffective for koala management activities.
- 5. It is managed by the City of Gold Coast (CoGC) as a conservation estate with active habitat restoration, fire management and feral animal control.

A pre-translocation population viability analysis (PVA) by EVE showed the resident population was on an extinction trajectory, primarily due to *Chlamydia*-related illness, which can result in sterility and early mortality. Managing infection/disease and introducing healthy (fecund) female koalas were considered important management actions to aid in recovery of the population.

Additional benefits of the selection of the PRCA site included:

- 1. There existed, by virtue of the existing disease prevalence, a real opportunity for the CC-1 project to deliver a meaningful and measurable conservation benefit by reversing the koala population decline through disease control and translocation of healthy, fecund koalas into the area.
- 2. Its proximity to the CC-1 corridor, reducing the translocation distance for koalas and providing logistical and cost benefits for the koala management program i.e., it was a cost-effective site to conduct koala management activities.
- 3. It was ideal for a *Chlamydia* vaccine field trial, in line with recommended KCS *other compensatory measures*, because of the presence and prevalence of chlamydial infection in and around the site.
- 4. The available habitat had the capacity to support additional koalas and population growth, based on comparison with other sites with natural koala populations and similar vegetation and geology types.
- 5. It is in an area identified as a high priority for koala conservation, and in a Statemapped *koala priority area*.

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4 Resident koala summary

4.1 Prevalence of disease in resident koalas in the PRCA

Over the 3.5 years between August 2021 and 31 March 2025, 143 resident koalas (59 males and 84 females) had been recruited into the KTP at the PRCA. This figure is comprised of 96 koalas captured *prior to* the translocation of any koalas into the site as well as 47 koalas captured *after* the commencement of translocation of koalas into the site (mainly new immigrants and recruited juveniles). Prior to the translocation of any koalas, the health of resident koalas was intensively managed through the capture of essentially all koalas at the site and treatment of those found to be infected and/or diseased with *Chlamydia*.

Estimates of the prevalence of chlamydial infection and disease at the PRCA prior to any veterinary management are based on the initial veterinary assessments conducted of each resident koala at its first capture. All resident koalas were not captured at one moment in time (which would allow calculation of true prevalence), but rather over several years, therefore the figure for prevalence is *inferred prevalence*. Moreover, prevalence changes over time and is expected to decline as time goes by due to active efforts to treat and manage chlamydial infection within the population. Accordingly, the prevalence figures presented below should be interpreted as estimates over a defined period—specifically from the commencement of the KTP up to the month prior to the translocations of any koalas. By that time, essentially all resident koalas had been captured and assessed. Following this period, most newly recruited koalas were either joeys born to resident females or individuals who had dispersed into the area and established residency at the site.

Among the 96 resident koalas (40 males and 56 females) that were recruited from August 2021 up to the month prior to any koala translocations:

- 11 had asymptomatic chlamydial infection (without disease) (12%),
- 50 had chlamydial disease (52%),
- 35 had <u>no</u> detectable chlamydial infection or disease (36%) (Table 1).

Hence, approximately two thirds of koalas required veterinary management of chlamydiosis (or infection).

Of the 35 resident koalas with <u>no</u> detectable chlamydial infection or disease, 1 had a disease unrelated to infection with *Chlamydia*, which was severe enough to warrant euthanasia.

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Chlamydial status of resident koalas	No. of koalas	Percentage
Affected by chlamydial infection or disease	61	64%
No detectable chlamydial infection/disease	35	36%
TOTALS	96	100%

 Table 1: Prevalence of chlamydial infection/disease among the Pimpama River Conservation Area

 resident koalas (August 2021-April 2023)

The prevalence of chlamydial infection and disease in *resident* koalas at the PRCA was notably high (64%) compared to most other subpopulations monitored for the CC-1 project's koala tagging and monitoring program (KTMP). For example, in the Helensvale area, the prevalence was around 3%, with koalas only occasionally requiring capture for chlamydial treatment.

Through proactive veterinary management during the early stages of the KTP and sustained management efforts, the prevalence of infection and disease among monitored koalas was reduced to very low levels. Figure 1a illustrates the number of koalas affected at their first veterinary examination (prior to any translocations) compared to the much healthier population as of 31st March 2025 (Figure 1b).

While no cases of chlamydial infection or disease were detected as of the end of March 2025, the PRCA is not a closed population and borders habitat in which koalas are not subject to veterinary management, such as the Greenridge site (to the south), where infected and diseased koalas are living. Ongoing monitoring and proactive management at these interfaces remain critical to preventing future incursions.





Figure 1a: Chlamydial health status and distribution of *resident* Pimpama River Conservation Area koalas at their first veterinary examinations (August 2021-April 2023)



Figure 1b: Chlamydial health status and distribution of resident and translocated koalas at the Pimpama River Conservation Area (as of 31st March 2025)

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4.2 Reproductive health (resident females)

Of the 56 *resident* female koalas recruited prior to the occurrence of any translocations, 48 were sexually mature at their first veterinary examination. Among these breeding-age females:

- 12 (25%) had a dependent joey or were pregnant,
- 36 (75%) had <u>no</u> joey or pregnancy, with 23 of these females diagnosed with reproductive disease. In other words, 48% of breeding-age resident females at PRCA were unable to breed due to permanent sterility, highlighting a significant limitation on the fecundity of the population.

Over the course of the project (up until 31st March 2025), additional cases of reproductive disease were identified through ongoing field monitoring, recapture and veterinary assessment. These cases included females who had originally been reproductively active and showed no signs of disease at their initial examination. In total, 39 resident females at the PRCA were determined, by veterinary examination, to be permanently sterile because of chronic chlamydial infection. Twenty-eight were surgically ovariohysterectomised, and 11 were either not considered suitable candidates for surgery and were humanely euthanased or died from unrelated causes prior to surgical intervention.



"Sloane", a resident female koala from the PRCA

5 Translocated koala summary

A total of 34 koalas – comprising 16 males and 18 females - were translocated to the PRCA, commencing in May 2023. As of 31st March 2025, the longest duration a translocated koala had been monitored was 683 days.

5.1 Reproductive health (translocated females)

Among the 18 translocated females:

- 4 were sexually immature at the time of translocation;
- 12 had dependent joeys, all of which subsequently successfully became independent;
- 2 had neither a joey nor a pregnancy at the time of translocation, but both subsequently bred post-translocation.

At the time of writing, since arriving at the PRCA, 15 of the 18 females had successfully bred and given birth. Notably, two of these females were raising their second joey since being translocated, highlighting positive reproductive outcomes post-translocation.

The addition of healthy, fecund female koalas to the population through translocation has improved the viability of the population, which had very low fecundity prior to and during the first few years of the health management program.

5.2 Health interventions and outcomes in translocated koalas

Of the 34 translocated koalas, six individuals required hospital admission during the monitoring period, with two of those koalas admitted on two separate occasions—resulting in a total of eight hospital admissions (Table 2). Reasons for admission included dental abscess (1 koala), septicaemia (1 koala), intraspecific conflict injuries (1 koala), chlamydial infection/disease (1 koala, with an established home range off-site in an area with no disease management), non-chlamydial cystitis (1 koala), and weight loss in a recently independent juvenile. The only koala to present on separate occasions with both chlamydial disease (cystitis) and, approximately one year later, chlamydial infection (without disease), had established a home range outside of the PRCA, in an area where *Chlamydia* is unmanaged—thereby increasing the likelihood of exposure and infection. All admissions ultimately had favourable outcomes with release following successful treatment. One individual, Pluto, required a second admission before improvements were observed, after which he was released and continued to do well under monitoring. These findings underscore the value of post-translocation health surveillance and timely veterinary intervention in supporting koala welfare.

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175	Chlamydial disease (cystitis)		Established home range off-site
578		Treated successfully	in unmanaged disease area
520	Chlamydial infection (no disease)	Treated successfully	Established home range off-site in unmanaged disease area
238	Recaptured due to noticeable decline in activity via the K-Tracker dashboard (Incyt). Septicaemia (Chromobacterium violaceum), liver abscesses	Treated successfully	
298	Maxillary abscess (dental infection)	Treated successfully	
64	Observations due to weight loss and drop in body condition. Recently independent joey; possible behavioural naivety/maladaptation or underlying undiagnosed health condition	Released on increased monitoring, but required re- admission just over one month later	No underlying health condition confirmed
105	Observations due to continued weight loss (no further body condition decline). Recently independent joey; possible behavioural naivety/maladaptation or underlying undiagnosed health condition	Released - ongoing weight gain and body condition improvements recorded at subsequent vet exams following release	No underlying health condition confirmed
103	Injuries from intraspecific conflict. Fight wounds; required partial digit amputation	Treated successfully	
	238 298 64 105 103 174	Recaptured due to noticeable decline in activity via the K-Tracker dashboard (Incyt). Septicaemia (Chromobacterium violaceum), liver abscesses 238 violaceum), liver abscesses 298 Maxillary abscess (dental infection) Observations due to weight loss and drop in body condition. Recently independent joey; possible behavioural naivety/maladaptation or underlying undiagnosed health condition 64 Undependent joey; possible behavioural naivety/maladaptation or underlying behavioural naivety/maladaptation or underlying undiagnosed health condition 105 Underlying undiagnosed health condition 105 underlying undiagnosed health condition 103 wounds; required partial digit amputation 174 Non-chlamydial cystitis	Recaptured due to noticeable decline in activity via the K-Tracker dashboard (Incyt). Septicaemia (Chromobacterium238violaceum), liver abscessesTreated successfully298Maxillary abscess (dental infection)Treated successfully298Maxillary abscess (dental infection)Treated successfully0bservations due to weight loss and drop in body condition. Recently independent joey; possible behavioural naivety/maladaptation or underlying 64Released on increased monitoring, but required re- admission just over one month later64Observations due to continued weight loss (no further body condition decline). Recently independent joey; possible behavioural naivety/maladaptation or underlying undiagnosed health conditionReleased - ongoing weight gain and body condition improvements recorded at subsequent vet exams 105105Injuries from intraspecific conflict. Fight 103Treated successfully104Non-chlamydial cystitisTreated successfully

Table 2: Koala admissions following translocation

5.3 Notable movements

Post-translocation telemetric monitoring (using the K-Tracker (Incyt, Sydney) system) of all living translocated koalas was ongoing at the time of writing. Of the 34 translocated koalas, 29 remained within the PRCA (Figure 2). Three of these koalas - Manor, Cannon, and Sven- exhibited localised movements or temporary dispersal but ultimately established home ranges on the PRCA site. One koala (Albany) established a home range outside of, but directly adjacent to and abutting, the PRCA boundary. Five koalas (Ariel, Battersea, Maui, Duchess, and Whitechapel) dispersed from the PRCA into surrounding habitats, with movement distances ranging from approximately 1 to 4 km, and timing of movements ranging from 22 days to 7.5 months post translocation. Notably, Duchess was relocated back to the site 4 days after dispersing off-site due to her movement to an area of highly fragmented habitat with access issues. She remained on site after relocation. These patterns are consistent with expected post-release and seasonal dispersal behaviour, and similar movements were observed in resident (non-translocated) animals.

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Young, dispersing koalas—whether resident or translocated—are more likely to encounter hazards as they move through unfamiliar areas in search of suitable habitat. These movements are a natural part of koala behaviour, particularly during the breeding season, and can involve traversing varied and sometimes challenging landscapes. In suburban areas, this may include roads and backyards, while in bushland, features such as watercourses or mangroves can present natural barriers. At the PRCA site, *Sven*, a dispersing subadult male koala, exhibited typical seasonal dispersal behaviour, moving northeast into mangrove habitat along the Pimpama River on two occasions. His tracking collar was later recovered on the northern bank of the Pimpama River. *Sven* is presumed dead, although his body was not recovered.

The successful establishment and breeding of translocated koalas at the PRCA demonstrates that translocation is a viable, welfare-orientated, management strategy for use as a 'last resort' option to manage koalas in areas undergoing habitat loss or fragmentation. After a period of establishment, translocated koalas can be expected to behave and be exposed to all site-based threats, such as natural predation and extreme weather and environmental conditions, that impact the resident population of koalas, resulting in some mortality of translocated koalas.

In the current context, the translocation of healthy, fecund female koalas into the site was an important management action to address the extinction trajectory.





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6 Causes of death (resident and translocated koalas)

Of the 177 koalas—143 residents and 34 translocated individuals— recruited into the KTP between August 2021 and 31 March 2025, the following mortalities (including euthanasia) were recorded (Table 3):

- 58 of 143 resident koalas (41%)
- 4 of 34 translocated koalas (12%)*

* Note: one translocated koala (*Sven*) was presumed dead based on circumstantial evidence, although physical remains were not recovered.

Among resident koalas, the leading cause of death was disease, with *Chlamydia*-related illness being the most common. This was followed by predation, primarily by carpet pythons. Mortality among resident koalas was particularly high during the first 2 years of the program, reflecting the significant burden of *Chlamydia* and other diseases present in the local population at the time.

In contrast, the main contributor to mortality among translocated koalas was extreme weather associated with ex-*Tropical Cyclone Alfred*.

Cause of Death	Residents	Translocated	Additional notes re: translocation deaths
Disease	45	1	*septicaemia
Predation (python)	6	0	
Intermale fighting	1	0	
Trauma (natural)	2	0	
Ex-Tropical Cyclone Alfred-related	4	2	
Presumed dead (misadventure)	0	1	*collar found at low tide in mangroves (suspect drowning, body not located)
TOTALS	58	4	

Table 3: Causes of mortality of koalas at the PRCA (August 2021- 31st March 2025)

Following the first translocation in May 2023, a total of 112 resident koalas and 34 translocated koalas were telemetrically monitored to the 31st March 2025 (the time of writing). Despite a prevalent dogma that translocation often leads to increased mortality in koalas, interim findings from this program indicate that the mortality rate among translocated koalas (12%) was lower than that of resident koalas (24%) (Table 4, overleaf). During the study period, 27 resident koalas died or were euthanased, compared to four translocated koalas. The deaths in both groups were primarily attributed to diseases unrelated to chlamydial infection, with python predation being more common in residents. Extreme weather events contributed to mortality in both groups. These results debunk the belief that translocated koalas inevitably die as a result of the process. A more comprehensive analysis of mortality and disease in the resident versus translocated koalas will be presented in the final project report, due for completion in early 2026.



Table 4: Koala mortality comparison: resident vs. translocated koalas since translocation of the first koala (which occurred in May 2023) up to 31st March 2025.



"Marylebone" and joey "Bashful" – Marylebone, a resident female koala from the PRCA, was killed (but not successfully consumed) by a carpet python in January 2024.

1695 Pumicestone Road Toorbul, OLD, 4510 Table 5 summarises the time to mortality for the four koalas that died subsequent to translocation. Mortalities occurred between 27 and 346 days post-release. Two of the koalas died due to the impacts of ex-*Tropical Cyclone Alfred (Pluto, Westbourne*). One young, recently-independent female koala (*Anna*) died from septicaemia/pneumonia just under a month after translocation, following a period of inclement weather. Given her age and recent independence from her mother, she may have been more vulnerable to these opportunistic infections. The fourth koala's death was suspected based on circumstantial evidence, with the collar found at low tide in the mangroves, though physical remains were not recovered.

Name	Sex	Age when translocated (years)	No. Days Death Occurred Post-Translocation	Cause of Death
Pluto	Male	3.36	346	Ex-Tropical Cyclone Alfred
Anna	Female	1.17	27	Septicaemia (following rainy weather)
Westbourne	Male	2.24	303	Ex-Tropical Cyclone Alfred
Sven	Male	1.38	117	Presumed dead (*collar found in mangroves at low tide)

Table 5: Translocated koalas and time to mortality following release



"Muffin", a male koala, was translocated to Pimpama River Conservation Area in November 2023

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7 Discussion

The construction of the Coomera Connector necessitated the development of a scientifically robust *Koala Translocation Plan* as a component of the KMP to mitigate threats to koalas directly impacted by habitat loss. The *Pimpama River Conservation Area* was selected as the most suitable recipient site for koalas based on ecological and project-based requirements. The implementation of the KTP for the Coomera Connector – Stage 1 (CC-1) project has demonstrated that strategic planning, proactive veterinary management, and carefully managed translocation can deliver meaningful conservation outcomes for koalas in impacted landscapes.

Despite initial concerns regarding disease burden, the project successfully reduced the prevalence of chlamydial infection and disease among resident koalas through sustained veterinary intervention. Translocation of healthy, fecund females to the recipient site further bolstered the reproductive capacity of the local population, which had previously exhibited high levels of sterility and poor fecundity. Early reproductive success among translocated females, many of whom raised joeys post-release, highlights the potential for this strategy to contribute significantly to population recovery.

Mortality among translocated koalas was lower than among residents, with deaths largely attributed to extreme weather events and environmental factors beyond the scope of management. Importantly, the findings challenge the notion that translocation inherently increases mortality risk in koalas, provided it is supported by robust site selection, effective monitoring and adaptive management/intervention, and ongoing koala health management.

Overall, the interim outcomes of the KTP suggest that translocation, when applied with rigour and integrated into a broader habitat and health management framework, can be an effective tool for koala population recovery. The work of the CC-1 KTP in the PRCA provided a valuable opportunity to showcase the success of these management interventions on a population that was on a rapidly declining trajectory. The measurable benefits achieved should serve as a model for future translocation programs. The success of the program to date underscores the importance of continued monitoring, adaptive management, and investment in strategic, science-led conservation actions to support the long-term survival of koalas in rapidly developing regions.

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Appendix 1: Koalas translocated due to immediate or anticipated habitat loss, fragmentation, or elevated risk within or near the project corridor

		Demme durative			Dava sina s	Davis de eth			
		status whop	Age at	Data of	translocation	Days death	Considerations for translocation		Curront status
Namo	Sov	translocated	(voars)	translocation	(as of 21/2/25)	translocation	(including alternatives trialled)	Why was translocation was no cossary?	(ac of 21/2/25)
Name	JEX	transtocateu	(years)	transtocation	(85 01 31/3/23)		(including allematives thatted)	No suitable babitat within 5 km of native home	(850131/3/23)
							Pisk profile too high to remain $in_sit_{U_s}$ hit	range without unaccentable risks to this	
Manor	Malo		1 66	19/05/2022	602	NI/A	hyvehicle prior to translocation	individual given all considerations	Alivo
	Male	IN/A	1.00	18/03/2023	003	IN/A	Bisk profile too high to remain in-situ	No suitable babitat within 5 km of native home	Allve
							fragmented habitat and high dispersal	range without unaccentable risks to this	
Honor	Fomalo	NU	1 51	1/06/2022	660	NI/A	naginemed habitat and high dispersat	individual given all considerations	Alivo
нопо	remate	INIL	1.51	1/06/2023	009	IN/A	potential given age (nand-raised joey)	No suitable babitat within 5 km of native home	Allve
		Approx E C					Dick profile too high to remain in aity hit	range without unaccontable ricks to this	
Arial	Female	Appilox. 5-6	0.00	C/0C/0000	004	N1/A	Hisk profile too flight to remain <i>m-situ</i> - flit		A 1940
Ariel	Female	monun olu joey	3.83	6/06/2023	664	N/A			Auve
							Diak profile too high to remain in aity	No quitable behitst within E lym of pative home	
		Amman 7 0					Risk profile too fligh to remain <i>m-situ</i> -	INO SUITABLE HABITAL WITHIN 5 KIT OF HALIVE HOME	
Devile	E	Approx. 7-8	7.07	0.4.100.100.000	505		local relocation due to clearing, domestic	range without unacceptable risks to this	A.I
Purley	Female	month old joey	7.97	24/08/2023	585	N/A	Disk weefile to a birth to measure in a situ	Individual, given all considerations.	Auve
							Risk profile too high to remain <i>in-situ</i> -	No suitable nabitat within 5 km of native nome	
							Imminent danger of vehicle strike (M1)	range without unacceptable risks to this	
Cannon	Male	N/A	1.62	28/08/2023	581	N/A	prior to translocation	Individual, given all considerations.	Alive
							Risk profile too high to remain <i>in-situ</i>	No suitable habitat within 5 km of hative home	
							local relocation due to clearing, domestic	range without unacceptable risks to this	
Battersea	Male	N/A	3.48	2/09/2023	576	N/A	dog interaction prior to translocation	individual, given all considerations.	Alive
							Risk profile too high to remain <i>in-situ</i>		
							from habitat known as a "hotspot" for		
							koala deaths prior to translocation. High	No suitable habitat within 5 km of native home	
							dispersal potential given age (hand-	range without unacceptable risks to this	
Elmstead	Male	N/A	1.42	15/09/2023	563	N/A	raised joey)	individual, given all considerations.	Alive
							Risk profile too high to remain <i>in-situ</i>	No suitable habitat within 5 km of native home	
							habitat to be cleared, high dispersal	range without unacceptable risks to this	
Muffin	Male	N/A	1.71	24/11/2023	493	N/A	potential given age (hand-raised joey)	individual, given all considerations.	Alive
							Risk profile too high to remain <i>in-situ</i> -	No suitable habitat within 5 km of native home	
							habitat to be cleared, high dispersal	range without unacceptable risks to this	
Pacha	Female	Nil	1.26	17/04/2024	348	N/A	potential given age	individual, given all considerations.	Alive
							Risk profile too high to remain <i>in-situ</i>	No suitable habitat within 5 km of native home	
		Approx. 2-3					local relocation due to clearing,	range without unacceptable risks to this	
Blueberry (Tartlet	Female	month old joey	4.51	18/04/2024	347	N/A	eventually translocated	individual, given all considerations.	Alive
								No suitable habitat within 5 km of native home	
							Risk profile too high to remain in-situ -	range without unacceptable risks to this	
Pluto	Male	N/A	3.36	18/04/2024		346	habitat to be cleared	individual, given all considerations.	Dead

								No suitable habitat within 5 km of native home	
		Approx. 4-5					Risk profile too high to remain in-situ -	range without unacceptable risks to this	
Debden	Female	month old joey	5.21	19/04/2024	346	N/A	habitat to be cleared	individual, given all considerations.	Alive
								No suitable habitat within 5 km of native home	
							Risk profile too high to remain in-situ -	range without unacceptable risks to this	
Anna	Female	Nil	1.17	19/04/2024		27	habitat to be cleared	individual, given all considerations.	Dead
								No suitable habitat within 5 km of native home	
		Approx. 3-4					Risk profile too high to remain in-situ -	range without unacceptable risks to this	
Finsbury	Female	month old joey	6.53	25/04/2024	340	N/A	habitat to be cleared	individual, given all considerations.	Alive
								No suitable habitat within 5 km of native home	
		Approx. 3-4					Risk profile too high to remain in-situ -	range without unacceptable risks to this	
Leicester (Angie)	Female	month old joey	7.23	26/04/2024	339	N/A	habitat to be cleared	individual, given all considerations.	Alive
								No suitable habitat within 5 km of native home	
							Risk profile too high to remain in-situ -	range without unacceptable risks to this	
Duchess	Female	Nil	1.37	30/04/2024	335	N/A	habitat to be cleared	individual, given all considerations.	Alive
							Risk profile too high to remain in-situ -	No suitable habitat within 5 km of native home	
							high koala density in area and habitat to	range without unacceptable risks to this	
Purfleet	Female	Nil	5.18	15/05/2024	320	N/A	be cleared	individual, given all considerations.	Alive
							Risk profile too high to remain in-situ -	No suitable habitat within 5 km of native home	
							high koala density in area and habitat to	range without unacceptable risks to this	
Westbourne	Male	N/A	2.24	21/05/2024		303	be cleared	individual, given all considerations.	Dead
							Risk profile too high to remain in-situ -	No suitable habitat within 5 km of native home	
							high koala density in area and habitat to	range without unacceptable risks to this	
Tui	Male	N/A	1.36	22/05/2024	313	N/A	be cleared	individual, given all considerations.	Alive
							Risk profile too high to remain in-situ -	No suitable habitat within 5 km of native home	
							high koala density in area and habitat to	range without unacceptable risks to this	
Erith	Male	N/A	2.48	22/05/2024	313	N/A	be cleared	individual, given all considerations.	Alive
							Risk profile too high to remain in-situ -	No suitable habitat within 5 km of native home	
		Approx. 4-5					high koala density in area and habitat to	range without unacceptable risks to this	
Star	Female	month old joey	3.66	23/05/2024	312	N/A	be cleared	individual, given all considerations.	Alive
							Risk profile too high to remain <i>in-situ</i> -	No suitable habitat within 5 km of native home	
							high koala density in area and habitat to	range without unacceptable risks to this	
Maui	Male	N/A	1.42	23/05/2024	312	N/A	be cleared	individual, given all considerations.	Alive
							Risk profile too high to remain <i>in-situ</i> -	No suitable habitat within 5 km of native home	
		Approx. 3-4					high koala density in area and habitat to	range without unacceptable risks to this	
Gidea	Female	month old joey	4.19	24/05/2024	311	N/A	be cleared	individual, given all considerations.	Alive
							Risk profile too high to remain <i>in-situ</i> -	No suitable habitat within 5 km of native home	
		Approx. 4-5					high koala density in area and habitat to	range without unacceptable risks to this	
Albany	Female	month old joey	5.95	28/05/2024	307	N/A	be cleared	individual, given all considerations.	Alive
							Risk profile too high to remain in-situ -	No suitable habitat within 5 km of native home	
		Approx. 4-5					high koala density in area and habitat to	range without unacceptable risks to this	
Epping	Female	month old joey	4.36	29/05/2024	306	N/A	be cleared	individual, given all considerations.	Alive

							Risk profile too high to remain in-situ -	No suitable habitat within 5 km of native home	
		Approx. 4-5					relocation attempted twice, high koala	range without unacceptable risks to this	
Queensbury	Female	month old joey	5.31	5/06/2024	299	N/A	density in area and habitat to be cleared	individual, given all considerations.	Alive
							Risk profile too high to remain in-situ -	No suitable habitat within 5 km of native home	
		Approx. 5-6					high koala density in area and habitat to	range without unacceptable risks to this	
Whitechapel	Female	month old joey	7.61	6/06/2024	298	N/A	be cleared	individual, given all considerations.	Alive
							Risk profile too high to remain in-situ -	No suitable habitat within 5 km of native home	
							high koala density in area and habitat to	range without unacceptable risks to this	
Sven	Male	N/A	1.38	1/07/2024		117	be cleared	individual, given all considerations.	Presumed dead
							Risk profile too high to remain in-situ -	No suitable habitat within 5 km of native home	
							habitat cleared, high disperal potential	range without unacceptable risks to this	
Millie	Female	Nil	1.49	12/09/2024	200	N/A	(hand-raised joey)	individual, given all considerations.	Alive
							Risk profile too high to remain in-situ -		
							local relocation twice due to clearing.	No suitable habitat within 5 km of native home	
							Eventual translocation due to welfare	range without unacceptable risks to this	
Ilford	Male	N/A	3.87	19/09/2024	193	N/A	concerns	individual, given all considerations.	Alive
							Risk profile too high to remain in-situ -		
							captured on light rail tracks and local	No suitable habitat within 5 km of native home	
							relocation initially. Eventual translocation	range without unacceptable risks to this	
Notting	Male	N/A	2.57	19/09/2024	193	N/A	due to risky movements	individual, given all considerations.	Alive
							Risk profile too high to remain in-situ -		
							local relocation twice due to clearing.	No suitable habitat within 5 km of native home	
							Eventual translocation due to risky	range without unacceptable risks to this	
Watford	Male	N/A	3.68	22/10/2024	160	N/A	movements.	individual, given all considerations.	Alive
							Risk profile too high to remain in-situ -	No suitable habitat within 5 km of native home	
							habitat cleared while in care (orphaned	range without unacceptable risks to this	
Воо	Male	N/A	1.33	13/03/2025	18	N/A	joey)	individual, given all considerations.	Alive
							Risk profile too high to remain in-situ -	No suitable habitat within 5 km of native home	
							habitat cleared while in care (orphaned	range without unacceptable risks to this	
Freckles	Male	N/A	1.28	13/03/2025	18	N/A	joey)	individual, given all considerations.	Alive

*No deaths have been caused directly by translocation so no translocation alternatives considered.



7. Appendix D: Schedule of Plans

Condition 46c) A schedule of all plans in existence in relation to these conditions and accurate and complete details of how each plan is being implemented.

Koala Management Plan

In accordance with EPBC Approval (2020/8646) Condition 14, TMR submitted a revised Koala Management Plan (KMP) to DCCEEW on the 15th December 2023. Following the finalisation of CCS1 South package detailed design (July 2024), and achieving substantial progress in CCS1 Central package detailed design, TMR resubmitted the revised KMP to DCCEEW on 12th August 2024 for approval. No decision has been made by DCCEEW and no comments have been received on the revised KMP. In the interim, TMR is progressing through Construction in accordance with the approved Appendix 14 Koala Management Plan of the *Coomera Connector Stage 1 Public Environmental Report* and in accordance with the revised KMP submitted on 12th August 2024.

- Appendix A Coomera Connector Stage 1 Koala Conservation Strategy (KSC)
- Appendix B Koala Tagging and Monitoring Program (KTMP). This component includes:
 - the monitoring of Koalas that are identified as being at-risk during and/or because of construction activities; and the monitoring of the Koalas that are to remain during the operational phase of the approved action.
 - active Koala management including but not limited to monitoring and observing the presence of the Koala within and in proximity to the approved action corridor; assisted dispersal of Koalas to nearby surrounding habitat outside the proposed action corridor; and translocation of Koalas in imminent danger in the first instance to the East Coomera Koala Population. The translocation of any Koala will be undertaken through a coordinated and approved approach under the Koala Translocation Program
 - long term monitoring of the trends in Koala populations within and in proximity to the approved action corridor
- Protecting Koalas from harm during vegetation clearing and construction works through the use of fauna spotters and the adoption of sequential clearing practices consistent with the requirements outlined in the Nature Conservation (Koala) Conservation Plan 2017 (Qld)
- Engineering solutions
- Appendix B Koala Translocation Plan
- Appendix C Koala Movement Solutions
- Appendix D Peer-review by Independent Suitably Qualified Koala Ecologist
- Appendix E Procedures to ensure safe movement solutions are installed prior to opening any roads
- Koala Stakeholder Reference Group quarterly meetings
- TMR-EVE-DETSI-CoGC Quarterly Koala Meetings
- Monthly KTMP Reports

Water Quality Management Plan

The Water Quality Management Plans were submitted to the 9 November 2023 (*31CIDD00 Coomera Connector – Drainage Water Quality Management Plan*, Revision 3) and 21 December 2023 (*Coomera Connector – Helensvale Road to Smith Street Water Quality Management Plan*, Revision 3A) for the Stage 1 North and Stage 1 Central alignments respectively. Comments were received from DCCEEW on 28/03/24 and an update to the WQMPs is currently being undertaken at the time of writing this report.

Offset Area Management Plan

The Coomera Connector Stage 1 Offset Area Management Plan (OAMP) was approved by DCCEEW on 22nd August 2024. Refer to Appendix F of this Annual Compliance Report for a summary of activities delivered to date on Greenridge and Tabooba.

8. Appendix E: Coastal Swamp Oak TEC documentation

8.1 Condition 6bi): assess and document the quality and extent of Coastal Swamp Oak TEC to be retained within 30 m of clearing and/or construction, prior to the commencement of clearing and/or construction within 30 m of Coastal Swamp Oak TEC.

Provided below.

COASTAL SWAMP OAK TEC CONDITION MONITORING FEBRUARY 2023

COOMERA CONNECTOR – STAGE 1

Prepared for Department of Transport and Main Roads



Biodiversity Assessment and Management Pty Ltd PO Box 1376 CLEVELAND 4163



Specialised ecological knowledge that reduces your risk

Document Control Sheet

File Number: 0101-030d

Project Manager/s: Paulette Jones

Client: Department of Transport and Main Roads

Project Title: Coastal Swamp Oak TEC Condition Monitoring - Coomera Connector Stage 1 February 2023

Project Author/s: Conor O'Brien

Project Summary: Results of BioCondtion surveys undertaken in February 2023 in patches of Coastal Swamp Oak (*Casuarina glauca*) Forest of New South Wales and South East Queensland threatened ecological community (TEC) adjacent to the Coomera Connector Stage 1 Project boundary.

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Purpose of Report

Biodiversity Assessment and Management Pty Ltd has produced this report in its capacity as {consultants} for and on the request of Department of Transport and Main Roads (the "Client") for the sole purpose of providing the results of ecological condition monitoring within patches of the Coastal Swamp Oak (*Casuarina glauca*) Forest of New South Wales and South East Queensland threatened ecological community (TEC) adjacent to the Coomera Connector Stage 1 Project boundary (the "Specified Purpose"). This information and any recommendations in this report are particular to the Specified Purpose and are based on facts, matters and circumstances particular to the subject matter of the report and the Specified Purpose at the time of production. This report is not to be used, nor is it suitable, for any purpose other than the Specified Purpose. Biodiversity Assessment and Management Pty Ltd disclaims all liability for any loss and/or damage whatsoever arising either directly or indirectly as a result of any application, use or reliance upon the report for any purpose other than the Specified Purpose.

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Signed on behalf of **Biodiversity Assessment and Management Pty Ltd**

Date: 29 February 2024

Managing Director

COASTAL SWAMP OAK TEC CONDITION MONITORING – COOMERA CONNECTOR STAGE 1

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Appendix 1:	BioCondtion	Site	Data
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Appendix 2: Site Species Data

Table of Abbreviations

- BAAM Biodiversity Assessment and Management
- et al. and others
- GDA Geocentric Datum of Australia
- m metres
- MGA Metric Rectangular Grid System
- TEC Threatened Ecological Community
- RE Queensland Regional Ecosystem
- WoNS Weed of National Significance



1.0 INTRODUCTION

Biodiversity Assessment and Management Pty Ltd (BAAM) has prepared this report for Department of Transport and Main Roads with the purpose of documenting the results of ecological condition monitoring within patches of the Coastal Swamp Oak (*Casuarina glauca*) Forest of New South Wales and South East Queensland threatened ecological community (TEC) that are present adjacent to the Coomera Connector Stage 1 Project boundary.

1.1 STUDY AREA

The study area is defined by previously mapped Coastal Swamp Oak TEC reported by Planit (2022) for the Coomera Connector Stage 1 Public Environment Report as present within 30 metres outside the Project boundary (see **Figure 1.1**).

1.2 STUDY AIMS

The aims of the monitoring survey were to obtain baseline data for the ecological condition of Coastal Swamp Oak TEC adjacent to the Project boundary prior to the commencement of construction activities and establish monitoring sites for measuring change in condition over time.

2.0 METHODS

2.1 DESKTOP PLANNING

To record ecosystem condition, it was determined that the surveys would be undertaken applying the site-based attribute methods of the Queensland BioCondition Assessment Framework (Eyre, *et. al.* 2015). BioCondition assessment provides a measure of how well a terrestrial ecosystem is functioning for biodiversity values. It is a sitebased, quantitative method allowing repeatable assessment that is summarised in a condition rating.

A 30 m buffer was drawn around the Stage 1 footprint and overlaid with the Planit (2022) Coastal Swamp Oak TEC mapping and Queensland Regional Ecosystem (RE) mapping to identify representative survey sites and mark co-ordinates for field investigation.

Ten potential survey sites were identified for establishment of survey transects.

2.2 FIELD SURVEYS

Selection of transection locations was determined in the field considering available access, and the presence of the correct vegetation types as mapped by Planit (2022).

The TEC mapping at the pre-determined locations was found to be accurate and access to all sites was available. Ten permanent survey sites were established.

Each BioCondition transect was positioned with the principal objectives of avoiding the influence of adjacent vegetation types and achieving appropriate assessment unit replication within the limits of the area under investigation. Where a full 100 x 50 m transect could not be laid out due to the size of the TEC polygon available for survey, or for safety reasons (i.e. inundation), a 50 x 50 m transect was instead used at two sites, with values adjusted accordingly.

The measurements taken within each transect were recorded by entry into Queensland Government BioCondition Site Assessment Datasheets.

Transects were marked within the study area using a Trimble GPS unit capable of sub-metre accuracy. Co-ordinates were recorded at the start, mid and end points of each transect, and marked physically using copper tags (either attached to a peg in the ground or fixed to a tree), engraved with the site number, date, and location along the transect.

3.0 RESULTS

A summary of results for each site is provided in **Tables 3.1-3.10**, including photographs facing north, south, east and west from the midpoint of each transect and notes on the main threats to the condition of the TEC in each area. Additional site and species data are provided in **Appendices 1** & **2**.

The threats recorded were primarily associated with the presence of invasive plant species.

Scoring of the site-based BioCondition attributes was in accordance with the scoring process of Eyre *et al.* (2015), with reference to the relevant BioCondition benchmarks (Version 3.3).



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Table 3.1. Site BC01 Summary

Site ID:	BC01 (see Figure 3.1)				
Bioregion:	South-East Quee	nsland			
RE	12.1.1 : <i>Casuarina glauca</i> woodland on margins of marine clay plains				
Date:	21/02/2023				
Observer/s:	Simon Danielsen,	, Conor O'Brien	BC01 North	BC01 East	
Datum:	WGS 84				
Zone:					
50x100m transect:					
Location	Latitude	Longitude			
Start	-27.8580	153.3268			
Mid/photo	-27.8583	153.3270	BC01 South	BC01 West	
End	-27.8588	153.3271			
Transect bearing	ıg: 160.775854°E				
General descri	ption : Semi-open w	voodland of <i>Casuarina</i> g	lauca regrowth, with sparse grassy understorey.		
Main threats: Incursion and spread of invasive plant species from roadside boundary.					
BIOCONDITION SITE-BASED ATTRIBUTES SCORE OUT OF 10: (58/80)x10 = 7.3					





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Table 3.2. Site BC02 Summary

Site ID:	BC02 (see Fig	jure 3.1)				
Bioregion:	South-East Qu	ueensland				
RE	12.1.1: Casua margins of ma	<i>rina glauca</i> woodland on rine clay plains				
Date:	21/02/2023		THANKS!			
Observer/s:	Simon Danielsen, Conor O'Brien		BC02 North	BC02 East		
Datum:	WGS 84					
Zone:						
50x100m trans	sect:					
Location	Latitude	Longitude				
Start	-27.8576	153.3279				
Mid/photo	-27.8580	153.3280	BC02 South	BC02 West		
End	-27.8584	153.3282				
General descr	General description: Open Casuarina glauca woodland with grassy understorey.					
Main threats:	ncursion and spr	ead of invasive plant spec	ies from roadside boundary.			
BIOCONDITIO	N SITE-BASED	ATTRIBUTES SCORE OL	JT OF 10: (64/80)x10 = 8.0			



Table 3.3. Site BC03 Summary

Site ID:	BC03 (see Figure 3.2)			
Bioregion:	South-East Qu	eensland		1 MARCHINA MARKIN
RE	12.1.1: Casuar margins of mar	<i>ina glauca</i> woodland on ine clay plains		
Date:	21/02/2023			
Observer/s:	Simon Daniels	en, Conor O'Brien	BC03 North	BC03 East
Datum:	WGS 84			
Zone:				
50x100m trans	ect:			
Location	Latitude	Longitude		
Start	-27.8921	153.3396		
Mid/photo	-27.8924	153.3392	BC03 South	BC03 West
End	-27.8927	153.3390		
General descri understorey	ption: Semi-ope	n <i>Casuarina glauca</i> woodl	and in floodplain, bordering on mangroves, inu	ndated with brackish water. Grassy/mangrove fern
Main threats: Ir	ncursion and spre	ead of invasive plant speci	es, particularly <i>Salvinia molesta</i> (WoNS) growi	ng in inundated areas, under little/no canopy cover.
BIOCONDITION	N SITE-BASED A	ATTRIBUTES SCORE OU	T OF 10: (58/80)x10 = 7.3	









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Table 3.4. Site BC04 Summary

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Site ID:	BC04 (see Figure 3.2)					
Bioregion:	South-East Queensland					
RE	12.1.1: Casua margins of ma	a <i>rina glauca</i> woodland on arine clay plains		man Tes Aller		
Date:	21/02/2023					
Observer/s:	Simon Daniel	sen, Conor O'Brien	BC04 North	BC04 East		
Datum:	WGS 84					
Zone:						
50x100m transe	ect:		THE THE SEC.			
Location	Latitude	Longitude	Charles and a			
Start	-27.8934	153.3381				
Mid/photo	-27.8938	153.3379	BC04 South	BC04 West		
End	-27.8942	153.3380				
General descri understorey.	ption: Semi-op	en <i>Casuarina glauca</i> woodl	and in floodplain, bordering on mangroves, inund	dated with brackish water. Grassy/mangrove fern		
Main threats: Ir	Main threats: Incursion and spread of invasive species, particularly Salvinia molesta (WoNS) growing in inundated areas, under little/no canopy cover.					
BIOCONDITION	I SITE-BASED	ATTRIBUTES SCORE: (5	1.5/80)x10 = 6.4			



Table 3.5. Site BC05 Summary

Site ID:	BC05 (see Figure 3.2)			
Bioregion:	South-East Queensland			
RE	12.3.20: Melaleuca quinquenervia, Casuarina glauca +/- Eucalyptus tereticornis, E. siderophloia, M. styphelioides open forest on low coastal alluvial plains			
Date:	21/02/2023		BC05 North	BC05 East
Observer/s:	Simon Danielsen, Conor O'Brien			
Datum:	WGS 84		FTAN GRAD	
Zone:				
50x100m trans	ect:			
Location	Latitude	Longitude	BC05 South	BC05 West
Start	-27.9026	153.3409		
Mid/photo	-27.9030	153.3409		
End	-27.9035	153.3410		
General descrigroundcover.	ption: Semi-op	en <i>Casuarina glauca</i> woodla	nd, bordering on RE 12.1.1. Non-native sh	rubs predominant in understorey, with grassy
Main threats: I (WoNS).	ncursion and sp	read of invasive plant specie	es, with <i>Salvinia molesta</i> (WoNS) growing i	n inundated areas and large stands of Lantana camara
BIOCONDITIO	N SITE-BASED	ATTRIBUTES SCORE: (40	/80)x10 = 5.0	



Table 3.6. Site BC06 Summary

Site ID:	BC06 (see Figure 3.2)				
Bioregion:	South-East Queensland			ALL PARTY BUT PARTY	
RE	12.1.1 : <i>Casuari</i> margins of mari	<i>ina glauca</i> woodland on ine clay plains			
Date:	21/02/2023				
Observer/s:	Simon Danielse	en, Conor O'Brien	BC06 North	BC06 East	
Datum:	WGS 84				
Zone:				加卡斯以用和波多	
50x100m trans	ect:			如山田的人物的公案	
Location	Latitude	Longitude			
Start	-27.8986	153.3394			
Mid/photo	-27.8991	153.3396	BC07 South	BC06 West	
End	-27.8995	153.3398			
General descri Asparagus grou	ption : Semi-oper nd cover.	n <i>Casuarina glauca</i> woodla	and, with sparse shrub understorey. Inundated pat	ches supporting mangrove ferns, exotic	
Main threats: Incursion and spread of invasive plant species, with large stands of Lantana camara (WoNS), Singapore Daisy Schinus terebinthifolius and extensive mats of Asparagus aethiopicus (WoNS).					
BIOCONDITION	I SITE-BASED A	TTRIBUTES SCORE: (4	5/80)x2 = 5.6		



Table 3.7. Site BC07 Summary

Site ID:	BC07 (see Figu	re 3.3)		CTAP 2			
Bioregion:	South-East Que	ensland					
RE	12.3.20: Melaleu Casuarina glauc tereticornis, E. s. styphelioides ope alluvial plains	ica quinquenervia, a +/- Eucalyptus iderophloia, M. en forest on low coastal					
Date:	21/02/2023		BC07 North		BC07 East		
Observer/s:	Simon Danielsen, Conor O'Brien						
Datum:	WGS 84			A.T.	LANK!		
Zone:							
25 x 50m transe	ect:						
Location	Latitude	Longitude	BC07 South		BC07 West		
Start	-27.9161	153.3417					
Mid/photo	-27.9162	153.3416					
End	-27.9164	153.3417					
General descript into open wetlan	otion: Casuarina g d vegetation.	<i>glauca</i> woodland on flood	plain, with dense shrub/mang	rove fern understorey	/. Inundated with brac	ckish water, transi	tioning
Main threats: In	cursion and sprea	ad of invasive plant specie	es.				
BIOCONDITION	SITE-BASED AT	TRIBUTES SCORE: (49	.5/80)x10 = 6.2				





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Table 3.8. Site BC08 Summary

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Site ID:	BC08 (see Figure 3.3)					
Bioregion:	South-East Queensland		Red Harris			
RE	12.1.1: Casual margins of ma	<i>rina glauca</i> woodland on rine clay plains				
Date:	21/02/2023					
Observer/s:	Simon Daniels	en, Conor O'Brien	BC08 North	BC08 East		
Datum:	WGS 84					
Zone:						
50x100m trans	ect:					
Location	Latitude	Longitude				
Start	-27.9177	153.3424				
Mid/photo	-27.9179	153.3428	BC08 South	BC08 West		
End	-27.9181	153.3432				
General descri heavily infested	ption: Casuarin with Singapore	a glauca woodland on floc Daisy <i>Sphagneticola trilob</i>	dplain, with dense shrub/mang ata.	grove fern understorey. Patches inundated with brackish water,		
Main threats:	Degradation of gr	ound layer, due particularl	y to extensive spread of Singa	apore Daisy.		
BIOCONDITIO	BIOCONDITION SITE-BASED ATTRIBUTES SCORE: (43.5/80)x10 = 0.54					



Table 3.9. Site BC09 Summary

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Site ID:	BC09 (see Figur	e 3.3)			
Bioregion:	South-East Queensland			NU ANDRESSAI	
RE	12.3.20: <i>Melaleuca quinquenervia,</i> <i>Casuarina glauca +/- Eucalyptus</i> <i>tereticornis, E. siderophloia, M.</i> <i>styphelioides</i> open forest on low coastal alluvial plains				
Date:	21/02/2023		BC09 North	BC09 East	
Observer/s:	Simon Danielsen, Conor O'Brien				
Datum:	WGS 84				
Zone:					
50x100m transe	ect:				
Location	Latitude	Longitude	BC09 South	BC09 West	
Start	-27.9305	153.3402			
Mid/photo	-27.9303	153.3406			
End	-27.9300	153.3409			
General descrip	otion: Casuarina g	<i>lauca</i> woodland with der	se understorey regrowth, bordering on mangrove	vegetation.	
Main threats: In	cursion and sprea	d of invasive plant specie	es.		
BIOCONDITION	SITE-BASED AT	TRIBUTES SCORE: (37	.5/80)x10 = 4.7		



Table 3.10. Site BC10 Summary

Site ID:	BC10 (see Figure 3.3)				
Bioregion:	South-East Queensland				
RE	12.1.1 : Casuarina glauca woodland on margins of marine clay plains		MARKE -		
Date:	21/02/2023				
Observer/s:	Simon Danielsen, Conor O'Brien		BC10 North	BC10 East	
Datum:	WGS 84				
Zone:					
25x50m transe	ct:				R
Location	Latitude	Longitude			
Start	-27.9396	153.3427			
Mid/photo	-27.9394	153.3425	BC10 South	BC10 West	
End	-27.9392	153.3425			
General descri	ption: Semi-ope	n <i>Casuarina glauca</i> woodla	and, with grassy understorey. Transit	itions into non-remnant/revegetated patches.	
Main threats: In	ncursion and spr	ead of invasive plant specie	es.		
BIOCONDITION	N SITE-BASED	ATTRIBUTES SCORE: (52	/80)x10 = 6.5		



4.0 REFERENCES

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- Planit (2022). Impact Site Coastal Swamp Oak EEC Habitat Assessment. Appendix to EPBC 2020-8646 Public Environmental Report Stage 1: Coomera Connector. Prepared for Department of Transport and Main Roads by Planit Consulting Pty Ltd. July 2022.
- Queensland Government (2023). BioCondition Benchmarks Version 3.3. https://www.qld.gov.au/environment/plants-animals/biodiversity/benchmarks

APPENDIX 1

BioCondition Site Data

Site:	BC01	Page 1 of 2		
Bioregion:	SEQ			
Date:	21/02/2023			
Observer/s:	Simon Danielse	en, Conor O'Brien		
RE/Landtype:	12.1.1			
Datum:	WGS 84			
Start	Lat.: -2	7.8580	Long.:	153.3268
Mid-point	Lat.: -2	7.8583	Long.:	153.3270
End	Lat.: -2	7.8587	Long.:	153.3271
Transect bearing:	: 60.775854°E			

100 X 50m area (EDL)

Number of large Eucalypt trees:				0
Eucalypt large tree DBH from benchmark doc.:				n/a
Number of large Non-eucalypt trees:				7
Non-eucalypt large tree DBH from benchmark doc.:			29	
Total large trees recorded:			7	
Large trees per/ha			14	
Tree canopy height (EDL) m:				8
Subcanopy and/or Emergent height:	Subcanopy:	4	Emergent:	n/a
Proportion of dominant canopy (EDL) species with evidence of recruitment:			75%	
Total Tree spp Richness (all tree species, single stemme	ed >2m):			5

50 X 20m area (see CWD tab)

Total length of coarse woody debris (m):	106
Total CWD per ha (m)	1060

50 x 10m area

Native shrub spp richness (single-stemmed & <2m OR if multi stemmed from base/below 20cm):	4
Native grass spp richness:	2
Native forb and other (non-grass) spp richness:	9
Non-native cover:	1%

Site: BC01 Page 2 of 2

Five 1 X 1m plots

Ground cover % (*used in scoring)	1	2	3	4	5	Mean
Native perennial ('decreaser') grass*	0	1	0	0	0	0.2
Native other grass (if relevant)*	0	0	0	0	0	0
Native forbs and other species (non-grass)	2	0	0	2	0	0.8
Native shrubs (<1m height)	0	0	0	0	0	0
Non-native grass	0	0	0	0	0	0
Non-native forbs and shrubs	2	0	3	0	0	1
Litter*	96	99	97	98	100	98
Rock	0	0	0	0	0	0
Bare ground	0	0	0	0	0	0
Cryptograms	0	0	0	0	0	0
Total	100	100	100	100	100	100

100m transect

Tree canopy cover	(distance, m)
Total Canopy:	56.1
Total Emergent:	n/a
Total Subcanopy:	32.1

Shrub canopy cover (distance, m. Only native used in scoring.)

Total Native: 3.1

Total Exotic: 20

Site:	BC02	Page 1 of 2		
Bioregion:	SEQ			
Date:	21/02/2023			
Observer/s:	Simon Danielsen,	Conor O'Brien		
RE/Landtype:	12.1.1			
Datum:	WGS 84			
Start	Lat.: -27	.8576	Long.:	153.3279
Mid-point	Lat.: -27	.8580	Long.:	153.3280
End	Lat.: -27	.8584	Long.:	153.3282
Transect bearing:	165.829841°E			

100 X 50m area (EDL)

Number of large Eucalypt trees:				0
Eucalypt large tree DBH from benchmark doc.:				n/a
Number of large Non-eucalypt trees:				25
Non-eucalypt large tree DBH from benchmark doc.:				29
Total large trees recorded:				25
Large trees per/ha				50
Tree canopy height (EDL) m:				16
Subcanopy and/or Emergent height: Subcanopy: 7 Emergent:				
Proportion of dominant canopy (EDL) species with evidence of recruitment:				100%
Total Tree spp Richness (all tree species, single stemmed	>2m):			1

50 X 20m area

Total length of coarse woody debris (m):	20
Total CWD per ha (m)	200

<u>50 x 10m area</u>

Native shrub spp richness (single-stemmed & <2m OR if multi stemmed from base/below 20cm):	2
Native grass spp richness:	3
Native forb and other (non-grass) spp richness:	13
Non-native cover:	5%

Site: BC02 Page 2 of 2

Five 1 X 1m plots

Ground cover % (*used in scoring)	1	2	3	4	5	Mean
Native perennial ('decreaser') grass*	100	59	25	0	5	37.8
Native other grass (if relevant)*	0	0	0	0	0	
Native forbs and other species (non-grass)	0	0	0	0	0	0
Native shrubs (<1m height)	0	0	0	0	0	0
Non-native grass	0	0	0	0	0	0
Non-native forbs and shrubs	0	1	15	0	0	3.2
Litter*	0	40	60	100	95	59
Rock	0	0	0	0	0	0
Bare ground	0	0	0	0	0	0
Cryptograms	0	0	0	0	0	0
Total	100	100	100	100	100	

100m transect

Tree canopy cover (distance,	m)
Total Canopy:	74.7
Total Emergent:	n/a
Total Subcanopy:	48.8

Shrub canopy cover (distance, m. Only native used in scoring.)

Total Native: 4.1

Total Exotic: 4.4

Site:	BC03	Page 1 of 2		
Bioregion:	SEQ			
Date:	21/02/2023			
Observer/s:	Simon Daniels	en, Conor O'Brien		
RE/Landtype:	12.1.1			
Datum:	WGS 84			
Zone:				
Start	Lat.: -2	7.8921	Long.:	153.3396
Mid-point	Lat.: -2	7.8923	Long.:	153.3394
End	Lat.: -2	7.8926	Long.:	153.3391
Transect bearing:	36.768279°W			

100 X 50m area (EDL)

Number of large Eucalypt trees:				0
Eucalypt large tree DBH from benchmark doc.:				n/a
Number of large Non-eucalypt trees:				6
Non-eucalypt large tree DBH from benchmark doc.				29
Total large trees recorded:				6
Large trees per/ha				
Tree canopy height (EDL) m:				16
Subcanopy and/or Emergent height:Subcanopy:7Emergent:				
Proportion of dominant canopy (EDL) species with evidence of recruitment:				40
Total Tree spp Richness (all tree species, single stemmed	d >2m):			5

50 X 20m area

Total length of coarse woody debris (m):	8.5
Total CWD per ha (m)	850

50 x 10m area

Native shrub spp richness (single-stemmed & <2m OR if multi stemmed from base/below 20cm):	
Native grass spp richness:	2
Native forb and other (non-grass) spp richness:	16
Non-native cover:	1

Site: BC03 Page 2 of 2

Five 1 X 1m plots

Ground cover % (*used in scoring)	1	2	3	4	5	Mean
Native perennial ('decreaser') grass*	0	0	0	0	0	0
Native other grass (if relevant)*	0	0	0	0	0	
Native forbs and other species (non-grass)	2	10	85	80	95	54.4
Native shrubs (<1m height)	3	0	0	0	0	0.6
Non-native grass	0	0	0	0	0	0
Non-native forbs and shrubs	0	0	0	0	0	0
Litter*	0	0	5	15	0	4
Rock	0	0	0	0	0	0
Bare ground	95	90	1	5	5	39.2
Cryptograms	0	0	0	0	0	0
Total	100	100	91	100	100	

100m transect (See ShrubCanopyCover tab)

Tree canopy cover (distance, m)Total Canopy:67.9Total Emergent:n/aTotal19.3

Shrub canopy cover (distance, m. Only native used in scoring.)

Total Native: 10 Total Exotic: 0

Site:	BC04	Page 1 of 2		
Bioregion:	SEQ			
Date:	21/02/2023			
Observer/s: Simor	n Danielsen, (Conor O'Brien		
RE/Landtype: 12.1	.1			
Datum:	WGS 84			
Zone:				
Start	Lat.:	-27.8934	Long.:	153.3381
Mid-point	Lat.:	-27.8938	Long.:	153.338
End	Lat.:	-27.8942	Long.:	153.338
Transect bearing:	171.366368	W		

100 X 50m area (EDL)

Number of large Eucalypt trees:				0
Eucalypt large tree DBH from benchmark doc.:				n/a
Number of large Non-eucalypt trees:				11
Non-eucalypt large tree DBH from benchmark doc.:				29
Total large trees recorded:				11
Large trees per/ha				22
Tree canopy height (EDL) m:				18
Subcanopy and/or Emergent height: Subcanopy: 7 Emergent:				
Proportion of dominant canopy (EDL) species with evidence of recruitment:				60
Total Tree spp Richness (all tree species, single stemmed >2m):				5

50 X 20m area

Total length of coarse woody debris (m):	3
Total CWD per ha (m)	30

<u>50 x 10m area</u>

Native shrub spp richness (single-stemmed & <2m OR if multi stemmed from base/below 20cm):		
Native grass spp richness:	1	
Native forb and other (non-grass) spp richness:	19	
Non-native cover:	2	

Site: BC04 Page 2 of 2

Five 1 X 1m plots

Ground cover % (*used in scoring)	1	2	3	4	5	Mean
Native perennial ('decreaser') grass*	0	10	0	0	0	2
Native other grass (if relevant)*	0	0	0	0	0	0
Native forbs and other species (non-grass)	33	70	25	95	5	45.6
Native shrubs (<1m height)	0	0	0	0	0	0
Non-native grass	0	0	0	0	0	0
Non-native forbs and shrubs	2	5	0	0	0	1.4
Litter*	55	5	50	0	90	40
Rock	0	0	0	0	0	0
Bare ground	10	10	25	5	5	11
Cryptograms	0	0	0	0	0	0
Total	100	100	100	100	100	

100m transect

Tree canopy cover (distance, m)Total Canopy:62.2Total Emergent:n/aTotal Subcanopy:20.4

Shrub canopy cover (distance, m. Only native used in scoring.)

Total Native: 10.6 Total Exotic: 0

Site:	BC05	Page 1 of 2		
Bioregion:	SEQ			
Date:	21/02/2023			
Observer/s:	Simon Danielse	en, Conor O'B	rien	
RE/Landtype:	12.3.20			
Datum:	WGS 84			
Zone:				
Start	Lat.: -2	27.9027	Long.:	153.3408
Mid-point	Lat.: -2	27.9032	Long.:	153.341
End	Lat.: -2	27.9034	Long.:	153.3409
Transect bearing:	23.240385°W			

100 X 50m area (EDL)

Number of large Eucalypt trees:				0
Eucalypt large tree DBH from benchmark doc.:				n/a
Number of large Non-eucalypt trees:				4
Non-eucalypt large tree DBH from benchmark doc				30
Total large trees recorded:				4
Large trees per/ha				8
Tree canopy height (EDL) m:				10
Subcanopy and/or Emergent height: Subcanopy: 7 Emergent:				
Proportion of dominant canopy (EDL) species with evidence of recruitment:				60
Total Tree spp Richness (all tree species, single stemmed >2m):				5

50 X 20m area (see CWD tab)

Total length of coarse woody debris (m):	3.5
Total CWD per ha (m)	35

<u>50 x 10m area</u>

Native shrub spp richness (single-stemmed & <2m OR if multi stemmed from base/below 20cm):	
Native grass spp richness:	1
Native forb and other (non-grass) spp richness:	11
Non-native cover:	20

Site: BC05 Page 2 of 2

Five 1 X 1m plots

Ground cover % (*used in scoring)	1	2	3	4	5	Mean
Native perennial ('decreaser') grass*	0	0	0	0	0	0
Native other grass (if relevant)*	0	0	0	0	0	0
Native forbs and other species (non-grass)	0	0	2	1	0	0.6
Native shrubs (<1m height)	0	0	0	0	0	0
Non-native grass	0	0	0	0	0	0
Non-native forbs and shrubs	2	5	0	0	0	1.4
Litter*	60	100	98	54	100	82.4
Rock	0	0	0	0	0	0
Bare ground	40	0	0	45	0	17
Cryptograms	0	0	0	0	0	0
Total	102	105	100	100	100	

100m transect

Tree canopy cover (distance, m)Total Canopy:40.9Total Emergent:n/aTotalSubcanopy:26

Shrub canopy cover (distance, m. Only native used in scoring.)

Total Native: 0 Total Exotic: 6.4

Site:	BC06	Page 1 of 2		
Bioregion:	SEQ			
Date:	21/02/2023	3		
Observer/s: Simon	Danielsen,	Conor O'Brien		
RE/Landtype: 12.1	.1			
Datum:	WGS 84			
Zone:				
Start	Lat.: -	27.8995	Long.:	153.3398
Mid-point	Lat.: -	27.899	Long.:	153.3396
End	Lat.: -	27.8986	Long.:	153.3394
Transect bearing:	173.696202	2°E		

100 X 50m area (EDL)

Number of large Eucalypt trees:				
Eucalypt large tree DBH from benchmark doc .:				n/a
Number of large Non-eucalypt trees:				17
Non-eucalypt large tree DBH from benchmark doc.:				29
Total large trees recorded:				
Large trees per/ha				12
Tree canopy height (EDL) m:				18
Subcanopy and/or Emergent height: Subcanopy: 9 Emergent:				
Proportion of dominant canopy (EDL) species with evidence of recruitment:				
Total Tree spp Richness (all tree species, single stemmed >2m):				4

50 X 20m area

Total length of coarse woody debris (m):	3
Total CWD per ha (m)	30

50 x 10m area

Native shrub spp richness (single-stemmed & <2m OR if multi stemmed from base/below 20cm):	1
Native grass spp richness:	4
Native forb and other (non-grass) spp richness:	13
Non-native cover:	60

Site: BC06 Page 2 of 2

Five 1 X 1m plots

Ground cover % (*used in scoring)	1	2	3	4	5	Mean
Native perennial ('decreaser') grass*	0	0	0	0	5	1
Native other grass (if relevant)*	0	0	0	0	0	0
Native forbs and other species (non-grass)	0	0	35	10	70	23
Native shrubs (<1m height)	0	0	0	0	0	0
Non-native grass	35	0	0	0	0	7
Non-native forbs and shrubs	0	0	0	0	0	0
Litter*	65	100	65	90	5	65
Rock	0	0	0	0	0	0
Bare ground	0	0	0	0	20	4
Cryptograms	0	0	0	0	0	0
Total	100	100	100	100	100	

100m transect

Tree canopy cover (distance, m)Total Canopy:93.9Total Emergent:n/aTotal Subcanopy:12.8

Shrub canopy cover (distance, m. Only native used in scoring.)

Total Native: 1.9 Total Exotic: 7

Site:	BC07	Page 1 o	f 2	Note: 50m transect captured due to lack of safe access further into site (soft sediment in water >1m in height)
Bioregion:	SEQ	-		
Date:	22/02/2	023		
Observer/s:	Simon I	Danielsen, Cor	nor O'Brien	
RE/Landtype:	12.3.20)		
Datum:	WGS 8	4		
Start	Lat.:	-27.9161	Long.:	153.3417
Mid-point	Lat.:	-27.9162	Long.:	153.3416
End	Lat .:	-27.9164	Long.:	153.3417
Transect bearing	g: 173.33	2908°E		

50 X 25m area (EDL)

Number of large Eucalypt trees:				
Eucalypt large tree DBH from benchmark doc .:				n/a
Number of large Non-eucalypt trees:				9
Non-eucalypt large tree DBH from benchmark doc.:				30
Total large trees recorded:				
Large trees per/ha				72
Tree canopy height (EDL) m:				16
Subcanopy and/or Emergent height: Subcanopy: 7 Emergent:				
Proportion of dominant canopy (EDL) species with evidence of recruitment:				
Total Tree spp Richness (all tree species, single stemmed >	2m):			3

50 X 20m area

Number of coarse woody debris:	20
Total length of coarse woody debris (m):	200

<u>50 x 10m area</u>

Native shrub spp richness (single-stemmed & <2m OR if multi stemmed from base/below 20cm):	5
Native grass spp richness:	2
Native forb and other (non-grass) spp richness:	14
Non-native cover:	5

Site: BC07 Page 2 of 2

Five 1 X 1m plots

Ground cover % (*used in scoring)	1	2	3	4	5	Mean
Native perennial ('decreaser') grass*	0	0	0	0	95	19
Native other grass (if relevant)*	0	0	0	0	0	0
Native forbs and other species (non-grass)	15	65	95	0	0	35
Native shrubs (<1m height)	0	0	0	0	0	0
Non-native grass	0	0	0	95	0	19
Non-native forbs and shrubs	0	0	0	0	0	0
Litter*	85	30	5	5	5	26
Rock	0	0	0	0	0	0
Bare ground	0	5	0	0	0	1
Cryptograms	0	0	0	0	0	0
Total	100	100	100	100	100	

100m transect

Tree canopy cover (distance, m)Total Canopy:86.2 (43.1)Total Emergent:n/a

Shrub canopy cover (distance, m. Only native used in scoring.)Total Native:0Total Exotic:11 (5.5)

Note: canopy, subcanopy, shrub cover recorded over 50m transect, value multiplied by 2 (original value in brackets)

Total Subcanopy: 16 (8)

Site:	BC08		Page 1	l of 2	
Bioregion:	SEQ				
Date:	22/02/202	3			
Observer/s:	Simon Da	nielsen, (Conor	O'Brien	
RE/Landtype:	12.1.1				
Datum:	WGS 84				
Start	Lat.:	-27.918	1	Long.:	153.3432
Mid-point	Lat.:	-27.9179	9	Long.:	153.3428
End	Lat.:	-27.9177	7	Long.:	153.3424
Transect bearing:	57.708584	ŀ°W			

100 X 50m area (EDL)

Number of large Eucalypt trees:					
Eucalypt large tree DBH from benchmark doc.:					
Number of large Non-eucalypt trees:				14	
Non-eucalypt large tree DBH from benchmark doc.:					
Total large trees recorded:					
Large trees per/ha					
Tree canopy height (EDL) m:					
Subcanopy and/or Emergent height:Subcanopy:10Emergent:					
Proportion of dominant canopy (EDL) species with evidence of recruitment:					
Total Tree spp Richness (all tree species, single stemmed >2m):					

50 X 20m area

Number of coarse woody debris:	4
Total length of coarse woody debris (m):	40

<u>50 x 10m area</u>

Native shrub spp richness (single-stemmed & <2m OR if multi stemmed from base/below 20cm):		
Native grass spp richness:	1	
Native forb and other (non-grass) spp richness:	4	
Non-native cover:	55	

Site: BC08 Page 2 of 2

Five 1 X 1m plots

Ground cover % (*used in scoring)	1	2	3	4	5	Mean
Native perennial ('decreaser') grass*	0	0	0	0	0	0
Native other grass (if relevant)*	0	0	0	0	0	0
Native forbs and other species (non-grass)	0	0	0	0	0	0
Native shrubs (<1m height)	0	0	0	0	0	0
Non-native grass	0	2	0	0	0	0.4
Non-native forbs and shrubs	95	98	95	95	95	95.6
Litter*	5	0	5	0	0	2
Rock	0	0	0	0	0	0
Bare ground	0	0	0	5	5	2
Cryptograms	0	0	0	0	0	0
Total	100	100	100	100	100	

100m transect

Tree canopy cover (distance, m)Total Canopy:94.6Total94.6Emergent:n/aTotal10

Shrub canopy cover (distance, m. Only native used in scoring.)

Total Native: 0

Total Exotic: 22.8

Site:	BC09	Р	age 1 of 2	
Bioregion:	SEQ			
Date:	22/02/202	3		
Observer/s:	Simon Da	nielsen, C	onor O'Brien	
RE/Landtype:	12.3.20			
Datum:	WGS 84			
Start	Lat.:	-27.9305	Long.:	153.3402
Mid-point	Lat.:	-27.9303	Long.:	153.3406
End	Lat.:	-27.93	Long.:	153.3409
Transect bearing:	50.739118	З°Е		

100 X 50m area (EDL)

Number of large Eucalypt trees:					
Eucalypt large tree DBH from benchmark doc.:					
Number of large Non-eucalypt trees:				7	
Non-eucalypt large tree DBH from benchmark doc.				30	
Total large trees recorded:					
Large trees per/ha					
Tree canopy height (EDL) m:				12	
Subcanopy and/or Emergent height: Subcanopy: 6 Emergent:					
Proportion of dominant canopy (EDL) species with evidence of recruitment:					
Total Tree spp Richness (all tree species, single stemmed >2m):					

50 X 20m area

Number of coarse woody debris:	0
Total length of coarse woody debris (m):	0

<u>50 x 10m area</u>

Native shrub spp richness (single-stemmed & <2m OR if multi stemmed from base/below 20cm):			
Native grass spp richness:	0		
Native forb and other (non-grass) spp richness:	4		
Non-native cover:	70		

Site: BC09 Page 2 of 2

Five 1 X 1m plots

Ground cover % (*used in scoring)	1	2	3	4	5	Mean
Native perennial ('decreaser') grass*	0	0	0	0	0	0
Native other grass (if relevant)*	0	0	0	0	0	0
Native forbs and other species (non-grass)	0	1	2	0	0	0.6
Native shrubs (<1m height)	0	0	0	0	0	0
Non-native grass	0	0	0	0	0	0
Non-native forbs and shrubs	60	5	50	85	90	58
Litter*	40	94	48	15	10	41.4
Rock	0	0	0	0	0	0
Bare ground	0	0	0	0	0	0
Cryptograms	0	0	0	0	0	0
Total	100	100	100	100	100	

100m transect

Tree canopy cover (distance, m)Total Canopy:95.9Total Emergent:n/aTotal Subcanopy:41.1

Shrub canopy cover (distance, m. Only native used in scoring.)

Total Native: 0 Total Exotic: 4.1

Site:	BC10) F	Page 1 of 2	Note: 50m transect captured due to site fragmentation (not enough length in target RE polygon)
Bioregion:	SEQ			
Date:	22/02/2	2023		
Observer/s:	Simon	Danielsen,	Conor O'Brier	1
RE/Landtype:	12.1.1			
Datum:	WGS 8	34		
Start	Lat .:	-27.9396	Long.:	153.3426
Mid-point	Lat .:	-27.9394	Long.:	153.3426
End	Lat .:	-27.9392	Long.:	153.3425
Transect bearing:	19.297	57°W		

50 X 25m area (EDL)

Number of large Eucalypt trees:				0
Eucalypt large tree DBH from benchmark doc.:				n/a
Number of large Non-eucalypt trees:				1
Non-eucalypt large tree DBH from benchmark doc.	:			29
Total large trees recorded:				
Large trees per/ha				
Tree canopy height (EDL) m:				10
Subcanopy and/or Emergent height:Subcanopy:7Emergent:				
Proportion of dominant canopy (EDL) species with evidence of recruitment:				
Total Tree spp Richness (all tree species, single stemmed >2m):				

50 X 20m area

Number of coarse woody debris:	1
Total length of coarse woody debris (m):	10

<u>50 x 10m area</u>

Native shrub spp richness (single-stemmed & <2m OR if multi stemmed from base/below 20cm):	13
Native grass spp richness:	3
Native forb and other (non-grass) spp richness:	13
Non-native cover:	5

Site: BC10 Page 2 of 2

Five 1 X 1m plots						
Ground cover % (*used in scoring)	1	2	3	4	5	Mean
Native perennial ('decreaser') grass*	0	0	10	97	15	24.4
Native other grass (if relevant)*	0	0	0	0	0	0
Native forbs and other species (non-grass)	5	10	0	0	0	3
Native shrubs (<1m height)	1	0	5	0	5	2.2
Non-native grass	0	0	0	0	0	0
Non-native forbs and shrubs	0	1	0	0	0	0.2
Litter*	94	89	85	3	80	70.2
Rock	0	0	0	0	0	0
Bare ground	0	0	0	0	0	0
Cryptograms	0	0	0	0	0	0
Total	100	100	100	100	100	

100m transect

Tree canopy cover(distance, m)Total Canopy:81.8 (40.9)Total Emergent:n/a

Shrub canopy cover (distance, m. Only native used in scoring.)Total Native:20 (10)Total Exotic:0

Note: canopy, subcanopy, shrub cover recorded over 50m transect, value multiplied by 2 (original value in brackets)

Total Subcanopy: 52 (26)

APPENDIX 2

Site Species Data
		BC01	BC02	BC03	BC04
	Grasses	- Paspalidium distans - Sporobolus virginicus	- Eriochloa procera - Paspalidium distans - Sporobolus virginicus	 Phragmites australis Sporobolus virginicus 	- Phragmites australis
50x10m	Forbs	 Alternanthera denticulata Cyperus sp. Dianella caerulea Eclipta platyglossa Einadia hastata Eustrephus latifolius Marsdenia viridiflora Parsonsia straminea Tetragonia tetragonoides 	 Alternanthera denticulata Bacopa monnieri Cyperus polystachyos Dianella caerulea Eclipta platyglossa Eclipta prostrata Einadia hastata Eustrephus latifolius Juncus kraussii Marsdenia viridiflora Parsonsia straminea Phyla nodiflora var. nodiflora 	 Acrostichum speciosum Bacopa monnieri Centella asiatica Cyclosorus interruptus Cynanchum sp. Cyperus sp. Enydra fluctuans Juncus kraussii Marsdenia viridiflora Parsonsia straminea Platycerium bifurcatum 	 Acrostichum speciosum Bacopa monnieri Cynanchum bowmanii Enydra fluctuans Gahnia sieberiana Gleichenia sp. Juncus kraussii Parsonsia straminea Platycerium bifurcatum
	Shrubs	- Casuarina glauca - Cupaniopsis anacardiodes - Ficus rubiginosa Lauraceae sp.	- Casuarina glauca - Cupaniopsis anacardiodes	- Casuarina glauca - Cupaniopsis anacardiodes - Cyathea cooperi - Livistona australis	- Casuarina glauca - Excoecaria agallocha
	Native trees	- Acacia leiocarpa - Alphitonia excelsa - Casuarina glauca - Ficus rubiginosa - Melaleuca quinquenervia	- Casuarina glauca	- Avicennia marina - Casuarina glauca - Excoecaria agallocha - Jagera pseudorhus - Melaleuca quinquenervia	- Avicennia marina - Melaleuca quinquenervia - Excoecaria agallocha - Bruguiera gymnorhiza - Casuarina glauca
50x100m	Non-native species	 Ageratum houstonianum Asparagus aethiopicus Baccharis halimifolia Lantana camara Passiflora foetida Rivina humilis Schinus terebinthifolius Senna pendula var. glabrata Solanum mauritianum Solanum nigrum Solanum seaforthianum 	 Asparagus aethiopicus Cynodon dactylon var. dactylon Emilia sonchifolia Lantana camara Paspalum sp. Passiflora foetida Schinus terebinthifolius Senna pendula var. glabrata Solanum nigrum Solanum seaforthianum Solanum torvum 	- Ardisia crenata - Physalis sp. - Solanum nigrum - Schinus terebinthifolius - Ludwigia sp.	- Salvinia molesta - Solanum mauritianum

		BC05	BC06	BC07
	Grasses	- Phragmites australis	- Ottochloa gracillima - Paspalidium sp. - Phragmites australis - Sporobolus virginicus	- Ottochloa gracillima - Phragmites australis
50x10m	Forbs	 Acrostichum speciosum Alternanthera denticulata Bacopa monnieri Cynanchum bowmanii Eclipta prostrata Enydra fluctuans Juncus kraussii Lomandra longifolia Marsdenia viridiflora Parsonsia straminea 	 Acrostichum speciosum Bacopa monnieri Centella asiatica Cynanchum bowmanii Cyperus sp. Enydra fluctuans Fimbristylis dichotoma Juncus kraussii Lobelia sp. Marsdenia viridiflora Parsonsia straminea Platycerium bifurcatum 	 Acrostichum speciosum Asplenium australasicum Bacopa monnieri Centella asiatica Cyprus sp. Enydra fluctuans Fern sp. 1 Fern sp. 2 Ludwigia sp. Marsdenia viridiflora Murdannia graminea Parsonsia straminea Platycerium bifurcatum
	Shrubs	- Casuarina glauca	- Casuarina glauca	- Casuarina glauca - Cupaniopsis anacardioides - Cyathea cooperi - Glochidion sumatranum
m	Native trees	- Acacia disparrima - Casuarina glauca - Ficus coronata - Ficus rubiginosa - Melaleuca quinquenervia	- Acacia disparrima - Casuarina glauca - Eucalyptus siderophloia - Melaleuca quinquenervia	- Aegiceras corniculatum - Casuarina glauca - Melaleuca quinquenervia
50×10(Non-native species	 Ipomoea cairica Lantana camara Megathyrsus maximus Salvinia molesta Schinus terebinthifolius Solanum mauritianum Solanum seaforthianum 	- Asparagus aethiopicus - Lantana camara - Passiflora suberosa - Schinus terebinthifolius	 Asparagus aethiopicus Ipomoea cairica Megathyrsus maximus Schinus terebinthifolius Senna pendula var. glabrata Syagrus romanzoffiana

		BC08	BC09	BC10
0x10m	Grasses	- Ottochloa gracillima		- Ottochloa gracillima - Paspalidium distans - Sporobolus virainicus
	Forbs	- Acrostichum speciosum - Bacopa monnieri - Parsonsia straminea	- Eustrephus latifolius - Geitonoplesium cymosum - Murdannia graminea - Parsonsia straminea	 Acrostichum speciosum Bacopa monnieri Centella asiatica Dianella caerulea Eclipta sp. Fimbristylis dichotoma Lobelia sp. Lomandra longifolia Marsdenia viridiflora Parsonsia straminea Sphaeromorphaea australis Stephania japonica var. discolor
5	Shrubs	- Casuarina glauca	- Aegiceras corniculatum - Casuarina glauca - Cupaniopsis anacardiodes - Melaleuca quinquenervia	 Acacia fimbriata Acacia leiocarpa Allocasuarina littoralis Alphitonia excelsa Avicennia marina Breynia oblongifolia Casuarina glauca Cupaniopsis anacardiodes Eucalyptus tereticornis Excoecaria agallocha Glochidion sumatranum Maclura cochinchinensis Melaleuca quinquenervia
50x100m	Native trees	- Acacia disparrima - Aegiceras corniculatum - Casuarina glauca - Glochidion sumatranum - Melaleuca quinquenervia	 Acacia disparrima Aegiceras corniculatum Alphitonia excelsa Casuarina glauca Cryptocarya triplinervis var. pubens Eucalyptus siderophloia Eucalyptus tereticornis Melaleuca guinguenervia 	- Acacia concurrens - Avicennia marina - Casuarina glauca - Eucalyptus tereticornis - Melaleuca quinquenervia

	BC08	BC09	BC10
Non-native species	 Euphorbia sp. Ipomoea cairica Lantana camara Megathyrsus maximus Passiflora suberosa Schinus terebinthifolius Senna pendula var. glabrata Solanum mauritianum Solanum seaforthianum Solanum torvum Sphagneticola trilobata Verbena sp. 	 Acalypha sp. Ageratum houstonianum Asparagus aethiopicus Lantana camara Schinus terebinthifolius Senna pendula var. glabrata Solanum seaforthianum Sphagneticola trilobata Syagrus romanzoffiana 	 Ageratum houstonianum Baccharis halimifolia Bryophyllum delagoense Ipomoea cairica Lantana camara Schinus terebinthifolius Scoparia dulcis Senna pendula var. glabrata Sida rhombifolia Solanum torvum Sphagneticola trilobata

8.2 Condition 6bii): at least once each calendar year following the commencement of clearing and/or construction within 30 m of retained Coastal Swamp Oak TEC, and continuing for at least two calendar years after clearing and/or construction within 30 m of retained Coastal Swamp Oak TEC, assess and document: the quality and extent of retained Coastal Swamp Oak TEC within 30 m of clearing and/or construction, and any degradation in quality and/or extent of retained Coastal Swamp Oak TEC within 30 m of clearing and/or construction, that is attributable to this Action.

Provided below.



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Coomera Connector - Threatened Ecological Community Assessments

Prepared for: DTMR Report issued: August 2024



This document has been prepared and is certified by: **AUSECOLOGY PTY LTD** ABN 15 155 304 751 PO Box 594, Morningside, QLD 4170 w www.ausecology.com e info@ausecology.com

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Glossary of Terms

Acronym	Description	
CWD	Coarse Woody Debris	
DEE	Department of the Environment and Energy	
DTMR	Department of Transport and Main Roads	
EPBC	Environment Protection and Biodiversity Conservation Act 1999	
EDL	Ecologically Dominant layer	
На	hectare	
TEC	Threatened Ecological Community	
RE	Regional Ecosystem	
SS	Superseded	



1 Introduction

1.1 Project context

1.1.1 Background

The Coomera Connector Stage 1 (the Project) is a new 16 km motorway that is under construction between Coomera and Nerang. The Project is jointly funded by the Queensland and Australian Governments aiming at reducing congestion and improving safety on the M1 between Logan and the Gold Coast. The project includes several environmental and construction constraints, including listed species and Threatened Ecological Communities (TEC) listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

Coastal Swamp Oak (*Casuarina glauca*) Forest of New South Wales and South-east Queensland ecological community (Swamp Oak TEC) is an ecosystem listed as Endangered under the *Environment Protection and Biodiversity Conservation Act 1999* (Department of the Environment, 2024). The TEC is defined by Key Diagnostic criteria and condition thresholds described in the Approved Conservation Advice. Large areas of the TEC are mapped within the Project footprint and it is recognised as key constraint.

1.1.2 Approval Conditions

As per EPBC Approval Notice 2020/8646, The Department of Transport and Main Roads (DTMR) must not clear or cause the functional loss of more than 15.928 ha of Coastal Swamp Oak TEC. They must also engage an independent Suitably Qualified Person (SQP) to undertake an assessment of coastal swamp oak TEC.

The relevant EPBC Conditions are as follows:

6) To maintain the quality of retained Coastal Swamp Oak TEC within 30 m of clearing and/or construction as a result of this Action, the approval holder must:

- a) Ensure that the quality and/or extent of retained Coastal Swamp Oak TEC within 30 m of clearing and/or construction does not degrade due to impacts attributable to this Action
- b) Engage an independent suitably qualified expert to:
 - *i.* Assess and document the quality and extent of Coastal Swamp Oak TEC to be retained within 30 m of clearing and/or construction, prior to the commencement of clearing and/or construction within 30 m of Coastal Swamp Oak TEC.
 - *ii.* At least once each calendar year following the commencement of clearing and/or construction within 30 m of retained Coastal Swamp Oak TEC, and continuing for at least two calendar years after clearing and/or construction within 30 m of retained Coastal Swamp Oak TEC, assess and document:
 - the quality and extent of retained Coastal Swamp Oak TEC within 30 m of clearing and/or construction,
 - and any degradation in quality and/or extent of retained Coastal Swamp Oak TEC within 30 m of clearing and/or construction, that is attributable to this Action.
 - iii) Provide a report of the assessment required by condition 6(b) (ii) to the approval holder
 by 1 February of each calendar year following the undertaking of such assessment.



1.2 Study objectives and scope

Ausecology Pty Ltd (Ausecology) has been engaged by the Department of Transport and Main Roads (DTMR) to conduct an ecological assessment of Coastal Swamp Oak TEC adjacent to the Coomera Connector Stage 1 project footprint and assess compliance with conditions under the EPBC Decision Notice 2020/8646.

This survey and report is concentrated on determining any changes to the quality of retained Coastal Swamp Oak TEC within 30m of the project footprint as per condition 6 of EPBC Approval 2020/8646. If the condition of Coastal Swamp TEC has decreased, the extent of the area impacted must also be quantified. Plots must be aligned to ensure the full 30m width from the clearing footprint is surveyed.

Preliminary surveys were undertaken in 2023 by BAAM (BAAM, 2023) and the raw data from this report will form a baseline of comparison for this report and future monitoring events. BAAM (2023) established 10 BioCondition monitoring transects that will be monitored yearly as part of the project.

1.3 Survey site details

Table 1-1 A summary of GPS locations for the start and end points of each transect, including updated locatio	ins.
GDA94 Zone 54.	

Site ID	Start		End	
Site iD	Latitude	Longitude	Latitude	Longitude
BC01	-27.858	153.3268	-27.8588	153.3271
BC02	-27.8576	153.3279	-27.8584	153.3282
BC03	-27.8922	153.3397	-27.8924	153.3393
BC03 (SS)*	-27.8921	153.3396	-27.8927	153.339
BC04	-27.8937	153.3383	-27.894	153.3383
BC04 (SS)*	-27.8934	153.3381	-27.8942	153.338
BC05	-27.9026	153.3409	-27.9035	153.341
BC06	-27.8986	153.3394	-27.8995	153.3398
BC07	153.3417	153.3417	-27.9164	153.3417
BC08	-27.9177	153.3424	-27.9181	153.3432
BC09	-27.9305	153.3402	-27.93	153.3409
BC10	-27.9396	153.3427	-27.9392	153.3425

* Superseeded (SS)

1.4 Site Weather and Climate

Rainfall data was sourced from the Bureau of Meteorology (2024). Rainfall throughout most of the state over the last 12 months has been above average (Figure 1-2), and the same can be said for the Coomera area comprising the study sites. Although 2023 saw predominately below average rainfall at the site compared with the historical average, the start of 2024 saw extremely high rainfall totals, well above the average (Figure 1-2). Observations at the site corroborate this data, as the wetlands were significantly inundated in some areas and there was significant new growth observed.

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Figure 1-1Monthly total rainfall (mm) at the nearest weather station (Coombabah Water TreatmentPlant Station ID: 40849) since 2022 compared with the historical monthly total rainfall average



Figure 1-2 12-monthly rainfall deciles for Queensland 01/07/2023 – 30/06/2024



2 Methodology

2.1 BioCondition methodology

Fieldwork was undertaken on four separate occasions: 29th May, 5th June, 27th June and 29th August 2024 by teams of two Ausecology ecologists. BioCondition surveys were undertaken at all ten sites from the baseline report, with methodology in accordance with *BioCondition – A Condition Assessment Framework for Terrestrial Biodiversity in Queensland, Assessment Manual* (Eyre et al., 2015). A summary of the attributes assessed at each site is presented in Table 2-1. Field based attributes have been compared to BioCondition benchmark scores for the relevant Regional Ecosystems (REs) to determine habitat quality.

Assessment plot	Attribute	Description	
	Larga tracs	Number of large trees per hectare (determined by BioCondition	
	Large trees	benchmarks for relevant RE)	
100 m x	Trop canony hoight	Median canopy height in metres of the ecologically dominant	
50 m plot		layer (EDL)	
	Recruitment (%)	Proportion of canopy EDL species regenerating (<5 cm DBH)	
	Tree species richness	Number of native tree species	
	Tree capepy cover (%)	Vertical projection of living, native tree canopy cover	
100 m		overlapping the transect	
transect	Shrub layer cover (%)	Vertical projection of living, native shrub layer cover overlapping	
		the transect	
50 m x	Coorse wood debris	Length of fallen woody logs and other coarse woody debris	
20 m plot		(>1cm diameter, 0.5 m length) per hectare	
	Native plant species	Number of species in each of the three-life forms: shrubs,	
50 m x 10m	richness	grasses and forbs/other	
plot	Non nativo plant covor	Cover of exotic species as a component of overall vegetation	
	Non-flative plant cover	cover	
Five 1 m v	Native perennial grass	Average percentage cover of pative perennial grass species	
	cover (%)	Average percentage cover of native perennial grass species	
1 m quadrat	Litter cover	Average percentage cover of fine and coarse organic material	
		such as fallen leaves, twigs and branches <10 cm diameter	

Table 2-1 Site-based attributes m	easured by RioCondition	methodology (Eure et al	2015)
TUDIE Z-I SILE-DUSEU ULLIDULES III	eusureu by bioconullion	methodology (Eyre et di	., 2015)

2.1.1 Relocated plots

The EPBC approval conditions require an area the width of 30m immediately adjacent to edge of the disturbance footprint (within the TEC) be surveyed to determine any potential impacts of the Coomera Connector Stage 1 development to the TEC. Given the total width of a BioCondition plot is 50m, the centre line must be placed a minimum of 25m from the edge of the disturbance. Plots cannot be placed closer to the disturbance footprint or the large tree plot will overlap with the impact zone and result in under sampling of large trees. For example, a transect placed 15m from the edge of the disturbance footprint would lose 10m x 100m of the large tree and tree richness plots, resulting in sampling bias.

Two previously established plots do not comply with this condition and were subsequently relocated. This resulted in an extra 20 m of survey area beyond the required 30m outside of the impact disturbance footprint, however this is considered necessary to obtain a meaningful sample in a confined survey footprint.



2.1.2 Reduced BioCondition Plots

A reduced length BioCondition methodology (Eyre et al., 2015) was utilised at four sites (BC03, BC04, BC07 and BC10). Each plot had been modified by reducing the total length of the 100 m transect to 50 m (start: 0 m, centre: 25 m and end: 50 m). The justification for this action is that there was no viable option to place the transect completely within the target TEC without overlapping into a non-target adjacent RE.

The reduced transect utilises the start location as 0 m for all attributes, with each measured across its typical distance between 0 m and 50 m.

Quadrats will commence at the 4 m mark on the left-hand side of the centre transect, repeating every 10 m on alternating sides until the last quadrat at the 44 m mark.

BioCondition attributes that are typically measured utilising the full 100 m transect length have been scaled up to allow comparison with benchmark scores. These attributes include: large trees, tree canopy cover and shrub layer cover.

For example, reduced 50 m transects:

- Equate to a plot size of 0.25 ha and large tree site data have been multiplied by four prior to comparison to benchmark data (instead of being multiplied by two).
- Require line intercept data (tree canopy cover and shrub layer cover site data) to be doubled to achieve a score comparable with benchmark data (out of 100 m or 100%).

A full species richness plot is able to be conducted in a 50m BioCondition plot, with the species count commencing at zero rather than 25m.

2.2 Limitations

Survey transect placement adjustments were required to be made in response to a shift in the project footprint since the baseline monitoring. The footprint near Helensvale Road has expanded, with two baseline plots no longer occurring within a buffer area and now appearing in an impact area. The location of these plots was adjusted such that the 30 m buffer directly adjacent to the project footprint was included within the plot, as close as possible to the previous transect position to keep baseline data relevant. Although the overall ecological community and vegetation composition appeared relatively similar in the new location, moving a long-term transect even a small distance can reduce the consistency of results.

Intensive pumping into the wetland appeared to have caused significant inundation of previously surveyed areas, which proved extremely difficult to traverse, often having sections of waist high water or deeper. Subsequently, inferences were made regarding some large tree DBHs and two BioCondition plots were reduced in size.

Additionally, many of the existing plots, as well as the surrounding area, have been significantly impacted by a large storm cell over Christmas 2023. Large areas no longer have canopy present and there are hundreds of trees knocked over, often snapped in half. It is possible to map the areas that have been damaged, and this will definitely have an impact on the results. However, it is possible to demonstrate and isolate this damage from the Coomera Connector project and this is presented throughout this report.

Lastly, it was also extremely difficult to reconstruct the exact alignment of the BAAM (2023) surveys for a number of reasons. Firstly, many of the transects are not straight to begin with and have large kinks in them, which are difficult to recreate. Additionally, in some cases flagging tape has been used and/or wooden stakes. It is evident that both flagging tape and wooden stakes do not last in this extremely wet environment and rate of decay is extremely high and the sites will rarely look the same year on year. The principal contractor on site (Fulton



Hogan joint venture) also does not allow driving of star pickets without an additional permit. Wooden stakes and flagging tape have been replaced where possible, however the likelihood of these lasting in the field is low. It is also worth noting that the BAAM report (2023) does not have transect start or end photos, making the correct trajectory and alignment of transects difficult to recreate.



3 Results

Field surveys have revealed that between 2023 and 2024, there has been moderate variation in the extent and direction of changes across the ten sites. The nature and extent of the changes also vary from site to site. As such, results are split by site in sections below, allowing emphasis on areas that have undergone more significant changes than others, and a precise breakdown of potential impacting factors. Total scores are presented in a summary table (Table 3-1) to be continually updated following annual monitoring.

	Monitoring Year							
Site ID	Baseline (2023)	2024	2025	2026	2027	2028	2029	
BC01	58	53						
BC02	64	58						
BC03	58	50.5						
BC04	51.5	52.5						
BC05	40	37.5						
BC06	45	48						
BC07	49.5	50						
BC08	43.5	35.5						
BC09	37.5	42.5						
BC10	52	53.5						

Table 3-1	BioCondition	site	attributes	total	scores by year

NB: Orange cells indicate a decline, and green cells indicate an increase in score since baseline monitoring. Greyed out cells are left blank for future year scores



3.1 BC01

3.1.1 BC01 Summary

With minor exceptions detailed below the overall plot is mostly unchanged from 2023 and there is little evidence of additional disturbance caused by the project (Table 3-2).

Individual attribute scores are presented in Section 3.1.2. Given the location of existing plot and its proximity to the edge of the impact footprint several large trees that would have once been within the 100x50 m plot have subsequently been cleared by the project. These trees have been cleared within the approved impact footprint and the loss of their data within the BioCondition plot is a natural consequence of the width of the BioCondition plot being wider than the 30m buffer width applied in the EPBC Conditions. Depending on the location of the centre of the plot and where it was established, the large tree plot would either sample areas beyond the 30m buffer or areas that are within the impact footprint. The loss of these large trees should therefore not be considered an additional impact and the 2024 large tree count should be used as an adjusted baseline. See Figure 3-1 in Section 3.2.3 for aerial imagery of the site before and following storm damage.

Non-native cover has seen a slight increase within the plot based on new growth of broad-leafed pepper tree and easter cassia, particularly in the southern end of the plot. New saplings have germinated in some areas but are a likely product of existing seed stock from mature individuals and will continue to persist without weed management intervention. There is some minor discrepancy in the canopy cover (Section 3.1.2) between years that is not representative of a natural increase. Rather the canopy has increased while the subcanopy has decreased due to a difference in which trees were classified into each respective stratum.

Baseline	2024	Reason for change	Is the change likely a direct or
Score	Score		indirect impact of the project?
58	53	Loss of large trees due to permitted destruction within the impact footprint	No

Table 3-2 Summary of score for BC01 and comparison with EPBC Approval Conditions



3.1.2 BC01 Results Table

Site ID: BC01	RE: 12.1.1	Site Summary:	Dense woodland dominated by <i>Casuarina glauca</i> . Some areas of dense weed cover dominated by <i>Lantana camara</i> and broad-leaved por tree. Lots of large trees have fallen over in intense Gold Coast storms around Christmas 2023.	
BioCondition Site Attributes	2023	2024	Baseline (2023) score out of 80	Current (2024) score out of 80
No. Large Eucs (per ha)	0	0	58	53
No. Large Non-Eucs (per ha)	14	8	BC01 Centre North 2023	BC01 Centre North 2024
Total Large Trees (per ha)	14	8		
EDL Recruitment	75	100		
Emergent Tree Height	-	-		
Canopy Tree Height	8	8		
Subcanopy Tree Height	4	5		
Mean Tree Height	6	6.5		
Emergent Tree Cover	-	-		
Canopy Tree Cover	56.1	85		
Subcanopy Tree Cover	32.1	20		
Mean Tree Cover	44.1	47.5	BC01 Centre East 2023	BC01 Centre East 2024
(Native) Shrub Cover	3.1	7		
Native Perennial Grass Cover	0.2	7		
Litter Cover	98	63		
Non-native Cover	20*	32		
Native Tree Species Richness	5	8		TRAFFICIER DESCRIPTION
Native Shrub Species Richness	4	4		
Native Grass Species	2	2		
Native Forbs & Other Species Richness	9	7		
CWD (m/ha)	1060	1064	AND TARE OF	

*Note that the value used for non-native cover for 2023 was taken from the line intercept data rather than the 50x20 m plot, due to inconsistency between these two scores. This was likely a result of a dense infestation of weeds outside the 50x20 m plot.



3.2 BC02

3.2.1 BC02 Summary

With minor exceptions detailed below the overall plot is mostly unchanged from 2023 and there is little evidence of additional disturbance caused by the project (Table 3-3).

As with BC01, the large tree totals for BC02 have decreased between 2023 and 2024 due to a combination of clearing within the permitted Impact footprint and several trees that have been destroyed in the major storm event on the 25th of December 2023. The other major difference between 2023 and 2024 is regarding native perennial grass cover. There were large areas of native grass near the start of the transect but the middle sections were devoid of most grass cover as is typical in dense Casuarina canopies with a high leaf litter cover. There were also some large patches inundated through the transect that may have also reduced the grass cover overall. However, neither change can be attributed to a primary or secondary impact of the project works.

See Figure 3-1 in section 3.2.3 for aerial imagery of the site before and following storm damage.

Table 3-3 Summary of score for BCO2 and comparison with EPBC Approval Conditions

Baseline Score	2024 Score	Reason for change	Is the change likely a direct or indirect impact of the project?
64	58	Loss of large trees due to permitted destruction within the impact footprint. Loss of native grass cover	No



3.2.2 BC02 Results Table

Site ID: BC02	RE: 12.1.1	Site Summary:	Closed Casuarina glauca. Woodland with a grassy understory. Moderat destroyed in storms or pushed over from the edge of the disturbance f	te cover of broadleaf pepper tree. Several large trees have either been ootprint
BioCondition Site Attributes	2023	2024	Baseline (2023) score out of 80	Current (2024) score out of 80
No. Large Eucs (per ha)	0	0	64	58
No. Large Non-Eucs (per ha)	50	40	BC02 Centre South 2023	BC02 Centre South 2024
Total Large Trees (per ha)	50	40		
EDL Recruitment	16	100		
Emergent Tree Height	-	-		1/ CARRENA IN
Canopy Tree Height	16	16		
Subcanopy Tree Height	7	8		
Mean Tree Height	11.5	12	NH NH P	
Emergent Tree Cover	-	-		
Canopy Tree Cover	74.7	69	I and an a spectrum of the	
Subcanopy Tree Cover	48.8	29		
Mean Tree Cover	61.75	41.75	BC02 Centre North 2023	BC02 Centre North 2024
(Native) Shrub Cover	4.1	0		
Native Perennial Grass Cover	37.8	3		
Litter Cover	59	54		
Non-native Cover	5	3		
Native Tree Species Richness	1	1	AHY LEAD AND A MORE STO	
Native Shrub Species Richness	2	3		
Native Grass Species	3	2		
Native Forbs & Other Species Richness	13	15		
CWD (m/ha)	200	199		









3.2.3 Aerial imagery timestamps



Figure 3-1 Timestamped aerial images of sites BC01 and BC02 before and after storms on Christmas Day 2023. Source: Nearmap.



3.3 BC03

3.3.1 BC03 Summary

Site BC03 should be compared with caution between years 2023 and 2024 as the entire plot was realigned to comply with the scope (see Section 1.3 and Table 1-1 for GPS locations and mapping of adjusted transects). The reason for the realignment was twofold:

- 1. The impact footprint has been adjusted between the 2023 monitoring and 2024 due to the added requirement for water management infrastructure adjacent to Helensvale Road. This resulted in significant parts of the existing plot being located within the impact footprint; and
- 2. The 25th of December 2023 major storm event decimated the TEC areas adjacent to Helensvale Road as illustrated by the timelapse imagery in Figure 3-6, Section 3.2.3.

Note that positioning a plot representative of the correct swamp oak TEC, within the required 30m buffer that also did not cross into a mangrove Regional Ecosystem was not possible due to insufficient space. This section of the TEC was also extremely inundated, with some locations waist deep with large areas of deep water that were impossible to traverse on foot. In light of these constraints, the overall plot was also reduced to a length of 50 m.

The site has decreased slightly in condition since 2023 (Table 3-4), but given the severity of the destruction caused by the December storm it is almost impossible to determine whether there are any additional impacts from the project. However, the area is likely to change once again following the construction of a new Bio basin or similar. Future monitoring events will thus be integral in determining whether there are any secondary impacts and loss of quality. Nearmap aerial imagery depicting vegetation changes near the site since December 2023 up until the current survey date can be viewed in Figure 3-6, Section 3.4.3.

Baseline Score	2024 Score	Reason for change	Is the change likely a direct or indirect impact of the project?
58	50.5	Realignment of transect	Unclear

Table 3-4 Summary of score for BC03 and comparison with EPBC Approval Conditions





Figure 3-3 Examples of canopy trees snapped in half by storms on December 25, 2023

3.3.2 BC03 Results Table

Site ID: BC03	RE: 12.1.1	Site Summary:
BioCondition Site Attributes	2023	2024
No. Large Eucs (per ha)	0	0
No. Large Non-Eucs (per ha)	12	6
Total Large Trees (per ha)	12	6
EDL Recruitment	40	100
Emergent Tree Height	-	-
Canopy Tree Height	16	15
Subcanopy Tree Height	7	7
Mean Tree Height	11.5	11
Emergent Tree Cover	-	-
Canopy Tree Cover	67.9	62
Subcanopy Tree Cover	19.3	38
Mean Tree Cover	43.6	50
(Native) Shrub Cover	10	5
Native Perennial Grass Cover	0	0
Litter Cover	4	33
Non-native Cover	1	5
Native Tree Species Richness	5	3
Native Shrub Species Richness	3	1
Native Grass Species	2	1
Native Forbs & Other Species Richness	16	10
CWD (m/ha)	850	30



58

BC03 Centre North 2023*

Patchy storm damaged Casuarina glauca swampland. Reduced 50m plot. Reduced 50x30 large tree plot due to storm damaged areas and
mangrove RE. Open Casuarina glauca woodland with dense ferny undergrowth and considerable inundation throughout the entire plot.Baseline (2023) score out of 80Current (2024) score out of 80

50.5





BC03 Centre North 2024





*Note that the plot at BC04 was required to be relocated due to the adjustment in the impact footprint and subsequent shifting of the 30m buffer area.



3.4 BC04

3.4.1 BC04 Summary

Similar to site BC03, site BC04 should be compared with caution between years 2023 and 2024 as the entire plot was realigned to comply with the scope. The reason for the realignment was consistent with site BC03:

- 1. The impact footprint has been adjusted between the 2023 and 2024 monitoring due to the added requirement for water management infrastructure adjacent to Helensvale Road. This resulted in significant parts of the existing plot being located within the impact footprint; and
- 2. The 25th of December 2023 major storm event decimated the TEC areas adjacent to Helensvale Road as illustrated by the timelapse imagery in Figure 3-6, Section 3.2.3.

While the realigned plot avoids the worst impacted areas and overall condition scores are consistent between 2023 and 2024 (Table 3-5) there are still many fallen trees scattered through the site. Given the severity of the destruction caused by the storm it is almost impossible to determine whether there is any additional impacts from the project as the area now looks completely different as shown in Figure 3-6.

As with BC03, the area is likely to change once again following the construction of a new Bio basin or similar and future monitoring events will be integral in determining whether there are any secondary impacts and loss of quality.

Nearmap aerial imagery depicting vegetation changes near the site since December 2023 up until the current survey date can be viewed in Figure 3-6, Section 3.4.3.

Baseline Score	2024 Score	Reason for change	Is the change likely a direct or indirect impact of the project?
51.5	52.5	Realignment of transect	Unclear

Table 3-5 Summary of score for BC04 and comparison with EPBC Approval Conditions

DTMR Coomera Connector - Threatened Ecological Community Assessments August 2024





RE: 12.1.1



Site Summary:

3.4.2 BC04 Results Table

Site ID: BC04

Patchy cover of Casuarina glauca with deep inundations and dense coverage of Salvinia molesta. Dense cover of swamp fern in the understory.
Deep pools making movement extremely difficult. Plot has been realigned based on the altered construction footprint. Only 50m transect.
Large amount of damage from recent summer storms and lots of trees over.

BioCondition Site Attributes	2023	2024	Baseline (2023) score out of 80	Current (2024) score out of 80
No. Large Eucs (per ha)	0	0	51.5	52.5
No. Large Non-Eucs (per ha)	22	24	BC04 Centre South 2023*	BC04 Centre South 2024
Total Large Trees (per ha)	22	24		
EDL Recruitment	60	100		
Emergent Tree Height	-	-	A CONTRACTOR	
Canopy Tree Height	18	18	A ALLANDAR	
Subcanopy Tree Height	7	7	CONTRACTOR DE LA CARACTERIA DE LA CARACT	
Mean Tree Height	12.5	12.5		
Emergent Tree Cover	-	-		
Canopy Tree Cover	62.2	54		
Subcanopy Tree Cover	20.4	37		
Mean Tree Cover	41.3	45.5	BC04 Centre West 2023*	BC04 Centre West 2024
(Native) Shrub Cover	10.6	0		
Native Perennial Grass Cover	2	0		
Litter Cover	40	13	X CONTRACTOR	
Non-native Cover	2	1		
Native Tree Species Richness	5	4		
Native Shrub Species Richness	2	2		
Native Grass Species	1	2		
Native Forbs & Other Species Richness	19	10		
CWD (m/ha)	30	100		A A A A A A A A A A A A A A A A A A A

*Note that the plot at BC04 was required to be relocated due to the adjustment in the impact footprint and subsequent shifting of the 30m buffer area.



3.4.3 Aerial imagery timestamps



Figure 3-6 Timestamped aerial images of sites BC03 and BC04 before and after storms on Christmas Day 2023. Red boundary highlights mapped storm damage areas. Realigned transects can be seen in Appendix A. Source: Nearmap.



3.5 BC05

3.5.1 BC05 Summary

BC05 saw very little variation in condition between 2023 and 2024 and no evidence of impacts from the Coomera Connector project. Interestingly, Ausecology recorded a significant increase in the number of large trees, and this patch in general has more large trees per hectare than indicated in the 2023 BAAM report. It was also noted there was a significant increase in the non-native cover observed. This can be attributed primarily to an increase in *Salvinia molesta* and other aquatic weeds. This is likely due to an increase in the level of inundation throughout the site as a result of preceding rainfall events. The level of cover comprised by these type of species is likely continually fluctuate naturally based on rainfall and inundation levels. The proportion of this site that is inundated is also likely to result in fluctuations in native grass and forb cover/richness which will get temporarily drowned by long periods of water logging.

Baseline Score	2024 Score	Reason for change	Is the change likely a direct or indirect impact of the project?
40	37.5	Increase in non-native cover, offset by large increase in large trees	No

Table 3-6 Summary of score for BC05 and comparison with EPBC Approval Conditions



3.5.2 BC05 Results Table

Site ID: BC05	RE: 12.3.20	Site Summary:
BioCondition Site Attributes	2023	2024
No. Large Eucs (per ha)	0	0
No. Large Non-Eucs (per ha)	8	22
Total Large Trees (per ha)	8	22
EDL Recruitment	60	100
Emergent Tree Height	-	-
Canopy Tree Height	10	17.8
Subcanopy Tree Height	7	8.24
Mean Tree Height	8.5	13.02
Emergent Tree Cover	-	-
Canopy Tree Cover	40.9	74.9
Subcanopy Tree Cover	26	23.7
Mean Tree Cover	33.45	49.3
(Native) Shrub Cover	0	0
Native Perennial Grass Cover	0	0.4
Litter Cover	82.4	44.6
Non-native Cover	20	60
Native Tree Species Richness	5	5
Native Shrub Species Richness	1	2
Native Grass Species	1	1
Native Forbs & Other Species Richness	11	7
CWD (m/ha)	35	45

Low lying woodland dominated by <i>Casuarina glauca</i> . Pockets of retained ponding water with <i>Salvinia molesta</i> . Large areas of ponded water have contributed to a substantial increase in non-native cover and reduction in leaf litter. No storm damage noted.			
Baseline (2023) score out of 80	Current (2024) score out of 80		
40	37.5		
BC05 Centre North 2023	BC05 Centre North 2024		
BC05 Centre South 2023	BC05 Centre South 2024		



3.6 BC06

3.6.1 BC06 Summary

Site BC06 showed minimal variation between years 2023 and 2024 other than what can be attributed to natural variation and minor differences between plot alignment between years (Table 3-7). Note that in 2023 the transects were only marked with flagging tape tied to trees which in this case was unable to be located, forcing ecologists to rely on GPS points which have a minor degree of inaccuracy (several metres). This is likely to lead to minor variations in canopy and subcanopy cover. Regardless the site has increased in BioCondition score overall and noticeably decreased in key metrics such as non-native cover (see Section 0 for individual attribute scores). The number of large trees has also increased, although there is some confusion around the 2023 data for large trees recorded by BAAM. This site was also mostly unimpacted by the 2023 storms given it is relatively sheltered away from exposed edge of the patch. Overall there is no evidence of primary or secondary impacts from the project.

Baseline Score	2024 Score	Reason for change	Is the change likely a direct or indirect impact of the project?
45	48	Increase in large trees and decreased non-native cover	No

Table 2 7 Cumana	rev of coor	a far DCOC ana	l comparicon with	FDDC Ammround Com	ditiona
10018 3-7 500000	πν οι score	2 101 BLUD 0110	comparison with	ΕΡΒΕ ΑΟΟΓΟναι ΕΟΠ	annons







3.6.2 BC06 Results Table

Site ID: BC06	RE: 12.1.1	Site Summary:
BioCondition Site Attributes	2023	2024
No. Large Eucs (per ha)	0	0
No. Large Non-Eucs (per ha)	12	20
Total Large Trees (per ha)	12	20
EDL Recruitment	100	100
Emergent Tree Height	-	-
Canopy Tree Height	18	19
Subcanopy Tree Height	9	9
Mean Tree Height	13.5	14
Emergent Tree Cover	-	-
Canopy Tree Cover	93.9	67
Subcanopy Tree Cover	12.8	21
Mean Tree Cover	53.35	44
(Native) Shrub Cover	1.9	0
Native Perennial Grass Cover	1	1
Litter Cover	65	67
Non-native Cover	60	15
Native Tree Species Richness	4	3
Native Shrub Species Richness	1	2
Native Grass Species	4	3
Native Forbs & Other Species Richness	13	11
CWD (m/ha)	30	0

Patchy, near closed casuarina glauca woodland, nearly fully inundated at the northern end. ferns and wetland species present dense to open shrub layer and an infestation of <i>Lantana</i> and <i>Asparagus</i> at the south as a result of disturbance on the peripher		
	Baseline (2023) score out of 80	Current (2024) score out of 80
	45	48
	BC06 Centre South 2023	BC06 Centre South 2024
	BC06 Centre North 2023	BC06 Centre North 2024



3.7 BC07

3.7.1 BC07 Summary

Site BC07 is almost unrecognisable from the 2023 surveys and has been decimated by the December 2023 storms. This is demonstrated in Figure 3-9 and Figure 3-10. There are numerous large trees that have been pushed over by the storms and debris is scattered throughout the site making traversing the site nearly impossible. The 2023 baseline plot was also crooked and replicating the bowed transect line was consequently challenging. Despite the loss of several canopy trees, the overall BioCondition score is roughly the same as the baseline due to increases in native grass cover and tree height overall (see Section 3.7.2 for individual attribute scores). Given the severity of the destruction caused by the December 2023 storm it is almost impossible to determine whether there are any additional impacts from the project.

Table 3-8 Summary of score for BC07 and comparison with EPBC Approval Conditions

Baseline Score	2024 Score	Reason for change	Is the change likely a direct or indirect impact of the project?
49.5	50	Loss of canopy cover countered by increases in other metrics	Νο





Figure 3-10 Entire root area ripped from the ground and leaving a large pool of water up to 1.5m deep. This tree would have qualified as a large non-eucalypt tree. These new pools are frequently colonised by the restricted weed <u>Salvinia molesta</u>



3.7.2 BC07 Results Table

Site ID: BC07	RE: 12.3.20	Site Summary:
BioCondition Site Attributes	2023	2024
No. Large Eucs (per ha)	0	0
No. Large Non-Eucs (per ha)	18	16
Total Large Trees (per ha)	18	16
EDL Recruitment	100	100
Emergent Tree Height	-	-
Canopy Tree Height	16	20
Subcanopy Tree Height	7	6
Mean Tree Height	11.5	13
Emergent Tree Cover	-	0
Canopy Tree Cover	86.2	64
Subcanopy Tree Cover	16	0
Mean Tree Cover	51.1	32
(Native) Shrub Cover	0	0
Native Perennial Grass Cover	19	29
Litter Cover	26	20
Non-native Cover	5	5
Native Tree Species Richness	3	3
Native Shrub Species Richness	5	5
Native Grass Species	2	3
Native Forbs & Other Species Richness	14	15
CWD (m/ha)	200	0

Swamp oak TEC with dense patches of Mangrove fern and some inundated pools. Some areas where trees have been knocked over in storm damage. Will likely lead to reduced canopy cover. Transect start point very close to pedestrian footpath.			
Baseline (2023) score out of 80	Current (2024) score out of 80		
49.5	50		
BC07 Centre North 2023	BC07 Centre North 2024		
BC07 Centre South 2023	BC07 Centre South 2024		


3.8 BC08

3.8.1 BC08 Summary

Despite a marked decrease in score, there is no evidence of direct impacts from the project itself as the key score losses can be directly attributed to the storm damage.

The first 30 m of the transect at BC08 has had major impacts from the December 2023 storms. This is reflected in the overall loss in canopy cover and loss of BioCondition Score overall (Table 3-9). The impact of the storm can be clearly seen as illustrated in Figure 3-12.

The site retains a poor score overall for non-native cover with 60% cover recorded in this monitoring run. Most weed cover is contained within the second half of the transect along the flat, dry sections and is primarily comprised of Singapore daisy and broad-leafed pepper tree.

It was also noted that a vehicle track is present at the end of the transect. Although not regularly used, this track will worsen the non-native cover in the direct area given the increased edge effect and seed spread (Figure 3-11). Non-native cover is likely to continue to degrade given the existing coverage throughout the survey area. It is recommended that this track be rehabilitated and weed control implemented to demonstrate that the project is improving the area rather than continuing to worsen it.

Nearmap aerial imagery depicting vegetation changes near the site since December 2023 up until the current survey date can be viewed in Section 3.8.3.

Baseline Score	2024 Score	Reason for change	Is the change likely a direct or indirect impact of the project?
43.5	35.5	Loss of canopy cover due to storm damage	No

Table 3-9 Summary of score for BC08 and comparison with EPBC Approval Conditions





Figure 3-11 Access track running immediately behind the end of the transect with high volume of blue billy goat weed (<u>Ageratum houstonianum</u>)



Figure 3-12 Evidence of potential large non-eucalypt trees snapped in half by storm damage on December 25, 2023



3.8.2 BC08 Results Table

Site ID: BC08	RE: 12.1.1	Site Summary:
BioCondition Site Attributes	2023	2024
No. Large Eucs (per ha)	0	0
No. Large Non-Eucs (per ha)	28	32
Total Large Trees (per ha)	28	32
EDL Recruitment	60	100
Emergent Tree Height	-	0
Canopy Tree Height	17	18
Subcanopy Tree Height	10	10
Mean Tree Height	13.5	14
Emergent Tree Cover	-	-
Canopy Tree Cover	94.6	54
Subcanopy Tree Cover	10	20
Mean Tree Cover	52.3	37
(Native) Shrub Cover	0	0
Native Perennial Grass Cover	0	0
Litter Cover	2	21
Non-native Cover	55	60
Native Tree Species Richness	5	4
Native Shrub Species Richness	1	0
Native Grass Species	1	1
Native Forbs & Other Species Richness	4	5
CWD (m/ha)	40	0

Swamp oak TEC with dense patches of Mangrove fern and some inundated pools. Some areas where trees have been knocked over in sto damage. Will likely lead to reduced canopy cover				
Baseline (2023) score out of 80	Current (2024) score out of 80			
43.5	35.5			
BC08 Centre South 2023	BC08 Centre South 2024			
BC08 Centre North 2023	BC08 Centre North 2024			



3.8.3 Aerial imagery timestamps



Figure 3-13 Timestamped aerial images of sites BC07 and BC08 before and after storms on Christmas Day 2023. Red boundary highlights mapped storm damage areas. Realigned transects can be seen in Appendix A. Source: Nearmap.



3.9 BC09

3.9.1 BC09 Summary

BC09 has very little evidence of change between 2023 and 2024 monitoring with only small differences in the raw results (see Section 0) and a slight overall improvement (Table 3-10).

The site has no evidence of storm damage and is adjacent to a well sheltered mangrove creek system. Nonnative cover at BC09 is very high, with the ground layer being a monoculture of Singapore daisy (*Sphagneticola trilobata*). Many other non-native species are also present, including a number of shrubs and exotic sub canopy trees. Non-native cover was similarly high in 2023 and the large coverage cannot be attributed to the commencement of the project, however it will continue to increase as the project continues. It is therefore recommended that actions be undertaken to reduce the non-native cover in this area of the project footprint to clearly demonstrate that the project is not contributing to negative changes.

Table 2-10 Summar	~ ~	fscore	for	BCOQ an	d com	naricon	with	EDRC A	nnroval	Conditions
10016 2-10 201111101	yυ	JSCOLE	וטן	DCU9 UII	и сотп	punson	WILII	EPDCA	ιρριοναι	Conultions

Baseline Score	2024 Score	Reason for change	Is the change likely a direct or indirect impact of the project?	
37.5	42.5	Natural variation	No	





Figure 3-14 Extremely dense cover of Singapore daisy (Sphagneticola trilobata) at BC09.



3.9.2 BC09 Results Table

Site ID: BC09	RE: 12.3.20	Site Summary:
BioCondition Site Attributes	2023	2024
No. Large Eucs (per ha)	0	0
No. Large Non-Eucs (per ha)	14	18
Total Large Trees (per ha)	14	18
EDL Recruitment	90	100
Emergent Tree Height	-	0
Canopy Tree Height	12	14
Subcanopy Tree Height	6	6
Mean Tree Height	9	10
Emergent Tree Cover	-	0
Canopy Tree Cover	95.9	91
Subcanopy Tree Cover	41.1	36
Mean Tree Cover	68.5	63.5
(Native) Shrub Cover	0	0
Native Perennial Grass Cover	0	0
Litter Cover	41.4	21
Non-native Cover	70	77
Native Tree Species Richness	9	8
Native Shrub Species Richness	4	7
Native Grass Species	0	2
Native Forbs & Other Species Richness	4	7
CWD (m/ha)	0	0

Lower bank of creek with Casuarina glauca. Scattered Eucalyptus tereticornis, Eucalyptus siderophloia. Ground cover is almost monoculture Singapore daisy.					
Baseline (2023) score out of 80	Current (2024) score out of 80				

42.5



37.5

BC09 Centre North 2023



BC09 Centre North 2024





3.10 BC10

3.10.1 BC10 Summary

BC10 saw an overall increase in score between 2023 and 2024, albeit a slight increase. There is minimal construction activity currently occuring in this southern section and there is accordingly no evidence of any unpermitted damage to the Swamp Oak TEC. This area is slightly younger than all other sites and only just meets remnant status. The only noticeable change between 2023 and 2024 is the drop in subcanopy cover. However this was likely a result of differences in how the subcanopy and canopy were split and which trees were accredited to which stratum. In future the Ausecology stratum heights should be used as a baseline as the BAAM report does not contain any detailed tree height information other than a single average height. Detailed tree height information is included in Appendix B. As with BC05, the number of large trees per hectare has also been increased at this site.

Baseline Score	2024 Score	Reason for change	Is the change likely a direct or indirect impact of the project?	
52	53.5	Natural variation	No	

Table 3-1	11 Summar	v of score	for BC10 an	d comparison with	EPBC Approval	Conditions
		, -,	Je			



3.10.2 BC10 Results Table

Site ID: BC10	RE: 12.3.20	Site Summary:
BioCondition Site Attributes	2023	2024
No. Large Eucs (per ha)	0	0
No. Large Non-Eucs (per ha)	2	8
Total Large Trees (per ha)	2	8
EDL Recruitment	100	100
Emergent Tree Height	-	-
Canopy Tree Height	10	13.66
Subcanopy Tree Height	7	5.4
Mean Tree Height	8.5	9.53
Emergent Tree Cover	-	-
Canopy Tree Cover	81.8	88.8
Subcanopy Tree Cover	52	13.6
Mean Tree Cover	66.9	47.8
(Native) Shrub Cover	20	14.4
Native Perennial Grass Cover	24.4	2.4
Litter Cover	70.2	77.6
Non-native Cover	5	5
Native Tree Species Richness	5	7
Native Shrub Species Richness	13	8
Native Grass Species	3	2
Native Forbs & Other Species Richness	13	12
CWD (m/ha)	10	95

:	Dense Casuarina glauca forest with an understory of Melaleuca and Acacia spp. Ground layer is dominated by thick pine needle leaf litter with scattered Lomandra hystrix and Ottochloa gracilima. No storm damage noted.								
	Baseline (2023) score out of 80	Current (2024) score out of 80							
	52	53.5							
	BC10 Centre South 2023	BC10 Centre South 2024							
	BC10 Centre North 2023	BC10 Centre North 2024							

36

1-200



4 Conclusion

Table 4-1 below summaries to overall BioCondition score for each site assessed along the Coomera Connector Project. This includes highlighting whether the overall score has increased or decrease along with a brief statement on the reasons for the change. Finally, Table 4-1 comments on whether there is any evidence of change resulting from the Project itself in accordance with EPBC 2020/8646 condition 6, which specifies that the proponent:

"Ensure that the quality and/or extent of retained Coastal Swamp Oak TEC within 30 m of clearing and/or construction does not degrade due to impacts attributable to this Action".

At the conclusion of the 2024 monitoring there is no direct evidence of any degradation of the TEC as a direct or indirect result of the impact. However, as discussed at length, many areas of the Project have been decimated by the December 25 2023 storms and drawing conclusions is difficult in these circumstances. Further monitoring is required as per the EPBC Conditions and will continue for the length of the construction period.

Site ID	Baseline Score	2024 Score	Reason for change	Is the change likely a direct or indirect impact of the project?
BC01	58	53	Loss of large trees due to permitted destruction within the impact footprint	No
BC02	64	58	Loss of large trees due to permitted destruction within the impact footprint. Loss of native grass cover	No
BC03	58	50.5	Realignment of transect	Unclear
BC04	51.5	52.5	Realignment of transect	Unclear
BC05	40	37.5	Increase non-native cover	No
BC06	45	48	Increase in large trees and decreased non-native cover	No
BC07	49.5	50	Loss of canopy cover countered by increases in other metrics	No
BC08	43.5	35.5	Loss of canopy cover due to storm damage	No
BC09	37.5	42.5	Natural variation	No
BC10	52	53.5	Natural variation	No

Table 4-1 Final Summary of 2024 findings and compliance with EPBC 2020/8646 Condition 6.



4.1 Recommendations

It is recommended that weed control be undertaken and targeted to sites with more than 25% non-native cover. This includes the sites and target species contained in Table 4-2. Improving the non-native cover score in these sites will increase the BioCondition score as well as allow more recruitment of native species richness across all strata.

Sites	Weed Cover	Target Species
BC01	32%	Lantana camara, Schinus terebinthifolius
BC05	60%	Salvinia molesta
BC08	60%	Sphagneticola trilobata
BC09	77%	Sphagneticola trilobata, Schinus terebinthifolius, Solanum spp.



5 References

BAAM 2023. Coastal Swamp Oak TEC Condition Monitoring – Coomera Connector Stage 1 February 2023.

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Department of the Environment and Energy 2018. Conservation advice (incorporating listing advice) for the Coastal Swamp Oak (*Casuarina glauca*) Forest of New South Wales and South East Queensland ecological community. Canberra: Department of the Environment and Energy. Available from: http://www.environment.gov.au/biodiversity/threatened/communities/pubs/141-conservation-advice.pdf. In effect under the EPBC Act from 20-Mar-2018.

Eyre, T.J., Kelly, A.L, Neldner, V.J., Wilson, B.A., Ferguson, D.J., Laidlaw, M.J. and Franks, A.J. 2015. BioCondition: A Condition Assessment Framework for Terrestrial Biodiversity in Queensland. Assessment Manual. Version 2.2. Queensland Herbarium, Department of Science, Information Technology, Innovation and Arts, Brisbane. Available from: https://www.qld.gov.au/__data/assets/pdf_file/0029/68726/bioconditionassessmentmanual.pdf.



Appendix A – BioCondition Locations





Appendix B – BioConditions Raw Data



Site Details:

Site Code:	BC01	Date:	2024-05-29	Time:	09:25
Ecologist/s:	Tim Shields, Yasmin Feile				

	Start		End
Latitude:	21.0		
Longitude:			
Ground truthed Deciseral Econuctomy		1211	Remnant

Transect Length (m): 90

Habitat Description:

Dense woodland dominated by Casuarina glauca. Some areas of dense weed cover dominated by Lantana camara and broad leaved pepper tree

General Comments:

Lots of large trees have fallen over in intense Gold Coast storms around Christmas 2023

BioCondition Scoring Summary:

Site Based Attributes	Site BC Score	Max BC Score per Attribute for RE	
No. Large Trees	5.0	15.0	
EDL Recruitment	5.0	5.0	
Tree Height			
- Emergent	na	0	
- Canopy	5.0	5.0	
- Subcanopy	5.0	5.0	
Average	5.0	5.0	
Tree Cover			
- Emergent	na	0	
- Canopy	5.0	5.0	
- Subcanopy	5.0	5.0	
Average	5.0	5.0	
Shrub Cover	5.0	5.0	
Native Perennial Grass Cover	0	5.0	
Litter Cover	3.0	5.0	
Non-Native Plant Cover	3.0	10.0	
Species Richness			
+ Trees	5.0	5.0	
- Shrubs	5.0	5.0	
- Grasses	5.0	5.0	
- Forbs & Other	5.0	5.0	
Coarse Woody Debris	2.0	5.0	
	1		
Total	53.0	80.0	

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EDL: Canopy

% EDL Recruitment: 100.0

Site Measurements:

	Height (m)	Cover (%)
Emergent:	0	0
Canopy:	8.4	84.9
Subcanopy:	7.0	19.7
Shrub:	na	6.6

Large Trees:

	No. Large trees	DBH threshold (cm)
Eucalypt;	0	0
Non-Eucalypt:	4	29.0
Total No. Large Trees per site:	4	
Total No. Large Trees per ha:	8	

Species Richness:

Native Trees:	8
Native Shrubs:	4
Native Grasses:	2
Native Forbs & Other:	7
Non-Natives:	17

Non-Native Plant Cove	r (%):
32.0	100

Line Intercept:

Strata	Start (m)	End (m)	Total (m)	Strata	Start (m)	End (m)	Total (m
С	0	9.4	9.4	С	78.4	85.3	6.9
SC	7.9	9.9	2.0	SHR-E	78.7	79.8	1.1
SHR	12.8	15.5	2.7	SC	81.0	86.1	5.1
С	12.8	15.8	3.0	SHR-E	81.7	82.8	1.1
SC	17.7	18.4	0.7	SHR-E	83.7	85.0	1.3
С	18.4	69.9	51.5	SC	86.9	90.0	3.1
SHR	21.0	22.2	1.2	SHR-E	87.8	90.0	2.2
SHR-E	40.8	41.2	0.4				
SHR-E	42.2	42.8	0.6			1	
SHR-E	46.0	46.9	0.9			-	
SHR	65.1	65.6	0.5				
SHR	67.0	67.3	0.3				
SHR-E	67.4	67.9	0.5				
SC	67.2	74.0	6.8			1	
SHR	70.1	70.9	0.8				
С	71.8	77.4	5.6				
SHR-E	73.7	75.8	2.1				
SHR	76.2	76.6	0.4		1		
SHR-E	76.7	76.9	0.2				
SC-E	78.0	78.8	0.8	la la companya di			

	Native	Non-Native
Total Emergent (%)	0	0
Total Canopy (%)	84.9	0
Total Subcanopy (%)	19.7	0.9
Total Shrub (%)	6.6	11.6



Coarse Woody Debris:

Total Length (m):	106.4	Total Length (m/ha):	1,064.0	
Lotal Follow Prints	100.1	recorden gen hilf nah.	1,001.0	

Length/s (m):

	Bend - fund.	_			_								
1	2.80	6	1.10	11	3.50	16	5.00	21	8.00	26	31	36	
2	3.00	7	3.00	12	3.00	17	5.00	22	8.50	27	32	37	
3	2.00	8	3.00	13	4.00	18	4.00	23		28	33	38	
4	9.00	9	8.00	14	10.00	19	0.50	24		29	34	39	
5	9.00	10	2.00	15	9.00	20	3.00	25		30	35	40	

Species Lists – Trees:

spe	icles	Other	Status	Strata
1	Casuarina glauca			C, SC
2	Schinus terebinthifolius		Restricted -	NN-SC
3	Corymbia torelliana			SC
4	Eucalyptus propinqua			С
5	Alphitonia excelsa			SC
6	Acacia disparrima			SC
7	Jagera pseudorhus			OTH
8	Melaleuca quinquenervia			SC
9	Ficus rubiginosa			OTH
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				
25				
26				
27				1
28				1
29				-
30				
31				1
32				1
33				
34				
35				



Species List – Shrubs, Grasses, Forbs & Other and Non-Natives:

Spe	cies	Other	Status	Lifeform
1	Schinus terebinthifolius		Restricted -	Non-Native
2	Passiflora foetida		*	Non-Native
3	Asparagus aethiopicus		Restricted -	Non-Native
4	Cupaniopsis anacardioides			SHR
5	Ageratum houstonianum		*	Non-Native
6	Rivina humilis		*	Non-Native
7	Senna pendula		*	Non-Native
8	Alternanthera denticulata			F
9	Parsonsia straminea			F
10	Enydra woollsii			F
11	Passiflora pallida		*	Non-Native
12	Solanum mauritianum		*	Non-Native
13	Crassocephalum crepidioides		*	Non-Native
14	Lantana camara		Restricted -	Non-Native
15	Solanum seaforthianum		*	Non-Native
16	Casuarina glauca			SHR
17	Macroptilium atropurpureum		*	Non-Native
18	Commelina benghalensis		*	Non-Native
19	Geitonoplesium cymosum			F
20	Alphitonia excelsa			SHR
21	Solanum americanum		*	Non-Native
22	Cyperus sp.		1	F
23	Paspalidium distans			G
24	Commelina diffusa			F
25	Emilia sonchifolia		*	Non-Native
26	Brassica sp.		*	Non-Native
27	Einadia hastata			SHR
28	Ottochloa gracillima			G
29	Dianella brevipedunculata			F
30	Solanum chrysotrichum		*	Non-Native
31				
32				
33				
34				
35				1
36				1
37	1			1
38				
39				
40				111
41				
42				
43				
44		1		
45				-
State	us: NT – Near Threatened (Nature Conservation Act 1992). V – 1	Vulnerable (NC Act), E - Endangered INC	Act). * - Exotic species.	1

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1m x 1m Quadrats:

	Native			Non-native								
Qu	adrat	Perennial Grass	Other Grass	Forbs & Other	Shrubs	Grasses	Forbs, Other & Shrubs	Litter	Rock	Bare- ground	Crypto- grams	Total
		0	0	0	0	0	0	63	0	30	7	100%
		2	o	5	0	0	35	48	0	10	0	100%
		0	o	0	0	0	0	100	0	0	0	100%
		6	o	0	0	0	3	91	0	0	0	100%
		25	O	0	0	0	50	15	0	10	0	100%
	Mean:	6.60	þ	1.00	0	0	17.60	63.40	0	10.00	1.40	

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Site Details:

Site Code:	BC02	Date:	2024-05-29	Time:	12:52
Ecologist/s:	Tim Shields, Yasmin Feile				

	Start		End
Latitude:	21 V		
Longitude:			
Ground-truthed Reg	ional Ecosystem:	12.1.1	Remnant

Transect Length (m): 100

Habitat Description:

Closed casuarina glauca. Woodland with a grassy understory. Moderate cover of broadleaf pepper tree.

General Comments:

Several large trees have either been destroyed in storms or pushed over from the edge of the disturbance footprint

BioCondition Scoring Summary:

Site Based Attributes	Site BC Score	Max BC Score per Attribute for RE
No. Large Trees	5.0	15.0
EDL Recruitment	5.0	5.0
Tree Height		
- Emergent	na	0
- Canopy	5.0	5.0
 Subcanopy 	5.0	5.0
Average	5.0	5.0
Tree Cover		
- Emergent	na	0
- Canopy	5.0	5.0
- Subcanopy	5.0	5.0
Average	5.0	5.0
Shrub Cover	0	5.0
Native Perennial Grass Cover	0	5.0
Litter Cover	3.0	5.0
Non-Native Plant Cover	10.0	10.0
Species Richness		-
+ Trees	5.0	5.0
- Shrubs	5.0	5.0
- Grasses	5.0	5.0
- Forbs & Other	5.0	5.0
Coarse Woody Debris	5.0	5.0
Total	58.0	80.0



Site Photos: **Transect Start Transect End** Centre Right **Centre Forward** Centre Back Centre Left



Site Measurements:

	Height (m)	Cover (%)
Emergent:	0	0
Canopy:	15.8	69.2
Subcanopy:	7.0	29.2
Shrub:	na	0.1

EDL: Canopy %EDL Recruitment: 100.0

Large Trees:

	No. Large trees	DBH threshold (cm)
Eucalypt;	0	0
Non-Eucalypt:	20	29.0
Total No. Large Trees per site:	20	
Total No. Large Trees per ha:	40	

Species Richness:

Native Trees:	1
Native Shrubs:	3
Native Grasses:	2
Native Forbs & Other:	15
Non-Natives:	12

Non-Native	Plant Cover (%):
3.0	

Line Intercept:

Strata	Start (m)	End (m)	Total (m)	Strata	Start (m)	End (m)	Total (m)
С	0	5.5	5.5				
С	9.6	28.0	18.4				
SHR-E	14.0	14.2	0.2				
SC	21.0	33.5	12.5				
SHR-E	23.2	23.5	0.3			-	
SHR-E	24.1	24.3	0.2				
SHR-E	24.9	25.0	0.1				
SHR	29.7	29.8	0.1				
SHR-E	30.0	30.3	0.3				
C	30.0	33.0	3.0				
С	37.0	40.0	3.0				
SC	40.0	45.9	5.9				
С	49.0	71.5	22.5	-			
SC	57.8	61.5	3.7				
SC	70.0	77.1	7.1	-			
С	76.1	92.9	16.8				
			1 11 11				
				11.0			

E – Emergent, E-E – Emergent Exotic, C – Canopy, C-E – Canopy Exotic, SC – Subcanopy, SC-E – Subcanopy Exotic, SHR – Shrub, SHR-E – Shrub Exotic

	Native	Non-Native
Total Emergent (%)	0	0
Total Canopy (%)	69.2	0
Total Subcanopy (%)	29.2	0
Total Shrub (%)	0.1	1.1



Coarse Woody Debris:

Total Length (m):	19.9	Total Length (m/ha):	199.0	
		and the second sec		

Ler	igth/s (m):	1		Con the second					
1	8.00	6	4.00	11	16	21	26	31	36
2	1.60	7	1.20	12	17	22	27	32	37
3	1.00	8		13	18	23	28	33	38
4	1.10	9		14	19	24	29	34	39
5	3.00	10		15	20	25	30	35	40

Species Lists – Trees:

spe	cles	Uther	Status	Strata
1	Casuarina glauca			C, SC
2	Schinus terebinthifolius		Restricted -	NN-SC
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				-
17				
18				
19				
20				1
21				1
22				
23				
24				
25				
26				
27				
28				
29				
30			-	
31				1
32				
33				
34	1			
35		7.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1.1		



Species List – Shrubs, Grasses, Forbs & Other and Non-Natives:

spe	cies	Other	Status	Lifeform
1	Schinus terebinthifolius		Restricted -	Non-Native
2	Casuarina glauca			SHR
3	Alternanthera denticulata			F
4	Emilia sonchifolia		*	Non-Native
5	Parsonsia straminea			F
6	Paspalidium distans			G
7	Cupaniopsis anacardioides			SHR
8	Asparagus aethiopicus		Restricted -	Non-Native
9	Solanum americanum		*	Non-Native
10	Crassocephalum crepidioides		*	Non-Native
11	Goodenia mystrophylla			Non-Native
12	Cyperus polystachyos			F
13	Eclipta prostrata		*	Non-Native
14	Centella asiatica			F
15	Ludwigia octovalvis			F
16	Cuphea carthagenensis		*	Non-Native
17	Entolasia stricta			G
18	Phyla nodiflora			F
19	Eclipta platyglossa			F
20	Juncus kraussii			F
21	Bacona monnieri			F
22	Cynodon dactylon		*	Non-Native
73				F
20				F
25	Pasnalum notatum		*	Non-Native
25	Solanum soaforthianum		*	Non Nativo
20	Sonna pondula		*	Non Native
2/			Destricted	Non-Native
28			Restricted -	Non-mative
29	Einadia nastata			SHR
30	Dianella brevipedunculata			
31				F
32	Enydra woollsii			F
33				-
34				_
35				
36				-
37				-
38				-
39				
40				
41				
42				
43				
44				
AF				1

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1m x 1m Quadrats:

1000 C			Na	tive		Non-	Non-native		Non-native		Non-native		Non-native		-native	tive			
Qu	adrat	Perenniai Grass	Other Grass	Forbs & Other	Shrubs	Grasses	Forbs, Other & Shrubs	Litter	Rock	Bare- ground	Crypto- grams	Total							
		2	O	10	0	0	12	76	0	0	0	100%							
		13	o	7	0	0	0	10	0	70	0	100%							
		0	o	23	0	0	0	77	0	0	0	100%							
		0	o	70	0	0	0	20	0	10	0	100%							
		0	o	0	0	0	0	85	0	15	0	100%							
	Mean:	3.00	þ	22.00	0	0	2.40	53.60	0	19.00	0								

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Site Details:

Site Code:	BC03	Date:	2024-06-05	Time:	14:09
Ecologist/s:	Tim Shields, Nicola Praschifka				

	Start		End	Trans
Latitude:				50
Longitude:				
Ground-truthed Reg	ional Ecosystem:	12.1.1	Remnant	

Transect Length (m):

Habitat Description: Patchy storm damaged Casuarina glauca swampland

General Comments:

Reduced 50m plot. Reduced 50x30 large tree plot due to storm damaged areas and mangrove RE. Open Casuarina glauca woodland with dense Ferny undergrowth and considerable inundation throughout the entire plot

BioCondition Scoring Summary:

Site Based Attributes	Site BC Score	Max BC Score per Attribute for RE
No. Large Trees	5.0	15.0
EDL Recruitment	5.0	5.0
Tree Height		
- Emergent	na	0
- Canopy	5.0	5.0
- Subcanopy	5.0	5.0
Average	5.0	5.0
Tree Cover		
- Emergent	na	0
- Canopy	5.0	5.0
- Subcanopy	5.0	5.0
Average	5.0	5.0
Shrub Cover	5.0	5.0
Native Perennial Grass Cover	0	5.0
Litter Cover	3.0	5.0
Non-Native Plant Cover	5.0	10.0
Species Richness		-
 Trees 	5.0	5.0
- Shrubs	5.0	5.0
- Grasses	2.5	5.0
- Forbs & Other	5.0	5.0
Coarse Woody Debris	0	5.0
		t.
Total	50.5	80.0



Site Photos: **Transect Start Transect End Centre Right Centre Forward** Centre Back Centre Left

Page 2 of 6



Site Measurements:

	Height (m)	Cover (%)
Emergent:	0	0
Canopy:	15.5	62.2
Subcanopy:	7.0	38.2
Shrub:	na	5.2

EDL: Canopy % EDL Recruitment: 100.0

Large Trees:

	No. Large trees	DBH threshold (cm)
Eucalypt:	0	0
Non-Eucalypt:	3	29.0
Total No. Large Trees per site:	3	
Total No. Large Trees per ha:	6	

Species Richness:

Native Trees:	3
Native Shrubs:	1
Native Grasses:	1
Native Forbs & Other:	10
Non-Natives:	4

Non-Native	Plant Cover (%):
5.0	

Line Intercept:

Strata	Start (m)	End (m)	Total (m)	Strata	Start (m)	End (m)	Total (m)
С	0	7.8	7.8				
SC	4.2	7.6	3.4				
SC	10.1	15.0	4.9				
С	11.8	28.4	16.6				
SHR-E	15.3	16.1	0.8				
SHR	16.7	18.3	1.6				
SHR	19.1	20.1	1.0				
SC	20.3	20.9	0.6				
SC	26.0	29.1	3.1				
C	30.0	36.7	6.7				
SC	31.4	36.2	4.8				
SC	39.5	41.4	1.9				
SC	44.8	45.2	0.4				
	1		1			1	
				1			

E - Emergent, E-E - Emergent Exotic, C - Canopy, C-E - Canopy Exotic, SC - Subcanopy, SC-E - Subcanopy Exotic, SHR - Shrub, SHR-E - Shrub Exotic

	Native	Non-Native
Total Emergent (%)	0	0
Total Canopy (%)	62.2	0
Total Subcanopy (%)	38.2	0
Total Shrub (%)	5.2	1.6



Coarse Woody Debris:

Total Length (m):	3.0	Total Length (m/ha):	30.0	
the stand of the s		and the second se		

Lei	ngth/s (m):							
1	3.00	6	11	16	21	26	31	36
2		7	12	17	22	27	32	37
3		8	13	18	23	28	33	38
4		9	14	19	24	29	34	39
5	-	10	15	20	25	30	35	40

Species Lists - Trees:

Species	Other	Status	Strata	
1 Casuarina glauca			C, SC	
2 Avicennia marina subsp. australasica			C, SC	
3 Melaleuca quinquenervia			С	
4				
5			1.1	
6				
7			1	
8				
9				
10				
11			1	
12				
13			1	
14				
15				
16				
17				
18				
19				
20				
21				
22				
23			1	
24			1	
25				
26				
27				
28				
29				
30				
31			1	
32				
33				
34				
35				



Species List – Shrubs, Grasses, Forbs & Other and Non-Natives:

Spe	cies	Other	Status	Lifeform
1	Acrostichum speciosum		Special least	F
2	Salvinia molesta		Restricted -	Non-Native
3	Phragmites australis			G
4	Vincetoxicum carnosum			F
5	Enydra woollsii			F
6	Parsonsia straminea			F
7	Platycerium bifurcatum		Special least	F
8	Schinus terebinthifolius		Restricted -	Non-Native
9	Centella asiatica			F
10	Hypolepis muelleri			F
11	Juncus kraussii			Non-Native
12	Lygodium microphyllum			F
13	Solanum mauritianum		*	Non-Native
14	Avicennia marina subsp. australasica			SHR
15	Crassocephalum crepidioides		*	Non-Native
16	Hydrocotyle verticillata			F
17				1
18				
19				Ť
20				
21				4
22				
23				
24				
25				
26				
27			1	
28				
29				1
30				
31				
32				4-
33				1
34				-
35				
36				1
37	1			-
38				1
39	1			1
40				
41			1	-
47			1	-
43				1
44				
45				
43	INT Next Threatened Wature Concentration Act 1002) V. V.	Incention (NC Act) E - Endependent (NC)	Act) * Evotic concion	-



1m x 1m Quadrats:

		Native			Non-native							
Qu	adrat	Perenniai Grass	Other Grass	Forbs & Other	Shrubs	Grasses	Forbs, Other & Shrubs	Litter	Rock	Bare- ground	Crypto- grams	Total
		0	O	65	0	0	0	35	0	0	0	100%
		0	o	96	0	0	1	3	0	0	0	100%
		0	o	60	0	0	15	25	0	0	0	100%
		0	o	20	0	0	2	78	0	0	0	100%
		0	0	75	0	0	0	25	0	0	0	100%
	Mean:	0	þ	63.20	0	0	3.60	33.20	0	0	0	1

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Site Details:

Site Code:	BC04	Date:	2024-06-05	Time:	11:51	
Ecologist/s:	Tim Shields, Nicola Praschifka					

Patchy cover of Casuarina glauca with deep inundations and dense coverage of Salvinia. Dense cover of swamp fern in the understory

	Start		End
Latitude:	0.00		
Longitude:			
Ground-truthed Reg	ional Frosystem	12.1.1	Remnant

Transect Length (m): 50

General Comments:

Habitat Description:

Deep pools making movement extremely difficult. Plot has been realigned based on the altered construction footprint. Only 50m transect. Large amount of damage from recent summer storms and lots of trees over

BioCondition Scoring Summary:

Site Based Attributes	Site BC Score	Max BC Score per Attribute for RE
No. Large Trees	5.0	15.0
EDL Recruitment	5.0	5.0
Tree Height		
- Emergent	na	0
- Canopy	5.0	5.0
- Subcanopy	5.0	5.0
Average	5.0	5.0
Tree Cover		
- Emergent	na	0
- Canopy	0	5.0
- Subcanopy	5.0	5.0
Average	2.5	5.0
Shrub Cover	0	5.0
Native Perennial Grass Cover	0	5.0
Litter Cover	3.0	5.0
Non-Native Plant Cover	10.0	10.0
Species Richness	4	-14-
 Trees 	5.0	5.0
- Shrubs	5.0	5.0
- Grasses	5.0	5.0
- Forbs & Other	5.0	5.0
Coarse Woody Debris	2.0	5.0
Total	52.5	80.0



Site Photos:









EDL: Canopy

% EDL Recruitment: 100.0

Site Measurements:

	Height (m)	Cover (%)
Emergent:	0	0
Canopy:	17.9	-25.8
Subcanopy:	7.0	37.2
Shrub:	na	0.4

Large Trees:

	No. Large trees	DBH threshold (cm)
Eucalypt;	0	0
Non-Eucalypt:	12	29.0
Total No. Large Trees per site:	12	
Total No. Large Trees per ha:	24	

Species Richness:

Native Trees:	4
Native Shrubs:	2
Native Grasses:	2
Native Forbs & Other:	10
Non-Natives:	4

Non-Native	Plant	Cover	(%):
1.0			

Line Intercept:

Strata	Start (m)	End (m)	Total (m)	Strata	Start (m)	End (m)	Total (m)
SC	0	2.7	2.7				
C	4.0	9.8	5.8				
SC	8.5	9.9	1.4				
SHR	11.5	11.7	0.2				
SC	13.8	20.5	6.7				
C	15.9	25.6	9.7				
SC	22.5	26.4	3.9				
0	28.4		-28.4				
SC	30.9	34.8	3.9				
						-	
		-					
					-		
	_		_				
	_						
					-		
			_		-		

E – Emergent, E-E – Emergent Exotic, C – Canopy, C-E – Canopy Exotic, SC – Subcanopy, SC-E – Subcanopy Exotic, SHR – Shrub, SHR-E – Shrub Exotic

	Native	Non-Native
Total Emergent (%)	0	0
Total Canopy (%)	-25.8	0
Total Subcanopy (%)	37.2	0
Total Shrub (%)	0.4	0


Coarse Woody Debris:

Total Length (m):	10.0	Total Length (m/ha):	100.0	

Ler	ngth/s (m):							
1	2.00	6	11	16	21	26	31	36
2	3.50	7	12	17	22	27	32	37
3	1.00	8	13	18	23	28	33	38
4	2.00	9	14	19	24	29	34	39
5	1.50	10	15	20	25	30	35	40

Species Lists – Trees:

Spe	cies	Other	Status	Strata
1	Casuarina glauca			C, SC
2	Ficus rubiginosa			SC, C
3	Cupaniopsis anacardioides			SC
4	Excoecaria agallocha			SC
5	Schinus terebinthifolius		Restricted -	NN-SC
6				
7				
8				
9				
10				
11				1
12				
13				
14				
15				
16				_
17				
18				
19				
20				
21				1
22				
23				
24				
25				
26				_
27				
28				
29				1
30				
31				11.
32				
33				1
34				
35				



Species List – Shrubs, Grasses, Forbs & Other and Non-Natives:

		Uther	Status	Lifeform
1 Casua	rina glauca			SHR
2 Acrost	ichum speciosum		Special least	F
3 Phrag	nites australis			G
4 Lomar	dra hystrix			F
5 Parso	nsia straminea			F
6 Ottoch	loa gracillima			G
7 Cuphe	a carthagenensis		*	F
8 Enydra	a woollsii			F
9 Salvin	a molesta		Restricted -	Non-Native
10 Cente	la asiatica			F
11 Bacop	a monnieri			F
12 Excoe	caria agallocha			SHR
13 Lygod	um microphyllum			F
14 Hypole	pis muelleri			F
15 Solani	im mauritianum		*	Non-Native
16 Schinu	is terebinthifolius		Restricted -	Non-Native
17 Senna	pendula		*	Non-Native
18 Platyc	erium bifurcatum		Special least	F
19				÷
20				
21				
22				
23			1	
24				
25				
26				
27				
28				
29			11-	
30				1
31		-		
37				1-
33				1
34		1	1	-
35				
36				1
37		-	*	*-
38				1
39			1	
40				-
41				-
47				
42			-	-
45		-		
44				-
45 Status NT	ear Threatened Wature Concernation Act 1002) V - Vulnarable	(NC Act) E - Endangerod (NC Act) * Evot	ic sporios	-



1m x 1m Quadrats:

		Native			Non-native							
Qu	adrat	Perenniai Grass	Other Grass	Forbs & Other	Shrubs	Grasses	Forbs, Other & Shrubs	Litter	Rock	Bare- ground	Crypto- grams	Total
		0	O	85	0	0	0	15	0	0	0	100%
		0	o	90	0	0	0	10	0	0	0	100%
		0	o	75	0	0	0	25	0	0	0	100%
		0	o	90	5	0	0	5	0	0	0	100%
		0	o	90	0	0	0	10	0	0	0	100%
	Mean:	0	0	86.00	1.00	0	0	13.00	0	0	0	

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Site Details:

Site Code:	BC05	Date:	29-08-2024	Time:	11:43	
Ecologist/s:	Tim Shields, Lachlan Willis					

	Start		End
Latitude:	0.10		
Longitude:			
	tion of management	12 2 20	Pompant

Transect Length (m): 100

Habitat Description:

Low lying woodland dominated by Casuarina glauca. Pockets of retained ponding water with Salvinia

General Comments:

No evidence of storm damage here. Heavy inundation resulting in reduced diversity

BioCondition Scoring Summary:

Site Based Attributes	Site BC Score	Max BC Score per Attribute for RE	
No. Large Trees	5.0	15.0	
EDL Recruitment	5.0	5.0	
Tree Height			
- Emergent	na	0	
- Canopy	5.0	5.0	
- Subcanopy	5.0	5.0	
Average	5.0	5.0	
Tree Cover	A		
- Emergent	na	0	
- Canopy	5.0	5.0	
- Subcanopy	5.0	5.0	
Average	5.0	5.0	
Shrub Cover	0	5.0	
Native Perennial Grass Cover	0	5.0	
Litter Cover	5.0	5.0	
Non-Native Plant Cover	0	10.0	
Species Richness	u .		
+ Trees	5.0	5.0	
- Shrubs	2.5	5.0	
- Grasses	2.5	5.0	
- Forbs & Other	2.5	5.0	
Coarse Woody Debris	0	5.0	
Total	37.5	80.0	

Site Photos:





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Ausecology



EDL: Canopy

% EDL Recruitment: 100.0

Site Measurements:

	Height (m)	Cover (%)
Emergent:	0	0
Canopy:	17.8	74.9
Subcanopy:	8.0	23.7
Shrub:	na	0

Large Trees:

	No. Large trees	DBH threshold (cm)
Eucalypt;	0	0
Non- Eucalypt:	11	30.0
Total No. Large Trees per site:	11	
Total No. Large Trees per ha:	22	

Species Richness:

Native Trees:	5
Native Shrubs:	2
Native Grasses:	1
Native Forbs & Other:	7
Non-Natives:	5

Non-Native	Plant	Cover	(%):
60.0		100	

Line Intercept:

Strata	Start (m)	End (m)	Total (m)	Strata	Start (m)	End (m)	Total (m
C	0	14.6	14.6	SC	95.7	96.5	0.8
SC	0	3.5	3.5				
SC-E	3.9	9.0	5.1				
SC	14.3	16.6	2.3				1
SC-E	18.6	20.2	1.6			1	1
C	20.3	26.4	6.1				1
C	31.3	32.2	0.9				
SC	37.4	39.0	1.6				
SC	42.0	43.4	1.4			1	
C	41.9	64.0	22.1			1	
SC	48.9	49.2	0.3				
SC	50.6	52.3	1.7				
SC	56.4	58.9	2.5				
SC	64.2	66.8	2.6			1	
С	65.0	71.2	6.2				
SC	71.2	73.0	1.8				
C	72.0	88.0	16.0				
SC	80.0	84.0	4.0				
SC	87.2	88.4	1.2				
С	91.0	100.0	9.0	la la companya da			

1. Contract 1. Con	Native	Non-Native
Total Emergent (%)	0	0
Total Canopy (%)	74.9	0
Total Subcanopy (%)	23.7	6.7
Total Shrub (%)	0	0



Coarse Woody Debris:

Total Length (m):	4.5	Total Length (m/ha):	45.0	
the stand of the s		and the second se		

Ler	ngth/s (m):							
1	4.50	6	11	16	21	26	31	36
2		7	12	17	22	27	32	37
3		8	13	18	23	28	33	38
4		9	14	19	24	29	34	39
5		10	15	20	25	30	35	40

Species Lists – Trees:

Spe	ecies	Other	Status	Strata
1	Casuarina glauca			C, SC
2	Acacia disparrima			SC
3	Melaleuca quinquenervia			C, SC
4	Schinus terebinthifolius		Restricted -	NN-SC
5	Ficus rubiginosa			С
6	Alphitonia excelsa			SC
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				_
17				
18				
19				
20				1
21				1
22				
23				
24				
25				
26				
27				
28				
29				1
30				
31				11.
32				
33				
34				
35				



Species List – Shrubs, Grasses, Forbs & Other and Non-Natives:

Spe	cies	Other	Status	Lifeform
1	Parsonsia straminea			F
2	Schinus terebinthifolius		Restricted -	Non-Native
3	Acrostichum speciosum		Special least	F
4	Salvinia molesta		Restricted -	Non-Native
5	Limnobium laevigatum		*	Non-Native
6	Enydra woollsii			F
7	Casuarina glauca			SHR
8	Juncus kraussii			F
9	Ipomoea cairica		*	Non-Native
10	Clematicissus opaca			F
11	Alternanthera denticulata			F
12	Phragmites australis			G
13	Bacopa monnieri			F
14	Phytolacca octandra		*	Non-Native
15	Melaleuca viminalis		- Alex	SHR
16				
17				
18				
19				1
20				
21				
22				
72				1
23				
25				-
25				
20				-
2/				
20				-
29				
30				-
31				4-
32				1
35				
34				
35				
36				
37		2		
38				-
39				
40				
41				
42				
43				
44				
45				
State	us: NT – Near Threatened (<i>Nature Conservation Act 1992</i>), V – V turn: E – Emergent, C – Canopy, SC – Subcanopy	/ulnerable (NC Act), E – Endangered (NC /	Act), * - Exotic species.	

Annualogy by stil BioConduitair é alessionni



1m x 1m Quadrats:

		Native			Non-native							
Qu	adrat	Perennial Grass	Other Grass	Forbs & Other	Shrubs	Grasses	Forbs, Other & Shrubs	Litter	Rock	Bare- ground	Crypto- grams	Total
		0	0	5	0	0	90	0	0	0	0	100%
		2	o	5	0	0	60	25	0	0	0	100%
		0	0	10	0	0	0	90	0	0	0	100%
		0	0	1	0	0	89	10	0	0	0	100%
		0	0	2	0	0	0	98	0	0	0	100%
	Mean:	0.40	0	4.60	0	0	47.80	44.60	0	0	0	

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Site Details:

Site Code:	BC06	Date:	2024-06-05	Time:	08:51	
Ecologist/s:	Nicola Praschifka, Tim Shields					

	Start		End	Transect Length (m)
Latitude:	0.10			100
Longitude:				
Convert touthad Day	in and Francisco and	12 1 1	Remnant	

Ground-truthed Regional Ecosystem: 12.1.1

Habitat Description:

Patchy, near closed casuarina glauca woodland, nearly fully inundated at the northern end. ferns and wetland species present in a moderately dense to open shrub layer and an infestation of lantana and asparagus at the south as a result of disturbance on the periphery

General Comments:

BioCondition Scoring Summary:

Dire de Scolo	Max BC Score per Attribute for RC
5.0	15.0
5.0	5.0
na	0
5.0	5.0
5.0	5.0
5.0	5.0
na	0
5.0	5.0
5.0	5.0
5.0	5.0
0	5.0
0	5.0
3.0	5.0
5.0	10.0
-3-	-
5.0	5.0
5.0	5.0
5.0	5.0
5.0	5.0
i 0	5.0
	 5.0 5.0

Site Photos:



Centre Forward

Centre Right



Centre Back

Centre Left



Ausecology



EDL: Canopy

% EDL Recruitment: 100.0

Site Measurements:

	Height (m)	Cover (%)
Emergent:	0	0
Canopy:	18.5	66.9
Subcanopy:	7.0	21.4
Shrub:	na	0

Large Trees:

	No. Large trees	DBH threshold (cm)
Eucalypt;	0	0
Non-Eucalypt:	10	29.0
Total No. Large Trees per site:	10	
Total No. Large Trees per ha:	20	

Species Richness:

Native Trees:	3
Native Shrubs:	2
Native Grasses:	3
Native Forbs & Other:	11
Non-Natives:	3

Non-Native Plant Cover ((%):
15.0	

Line Intercept:

Strata	Start (m)	End (m)	Total (m)	Strata	Start (m)	End (m)	Total (m)
C	0	5.1	5.1				
С	9.5	18.8	9.3				
C	21.4	29.7	8.3				
SC	31.2	33.2	2.0				
C	40.1	58.7	18.6				
SC	40.0	42.8	2.8				
SC	54.0	58.1	4.1				
C	61.1	63.6	2.5				
SC	65.2	66.1	0.9				
C	66.2	74.6	8.4			-	
SC-E	66.7	68.5	1.8				
SC	72.2	72.9	0.7				
SC	75.9	76.5	0.6				
SC-E	79.0	81.2	2.2				
SC	80.8	83.9	3.1				
SC-E	82.2	87.4	5.2		1		
C	85.3	100.0	14.7				
SC	89.7	96.9	7.2				
SC-E	91.3	93.5	2.2				
SC-E	96.4	100.0	3.6				

	Native	Non-Native
Total Emergent (%)	0	0
Total Canopy (%)	66.9	0
Total Subcanopy (%)	21.4	15.0
Total Shrub (%)	0	0



Coarse Woody Debris:

Total Length (m):	0	Total Length (m/ha):	0	
		and the first of a string the string has been a first of the string of t		

Length/s (m):							
1 0	6	11	16	21	26	31	36
2	7	12	17	22	27	32	37
3	8	13	18	23	28	33	38
4	9	14	19	24	29	34	39
5	10	15	20	25	30	35	40

Species Lists - Trees:

Spe	cies	Other	Status	Strata
1	Casuarina glauca			C, SC
2	Schinus terebinthifolius		Restricted -	NN-SC
3	Eucalyptus siderophloia			С
4	Melaleuca quinquenervia			SC
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				_
17				
18				
19				
20		-		
21				1
22				
23				
24				
25				
26				
27				
28				
29				
30			4	
31				11
32				
33				
34				
35				



Species List – Shrubs, Grasses, Forbs & Other and Non-Natives:

1Enydra woollsii2Centella asiatica3Acrostichum speciosum4Schinus terebinthifolius5Asparagus aethiopicus6Parsonsia straminea7Casuarina glauca8Bacopa monnieri9Alternanthera denticulata10Vincetoxicum carnosum11Phragmites australis12Hibiscus diversifolius13Paspalidium distans14Juncus kraussii15Platycerium bifurcatum16Pyrrosia rupestris17Eleocharis dulcis18Ottochloa gracillima20	Special least Restricted -	F F
2Centella asiatica3Acrostichum speciosum4Schinus terebinthifolius5Asparagus aethiopicus6Parsonsia straminea7Casuarina glauca8Bacopa monnieri9Alternanthera denticulata10Vincetoxicum carnosum11Phragmites australis12Hibiscus diversifolius13Paspalidium distans14Juncus kraussii15Platycerium bifurcatum16Pyrrosia rupestris17Eleocharis dulcis18Ottochloa gracillima20	Special least Restricted -	F
3 Acrostichum speciosum 4 Schinus terebinthifolius 5 Asparagus aethiopicus 6 Parsonsia straminea 7 Casuarina glauca 8 Bacopa monnieri 9 Alternanthera denticulata 10 Vincetoxicum carnosum 11 Phragmites australis 12 Hibiscus diversifolius 13 Paspalidium distans 14 Juncus kraussii 15 Platycerium bifurcatum 16 Pyrrosia rupestris 17 Eleocharis dulcis 18 Ottochloa gracillima 19 Salvinia molesta 20	Special least Restricted -	F
4Schinus terebinthifolius5Asparagus aethiopicus6Parsonsia straminea7Casuarina glauca8Bacopa monnieri9Alternanthera denticulata10Vincetoxicum carnosum11Phragmites australis12Hibiscus diversifolius13Paspalidium distans14Juncus kraussii15Platycerium bifurcatum16Pyrrosia rupestris17Eleocharis dulcis18Ottochloa gracillima19Salvinia molesta20	Restricted -	AL AL
5Asparagus aethiopicus6Parsonsia straminea7Casuarina glauca8Bacopa monnieri9Alternanthera denticulata10Vincetoxicum carnosum11Phragmites australis12Hibiscus diversifolius13Paspalidium distans14Juncus kraussii15Platycerium bifurcatum16Pyrrosia rupestris17Eleocharis dulcis18Ottochloa gracillima20	Destricted	Non-Native
6Parsonsia straminea7Casuarina glauca8Bacopa monnieri9Alternanthera denticulata10Vincetoxicum carnosum11Phragmites australis12Hibiscus diversifolius13Paspalidium distans14Juncus kraussii15Platycerium bifurcatum16Pyrrosia rupestris17Eleocharis dulcis18Ottochloa gracillima20	Restricted -	Non-Native
7Casuarina glauca8Bacopa monnieri9Alternanthera denticulata10Vincetoxicum carnosum11Phragmites australis12Hibiscus diversifolius13Paspalidium distans14Juncus kraussii15Platycerium bifurcatum16Pyrrosia rupestris17Eleocharis dulcis18Ottochloa gracillima19Salvinia molesta20		F
8Bacopa monnieriImage: second s		SHR
9Alternanthera denticulata10Vincetoxicum carnosum11Phragmites australis12Hibiscus diversifolius13Paspalidium distans14Juncus kraussii15Platycerium bifurcatum16Pyrrosia rupestris17Eleocharis dulcis18Ottochloa gracillima20		F
10Vincetoxicum carnosumIIIPhragmites australisIII11Phragmites australisIII12Hibiscus diversifoliusIIII13Paspalidium distansIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII		F
11Phragmites australisI12Hibiscus diversifoliusI13Paspalidium distansI14Juncus kraussiiI15Platycerium bifurcatumI16Pyrrosia rupestrisI17Eleocharis dulcisI18Ottochloa gracillimaI20II21II22II23II24II25II26II27II		F
12Hibiscus diversifolius13Paspalidium distans14Juncus kraussii15Platycerium bifurcatum16Pyrrosia rupestris17Eleocharis dulcis18Ottochloa gracillima19Salvinia molesta20		G
13Paspalidium distansI14Juncus kraussiiI15Platycerium bifurcatumI16Pyrrosia rupestrisI17Eleocharis dulcisI18Ottochloa gracillimaI19Salvinia molestaI20II21II22II23II24II25II26II27II		SHR
14Juncus kraussii15Platycerium bifurcatum16Pyrrosia rupestris17Eleocharis dulcis18Ottochloa gracillima19Salvinia molesta2021222324252627		G
15Platycerium bifurcatum16Pyrrosia rupestris17Eleocharis dulcis18Ottochloa gracillima19Salvinia molesta20		F
16 Pyrrosia rupestris 17 Eleocharis dulcis 18 Ottochloa gracillima 19 Salvinia molesta 20	Special least	F
17 Eleocharis dulcis 18 Ottochloa gracillima 19 Salvinia molesta 20	Special least	F
18 Ottochloa gracillima 19 Salvinia molesta 20		F
19 Salvinia molesta 20		G
20	Restricted -	Non-Native
21		
22 23 24 25 26 27		
23 24 25 26 27		
24 25 26 27		
25 26 27		
26 27		
27		
28		
29		
30		
31		
32		1
33		1
34		-
35		
36		1
37		-
38		1
39		
40		
41		-
42		-
43		1
44		
45		
Status: NT – Near Threatened (Nature Conservation Act 1992), V – Vulnerable (NC Act), E – Er	idangered (NC Act), * - Exotic species.	-



1m x 1m Quadrats:

			Na	tive		Non-	native					
Qu	adrat	Perennial Grass	Other Grass	Forbs & Other	Shrubs	Grasses	Forbs, Other & Shrubs	Litter	Rock	Bare- ground	Crypto- grams	Total
		0	0	45	0	0	0	55	0	0	0	100%
		0	o	60	0	0	0	40	0	0	0	100%
		0	o	4	3	0	0	93	0	0	0	100%
		0	o	0	0	0	0	100	0	0	0	100%
		7	0	0	0	0	45	48	0	0	0	100%
	Mean:	1.40	o	21.80	0.60	0	9.00	67.20	0	0	0	

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Site Details:

Site Code:	BC07	Date:	2024-06-27	Time:	12:00	
Ecologist/s:	Tim Shields, Lachlan Willis					

	Start		End	Transect Length (m):
Latitude:	0.10			50
Longitude:				
Ground-truthed Reg	gional Ecosystem:	12.3.20	Remnant	

Ground-truthed Regional Ecosystem:

Remnant

Habitat Description:

Swamp oak TEC with dense patches of Mangrove fern and some inundated pools. Some areas where trees have been knocked over in storm damage. Will likely lead to reduced canopy cover. Transect start point very close to pedestrian footpath.

General Comments:

BioCondition Scoring Summary:

5.0 5.0 na	15.0 5.0	
5.0 na	5.0	
na		
na		
	0	
5.0	5.0	
5.0	5.0	
5.0	5.0	
na	0	
5.0	5.0	
0	5.0	
2.5	5.0	
0	5.0	
5.0	5.0	
5.0	5.0	
5.0	10.0	
2.5	5.0	
5.0	5.0	
5.0	5.0	
5.0	5.0	
0	5.0	
	5.0 5.0 na 5.0 0 2.5 0 5.0 5.0 5.0 5.0 5.0 5.0 5.0	



Site Photos:



Centre Forward

Centre Right



Centre Back

Centre Left





Site Measurements:

	Height (m)	Cover (%)
Emergent:	0	0
Canopy:	19.8	64.0
Subcanopy:	8.0	0
Shrub:	na	0

EDL: Canopy % EDL Recruitment: 100.0

Large Trees:

	No. Large trees	DBH threshold (cm)		
Eucalypt;	0	0		
Non-Eucalypt:	9	30.0		
Total No. Large Trees per site:	9			
Total No. Large Trees per ha:	18			

Species Richness:

Native Trees:	3
Native Shrubs:	5
Native Grasses:	3
Native Forbs & Other:	15
Non-Natives:	7

Non-Native Pla	nt Cover (%):
5.0	0.000

Line Intercept:

Strata	Start (m)	End (m)	Total (m)	Strata	Start (m)	End (m)	Total (m)
C	0	4.8	4.8				
SHR-E	7.9	8.4	0.5				
C	10.5	13.6	3.1				
C	17.0	27.1	10.1				
C	27.3	41.3	14.0				
		_					
	_						
_	-	-	-				-
			-				
	-		-		-		
	-		-		-		
		-			-		
			-		-		-
	-	1	-				-
	-	-	-	-	-		

E – Emergent, E-E – Emergent Exotic, C – Canopy, C-E – Canopy Exotic, SC – Subcanopy, SC-E – Subcanopy Exotic, SHR – Shrub, SHR-E – Shrub Exotic

	Native	Non-Native
Total Emergent (%)	0	0
Total Canopy (%)	64.0	0
Total Subcanopy (%)	0	0
Total Shrub (%)	0	1.0



Coarse Woody Debris:

Total Length (m):	0	Total Length (m/ha):	0	

Length/s (m):							
1 0	6	11	16	21	26	31	36
2	7	12	17	22	27	32	37
3	8	13	18	23	28	33	38
4	9	14	19	24	29	34	39
5	10	15	20	25	30	35	40

Species Lists – Trees:

spe	icies	Other	Status	Strata
1	Casuarina glauca			C, SC
2	Melaleuca quinquenervia			C, SC
3	Aegiceras corniculatum			С
4				
5				
6				
7				
8				
9				
10				
11	110			
12				
13				
14				
15				
16				
17				1
18				
19				
20				
21				
22				
23				1.
24		1		
25				
26				
27				
28				
29				
30			-	
31				
32				
33				
34				
35		the second s		



Species List – Shrubs, Grasses, Forbs & Other and Non-Natives:

Spe	cies	Other	Status	Lifeform
1	Parsonsia straminea			F
2	Casuarina glauca			SHR
3	Solanum seaforthianum		*	Non-Native
4	Ipomoea cairica		*	Non-Native
5	Senna pendula		*	Non-Native
6	Paspalidium distans			G
7	Acrostichum speciosum		Special least	F
8	Ottochloa gracillima			G
9	Schinus terebinthifolius		Restricted -	Non-Native
10	Passiflora pallida		*	Non-Native
11	Cyperus eragrostis		1	G
12	Glochidion ferdinandi			SHR
13	Phragmites australis			G
14	Vincetoxicum carnosum			F
15	Acrostichum speciosum		Special least	SHR
16	Enydra woollsii			F
17	Macaranga tanarius			SHR
18	Stephania japonica			F
19	Cupaniopsis anacardioides			SHR
20	Lepidium sp.		*	Non-Native
21	Bacopa monnieri			F
22	Commelina diffusa			F
23	Asplenium australasicum			F
24	Persicaria strigosa			F
25	Sphaeropteris cooperi			F
26	Pyrrosia rupestris		Special least	F
27	Vigna marina			F
28	Eleocharis dulcis			F
29	Platycerium bifurcatum		Special least	F
30	Hibiscus diversifolius			F
31				
32			1	
33				
34				
35				
36				1
37				
38				
39				
40				
41		-		1
42				
43				
44				
45				
State	s; NT – Near Threatened (Nature Conservation Act 1992). V – Vi	ulnerable (NC Act), E – Endangered (NC	Act), * - Exotic species.	1



1m x 1m Quadrats:

		Native			Non-native							
Qu	adrat	Perenniai Grass	Other Grass	Forbs & Other	Shrubs	Grasses	Forbs, Other & Shrubs	Litter	Rock	Bare- ground	Crypto- grams	Total
		93	0	2	0	0	0	5	0	0	0	100%
		0	o	75	0	0	0	25	0	0	0	100%
		25	o	10	0	0	3	62	0	0	0	100%
		5	o	85	0	0	0	10	0	0	0	100%
		20	0	70	0	0	0	0	10	0	0	100%
	Mean:	28.60	þ	48.40	0	0	0.60	20.40	2.00	0	0	

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Site Details:

Site Code:	BC08	Date:	2024-06-27	Time:	10:08	
Ecologist/s:	Lachlan Willis, Tim Shields					

	Start		End	Transect Length (m):
Latitude:				90
Longitude:				
Ground-truthed Re	gional Ecosystem:	12.1.1	Remnant	

Habitat Description:

Swamp oak TEC with dense patches of Mangrove fern and some inundated pools. Some areas where trees have been knocked over in storm damage. Will likely lead to reduced canopy cover

General Comments:

Area of storm damage mapped in field maps

BioCondition Scoring Summary:

Site Based Attributes	Site BC Score	Max BC Score per Attribute for RE
No. Large Trees	5.0	15.0
EDL Recruitment	5.0	5.0
Tree Height		
- Emergent	na	0
- Canopy	5.0	5.0
 Subcanopy 	5.0	5.0
Average	5.0	5.0
Tree Cover		
- Emergent	na	0
- Canopy	5.0	5.0
- Subcanopy	5.0	5.0
Average	5.0	5.0
Shrub Cover	0	5.0
Native Perennial Grass Cover	0	5.0
Litter Cover	3.0	5.0
Non-Native Plant Cover	0	10.0
Species Richness		
+ Trees	5.0	5.0
- Shrubs	0	5.0
- Grasses	2.5	5.0
- Forbs & Other	5.0	5.0
Coarse Woody Debris	0	5.0
Total	35.5	80.0



Site Photos:





 Centre Back
 Centre Left



Site Measurements:

	Height (m)	Cover (%)
Emergent:	0	0
Canopy:	18.2	54.1
Subcanopy:	7.0	19.6
Shrub:	na	0

EDL: Canopy % EDL Recruitment: 100.0

Large Trees:

	No. Large trees	DBH threshold (cm)
Eucalypt;	0	0
Non-Eucalypt:	16	29.0
Total No. Large Trees per site:	16	
Total No. Large Trees per ha:	32	

Species Richness:

Native Trees:	4
Native Shrubs:	0
Native Grasses:	1
Native Forbs & Other:	5
Non-Natives:	11

Non-Native	Plant Cover (%):
60.0	

Line Intercept:

Strata	Start (m)	End (m)	Total (m)	Strata	Start (m)	End (m)	Total (m)
С	0	3.6	3.6				
с	36.0	48.4	12.4				
SC	43.8	46.9	3.1				
C	49.0	53.0	4.0				
SC-E	49.4	51.0	1.6				
SC-E	51.7	56.0	4.3				
C	54.0	68.7	14.7				
SC	55.3	57.5	2.2				
SHR-E	59.1	60.5	1.4				
SC	70.0	78.3	8.3				
C	76.0	90.0	14.0				
SC	80.6	81.7	1.1				
SC	83.2	84.6	1.4				
SC	87.0	88.5	1.5				
	-						
			-		-		-
	-	-	-	-	-		
					-		
					-		1

E – Emergent, E-E – Emergent Exotic, C – Canopy, C-E – Canopy Exotic, SC – Subcanopy, SC-E – Subcanopy Exotic, SHR – Shrub, SHR-E – Shrub Exotic

	Native	Non-Native
Total Emergent (%)	0	0
Total Canopy (%)	54.1	0
Total Subcanopy (%)	19.6	6.6
Total Shrub (%)	0	1.6



Coarse Woody Debris:

Total Length (m):	0	Total Length (m/ha):	0	
		teres senger (mythe).		

Length/s (m):							
1 0	6	11	16	21	26	31	36
2	7	12	17	22	27	32	37
3	8	13	18	23	28	33	38
4	9	14	19	24	29	34	39
5	10	15	20	25	30	35	40

Species Lists – Trees:

Spe	acles	Other	Status	Strata
1	Casuarina glauca			C, SC
2	Aegiceras corniculatum			С
3	Melaleuca quinquenervia			С
4	Schinus terebinthifolius		Restricted -	NN-SC
5	Leucaena leucocephala		*	NN-SC
6	Acacia disparrima			OTH
7				
8				
9				
10				
11				1
12	a second se			
13				
14				
15				
16				_
17				
18				
19				
20				1
21				1
22	· · · · · · · · · · · · · · · · · · ·			
23				
24				
25				
26				
27				
28				1
29				
30				
31				1
32				
33				
34				
35		7.1.1.1		



Species List – Shrubs, Grasses, Forbs & Other and Non-Natives:

Spe	cies	Other	Status	Lifeform
1	Senna pendula		*	Non-Native
2	Ageratum houstonianum		*	Non-Native
3	Parsonsia straminea			F
4	Ipomoea cairica		*	Non-Native
5	Acrostichum speciosum		Special least	F
6	Bacopa monnieri	-		F
7	Cyperus eragrostis		*	Non-Native
8	Sphagneticola trilobata		Restricted -	Non-Native
9	Hypolepis muelleri			F
10	Pyrrosia rupestris		Special least	F
11	Schinus terebinthifolius		*	Non-Native
12	Solanum mauritianum		*	Non-Native
13	Solanum seaforthianum		*	Non-Native
14	Euphorbia heterophylla		*	Non-Native
15	Lantana camara		Restricted -	Non-Native
16	Chloris gayana		*	Non-Native
17	Ottochloa gracillima			G
18				
19				Î
20				1
21				
22				
23				
24				
25				
26				
27				
28				
29				
30				
31				
32				-
33				1
34				-
35				
36				1
37	1			-
38				1
39				1
40				
41	1	-		-
47				-
42				-
44				
44			-	
45	w NT - Next Threatened (Wature Concernation Art 1992) V -	Wilson bla (NC Act) E Endermond (NC A	at & Funtle consider	



1m x 1m Quadrats:

			Na	tive		Non-	native					
Qu	adrat	Perenniai Grass	Other Grass	Forbs & Other	Shrubs	Grasses	Forbs, Other & Shrubs	Litter	Rock	Bare- ground	Crypto- grams	Total
		0	0	15	0	0	0	80	0	5	0	100%
		0	O	70	0	0	30	0	0	0	0	100%
		0	o	5	0	0	85	10	0	0	0	100%
		0	o	0	0	0	90	10	0	0	0	100%
		0	0	0	0	0	95	5	0	0	0	100%
	Mean:	0	þ	18.00	0	0	60.00	21.00	0	1.00	0	1

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Site Details:

Site Code:	BC09	Date:	2024-06-27	Time:	14:28	
Ecologist/s:	Tim Shields, Lachlan Willis					

	Start		End	Tra
Latitude:	20.0			100
Longitude:				
Ground-truthed Region	al Ecosystem:	12.3.20	Remnant	

Transect Length (m):

Habitat Description:

Lower bank of creek with Casuarina glauca. Scattered Eucalyptus tereticornis, Eucalyptus siderophloia. Ground cover is almost monoculture Singapore daisy

General Comments:

BioCondition Scoring Summary:

Site Based Attributes	Site BC Score	Max BC Score per Attribute for RE	
No. Large Trees	5.0	15.0	
EDL Recruitment	5.0	5.0	
Tree Height			
- Emergent	na	0	
- Canopy	5.0	5.0	
- Subcanopy	5.0	5.0	
Average	5.0	5.0	
Tree Cover			
- Emergent	na	0	
- Canopy	5.0	5.0	
- Subcanopy	5.0	5.0	
Average	5.0	5.0	
Shrub Cover	0	5.0	
Native Perennial Grass Cover	0	5.0	
Litter Cover	5.0	5.0	
Non-Native Plant Cover	0	10.0	
Species Richness			
+ Trees	5.0	5.0	
- Shrubs	5.0	5.0	
- Grasses	5.0	5.0	
- Forbs & Other	2.5	5.0	
Coarse Woody Debris	0	5.0	
Total	42.5	80.0	

Ausecology







EDL: Canopy

% EDL Recruitment: 100.0

Site Measurements:

	Height (m)	Cover (%)
Emergent:	0	0
Canopy:	14.2	91.2
Subcanopy:	8.0	36.3
Shrub:	na	0

Large Trees:

No. Large trees	DBH threshold (cm)
0	0
9	30.0
9	
18	
	No. Large trees 0 9 9 18

Species Richness:

Native Trees:	8
Native Shrubs:	7
Native Grasses:	2
Native Forbs & Other:	7
Non-Natives:	14

Non-Native Plan	t Cover (%):
77.0	

Line Intercept:

Strata	Start (m)	End (m)	Total (m)	Strata	Start (m)	End (m)	Total (m)
С	0	12.4	12.4				
SC	9.6	11.4	1.8				
C	15.2	25.7	10.5				
SC	18.6	21.3	2.7				
SC-E	20.3	20.8	0.5				
C	26.8	72.0	45.2				
SC	31.0	31.5	0.5				
SC	35.7	36.9	1.2				
SC-E	47.6	50.3	2.7				
SC	48.3	49.5	1.2				
SC	53.5	55.5	2.0				
SC	59.0	60.8	1.8				
SC	61.7	64.0	2.3				
SC	66.7	87.3	20.6				
C	75.0	81.4	6.4				
C	81.9	90.0	8.1		1		
C	91.4	100.0	8.6			1	
SC	97.4	99.6	2.2				
				his mental data			

E – Emergent, E-E – Emergent Exotic, C – Canopy, C-E – Canopy Exotic, SC – Subcanopy, SC-E – Subcanopy Exotic, SHR – Shrub, SHR-E – Shrub Exotic

	Native	Non-Native
Total Emergent (%)	0	0
Total Canopy (%)	91.2	0
Total Subcanopy (%)	36.3	3.2
Total Shrub (%)	0	0



Coarse Woody Debris:

Total Length (m):	0	Total Length (m/ha):	0	

Length/s (m):							
1 0	6	11	16	21	26	31	36
2	7	12	17	22	27	32	37
3	8	13	18	23	28	33	38
4	9	14	19	24	29	34	39
5	10	15	20	25	30	35	40

Species Lists – Trees:

she		other	Status	Juara
1	Eucalyptus tereticornis			С
2	Eucalyptus siderophloia			С
3	Casuarina glauca			C, SC
4	Aegiceras corniculatum			С
5	Schinus terebinthifolius		Restricted -	NN-SC
6	Duranta erecta		*	NN-SC
7	Syagrus romanzoffiana		*	NN-OTH
8	Ligustrum lucidum		Restricted -	NN-SC
9	Melaleuca quinquenervia			C, SC
10	Heptapleurum actinophyllum			SC
11	Alphitonia excelsa			SC
12	Cryptocarya triplinervis var. pubens			SC
13				
14				
15				
16				
17				
18				
19				
20				
21				1
22		1		
23				
24				
25				
26				
27			.*.	
28			1	-
29				
30		1		
31				1
32				1
33				
34				
35				



Species List – Shrubs, Grasses, Forbs & Other and Non-Natives:

Spe	cles	Other	Status	Lifeform
1	Solanum seaforthianum		*	Non-Native
2	Sphagneticola trilobata		Restricted -	Non-Native
3	Passiflora foetida		*	Non-Native
4	Passiflora suberosa		*	Non-Native
5	Ligustrum lucidum		Restricted -	Non-Native
6	Casuarina glauca			SHR
7	Causonis clematidea			F
8	Lantana camara		Restricted -	Non-Native
9	Ageratum houstonianum		*	Non-Native
10	Geitonoplesium cymosum			F
11	Macaranga tanarius		*	SHR
12	Murraya sp.		*	Non-Native
13	Melaleuca salicina			SHR
14	Asparagus aethiopicus		Restricted -	Non-Native
15	Eustrephus latifolius			F
16	Solanum torvum		*	Non-Native
17	Solanum americanum		*	Non-Native
18	Cupaniopsis anacardioides			SHR
19	Aegiceras corniculatum			SHR
20	Ludwigia octovalvis			F
21	Paspalidium distans			G
22	Gomphocarpus physocarpus		*	Non-Native
23	Acacia disparrima			SHR
24	Alphitonia excelsa			SHR
25	Dockrillia linguiformis		Special least	F
26	Clematicissus opaca			F
27	Ottochloa gracillima		1	G
28	Crassocephalum crepidioides		*	Non-Native
29	Passiflora subpeltata		*	Non-Native
30	Parsonsia straminea			F
31				
32		-		-
33				1
34				-
35				
36				1
37	1	-		-
38				1
39		1		
40				
41		-		-
47		-	1	-
42				-
45		-		
44				
45	us: NT - Near Threatened (Mature Concernation Act 1992) V - Vulner	ble (NC Act) E - Endangered (NC)	Act) *- Exotic species	



1m x 1m Quadrats:

			Na	tive		Non-	native					
Qu	adrat	Perenniai Grass	Other Grass	Forbs & Other	Shrubs	Grasses	Forbs, Other & Shrubs	Litter	Rock	Bare- ground	Crypto- grams	Total
		0	0	0	0	0	95	5	0	0	0	100%
		0	2	0	0	0	93	5	0	0	0	100%
		0	3	0	0	0	10	87	0	0	0	100%
		0	0	0	0	0	95	5	0	0	0	100%
		0	0	0	0	0	95	5	0	0	0	100%
	Mean:	0	1.00	0	0	0	77.60	21.40	0	0	0	

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Site Details:

Site Code:	BC10	Date:	29-08-2024	Time:	08:49	
Ecologist/s:	Lachlan Willis, Tim Shields					

	Start		End	Transect Length (m):
Latitude:	0.00			100
Longitude:				
Ground-truthed Reg	gional Ecosystem:	12.1.1	Remnant	

Habitat Description:	
Dense casuarina glauca forest with an understory of melaleuca and acacia Spp. Ground layer is dominated by thick pine needle leaf litter with scattered lomandra hystrix and ottochloa gracilima.	

General Comments:

BioCondition Scoring Summary:

Site Based Attributes	Site BC Score	Max BC Score per Attribute for RE
No. Large Trees	5.0	15.0
EDL Recruitment	5.0	5.0
Tree Height		
- Emergent	na	0
- Canopy	5.0	5.0
 Subcanopy 	5.0	5.0
Average	5.0	5.0
Tree Cover		
- Emergent	na	0
- Canopy	5.0	5.0
- Subcanopy	2.0	5.0
Average	3.5	5.0
Shrub Cover	5.0	5.0
Native Perennial Grass Cover	0	5.0
Litter Cover	3.0	5.0
Non-Native Plant Cover	5.0	10.0
Species Richness	9- 	
+ Trees	5.0	5.0
- Shrubs	5.0	5.0
- Grasses	5.0	5.0
- Forbs & Other	5.0	5.0
Coarse Woody Debris	2.0	5.0
Total	53.5	80.0

Ausecology

Site Photos:





EDL: Canopy

% EDL Recruitment: 100.0

Site Measurements:

	Height (m)	Cover (%)
Emergent:	0	0
Canopy:	13.7	44.4
Subcanopy:	7.0	6.8
Shrub:	na	7.2

Large Trees:

	No. Large trees	DBH threshold (cm)
Eucalypt;	0	0
Non-Eucalypt:	4	29.0
Total No. Large Trees per site:	4	
Total No. Large Trees per ha:	8	

Species Richness:

Native Trees:	7
Native Shrubs:	8
Native Grasses:	2
Native Forbs & Other:	12
Non-Natives:	16

Non-Native	Plant Cover (%):
5.0	200 AP 0 0 4

Line Intercept:

Strata	Start (m)	End (m)	Total (m)	Strata	Start (m)	End (m)	Total (m)
C	0	2.6	2.6	SHR	45.5	45.6	0.1
SC	0	4.4	4.4	SC	49.8	50.0	0.2
SHR	0.6	1.6	1.0	SHR	49.7	49.9	0.2
C	4.5	16.0	11.5				1
SHR	4.9	5.1	0.2			1	
SC	7.5	8.0	0.5				
SHR	9.4	10.3	0.9				
SHR	11.2	12.2	1.0				
SHR	12.5	13.0	0.5				
SC-E	13.8	16.7	2.9	1	1	1	
C	17.8	33.8	16.0				
SHR	17.6	17.8	0.2				
SHR	19.3	19.7	0.4				
SHR	25.2	25.5	0.3				
SHR	27.1	27.7	0.6				
SHR	32.5	33.1	0.6				
SHR	33.6	34.5	0.9				0
C	35.7	50.0	14.3		1		
SC	37.1	38.8	1.7				
SHR	38.2	38.5	0.3				1

	Native	Non-Native
Total Emergent (%)	0	0
Total Canopy (%)	44.4	0
Total Subcanopy (%)	6.8	2.9
Total Shrub (%)	7.2	0


Coarse Woody Debris:

Total Length (m):	9.5	Total Length (m/ha):	95.0	
The stand stand of the stand of the stand		the second se		

Length/s (m):								
1	3.00	6	11	16	21	26	31	36
2	1.00	7	12	17	22	27	32	37
3	4.00	8	13	18	23	28	33	38
4	1.50	9	14	19	24	29	34	39
5		10	15	20	25	30	35	40

Species Lists - Trees:

Spe	ecies	Other	Status	Strata	
1	Casuarina glauca			C, SC, OTH	
2	Eucalyptus major			OTH, SC	
3	Cupaniopsis anacardioides			OTH	
4	Melaleuca viminalis			SC	
5	Acacia disparrima			SC, OTH	
6	Melaleuca quinquenervia			С	
7	Alphitonia excelsa	2 mm		SC	
8	Schinus terebinthifolius		Restricted -	NN-SC	
9					
10					
11				1	
12	1 mm				
13				1.	
14					
15		-			
16					
17					
18					
19					
20				1	
21					
22					
23					
24					
25					
26		1			
27					
28				1	
29					
30					
31				1	
32					
33					
34					
35					



Species List – Shrubs, Grasses, Forbs & Other and Non-Natives:

Spe	cies	Other	Status	Lifeform
1	Bidens pilosa		*	Non-Native
2	Urena lobata		*	Non-Native
3	Glycine tabacina			F
4	Parsonsia straminea			F
5	Oxalis sp.			F
6	Casuarina glauca			SHR
7	Solanum seaforthianum		*	Non-Native
8	Ageratum houstonianum		*	Non-Native
9	Cuphea carthagenensis		*	Non-Native
10	Paspalidium distans			G
11	Eucalyptus major			Non-Native
12	Cyperus difformis			F
13	Senna pendula var. glabrata		*	Non-Native
14	Sphaeromorphaea australis	_		F
15	Centella asiatica			F
16	Maclura cochinchinensis			F
17	Schinus terebinthifolius		Restricted -	Non-Native
18	Cupaniopsis anacardioides			SHR
19	Ottochloa gracillima			G
20	Other species	Forb sp		F
21	Bryophyllum delagoense		Restricted -	Non-Native
22	Callisia repens		*	Non-Native
23	Sonchus oleraceus		*	Non-Native
24	Pseuderanthemum variabile			F
25	Sida rhombifolia		*	Non-Native
26	Clematicissus opaca			F
27	Trema tomentosa			SHR
28	Melaleuca guinguenervia			SHR
29	Dianella brevinedunculata			F
30	Asparaçus africanus		Restricted -	Non-Native
31	Glochidion ferdinandi			SHR
37	Lomandra hystrix			F
22	Convmbia torelliana			Non-Native
24	Passiflora suberosa		*	Non-Native
34	Acacia fimbriata			SHR
35	Macaranga tanarius			SHR
27	Sphagnaticala trilabata		Postrictod	Non Nativo
37	Phytolacca octandra		*	Non-Native
20		-		INOIT-INAUVE
39				-
40				-
41				-
42				-
43				-
44				
45	in the second	a second and a second second second		

Annualogy by stil BlaConduitait é ileastraint



1m x 1m Quadrats:

	adrat	Native			Non-native							
Qu		Perennial Grass	Other Grass	Forbs & Other	Shrubs	Grasses	Forbs, Other & Shrubs	Litter	Rock	Bare- ground	Crypto- grams	Total
		0	0	0	30	0	0	70	0	0	0	100%
		2	o	0	0	0	0	98	0	0	0	100%
		0	o	0	0	0	0	100	0	0	0	100%
		10	o	0	15	0	0	75	0	0	0	100%
		0	o	45	10	0	0	45	0	0	0	100%
	Mean:	2.40	þ	9.00	11.00	0	0	77.60	0	0	0	

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9. Appendix F: Annual Offset Area Report 22nd August 2024 to 17th March 2025

Refer to Appendix F Annual Offset Area Report.