ANNUAL HABITAT MONITORING REPORT

Birrigan Iluka Beach, Iluka
Lot 99 on DP823635 (Parent Lot)

A Report Prepared for
The Stevens Group

DECEMBER 2023

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Client Issue

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		Name	Initials	Name	Initials
RW1	24/11/23	Nicole Davies	ND	Adam McArthur	AM
RW2	07/12/23	Nicole Davies	ND	Adam McArthur	AM

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1 INTRODUCTION

1.1 Background

JWA Pty Ltd (JWA) have been engaged by The Stevens Group to prepare an Annual Habitat Monitoring report for the Birrigan Iluka Beach development site, located at Hickey Street, Iluka - originally described as Lot 99 on DP823635 (parent lot). This lot has been subdivided into Lot 1, Lot 2 and Lot 3 DP271283. The Birrigan Iluka Beach development is an approved 141 lot community scheme subdivision over the subject land (**FIGURES 1 & 2**). The subdivision incorporates 140 residential allotments and one (1) Community Property allotment (now Lot 1 DP271283) containing retained bushland. The Community Property Lot will be owned and maintained by the Birrigan Iluka Beach Association.

JWA previously prepared a Habitat Management Plan (HMP) (JWA 2020a) as required by EPBC Act approval (2017/8003) which included an amelioration strategy designed to minimise the impacts on fauna during both the construction and operational phases, undertake nature regeneration/revegetation works and to ensure that ecological processes and corridor function within the identified rehabilitation areas are protected and amplified. The HMP was subsequently approved by Minster for the Environment on the 3rd August 2020.

As part of the amelioration strategy, an ongoing monitoring program was established to meet the conditions of the Clarence Valley Council (CVC) and Commonwealth Department of Environment and Energy (DEE) approvals. The ongoing monitoring program includes:

- Fauna management;
- Nest boxes;
- Retained habitat/rehabilitation;
- Subdivision infrastructure construction by Contractor; and
- Operational management by the Association.

A separate Koala Monitoring and Reporting Program has been prepared in accordance with Condition 4f of the EPBC Act approval (2017/8003). Some of the fauna management procedures during vegetation clearing are also relevant to the koala, and this is noted where applicable.

This report details the methodology and results from the 3rd annual habitat monitoring program.

1.2 Project Status

The following provides an update on the key milestones and current status of the Birrigan Iluka Beach development.

- The project received approval under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) on 22nd March 2019 (EPBC Act Ref 2017/8003).

PROJECT:
ILUKA
LOT 99 ON DP 823635

LOCATION:
ILUKA ROAD, ELIZABETH, RIVERVIEW AND HICKEY STREETS
ILUKA, NSW, 2466

DEVELOPMENT CHARACTERISTICS	
ITEM	DESCRIPTION
PROPERTY DESCRIPTION	LOT 99 DP823635
AREA OF LOT 99	19.41 ha.
TOTAL NUMBER OF LOTS	141
PART LOT 1 (Approx.)	5.29 ha.

CLARENCE VALLEY COUNCIL
APPROVAL

This is the plan referred to in Council's Notice of Determination of SUB2015/0034

Date: 13/11/2019

BIKE / PATHWAY CONNECTION TO ILUKA ROAD
- BIKE LANE SITUATED ON THE NORTH EASTERN SIDE OF THE ILUKA ROAD INTERSECTION WITH HICKEY STREET AND TO PROVIDE A REFUGE ISLAND ON ILUKA ROAD

LOT 93 DP 1105124
LOT 64 DP 41701
LOT 7020 DP 1114873
LOT 971 DP 876936
LOT 972 DP 876936
LOT 18 DP 243136
LOT 7019 DP 1114862
LOT 7018 DP 1115127

New Bushfire Trail Connection

HICKEY STREET
ILUKA ROAD
RIVERVIEW STREET (UNFORMED PORTION)
STREET 1
STREET 2
STREET 3
STREET 4
STREET 5
STREET 6
STREET 7
STREET 8
AWAY 3

PART LOT 1 (PARK B)
PART LOT 1 (PARK D)
PART LOT 1 (PARK A)
PART LOT 1 (PARK C)
PART LOT 1 (PARK F)
PART LOT 1 (PARK E)

bike / pathway
16m (reserve)
25m (reserve)
35m

Emergency Access Only
MICALO STREET
BIKE / PATHWAY CONNECTION TO MICALO STREET
ELIZABETH STREET
MAINTAIN EXISTING BUSHFIRE TRAIL ACCESS TO ILUKA ROAD
REALIGN EXISTING BUSHFIRE TRAIL

STREETS FOR LIVING - CHARACTERISTICS				
STREET	RESERVE WIDTH (m)	VERGE WIDTH (m)	TOTAL SEAL WIDTH (m)	CUL DE SAC DIAMETER (m)
HICKEY STREET	30 EXISTING	VARIES	8	-
1	20	6	8	30 outer, 15 inner
2	20 (*1)	6 (*1)	8	-
3	25	6 (*2)	8	20
4, 6, 7	20	6	8	-
5, 8	20	6	8	20
AWAY 3	VARIES	3.5 (*3)	4	-

PURPOSE OF STREET CORRIDORS
- STREET FOR LIVING
- WATER SENSITIVE URBAN DESIGN CORRIDOR
- INFRASTRUCTURE CORRIDOR
- FAUNA / FLORA CORRIDOR

AWAY - MEANS ACCESS WAY

NOTES:
(* 1) - RESERVE WIDTH INCREASED TO 25m (AND VERGE OF 11m) TO ACCOMMODATE WSUD TREATMENT WITHIN RESERVE ON PARK SIDE OF STREET 2
- VERGE REDUCES TO 2m ON PARKSIDE FOR NORTHERN PART OF STREET 2 WHERE DETENTION / WSUD NOT REQUIRED. EXISTING RESERVE WIDTH APPROX. 30m FOR NORTHERN SECTION WHERE STREET 2 IS ACCOMMODATED WITHIN EXISTING HICKEY STREET RESERVE
(* 2) - VERGE WIDTH INCREASED TO 11m ON PARKSIDE TO ACCOMMODATE WSUD TREATMENT
(* 3) - ON SIDE WITH LOT ACCESS ONLY - REDUCED / VARIED VERGE WIDTH ON NON-ACCESS SIDE

TYPICAL ALLOTMENT ATTRIBUTES		
AREA (m2)	WIDTH (m)	LENGTH (m)
>400	13-14	30-35
500	14	35
600	17.5	35
700	19	37

NOTES:
1. **These notes form part of this plan.**
2. **Boundaries identified by plan dimensions only, the boundaries have not been surveyed.**
3. **Adjoining property boundary boundaries may not be complete, a summary of compiled DCDB only.**
4. **The dimensions, bearings, areas and number of allotments shown on this plan are subject to field survey and approval of relevant Government Authorities having jurisdiction over statutory requirements pursuant to any relevant legislation.**
5. **The information for this plan has been prepared for the purpose of a Development Approval for Subdivision and should not be used for any other purpose.**
6. **This plan has been prepared for the Stevens Group.**
7. **Do not scale from this plan.**

note: the layout is preliminary only and subject to detailed engineering and surveying input. all dimensions and areas are indicative only.

Scale 1 : 2500 - Lengths in metres

20 0 20 40 60 80 100

SOURCE: OneCollective - Masterplan (191113 CVC Approved Plans - Extract.pdf)

SCALE: 1 : 2500 @ A3

JWA PTY LTD
Ecological Consultants

CLIENT
Ocean Park Consulting Pty Ltd

PROJECT
Annual Koala Monitoring Report
Birrigan Estate
Lot 99 on DP823635, Hickey Street, Iluka NSW
Clarence Valley Council LGA

FIGURE 1

PREPARED: BW
DATE: 08 September 2021
FILE: N202001_SAT_20210908.dwg

TITLE
APPROVED MASTER PLAN

LEGEND

Site Boundary

Scale 1:20 000 - Lengths in metres

200 0 200 400 600 800 1000

SOURCE: Open Street Maps

SCALE: 1 : 20 000 @ A3

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Annual Koala Monitoring Report
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Lot 99 on DP823635, Hickey Street, Iluka NSW
Clarence Valley Council LGA

FIGURE 2

PREPARED: BW
DATE: 08 September 2021
FILE: N202001_SAT_20210908.dwg

TITLE

LOCALITY PLAN

- Clarence Valley Council (CVC) approved the Stage 1 Vegetation Clearing and Bulk Earthworks on the 2nd December 2020 (CVC Ref CC 2020/0623).
- Stage 1 Vegetation Clearing and Bulk Earthworks commenced on site on the 3rd December 2020 and were completed on the 18th December 2020.
- CVC approved the Subdivision Works Certificate – Stage 2 Vegetation Clearing on the 1st July 2021 (CVC Ref CC 2021/0061).
- Stage 2 Vegetation Clearing commenced on site on the 23rd August 2021 and were completed on the 8th September 2021.
- Stage 1 Bushland Rehabilitation works commenced on the 27th September 2021.
- A small area of additional clearing (within Elizabeth Street Road reserve) was completed on 26th October 2021.
- Stage 1 rehabilitation works were accepted as 'On Maintenance' on 23rd March 2022.
- Stage 3 & 4 (cleared simultaneously) Vegetation Clearing commenced on site on the 30th May 2022 and were completed on the 22nd June 2022.
- Stage 1 rehabilitation works were certified in May 2023 to be self-sustaining and are therefore accepted as 'Off Maintenance'.

2 MANAGEMENT STRATEGY IMPLEMENTATION

This Annual Habitat Monitoring Report has been prepared to discuss the results of the monitoring of management strategies implemented to date in relation to retained vegetation and rehabilitation, koala infrastructure, and construction and operational management against the Monitoring Performance Criteria identified in the approved HMP (JWA 2020a). Management strategies within the approved HMP are apportioned to pre-construction, construction and operational phases of the development.

The Implementation Schedules below (**TABLES 1-3)** have been extracted from the approved HMP and identify the associated personnel, and timing for all pre-construction, construction and operational phase management actions. Performance measures to be achieved during the 'establishment period' and 'maintenance period' of the project are also included in the implementation tables where appropriate. The Implementation Tables have been reproduced below as a checklist for whether the relevant management actions have been complied with, and appropriate evidence is also provided where relevant.

TABLE 1: PRE-CONSTRUCTION PHASE IMPLEMENTATION TABLE

Management Strategy	Applicable Management Area/s	Management Action	Responsibility	Performance Measure	Compliant	Details
Education of Site Personnel	MA1 / MU1	An induction program will be developed prior to construction commencing and all construction personnel, and any other persons/contractors completing works on the site during the construction phases, are to complete the induction prior to starting work on the site in accordance with **SECTION 6.2** of the HMP.	Principal Contractor / Site Supervisor	Induction program developed and all relevant personnel completed induction prior to starting work on the site. Records of all training conducted maintained.	✓	A site induction was completed with construction personnel and contractors prior to construction commencing by Adam McArthur, Principal Ecologist (JWA), on the 2nd December 2020. All landscaping and rehabilitation personnel have completed the induction training prior to starting work on the site. Records of all training conducted have been maintained.
Nest Boxes	MA2 / MU2 MA3 / MU4 MA4 / MU7 MA5 / MU10	Hollows removed for development replaced with nest boxes at minimum 1:1 ratio one (1) month prior to clearing works in accordance with **SECTION 6.3** of the HMP.	Project Ecologist	Nest boxes installed and details of each installation provided to Council.	✓	Nest boxes were installed on the 27th July 2020. Additional boxes were installed as required post Stage 2 clearing works on the 13th January 2022. Additional boxes were installed as required post Stage 3 and 4 clearing works on the 14th October 2022. These nest boxes were included in the following round of monitoring. Monitoring results are provided in **APPENDIX 1.**
Provision of Spotter Catcher	MA1 / MU1	A suitably qualified fauna spotter catcher will be appointed to conduct a pre-clearing site inspection and oversee all clearing works in accordance with **SECTION 6.3.2** of the HMP.	Principal Contractor / Site Supervisor	Fauna spotter catcher appointed.	✓	Pre-clearing inspection and supervision of clearing works have been undertaken prior to Stage 1 clearing, Stage 2 clearing and a small amount of additional clearing required within the Elizabeth Street road reserve. Pre-clearing inspection and supervision of clearing works have been undertaken prior to Stage 3 and 4 clearing between the 30th May and 22nd June 2022. Copies of relevant documentation are provided in **APPENDIX 2.**
Pre-clearing Site Inspection for Habitat Features	MA1 / MU1	Site Inspection completed no more that one (1) day prior to commencement of clearing with each stage to identify and mark for habitat trees/features in accordance with **SECTION 6.3.3** of the HMP.	Project Ecologist	Site inspection completed and habitat trees/features marked.	✓	Pre-clearing site inspection were completed and habitat/trees were marked by a JWA ecologist prior to clearing of Stage 1 and Stage 2. Pre-clearing site inspection were completed and habitat/trees were marked by a JWA ecologist prior to clearing of Stage 3 and Stage 4. Refer to copies of relevant documentation in **APPENDIX 2.**
	MA1 / MU1	A pre-clearing report prepared prior to clearing in accordance with **SECTION 6.3.3** of the HMP.	Project Ecologist	Report prepared.	✓	
Erosion and Sediment Control Measures	MA1 / MU1	All measures contained in the Sediment and Erosion Control Plan to be implemented prior to the commencement of construction in accordance with **SECTION 6.5** of the HMP.	Proponent	Sediment and erosion control measures implemented.	✓	Sediment and erosion control measures have been implemented as necessary.
Management of Retained Habitat	MA2 MA3 MA4 MA5 MA6	Retained habitat within Bushland Parks A - E clearly identified on site with marking pegs prior to commencement of construction works in accordance with **SECTION 6.8** of the HMP.	Principal Contractor / Site Supervisor	Boundaries of retained habitat areas identified and marked.	✓	Retained habitat within Bushland Parks A - E was clearly identified on site prior to commencement of clearing works.
Retained Habitat / Rehabilitation Monitoring	MA2 MA3 MA4 MA5 MA6	Baseline retained habitat monitoring completed prior to commencement of construction in accordance with **SECTION 7.4** of the HMP.	Project Ecologist	Baseline retained habitat monitoring completed.	✓	Baseline retained habitat monitoring was completed in November 2020 prior to the commencement of clearing works in December 2020. A Baseline Vegetation Monitoring Report (JWA 2020b) has been completed and a copy was provided in the Annual Habitat Monitoring Report (JWA 2021).
	MA2 MA3 MA4 MA5 MA6	Baseline monitoring report prepared in accordance with **SECTION 7.6.1** of the HMP.	Project Ecologist	Baseline monitoring report completed.	✓	

TABLE 2 - CONSTRUCTION PHASE IMPLEMENTATION TABLE

Management Strategy	Applicable Management Area/s	Management Action	Responsibility	Performance Measure	Compliant	Details
No Go Zones	MA2 MA3 MA4 MA5 MA6	Access to no-go zones (Management Areas 2 – 6) by construction personnel and machinery is prohibited during clearing works except for non-destructive works (e.g. bush regeneration) with prior approval in accordance with **SECTION 6.4.3** of the HMP.	Principal Contractor / Site Supervisor / Project Ecologist	No unauthorised access to no-go zones.	✓	No unauthorised access to no-go zones has occurred.
	MA2 MA3 MA4 MA5 MA6	In accordance with **SECTION 6.3.5** of the HMP the following activities are not permitted within the No Go Zones: • Storage and mixing of materials; • Vehicle parking; • Liquid disposal; • Machinery repairs and/or refuelling; • Construction site office or shed; • Combustion of any material; • Stockpiling of soil, rubble and debris, cleared vegetation and site mulch; • Any filling or excavation including trench line, topsoil skimming and/or surface excavation; and • Unauthorised pesticide, herbicide or chemical applications.	Principal Contractor / Site Supervisor	No prohibited activities within no go zones.	✓	No prohibited activities within no go zones have occurred.
Pre-clearing Site Inspection for Fauna	MA1 / MU1	Clearing area to be inspected for presence of koalas and other fauna prior to the commencement of clearing each day in accordance with **SECTION 6.3.4** of the HMP.	Fauna Spotter Catcher	Pre-clearing site inspection for fauna completed.	✓	Pre-clearing inspection and supervision of clearing works have been undertaken prior to Stage 1 clearing, Stage 2 clearing and a small amount of additional clearing required within the Elizabeth Street road reserve. Pre-clearing inspection and supervision of clearing works have been undertaken prior to Stage 3 and 4 clearing between the 30th May and 22nd June 2022. No native animals have been observed to be injured or killed to date. Copies of relevant documentation is provided in **APPENDIX 2**.
				No native animals injured or killed.	✓	
Nest Boxes	MA2 / MU2 MA3 / MU4 MA4 / MU7 MA5 / MU10	Additional hollows removed during clearing works replaced with nest boxes at minimum 1:1 ratio in accordance with **SECTION 6.3** of the HMP.	Project Ecologist	Nest boxes installed and details of each installation provided to Council.	✓	Nest boxes were installed on the 27th July 2020. Additional boxes were installed as required post Stage 2 clearing works on the 13th January 2022. Additional boxes were installed as required post Stage 3 and 4 clearing works on the 14th October 2022. These nest boxes were included in the next round of monitoring. Monitoring results are provided in **APPENDIX 1.**
	MA2 / MU2 MA3 / MU4 MA4 / MU7 MA5 / MU10	Nest boxes monitored and maintained on an annual basis until completion of all stages and then for an additional period of three (3) years in accordance with **SECTION 7.3** of the HMP.	Project Ecologist / Community Property (Lot 1) Contractor	Nest boxes monitored and repaired/replaced as required.	✓	
	MA2 / MU2 MA3 / MU4 MA4 / MU7 MA5 / MU10	Annual nest box monitoring results to be included in the Annual Habitat Monitoring Report in accordance with **SECTION 7.3** and **SECTION 7.6.2** of the HMP.	Project Ecologist / Community Property (Lot 1) Contractor	Reporting completed.	✓	
Vegetation and Fauna Management During Construction Phase	MA1 / MU1	Tree clearing undertaken in accordance with procedures outlined in **SECTION 6.3.6** and **SECTION 6.3.7** of the HMP.	Principal Contractor / Site Supervisor / Fauna Spotter Catcher	Tree clearing procedures followed.	✓	All tree clearing procedures have been followed under the supervision of a suitably qualified fauna spotter catcher. Copies of relevant documentation is provided in **APPENDIX 2**.
	MA1 / MU1	Vegetation waste to be mulched and retained on site for re-use in landscape works or disposed of appropriately in accordance with **SECTION 6.3.6** of the HMP**.**	Principal Contractor / Site Supervisor	Vegetation waste reused on site or disposed of appropriately.	✓	Vegetation has been mulched and reused in rehabilitation areas – refer to **APPENDIX 3**.

Management Strategy	Applicable Management Area/s	Management Action	Responsibility	Performance Measure	Compliant	Details
	MA1 / MU1	Hollow logs to be relocated to areas proposed for rehabilitation works in accordance with **SECTION 6.3.6** of the HMP.	Project Ecologist	Hollow logs relocated where appropriate.	✓	Hollow logs have been relocated to areas proposed for rehabilitation where appropriate – refer to the spotter catcher reports (**APPENDIX 2**).
	MA1 / MU1	Stockpile areas are to be clearly delineated on plans and on the ground and soil and vegetation debris must be stockpiled within defined areas in accordance with **SECTION 6.3.6** of the HMP.	Principal Contractor / Site Supervisor	Stockpile locations identified and marked. Soil and vegetation debris stockpiled in designated areas.	✓	Stockpile locations were identified and marked prior to commencement. Soil and vegetation debris has been stockpiled in designated areas.
	MA1 / MU1	Construction zone to be regularly monitored for weeds and any weeds controlled in accordance with **SECTION 6.3.6** of the HMP.	Principal Contractor / Site Supervisor	Weeds controlled during construction phase.	✓	Weeds have been suitably controlled during construction phase of Stage 1, Stage 2, Stage 3 and Stage 4.
	ALL	Hygiene protocols for machinery (such as wash-down procedures) and personnel (such as boot-cleaning), are to be strictly observed to minimise the spread of weeds and the movement of pathogens in accordance with **SECTION 6.3.6** of the HMP.	Principal Contractor / Site Supervisor	Hygiene protocols followed.	✓	Hygiene protocols have been appropriately followed.
	MA1 / MU1	Any fauna captured on site during clearing works will be relocated/translocated by the spotter catcher to a suitable habitat area/s on or adjacent to the site the same day of capture in accordance with **SECTION 6.3.7.4** of the HMP.	Fauna Spotter Catcher	Fauna relocated as required.	✓	Any fauna captured on site during clearing works have been suitably relocated/translocated. Refer to the spotter catcher reports (**APPENDIX 2**).
	MA1 / MU1	Any animals injured or requiring support / rehabilitation during tree clearing to be immediately removed from site and taken to an appropriately qualified veterinary surgeon / wildlife carer or centre as required in accordance with **SECTION 6.3.7.4** and **SECTION 6.3.8** of the HMP**.**	Fauna Spotter Catcher	Animals provided appropriate care.	✓	No animals have been injured to date. Refer to the spotter catcher reports (**APPENDIX 2**).
	MA1 / MU1	Earthworks and/or the clearing of native vegetation will be temporarily suspended (up to 72 hrs) within a 25 m radius of any tree in which a koala is located and will not resume until the koala has moved outside of the clearing area of its own accord (**SECTION 6.3.7.4** of the HMP). If the animal does not self-relocate out of the clearing area within 72 hrs of its initial observation, experts will be consulted in relation to an appropriate protocol to encourage the animal to relocate. The tree can only to be removed following inspection by an appropriately qualified ecologist/fauna handler to ensure that the koala has dispersed and that the removal of the tree poses no direct threat to the health or survival of the koala.	Fauna Spotter Catcher	Procedures for tree clearing in vicinity of koalas observed.	✓	No koalas located during clearing works of Stage 1, Stage 2, Stage 3 or Stage 4. Spotter catcher reports are included in **APPENDIX 2.**
	MA1 / MU1	A Post Clearing Fauna Spotter Report to be prepared within two (2) weeks of completion of each stage of clearing activities and forwarded to all relevant agencies including CVC in accordance with **SECTION 6.3.7.4** of the HMP.	Principal Contractor / Site Supervisor / Fauna Spotter Catcher	Post Clearing Fauna Spotter Report prepared and provided to relevant agencies.	✓	Spotter catcher reports are included in **APPENDIX 2.**
Protocols for the Discovery of an Injured or Dead Animal	ALL	Any animals injured or requiring support / rehabilitation during construction phase to be immediately removed from site and taken to an appropriately qualified veterinary surgeon / wildlife carer or centre as required in accordance with **SECTION 6.3.7.4** and **SECTION 6.3.8** of the HMP**.**	Principal Contractor / Site Supervisor / Fauna Spotter Catcher	Animals provided appropriate care.	✓	No animals have been injured to date. Refer to the spotter catcher reports (**APPENDIX 2**).
	ALL	WIRES to be notified of any dead animals in accordance with **SECTION 6.3.8** of the HMP.	Principal Contractor / Site Supervisor / Fauna Spotter Catcher	WIRES notified as required.	✓	No animals have been killed to date. Refer to the spotter catcher reports (**APPENDIX 2**).

Management Strategy	Applicable Management Area/s	Management Action	Responsibility	Performance Measure	Compliant	Details
	ALL	Any koala observation or incident during the construction phase should result in an observation/incident report in accordance with **SECTION 6.3.8** of the HMP.	Principal Contractor / Site Supervisor / Fauna Spotter Catcher	Observation/incident report completed as required.	✓	No koalas located during clearing works of Stage 1, Stage 2, Stage 3 or Stage 4. Spotter catcher reports are included in **APPENDIX 2.**
Fencing During Construction	MA1 / MU1	The works area to be clearly delineated with temporary fencing (e.g. with high visibility para-webbing) during clearing and construction works in accordance with **SECTION 6.4.1** of the HMP.	Principal Contractor / Site Supervisor	Temporary fencing installed.	✓	Temporary fencing has been installed and inspected as required. No repairs have been necessary to date.
	MA1 / MU1	Temporary fencing to be inspection at not less than one (1) monthly intervals in accordance with **SECTION 6.4.1** of the HMP.	Principal Contractor / Site Supervisor	Temporary fencing inspected.	✓	
	MA1 / MU1	Any damage to fences to be repaired within two (2) working days of the discovery in accordance with **SECTION 6.4.1** of the HMP.	Principal Contractor / Site Supervisor	Temporary fencing repaired as required.	**n/a**	
Construction Signage	ALL	Temporary signage to be installed during construction phases in accordance with **SECTION 6.4.3** of the HMP. Following signage required: • Signs warning all personnel and the public of dangers, work health and safety requirements and contact details for the Site Manager. • At appropriate and highly visible locations noting the total prohibition of dogs on the site; • Beside temporary roads/haul routes noting a 50 km/hr speed limit, or 40 km/hr speed limit where roads traverse the environmental protection areas; and • At approximately 100 m intervals along all fencing stating "Environmental Protection Zone – No Unauthorised Entry".	Principal Contractor / Site Supervisor	Temporary signage installed.	✓	Temporary signage has been installed as appropriate.
Permanent Signage	ALL	Permanent signage to be installed at end of construction phase at each Bushland Park in accordance with **SECTION 6.4.4, SECTION 6.11** and **SECTION 6.10** of the HMP. Following types of signage required: • Notification of conservation area (including educational material on significant flora, fauna and EECs known to occur within the local area – Coastal Cypress Pine Forest and Littoral rainforest); • Specific information regarding the Iluka Peninsula Koala population; • Prohibition of dumping of garden refuse in bushland areas; • The importance of dog control, particularly between dusk and dawn and warning of total prohibition of dogs within the conservation area; • Contact details for WIRES as the primary organization for the rehabilitation of sick and injured koalas in the locality; and • Contact information for incident reporting.	Principal Contractor / Site Supervisor	Permanent signage installed.	n/a	Stages 1-3: Landscape signage post signs and interpretive signs installed. Stage 4: Not applicable – the project is not yet at the end of construction phase.

Management Strategy	Applicable Management Area/s	Management Action	Responsibility	Performance Measure	Compliant	Details
Erosion and Sediment Control Measures	MA1 / MU1	All measures contained in the Sediment and Erosion Control Plan to be implemented and maintained throughout construction phase in accordance with **SECTION 6.5** of the HMP.	Principal Contractor / Site Supervisor	Sediment and erosion control measures implemented and maintained.	✓	Sediment and erosion control measures have been implemented as necessary.
Access and Traffic Management	ALL	All traffic access to occur via Hickey Street or at the intersection of Elizabeth Street and Micalo Street, or within the existing bushfire access track during construction in accordance with **SECTION 6.6** of the HMP.	Principal Contractor / Site Supervisor	Appropriate traffic and access controls implemented.	✓	Appropriate traffic and access controls have been implemented.
	ALL	Vehicles and deliveries are not to block any access along roads or the fire trail in accordance with **SECTION 6.6** of the HMP.	Principal Contractor / Site Supervisor	Appropriate traffic controls implemented.	✓	
	ALL	Vehicles and construction plant to be restricted to a maximum speed of 40 kph (or less as identified by the contractor) and daylight operation for the duration of the construction phase in accordance with **SECTION 6.6** of the HMP.	Principal Contractor / Site Supervisor	Appropriate traffic controls implemented.	✓	
				No reported vehicle strike mortalities	✓	To date there has been no reported vehicle strike mortalities.
Verge Management and Maintenance	MA1 / MU1	Tree planting in the road verges to be completed in accordance with the Landscape Master Plan (Moir Landscape Architecture 2018) and **SECTION 6.7** of the HMP.	Principal Contractor / Site Supervisor	Tree planting in road verges completed as required.	n/a	Construction is ongoing and landscaping works are in progress for Stages 2, 3 and 4. Final inspection of Stage 1 Landscaping was completed on the 26th August 2022. Tree planting within the road verges of Stage 3 have been completed in general accordance with the requirements of the Landscape Master Plan and the Habitat Management Plan. Due to stock availability issues some alterations were made to the original species to be planted in road verges. These alterations were reviewed and approved by the project ecologist as being suitable substitute species. In some instances smaller size stock was used in order to provide required species.
Management of Retained Habitat	ALL	Retained habitat to be maintained/improved through weed control and rehabilitation works in accordance with the protocols as described in **SECTION 6.8** and **SECTION 6.9** of the HMP.	Bush Regeneration Company	Weed control and rehabilitation works completed as required. Specific performance indicators and targets for rehabilitation works are provided in **SECTION 7.4.3**.	✓	Weed control and rehabilitation works commenced on 27th September 2021. Stage 1 went to 'On Maintenance' on the 24th March 2022. Compliance with Specific performance indicators and targets for rehabilitation works was assessed during the ongoing monitoring – refer to the latest Retained Vegetation Monitoring Report 2023 (**APPENDIX 4**). Lot 1 north of Stage 3 weed removal underway in late September 2022. Dead vegetation / leaves caused by prolonged surface stormwater inundation in 2021 / 2022 rain / flood events. Late September 2022: Lot 1 north-east corner area adjacent to Iluka Road first round of weed removal underway. Stage 1 rehabilitation works were certified in May 2023 to be self-sustaining and are therefore accepted as 'Off Maintenance'

Management Strategy	Applicable Management Area/s	Management Action	Responsibility	Performance Measure	Compliant	Details
Rehabilitation Strategy	MA2 MA3 MA4 MA5 MA6	Rehabilitation works and weed control to be completed in accordance with **SECTION 6.9** of the HMP.	Bush Regeneration Company	Rehabilitation works and weed control completed. Specific performance indicators and targets for rehabilitation works are provided in **SECTION 7.4.3**.	✓	Weed control and rehabilitation works commenced on 27th September 2021 and the first follow-up inspection and treatment occurred in November 2021. Compliance with Specific performance indicators and targets for rehabilitation works were assessed during the ongoing monitoring – refer to the latest Retained Vegetation Monitoring Report 2023 (**APPENDIX 4**). Lot 1 north of Stage 3 weed removal underway in late September 2022. Dead vegetation / leaves caused by prolonged surface stormwater inundation in 2021 / 2022 rain / flood events. Late September 2022: Lot 1 north-east corner area adjacent to Iluka Road first round of weed removal underway. Stage 1 rehabilitation works were certified in May 2023 to be self-sustaining and are therefore accepted as 'Off Maintenance'
	MA2 MA3 MA4 MA5 MA6	Weed monitoring visits will be completed every month for the duration of the establishment period, and every six (6) months during the maintenance period in accordance with **SECTION 6.9.5.5** of the HMP.	Bush Regeneration Company	Weed monitoring completed.	✓	Weed control and rehabilitation works commenced on 27th September 2021 and the first follow-up inspection and treatment occurred in November 2021. Compliance with Specific performance indicators and targets for rehabilitation works were assessed during the ongoing monitoring – refer to the latest Retained Vegetation Monitoring Report 2023 (**APPENDIX 4**). Lot 1 north of Stage 3 weed removal underway in late September 2022. Dead vegetation / leaves caused by prolonged surface stormwater inundation in 2021 / 2022 rain / flood events. Late September 2022: Lot 1 north-east corner area adjacent to Iluka Road first round of weed removal underway. Stage 1 rehabilitation works were certified in May 2023 to be self-sustaining and are therefore accepted as 'Off Maintenance'
	MA2 MA3 MA4 MA5 MA6	Plantings within the APZs are to be minimal and consist of low, 'fire retardant' ground covers in accordance with **SECTION 6.9.7.4** of the HMP.	Bush Regeneration Company	Minimal plantings within APZ.	✓	Rehabilitation works within APZs are compliant.
	MA2 MA3 MA4 MA5 MA6	No rehabilitation plantings are to occur within the existing fire break along the southern boundary in accordance with **SECTION 6.9.7.4** of the HMP.	Bush Regeneration Company	No plantings within fire break.	✓	No plantings have occurred within the fire break.
	MA2 MA3 MA4 MA5 MA6	Replacement preferred koala food trees to be planted in rehabilitation areas in accordance with **SECTION 6.9.7.4** of the HMP.	Bush Regeneration Company	Replacement trees planted.	✓	Weed control and rehabilitation works commenced on 27th September 2021 and the first follow-up inspection and treatment occurred in November 2021. Replacement preferred koala food trees have been planted.

Management Strategy	Applicable Management Area/s	Management Action	Responsibility	Performance Measure	Compliant	Details
	ALL	No plantings of any *Acronychia* species are to occur on site in accordance with **SECTION 6.9.7.4** of the HMP.	Bush Regeneration Company	No *Acronychia* species planted.	✓	No *Acronychia* species have been planted.
Domestic Pet Controls	ALL	All dogs will be banned from the subject site during the construction phase in accordance with **SECTION 6.10** of the HMP.	Contractor / Site Supervisor	No dogs on site.	✓	To date there has been no dogs reported on site
	ALL	Any evidence of dogs within Bushland Parks observed during monitoring or maintenance works to be reported to the Community Association in accordance with **SECTION 6.10** of the HMP.	Contractor / Site Supervisor	Evidence of dogs reported.	✓	
Fire Management	ALL	Fire hazard within Bushland Parks managed appropriately in accordance with **SECTION 6.12** of the HMP.	The Proponent	Fire management activities completed as required.	n/a	Fire management activities have not occurred/been necessary at this stage. APZ are being maintained.
Fauna Management Monitoring	MA1 / MU1	Details of all fauna encountered during clearing works are to be recorded and reported in accordance with **SECTION 7.2** of the HMP.	Project Ecologist / Fauna Spotter Catcher	Reporting completed.	✓	Spotter catcher reports are included in **APPENDIX 2.** No other encounters with fauna have occurred to date.
Retained Habitat / Rehabilitation Monitoring	MA2 MA3 MA4 MA5 MA6	Retained habitat/rehabilitation monitoring to be completed six (6) monthly until the establishment period performance criteria are met and then annually during the maintenance period in accordance with **SECTION 7.4.2** of the HMP.	Project Ecologist	Retained habitat / rehabilitation monitoring completed	✓	Weed control and rehabilitation works commenced on 27th September 2021 and the first follow-up inspection and treatment occurred in November 2021. Compliance with Specific performance indicators and targets for rehabilitation works were assessed during the ongoing monitoring – refer to the latest Retained Vegetation Monitoring Report 2023 (**APPENDIX 4**). Stage 1 rehabilitation works were certified in May 2023 to be self-sustaining and are therefore accepted as 'Off Maintenance'
	MA2 MA3 MA4 MA5 MA6	The bush regeneration team to keep work sheets detailing works completed in accordance with **SECTION 7.4.2.4** of the HMP.	Bush Regeneration Company	Reporting completed.	✓	Weed control and rehabilitation works commenced on 27th September 2021 and the first follow-up inspection and treatment occurred in November 2021. Lot 1 north of Stage 3 weed removal underway in late September 2022. Dead vegetation / leaves caused by prolonged surface stormwater inundation in 2021 / 2022 rain / flood events. Late September 2022: Lot 1 north-east corner area adjacent to Iluka Road first round of weed removal underway. Ongoing weed control and rehabilitation works ongoing in 'On Maintenance' areas.
Infrastructure, Construction and Operational Management Monitoring	ALL	Relevant construction activities and infrastructure to be monitored during and after construction in accordance with **SECTION 7.5** of the HMP.	Contractor / Site Supervisor / Project Ecologist	Monitoring completed.	✓	Relevant monitoring during the construction period is ongoing.
	ALL	Construction/installation of temporary and/or permanent fences and signage to be monitored to ensure that no barriers to wildlife movement created and temporary fencing does not prevent koalas accessing koala habitat on the site in accordance with **SECTION 7.5.2** of the HMP.	Project Ecologist	Fencing and signage installation/construction monitored and no barriers created.	✓	Temporary fencing has been installed and inspected and is as required.

Management Strategy	Applicable Management Area/s	Management Action	Responsibility	Performance Measure	Compliant	Details
	ALL	Visual inspections of infrastructure to be completed on a monthly basis during construction phase in accordance with **SECTION 7.5.2** of the HMP.	Project Ecologist	Inspections completed.	✓	Relevant monitoring during the construction period is ongoing.
	ALL	Where damage or other failures to infrastructure are observed a report will be prepared within 24 hours and the damage or failure corrected within 48 hours of the report in accordance with **SECTION 7.5.2** of the HMP.	Principal Contractor / Site Supervisor	Report completed. Damage or failure corrected.	✓	No damage or other failures to infrastructure have been observed to date.
Disease Management for Koalas	ALL	In the event that a suspected diseased koala is observed during monitoring, the time, date and location of the sighting must be recorded and provided to an appropriate wildlife care organization as soon as practicable in accordance with **SECTION 8.3.2** of the HMP.	Project Ecologist	Suspected diseased koalas reported.	✓	No sick koalas have been observed to date.
Annual Habitat Monitoring Report	ALL	Annual Habitat Monitoring Report to be prepared and submitted to CVC and DAWE in accordance with **SECTION 7.5.2, SECTION 7.6.2** and **SECTION 7.6.3** of the HMP**.**	Project Ecologist	Annual Habitat Monitoring Report prepared and submitted.	✓	This report represents the third Annual Habitat Monitoring Report.
Annual Koala Activity Monitoring and Reporting	MA2 MA3 MA4 MA5 MA6	Annual Koala activity monitoring to be completed from the date of commencement of works and continue for a period extending to five (5) years after completion of the final stage in accordance with **SECTION 8.3.2** of the HMP.	Project Ecologist	Koala activity monitoring completed.	✓	Annual Koala Monitoring Reports have been completed and latest report is included in **APPENDIX 5**.
	MA2 MA3 MA4 MA5 MA6	Additional koala activity monitoring event to be completed in the event of an uncontrolled bushfire occurring on the Birrigan Iluka Beach site in accordance with **SECTION 8.3.3** of the HMP.	Project Ecologist	Additional monitoring completed as required.	n/a	Not applicable. No uncontrolled bushfires have occurred.
	MA2 MA3 MA4 MA5 MA6	Annual Koala Monitoring Report to be prepared in accordance with **SECTION 8.3.2** and **SECTION 8.6.2** of the HMP.	Project Ecologist	Annual Koala Monitoring Report prepared.	✓	The Annual Koala Monitoring Reports have been completed and latest report is included in **APPENDIX 5**.
Lighting	MA1 / MU1	Lighting in public areas to be kept at a minimum required for safety and amenity in accordance with **SECTION 6.4.5** of the HMP.	Contractor, Utility Service Provider (electricity and lighting)	Appropriate lighting installed.	n/a	Appropriate lighting has been installed in Stages 1-3.
	MA1 / MU1	All street lighting to be capped and/or positioned to minimise light spill into retained habitat and habitat rehabilitation areas in accordance with **SECTION 6.4.5** of the HMP.	Contractor, Utility Service Provider (electricity and lighting)	Street lighting capped and/or appropriately positioned.	n/a	Appropriate lighting has been installed in Stages 1-3.

TABLE 3 - OPERATIONAL PHASE IMPLEMENTATION TABLE

Management Strategy	Applicable Management Area/s	Management Action	Responsibility	Performance Measure	Compliance	Details
Fencing Post Construction	ALL	No fencing to be constructed within Bushland Parks in accordance with **SECTION 6.4.2** of the HMP.	Community Property (Lot 1) Contractor	No fencing installed in Bushland Parks.	n/a	Not Applicable – Operational Phase is yet to commence
	ALL	Bollards or large stone blocks to be installed (where required) to delineate boundaries of Bushland Parks and prevent vehicle incursion in accordance with **SECTION 6.4.2** of the HMP.	Community Property (Lot 1) Contractor	Appropriate measures installed where required to delineate Bushland Park boundaries and prevent vehicle access.	n/a	Not Applicable – Operational Phase is yet to commence
Permanent Signage	ALL	Permanent signage to be maintained in accordance with **SECTION 6.4.4, SECTION 6.11** and **SECTION 6.10** of the HMP.	Community Property (Lot 1) Contractor	Permanent signage maintained.	n/a	Not Applicable – Operational Phase is yet to commence
Lighting	MA1 / MU1	Lighting in public areas to be kept at a minimum required for safety and amenity in accordance with **SECTION 6.4.5** of the HMP.	Contractor, Utility Service Provider (electricity and lighting)	Appropriate lighting installed.	n/a	Not Applicable – Operational Phase is yet to commence
	MA1 / MU1	All street lighting to be capped and/or positioned to minimise light spill into retained habitat and habitat rehabilitation areas in accordance with **SECTION 6.4.5** of the HMP.	Contractor, Utility Service Provider (electricity and lighting)	Street lighting capped and/or appropriately positioned.	n/a	Not Applicable – Operational Phase is yet to commence
	MA1 / MU1	Outdoor lighting in residential lots to be of low-wattage and of a type that reduces spills and glare in accordance with **SECTION 6.4.5** of the HMP.	Owners and Occupiers	Appropriate lighting installed.	n/a	Not Applicable – Operational Phase is yet to commence
	MA1 / MU1	No lights to be directed towards the retained bushland or into the entrances of pre-existing hollows in accordance with **SECTION 6.4.5** of the HMP.	Community Property (Lot 1) Contractor / Residents	Lighting appropriately positioned.	n/a	Not Applicable – Operational Phase is yet to commence
Swimming Pools	MA1 / MU1	Backyard swimming pools to include an acceptable Koala escape mechanism in accordance with **SECTION 6.4.6** of the HMP.	Owners and Occupiers	Koala escape mechanisms provided to swimming pools.	n/a	Not Applicable – Operational Phase is yet to commence
Access and Traffic Management	ALL	Access to the Bushland Parks to be via the existing roads and fire trails and internal tracks within the development footprint in accordance with **SECTION 6.6** of the HMP.	Community Property (Lot 1) Contractor	No unauthorised vehicle access.	n/a	Not Applicable – Operational Phase is yet to commence
	ALL	No vehicular access to the site is to occur through the Bushland Parks or via any new access point from Iluka Road in accordance with **SECTION 6.6** of the HMP.	Community Property (Lot 1) Contractor	No unauthorised vehicle access.	n/a	Not Applicable – Operational Phase is yet to commence
	ALL	Fire trail and APZs are to remain clear and act as maintenance tracks in accordance with **SECTION 6.6** of the HMP.	Community Property (Lot 1) Contractor	Fire trails and APZs managed and maintained.	n/a	Not Applicable – Operational Phase is yet to commence
	MA1 / MU1	Traffic calming measures to be implemented after occupation in accordance with **SECTION 6.6** of the HMP.	Community Property (Lot 1) Contractor	Appropriate traffic calming measures installed where required.	n/a	Not Applicable – Operational Phase is yet to commence
	ALL	Awareness of potential for vehicle strike. Vehicles not to exceed speed limits.	Community Property (Lot 1)	No native animals injured or killed on roads.	n/a	Not Applicable – Operational Phase is yet to commence

Management Strategy	Applicable Management Area/s	Management Action	Responsibility	Performance Measure	Compliance	Details
			Contractor			
Verge Management and Maintenance	MA1 / MU1	Internal public road verges on site and existing external public road verges surrounding the site to be managed and maintained in accordance within **SECTION 6.7** of the HMP.	Community Property (Lot 1) Contractor	Road verges managed and maintained.	n/a	Not Applicable – Operational Phase is yet to commence
Management of Retained Habitat	ALL	Weeds to be controlled within Bushland Parks in accordance with **SECTION 6.8** and **SECTION 6.9.5** of the HMP**.**	Community Property (Lot 1) Contractor	Weeds controlled as needed.	n/a	Not Applicable – Operational Phase is yet to commence
Domestic Pet Controls	ALL	Any evidence of dogs within Bushland Parks observed during monitoring or maintenance works to be reported to the Community Association in accordance with **SECTION 6.10** of the HMP.	Community Property (Lot 1) Contractor	Evidence of dogs reported.	n/a	Not Applicable – Operational Phase is yet to commence
	MA1 / MU1	Dog-proof and koala-proof exclusion fences and koala escape posts / planks to be installed at premises with dogs in accordance with **SECTION 6.10** of the HMP.	Owners and Occupiers	Dog-proof and koala-proof exclusion fences and koala escape posts / planks installed where required.	n/a	Not Applicable – Operational Phase is yet to commence
	MA1 / MU1	Dogs to be on leash at all times within the subdivision when outside of fenced premises in accordance with **SECTION 6.10** of the HMP.	Owners and Occupiers	Dogs properly controlled when outside fenced premises.	n/a	Not Applicable – Operational Phase is yet to commence
	MA1 / MU1	Domestic dogs to be confined indoors or within a koala exclusion external fence in accordance with **SECTION 6.10** of the HMP.	Owners and Occupiers	No domestic dogs outside premises or enclosures.	n/a	Not Applicable – Operational Phase is yet to commence
	MA1 / MU1	Domestic cats to be confined indoors or within a cat-proof enclosure in accordance with **SECTION 6.10** of the HMP.	Owners and Occupiers	No domestic cats outside premises or enclosures.	n/a	Not Applicable – Operational Phase is yet to commence
	ALL	All domestic pets are prohibited from Bushland Parks in accordance with **SECTION 6.10** of the HMP.	Community Property (Lot 1) Contractor / Residents	No domestic pets in Bushland Parks.	n/a	Not Applicable – Operational Phase is yet to commence
	MA1 / MU1	Dogs and cats are to be desexed in accordance with **SECTION 6.10** of the HMP**.**	Owners and Occupiers	Dogs and cats desexed.	n/a	Not Applicable – Operational Phase is yet to commence
	MA1 / MU1	All domestic pets are to be microchipped and registered within the CVC in accordance with **SECTION 6.10** of the HMP.	Owners and Occupiers	Dogs and cats microchipped and registered.	n/a	Not Applicable – Operational Phase is yet to commence
	MA1 / MU1	Vaccinations for all dogs and cats are to be kept up to date at all times in accordance with **SECTION 6.10** of the HMP.	Owners and Occupiers	Dogs and cats vaccinated.	n/a	Not Applicable – Operational Phase is yet to commence
	MA1 / MU1	Dogs and cats are to be wearing appropriate identification (collar and tag) at all times in accordance with **SECTION 6.10** of the HMP.	Owners and Occupiers	Dogs and cats wearing identification.	n/a	Not Applicable – Operational Phase is yet to commence
	MA1 / MU1	Domestic cats are to either be fitted with a bell to their collar or a motion activated audible and visual alarm to warn nearby wildlife in accordance with **SECTION 6.10** of the HMP.	Owners and Occupiers	Cats wearing bell or alarm.	n/a	Not Applicable – Operational Phase is yet to commence

Management Strategy	Applicable Management Area/s	Management Action	Responsibility	Performance Measure	Compliance	Details
Disease Management for Koalas	ALL	In the event that a suspected diseased koala is observed during monitoring, the time, date and location of the sighting must be recorded and provided to an appropriate wildlife care organization as soon as practicable in accordance with **SECTION 8.3.2** of the HMP.	Project Ecologist / Community Property (Lot 1) Contractor	Suspected diseased koalas reported.	n/a	Not Applicable – Operational Phase is yet to commence
Fire Management	ALL	Fire hazard within Bushland Parks managed appropriately in accordance with **SECTION 6.12** of the HMP.	Community Property (Lot 1) Contractor	Fire management activities completed as required.	n/a	Not Applicable – Operational Phase is yet to commence
Raising Community Awareness and Education	MA1 / MU1	All new residents will be provided with a copy of the Community Management Statement/bylaws and an environmental education package in accordance with **SECTION 6.13** of the HMP.	The Proponent	Community Management Statement/bylaws and an environmental education package provide to all new residents.	n/a	Not Applicable – Operational Phase is yet to commence
Retained Habitat / Rehabilitation Monitoring and Reporting	MA2 MA3 MA4 MA5 MA6	Retained habitat / rehabilitation monitoring to be completed six (6) monthly until the establishment period performance criteria are met and then annually during the maintenance period in accordance with **SECTION 7.4.2** of the HMP.	Project Ecologist / Community Property (Lot 1) Contractor	Retained habitat / rehabilitation monitoring completed	n/a	Not Applicable – Operational Phase is yet to commence
	MA2 MA3 MA4 MA5 MA6	The bush regeneration team to keep work sheets detailing works completed in accordance with **SECTION 7.4.2.4** of the HMP.	Bush Regeneration Company	Reporting completed.	n/a	Not Applicable – Operational Phase is yet to commence
	MA2 MA3 MA4 MA5 MA6	Annual Habitat Monitoring Report to be prepared and submitted to CVC and DAWE in accordance with **SECTION 7.6.2** of the HMP.	Project Ecologist / Community Property (Lot 1) Contractor	Annual Habitat Monitoring Report prepared and submitted.	n/a	Not Applicable – Operational Phase is yet to commence
Annual Koala Activity Monitoring and Reporting	MA2 MA3 MA4 MA5 MA6	Annual Koala activity monitoring to be completed from the date of commencement of works and continue for a period extending to five (5) years after completion of the final stage in accordance with **SECTION 8.3.2** of the HMP.	Project Ecologist / Community Property (Lot 1) Contractor	Koala activity monitoring completed.	n/a	Not Applicable – Operational Phase is yet to commence
	MA2 MA3 MA4 MA5 MA6	Additional koala activity monitoring event to be completed in the event of an uncontrolled bushfire occurring on the Birrigan Iluka Beach site in accordance with **SECTION 8.3.3** of the HMP.	Project Ecologist / Community Property (Lot 1) Contractor	Additional monitoring completed as required.	n/a	Not Applicable – Operational Phase is yet to commence
	MA2 MA3 MA4 MA5 MA6	An Annual Koala Monitoring Report to be prepared in accordance with **SECTION 8.6.2** of the HMP.	Project Ecologist	Report prepared.	n/a	Not Applicable – Operational Phase is yet to commence

3 CONCLUSION

All pre-construction phase requirements have been complied with. The construction phase is underway, and all relevant fauna and habitat management related actions have been completed in compliance with the requirements of the approved HMP. No non-compliances with the requirements of the approved HMP (JWA 2020a) have occurred or been identified to date.

REFERENCES

JWA Pty Ltd (2020a) Habitat Management Plan, Birrigan Iluka Beach, Hickey Street, Iluka (Lot 99 on DP823635). Report to Steven Holdings Pty Ltd.

JWA Pty Ltd (2020b) Baseline Vegetation Monitoring Report, Birrigan Iluka Beach, Hickey Street, Iluka (Lot 99 on DP823635). Report to Steven Holdings Pty Ltd.

JWA Pty Ltd (2021) Annual Habitat Monitoring Report 1, Birrigan Iluka Beach, Hickey Street, Iluka (Lot 99 on DP823635). Report to The Stevens Group.

APPENDIX 1 – NEST BOX MONITORING REPORT 2023

NEST BOX MONITORING REPORT

Birrigan Iluka Beach, Iluka
Lot 99 on DP823635

A Report Prepared for
The Stephens Group Pty Ltd

AUGUST 2023

JWA Pty Ltd
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DOCUMENT CONTROL

Document

Title	Nest Box Monitoring Report
Job Number	N202001
File Reference	\\SERVER\data\2020 CLIENTS\202001 - Birrigan Iluka Beach - Iluka\Nest Box Monitoring
Version and Date	RW1 15/08/22
Client	The Stephens Group Pty Ltd

Revision History **(office use only)**

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Client Issue

Version	Date	Author		Approved by	
		Name	Initials	Name	Initials
RW1	15/08/22	Nicole Davies	ND	Adam McArthur	AM

TABLE OF CONTENTS

1 INTRODUCTION

1.1 Background

JWA Pty Ltd (JWA) have been engaged by The Stephens Group Pty Ltd to undertake required annual nest box monitoring at the Birrigan Iluka Beach development site, located at Hickey Street, Iluka - formally described as Lot 99 on DP823635. The Birrigan Iluka Beach development is an approved 141 lot community scheme subdivision over the subject land (**FIGURES 1 & 2**). JWA previously prepared a Habitat Management Plan (HMP) (JWA 2020) which included an amelioration strategy designed to minimise the impacts on fauna during both the construction and operational phases, undertake nature regeneration/revegetation works and to ensure that ecological processes and corridor function within the identified rehabilitation areas are protected and amplified.

As part of the amelioration strategy, an ongoing nest box monitoring program was established. This report details the methodology and results from the 3rd annual nest box monitoring completed by JWA during July 2023.

1.2 Nest Box Installation/Locations

The installation of nest boxes is required in accordance with the development consent issued for the Birrigan Iluka Beach development to meet the conditions of the Clarence Valley Council (CVC) and Commonwealth Department of Environment and Energy (DEE) approvals.

JWA completed an initial habitat tree audit over the proposed Stage 1 and 2 clearing areas and identified eight (8) hollow-bearing trees within and adjoining the Stage 1 clearing area containing a total of eighteen (18) small hollows, one (1) medium hollow and one (1) large hollow. Based on the 1:1 offset ratio required and the fauna species recorded from the site, particularly the Threatened species that rely on hollows, JWA recommend installing twenty (20) nest boxes.

The nest boxes were installed within the retained habitat areas on the 27th July 2020 by qualified ecologists to compensate for the loss of hollow-bearing trees as part of the development. Nest boxes were designed for target species (Hollow Log Homes Pty Ltd CYPLAS Boxes) and consisted of:

- 1 x Black cockatoo/large owl box (Approx. 360mm l, 490mm w, 640mm h, 150mm opening);
- 1 x Possum box (Approx. 260mm l, 340mm w, 460mm h, 110mm opening);
- 9 x Bat boxes (Approx. 300mm l, 160mm w, 340mm h, bottom opening); and
- 9 x Small parrot boxes (Approx. 180mm l, 200mm w, 490mm h, 75mm opening).

Additional boxes were installed as required post Stage 2 clearing works on 13th January 2022:

- 3 x bat boxes (approx. 300mm l, 160mm w, 340mm h, bottom opening);

PROJECT:
ILUKA
LOT 99 ON DP 823635

LOCATION:
ILUKA ROAD, ELIZABETH, RIVERVIEW AND HICKEY STREETS
ILUKA, NSW, 2466

DEVELOPMENT CHARACTERISTICS	
ITEM	DESCRIPTION
PROPERTY DESCRIPTION	LOT 99 DP823635
AREA OF LOT 99	19.41 ha.
TOTAL NUMBER OF LOTS	141
PART LOT 1 (Approx.)	5.29 ha.

CLARENCE VALLEY COUNCIL
APPROVAL

This is the plan referred to in Council's Notice of Determination of SUB2015/0034

Date: 13/11/2019

STREETS FOR LIVING - CHARACTERISTICS				
STREET	RESERVE WIDTH (m)	VERGE WIDTH (m)	TOTAL SEAL WIDTH (m)	CUL DE SAC DIAMETER (m)
HICKEY STREET	30 EXISTING	VARIES	8	-
1	20	6	8	30 outer, 15 inner
2	20 (*1)	6 (*1)	8	-
3	25	6 (*2)	8	20
4, 6, 7	20	6	8	-
5, 8	20	6	8	20
AWAY 3	VARIES	3.5 (*3)	4	-

PURPOSE OF STREET CORRIDORS
- STREET FOR LIVING
- WATER SENSITIVE URBAN DESIGN CORRIDOR
- INFRASTRUCTURE CORRIDOR
- FAUNA / FLORA CORRIDOR

AWAY - MEANS ACCESS WAY

NOTES:
(* 1) - RESERVE WIDTH INCREASED TO 25m (AND VERGE OF 11m) TO ACCOMMODATE WSUD TREATMENT WITHIN RESERVE ON PARK SIDE OF STREET 2
- VERGE REDUCES TO 2m ON PARKSIDE FOR NORTHERN PART OF STREET 2 WHERE DETENTION / WSUD NOT REQUIRED. EXISTING RESERVE WIDTH APPROX. 30m FOR NORTHERN SECTION WHERE STREET 2 IS ACCOMMODATED WITHIN EXISTING HICKEY STREET RESERVE
(* 2) - VERGE WIDTH INCREASED TO 11m ON PARKSIDE TO ACCOMMODATE WSUD TREATMENT
(* 3) - ON SIDE WITH LOT ACCESS ONLY - REDUCED / VARIED VERGE WIDTH ON NON-ACCESS SIDE

TYPICAL ALLOTMENT ATTRIBUTES		
AREA (m2)	WIDTH (m)	LENGTH (m)
>400	13-14	30-35
500	14	35
600	17.5	35
700	19	37

NOTES:
1. **These notes form part of this plan.**
2. **Boundaries identified by plan dimensions only, the boundaries have not been surveyed.**
3. **Adjoining property boundary boundaries may not be complete, a summary of compiled DCDB only.**
4. **The dimensions, bearings, areas and number of allotments shown on this plan are subject to field survey and approval of relevant Government Authorities having jurisdiction over statutory requirements pursuant to any relevant legislation.**
5. **The information for this plan has been prepared for the purpose of a Development Approval for Subdivision and should not be used for any other purpose.**
6. **This plan has been prepared for the Stevens Group.**
7. **Do not scale from this plan.**

BIKE / PATHWAY CONNECTION TO ILUKA ROAD
- BIKE LANE SITUATED ON THE NORTH EASTERN SIDE OF THE ILUKA ROAD INTERSECTION WITH HICKEY STREET AND TO PROVIDE A REFUGE ISLAND ON ILUKA ROAD

LOT 93 DP 1105124
LOT 64 DP 41701
LOT 7020 DP 1114873
LOT 971 DP 876936
LOT 972 DP 876936
LOT 18 DP 243136
LOT 7019 DP 1114862
LOT 7018 DP 1115127

HICKEY STREET
ILUKA ROAD
RIVERVIEW STREET (UNFORMED PORTION)
New Bushfire Trail Connection
bike / pathway
PART LOT 1 (PARK B)
PART LOT 1 (PARK D)
PART LOT 1 (PARK A)
PART LOT 1 (PARK C)
PART LOT 1 (PARK F)
PART LOT 1 (PARK E)
STREET 1
STREET 2
STREET 3
STREET 4
STREET 5
STREET 6
STREET 7
STREET 8
AWAY 3
16m (reserve)
25m (reserve)
Emergency Access Only
MICALO STREET
BIKE / PATHWAY CONNECTION TO MICALO STREET
ELIZABETH STREET
REALIGN EXISTING BUSHFIRE TRAIL
MAINTAIN EXISTING BUSHFIRE TRAIL ACCESS TO ILUKA ROAD

note: the layout is preliminary only and subject to detailed engineering and surveying input. all dimensions and areas are indicative only.

Scale 1 : 2500 - Lengths in metres
20 0 20 40 60 80 100

SOURCE: OneCollective - Masterplan (191113 CVC Approved Plans - Extract.pdf)
SCALE: 1 : 2500 @ A3
JWA PTY LTD Ecological Consultants

CLIENT
Ocean Park Consulting Pty Ltd
PROJECT
Nest Box Monitoring Report
Birrigan Estate
Lot 99 on DP823635, Hickey Street, Iluka NSW
Clarence Valley Council LGA

FIGURE 1

PREPARED: BW
DATE: 18 November 2021
FILE: N202001_Nest Box 211118.dwg

TITLE
APPROVED MASTER PLAN

LEGEND

Site Boundary

Scale 1:20 000 - Lengths in metres

200 0 200 400 600 800 1000

SOURCE: Open Street Maps SCALE: 1 : 20 000 @ A3 *JWA PTY LTD* *Ecological Consultants*	CLIENT Ocean Park Consulting Pty Ltd PROJECT Nest Box Monitoring Report Birrigan Estate Lot 99 on DP823635, Hickey Street, Iluka NSW Clarence Valley Council LGA	FIGURE 2 PREPARED: BW DATE: 18 November 2021 FILE: N202001_Nest Box 211118.dwg	TITLE LOCALITY PLAN

- 3 x small parrot boxes (approx. 180mm l, 200mm w, 490mm h, 75mm opening);
- 4 x possum box (approx. 260mm l, 340mm w, 460mm h, 110mm opening); and
- 3 x black cockatoo/large owl box (approx. 360mm l, 490mm w, 640mm h, 150mm opening).

Additional boxes were installed as required post Stage 3 and 4 clearing works on 14th October 2022:

- 2 x bat boxes (approx. 300mm l, 160mm w, 340mm h, bottom opening);
- 4 x small parrot boxes (approx. 180mm l, 200mm w, 490mm h, 75mm opening); and
- 1 x possum box (approx. 260mm l, 340mm w, 460mm h, 110mm opening).

FIGURE 3 shows the nest box locations.

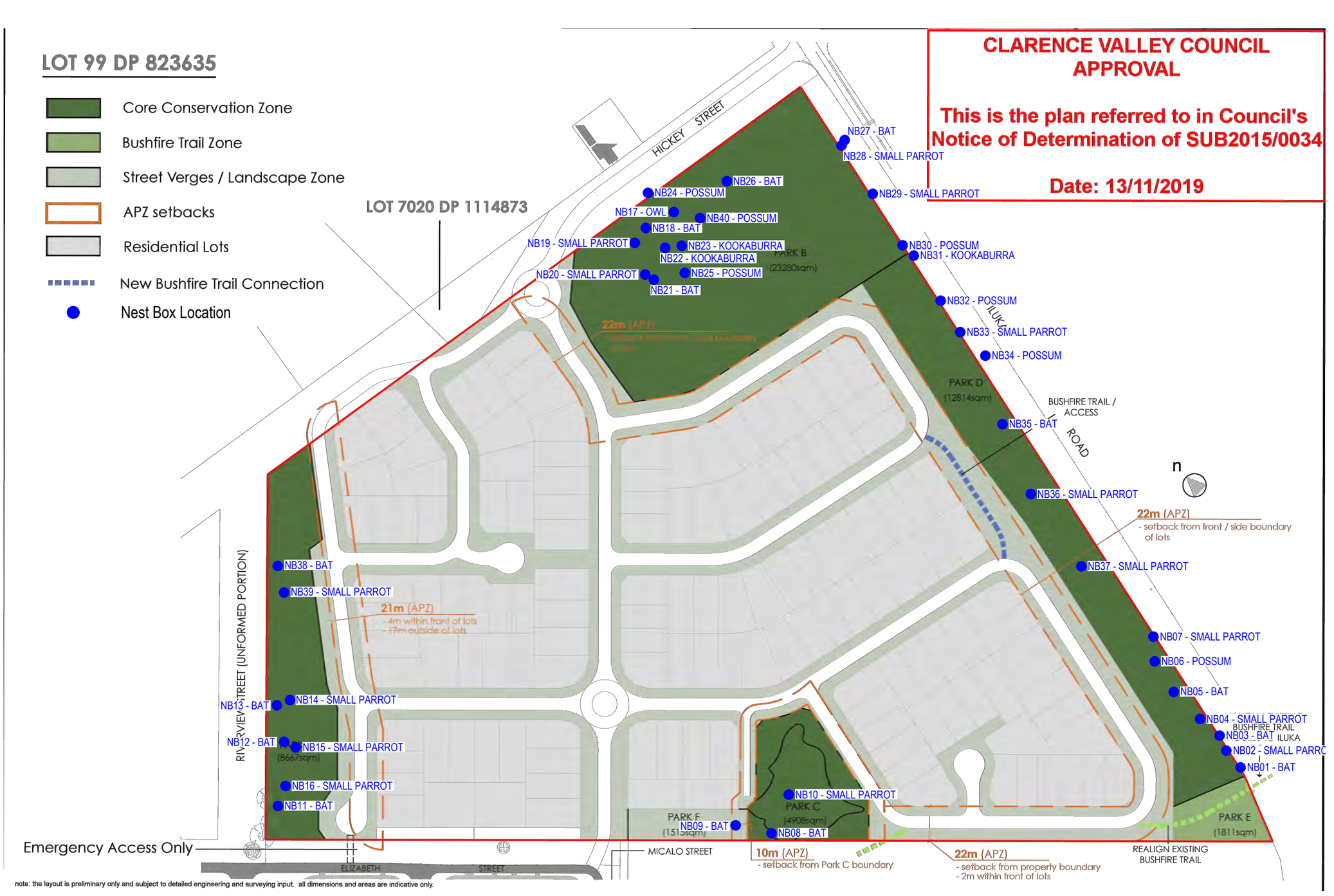
LOT 99 DP 823635

- Core Conservation Zone
- Bushfire Trail Zone
- Street Verges / Landscape Zone
- APZ setbacks
- Residential Lots
- New Bushfire Trail Connection
- Nest Box Location

CLARENCE VALLEY COUNCIL APPROVAL

This is the plan referred to in Council's Notice of Determination of SUB2015/0034

Date: 13/11/2019



note: the layout is preliminary only and subject to detailed engineering and surveying input. all dimensions and areas are indicative only.

Scale 1 : 2500 - Lengths in metres

20 0 20 40 60 80 100

SOURCE: JWA Site Investigations; OneCollective - Vegetation Zones (191113 CVC Approved Plans - Extract.pdf)

SCALE: 1 : 2500 @ A3

JWA PTY LTD
Ecological Consultants

CLIENT
Ocean Park Consulting Pty Ltd

PROJECT
Nest Box Monitoring Report
Birrigan Estate
Lot 99 on DP823635, Hickey Street, Iluka NSW
Clarence Valley Council LGA

FIGURE 3

PREPARED: BW
DATE: 08 March 2024
FILE: N202001_Nest Box 240308.dwg

TITLE

NEST BOX LOCATIONS

2 METHODOLOGY

2.1 Introduction

The methodology for the nest box monitoring program has been outlined in detail in the HMP (JWA 2020). The methodologies are briefly described in the following sections.

2.2 Monitoring Program

Nest boxes are to be monitored by an experienced ecologist on an annual basis for obvious signs of disrepair and replaced as necessary. Any boxes occupied by feral bees are to be replaced. The annual monitoring of nest boxes will occur until completion of all stages and then for an additional period of three (3) years. The requirement for further ongoing monitoring of nest boxes is to be reviewed upon cessation of this three (3) year period.

An inspection camera mounted on an extendable pole will be used to inspect the contents of nest boxes.

Monitoring of nest boxes will be undertaken and documented by a suitably qualified Ecologist trained to handle fauna (in the event that non-target species are found in the boxes) and to identify fauna species, so target species are not unnecessarily removed or harassed. Records of all inspections are to be provided to the Applicant.

Monitoring should determine the occupation of the boxes by the target species and highlight any maintenance actions that are required. During each monitoring event, a visual inspection of each nest box should be completed, and the following information recorded:

- Any native/pest species occupancy; and
- Any nest box maintenance requirements.

Visual inspection will enable the observer to perform a close inspection for signs of fauna occupancy including feathers, droppings/scats, hair, nesting material and animals themselves. During monitoring, any maintenance requirements should be considered including:

- The need to remove non-target species such as European bees and Ants;
- Replacement of fallen or damaged nest boxes;
- The GPS location of any damaged boxes;
- Re-positioning, re-installation and/or relocation of any wrongly installed or ineffective nest boxes; and
- Checking that each box is not holding water.

2.3 Controls and Corrective Actions

The following controls and corrective actions will be implemented:

- If a nest box becomes occupied by exotic or invasive fauna, the fauna is to be removed within one (1) month of monitoring event; and
- Where damage to a nest box is identified during a monitoring event, the nest box is to be repaired or replaced within one (1) month of monitoring event.

2.4 Reporting

Results of the annual nest box monitoring will be included in the Annual Habitat Monitoring Report.

3 RESULTS

3.1 Nest box monitoring

Nest boxes at the subject site were monitored on the:

- 12th August 2021 by one (1) ecologist;
- 27th July 2022 by one (1) ecologist; and
- 21st July 2023 by one (1) ecologist.

Nest box monitoring results are shown in **TABLE 1**.

No nest boxes required maintenance/replacing due to damage. No nest boxes were occupied by feral bees.

TABLE 1
NEST BOX MONITORING RESULTS

Nest Box		Monitoring Period		
		July 2020 - August 2021	September 2021 - July 2022	August 2022 - July 2023
Bat Box	Nb-01	Unoccupied	Unoccupied	Unoccupied
	Nb-03	Unoccupied	Unoccupied	Unoccupied
	Nb-05	Estimated 5 microbats observed. Not identified to species level to avoid disturbance	Microbats observed. Not identified to species level to avoid disturbance	Unoccupied
	Nb-08	Unoccupied	Unoccupied	Unoccupied
	Nb-09	Unoccupied	Unoccupied	Unoccupied
	Nb-11	Unoccupied	Unoccupied	Estimated 10 microbats observed. Not identified to species level to avoid disturbance
	Nb-12	Estimated 6 microbats observed. Not identified to species level to avoid disturbance	Unoccupied	Unoccupied
	Nb-13	Unoccupied	Unoccupied	Unoccupied
	Nb-18	Unoccupied. Vines and ant nest removed	Unoccupied	Unoccupied. Vines and ant nest removed
	Nb-21	-	Microbats observed. Not identified to species level to avoid disturbance	Unoccupied
	Nb-26	-	Unoccupied	Unoccupied
	Nb-27	-	Unoccupied	Unoccupied
	Nb-35	-	-	Unoccupied
	Nb-38	-	-	Unoccupied

Nest Box		Monitoring Period		
		July 2020 - August 2021	September 2021 - July 2022	August 2022 - July 2023
Small Parrot Box	Nb-02	Unoccupied	Gliders	Unoccupied. Evidence of occupation observed i.e. leaf nest.
	Nb-04	Unoccupied	Unoccupied. Evidence of occupation observed i.e. leaf nest.	Unoccupied. Evidence of occupation observed i.e. leaf nest.
	Nb-07	Unoccupied	Unoccupied. Evidence of occupation observed i.e. leaf nest.	Unoccupied. Evidence of occupation observed i.e. leaf nest.
	Nb-10	Unoccupied	Gliders	Unoccupied. Evidence of occupation observed i.e. leaf nest.
	Nb-14	Unoccupied. Evidence of occupation observed i.e. leaf nest	Unoccupied. Evidence of occupation observed i.e. leaf nest	Unoccupied. Evidence of occupation observed i.e. leaf nest.
	Nb-15	Unoccupied	Unoccupied. Evidence of occupation observed i.e. leaf nest	Unoccupied. Evidence of occupation observed i.e. leaf nest.
	Nb-16	Unoccupied. Evidence of occupation observed i.e. leaf nest	Unoccupied. Evidence of occupation observed i.e. leaf nest	Unoccupied. Evidence of occupation observed i.e. leaf nest.
	Nb-19	Unoccupied	Unoccupied	Unoccupied. Evidence of occupation observed i.e. leaf nest.
	Nb-20	Unoccupied	Unoccupied. Evidence of occupation observed i.e. leaf nest.	Unoccupied. Evidence of occupation observed i.e. leaf nest.
	Nb-28	-	Unoccupied	Unoccupied. Evidence of occupation observed i.e. leaf nest.
	Nb-29	-	Unoccupied	Unoccupied
	Nb-36	-	-	Unoccupied. Evidence of occupation observed i.e. leaf nest.
	Nb-37	-	-	Unoccupied. Evidence of occupation observed i.e. leaf nest.
	Nb-39	-	-	Unoccupied

Nest Box		Monitoring Period		
		July 2020 - August 2021	September 2021 - July 2022	August 2022 - July 2023
Kookaburra box	Nb-22	-	Unoccupied. Evidence of occupation observed i.e. leaf nest.	Unoccupied. Evidence of occupation observed i.e. leaf nest.
	NB-23	-	Unoccupied. Evidence of occupation observed i.e. leaf nest.	Unoccupied. Evidence of occupation observed i.e. leaf nest.
	Nb-31	-	Brushtail possum	Unoccupied. Evidence of occupation observed i.e. leaf nest.
Possum Box	Nb-06	Unoccupied	Unoccupied. Evidence of occupation observed i.e. leaf nest.	Unoccupied. Evidence of occupation observed i.e. leaf nest.
	Nb-24	-	Unoccupied. Evidence of occupation observed i.e. leaf nest.	Unoccupied. Evidence of occupation observed i.e. leaf nest.
	Nb-25	-	Unoccupied	Unoccupied
	Nb-30	-	Unoccupied	Unoccupied. Evidence of occupation observed i.e. leaf nest.
	Nb-32	-	Unoccupied. Evidence of occupation observed i.e. leaf nest.	Unoccupied. Evidence of occupation observed i.e. leaf nest.
	Nb-33	-	Unoccupied	Unoccupied. Evidence of occupation observed i.e. leaf nest.
	Nb-34	-	-	Ringtail possum
	Nb-40	-	-	Unoccupied. Evidence of occupation observed i.e. leaf nest.
Black Cockatoo/ Large Owl Box	Nb-17	Unoccupied	Unoccupied. Evidence of occupation observed i.e. leaf nest	Unoccupied. Evidence of occupation observed i.e. leaf nest.

3.2 Corrective actions

One (1) nest box required maintenance due to the presence of pest species (ant nest removal) during the 2023 monitoring round. No nest boxes required replacing due to damage during the 2023 monitoring round. No corrective actions are required/outstanding at the time of this monitoring report.

4 NEXT MONITORING ROUNDS

The requirements and future survey dates for the nest box monitoring program are present in **TABLE 2**. Monitoring reports will be prepared annually.

TABLE 2
MONITORING PROGRAM REQUIREMENTS AND SURVEY DATES

Requirement	Frequency	Latest Survey Date	Next Survey Date
Nest box monitoring	Boxes physically inspected annually	July 2023	July/August 2024
Monitoring reports	Monitoring reports prepared annually	August 2023	August 2024

APPENDIX 2 – PRE-CLEARING INSPECTION & SPOTTER CATCHER REPORTS

Our Ref: AM/N202001/Lw1

23rd November 2020

Stevens Holdings Pty Ltd
C/- Ocean Park Consulting Pty Limited
PO Box 99
Miami, QLD 4220

Attention: Rangi Campbell (rangi@oceanparkqld.com.au)

Dear Rangi,

RE: Birrigan Iluka Beach – Vegetation Clearing

JWA Pty Ltd (JWA) were commissioned by Stevens Holdings Pty Ltd, the holder of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) approval issued on 22nd March 2019 (Ref No. 2017/8003), to prepare the Habitat Management Plan (HMP) required by the relevant conditions of the EPBC Act approval. The Minister of the Australian Government Department of Agriculture, Water and the Environment approved the HMP (Volume 1 and Volume 2) on the 3rd August 2020.

I have subsequently reviewed the following drawings by Burchill Engineering Solutions showing the extent of upcoming vegetation clearing works to be completed on site:

- Stage 1 – Vegetation Clearing. Drawing No. C100(A) and Drawing C200 (A); and
- Stage No. 01B – Bulk Earthworks – Overall Layout Plan. Drawing No. C100 (B)

My review has indicated that the staging arrangement is in general accordance with the relevant drawings referenced in correspondence from Clarence Valley Council (dated 24th December 2019), being Masterplan – Drawing No. PO147-04(A) dated October 2019 by Onecollective Urban Design Studio, and Development Staging Plan – Drawing No. PO147-06(A) dated October 2019 by Onecollective Urban Design Studio.

I can also confirm the proposed Vegetation Clearing and Bulk Earthworks, as identified on the current drawings by Burchill Engineering Solutions listed above, will be undertaken in accordance with the protocols and management arrangements identified in the HMP, and the works when undertaken in this manner will not adversely impact on the local biodiversity of the area.

I further note that JWA has been commissioned to manage/supervise vegetation clearing works as required by the management protocols identified in the approved HMP. To date this has

included pre-clearing inspections, collection of baseline data and installation of nest boxes. JWA will also undertake the initial HMP project briefing prior to vegetation clearing works commencing on site, will be on site to supervise vegetation clearing works, and will complete the required ecological reporting in accordance with the EPBC Act approval and the HMP.

Please do not hesitate to contact me if you require any further information.

Yours faithfully,
JWA Pty Ltd

Adam McArthur
Director / Principal Ecologist

Our Ref: AM/N202001/Lw1

10th February 2021

Stevens Holdings Pty Ltd
C/- Ocean Park Consulting Pty Limited
PO Box 99
Miami, QLD 4220

Attention: Rangi Campbell (rangi@oceanparkqld.com.au)

Dear Rangi,

RE: Birrigan Iluka Beach – Spotter Catcher Services

JWA Pty Ltd (JWA) were commissioned by Stevens Holdings Pty Ltd, the holder of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) approval issued on 22nd March 2019 (Ref No. 2017/8003), to provide spotter catcher services during clearing of vegetation occurring on land at Hickey Street, Iluka - formally described as Lot 99 on DP82363.

The following outlines the methodologies and results of the fauna spotter catcher services provided during clearing works on the 3rd and 7th – 11th December 2020.

Pre-clearance inspections

Prior to any heavy disturbance activities each day, a thorough pre-clearance inspection within the clearance boundaries was undertaken. Survey methodologies included:

- Terrestrial habitats
    - Targeted searches for indications of occupancy of rocks and rock piles, hollow logs, bark exfoliations, scattered timber and timber piles, burrows, soil cracks and termite mounds, ground nests, dense shrubs, leaf litter and grasses;
    - Occupancy indicators include: wildlife presence, scats, tracks, slide marks, food scraps or diggings.
    - Any high value terrestrial habitat was clearly delineated.

- Arboreal habitats
    - Visual searches for indications of occupancy of nests, hollows, exfoliating bark, fissures, dreys and arboreal termitaria.

- Occupancy indicators include: wildlife presence, detritus (scats/scraps/hair) in the drip zone, markings or scratches to trunk, chew marks and/or smooth entries to hollows, incisions in trunk and adult presence at nests.
- All koala food trees were searched for the presence of koalas.
- Any high value habitat was clearly delineated.

Vegetation clearance procedures

The fauna spotter catcher worked alongside the machinery operator to ensure tree felling was undertaken in a methodical, systematic way facilitating the best possible fauna management outcomes.

Communication between the fauna spotter catcher and clearing operators involved the use of UHF radios, direct communication and visual communications where appropriate.

The fauna spotter catcher directly supervised the felling and/or disturbance of all site vegetation. If no wildlife could be sighted, habitat trees were felled in a manner to cause minimal impact to features that could potentially conceal undetected fauna.

Where fauna was present in standing vegetation the tree was either left standing overnight or the animal/s was encouraged out of the tree and/or captured by the fauna spotter.

Once a habitat tree was felled the fauna spotter catcher inspected all habitat features for the presence of fauna.

Fauna spotter catcher results

ATTACHMENT 1 details the clearing location, the fauna found, the actions taken and the habitat types impacted with details as required.

Hollow-bearing tree audit

The installation of nest boxes is required to meet relevant conditions of the Clarence Valley Council (CVC) and Commonwealth Department of Environment and Energy (DEE) approvals. JWA completed an initial habitat tree audit over the proposed Stage 1 clearing area prior to clearing commencing. Eight (8) hollow-bearing trees were observed within and adjoining the Stage 1 clearing area potentially containing a total of eighteen (18) small hollows, one (1) medium hollow and one (1) large hollow.

Based on the 1:1 offset ratio required within the approved HMP, and the fauna species recorded from the site (particularly the Threatened species that rely on hollows) JWA have recommend and installed the following nest boxes:

- 9 x bat boxes (approx. 300mm l, 160mm w, 340mm h, bottom opening);
- 9 x small parrot boxes (approx. 180mm l, 200mm w, 490mm h, 75mm opening);
- 1 x possum box (approx. 260mm l, 340mm w, 460mm h, 110mm opening); and

- 1 x black cockatoo/large owl box (approx. 360mm l, 490mm w, 640mm h, 150mm opening).

The approved Habitat Management Plan (JWA 2020) notes that additional/supplementary boxes may need to be installed after the felled trees are inspected within each development stage and the numbers and characteristics of the hollows properly determined. Additional/supplementary nest boxes (if required) are to be erected as soon as possible after the clearing.

An audit of actual hollows removed from the clearing area was completed by the fauna spotter catcher (**ATTACHMENT 1**). In total, the clearing removed fourteen (14) small hollows, one (1) medium hollow and one (1) large hollow. Therefore, sufficient numbers and types of nest boxes were installed prior to clearing works and additional/supplementary nest boxes are not required at this stage.

Summary and Conclusion

All vegetation on the site was cleared/felled under the supervision of the fauna spotter/catcher. All recovered native vertebrate fauna were assessed for injuries and the appropriate actions taken.

Sufficient numbers and types of nest boxes were installed prior to clearing works and additional/supplementary nest boxes are not required at this stage.

Please do not hesitate to contact me if you require any further information.

Yours faithfully,
JWA Pty Ltd

Adam McArthur
Director / Principal Ecologist

ATTACHMENT 1 – Fauna spotter catcher data

Date	Fauna / Habitat Feature	Tree Hollow Details					Action taken
		Tree Species	DBH (m)	Height (m)	Hollows	GPS	
3rd December 2020	Small birds nest in Acacia						Lowered slowly by machine, no fauna or eggs observed. Nest relocated.
3rd December 2020	Small birds nest in Acacia						Lowered slowly by machine, no fauna or eggs observed. Nest relocated.
7th December 2020	Brown snake (*Pseudonaja textilis*)						Found dead near cleared vegetation.
7th December 2020	Blue tongue lizard (*Tiliqua scincoides*)						Rescued and relocated to retained vegetation area in good health.
7th December 2020	Hollow ground logs x 2						Large hollow ground logs left overnight to allow any fauna escape . Logs relocated to retained vegetation on 8th December 2020.
8th December 2020	Termitaria with bird entrance hole						Lowered slowly by machine, no fauna or eggs observed.
8th December 2020	Yellow-footed antechinus (*Antechinus flavipes*) with young	Stag	0.6	20	1 Medium (trunk) 2 Small (limb)	29º23'55" S 153º21' 20" E	Found within hollow. Hollow blocked and relocated, unblocked in evening (Release point: Release 29º23'50" S 153º21'11" E). One juvenile fallen from hollow found deceased. Other juveniles remained attached to mother at time of release.
8th December 2020	Birds nest in small tree						Lowered slowly by machine, no fauna or eggs observed. Nest relocated.
8th December 2020	Red-bellied black snake (*Pseudechis porphyriacus*)						Observed to self-relocate out of clearing area. Appeared healthy and uninjured.
9th December 2020	Medium hollow ground log						No fauna observed. Log hollow salvaged and relocated to retained vegetation.

Date	Fauna / Habitat Feature	Tree Hollow Details					Action taken
		Tree Species	DBH (m)	Height (m)	Hollows	GPS	
9th December 2020	Large trunk hollow on stag	Stag	0.4	4	1 Large (trunk)	29º23'50" S 153º21'16" E	Stag was "knocked" with excavator prior to clearing. No fauna were recorded within felled stag. Hollow limb was relocated to protection zone vegetation and placed on ground.
9th December 2020	Pink-tongued skink (*Cyclodomorphus gerrardii*) x2						Observed to self-relocate out of clearing area. Appeared healthy and uninjured.
9th December 2020	Bush rat (*Rattus fuscipes*)						Observed to self-relocate out of clearing area from ground log hollow. Log hollow salvaged and relocated to retained vegetation.
10th December 2020	Ground log Limb hollow				1 Small (limb)	29º23'51" S 153º21'16" E	Log hollow salvaged and relocated to retained vegetation.
10th December 2020	Yellow-footed antechinus (*Antechinus flavipes*) with young	Stag	0.4	15	1 Small (trunk) 2 Small (limb)	29º23'51" S 153º21'16" E	Observed to self-relocate out of clearing area. All appeared healthy and uninjured.
10th December 2020	Northern brown bandicoot (*Isoodon macrourus*)						Observed to self-relocate out of clearing area. Appeared healthy and uninjured.
10th December 2020	Pink-tongued skink (*Cyclodomorphus gerrardii*)						Found deceased.
10th December 2020	Lace monitor (*Varanus varius*), juvenile.						Observed to self-relocate out of clearing area. Appeared healthy and uninjured.
10th December 2020	Hollows	Stag	0.5	20	2 Small (limb)	29º23'53" S 153º21'17" E	Stag was "knocked" with excavator prior to clearing. No fauna were recorded within felled stag. Hollow limb was relocated to protection zone vegetation and placed on ground.

Date	Fauna / Habitat Feature	Tree Hollow Details					Action taken
		Tree Species	DBH (m)	Height (m)	Hollows	GPS	
10th December 2020	6 - 8 unidentified Microchirpoteran bats	Stag	0.5	20	3 Small (limb)	29°23'53" S 153°21'17" E	Stag was "knocked" with excavator prior to clearing. Unidentified Microchirpoteran bats were observed to exit from stag into another nearby stag. Machine was stopped and both stags left overnight.
10th December 2020	Yellow-footed antechinus (Antechinus flavipes) with young	Stag	0.4	12	1 Small (trunk) 1 small (limb)	29°23'51" S 153°21'17" E	Captured and placed into salvaged hollow and entrance blocked. Relocated to retained vegetation. Entrance unblocked that evening approx. 6pm.
10th December 2020	Termitaria	Bloodwood	0.4	15	1 Small entrance	29°23'52" S 153°21'17" E	3 small bird eggs fell from birds nest inside termite nest. Eggs were determined to be infertile and were destroyed.
11th December 2020	Stags with 6 - 8 unidentified Microchirpoteran bats described above				As above	As above	Stags were "knocked" with excavator first thing in morning approx. 7am. Weather was overcast with showers. 6-8 microbats evacuated middle stag and flew west into protection zone vegetation. No fauna were recorded within felled stags. 6 hollow limbs were relocated to protection zone vegetation and placed on ground.

Our Ref: AM/N202001/Lw1

16th September 2021

Stevens Holdings Pty Ltd
C/- Ocean Park Consulting Pty Limited
PO Box 99
Miami, QLD 4220

Attention: Rangi Campbell (rangi@oceanparkqld.com.au)

Dear Rangi,

RE: Birrigan Iluka Beach – Spotter Catcher Services (Stage 2 Clearing Works)

JWA Pty Ltd (JWA) were commissioned by Stevens Holdings Pty Ltd, the holder of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) approval issued on 22nd March 2019 (Ref No. 2017/8003), to provide fauna spotter catcher services during Stage 2 vegetation clearing works which occurred on land at Hickey Street, Iluka - formally described as Lot 99 on DP82363.

The following outlines the methodologies and results of the fauna spotter catcher services provided during clearing works between the 23rd August and 8th September 2021.

Pre-clearance inspections

Prior to any heavy disturbance activities each day, a thorough pre-clearance inspection within the clearance boundaries was undertaken. Survey methodologies included:

- Terrestrial habitats
    - Targeted searches for indications of occupancy of rocks and rock piles, hollow logs, bark exfoliations, scattered timber and timber piles, burrows, soil cracks and termite mounds, ground nests, dense shrubs, leaf litter and grasses;
    - Occupancy indicators include: wildlife presence, scats, tracks, slide marks, food scraps or diggings.
    - Any high value terrestrial habitat was clearly delineated.

- Arboreal habitats
    - Visual searches for indications of occupancy of nests, hollows, exfoliating bark, fissures, dreys and arboreal termitaria.

- Occupancy indicators include: wildlife presence, detritus (scats/scraps/hair) in the drip zone, markings or scratches to trunk, chew marks and/or smooth entries to hollows, incisions in trunk and adult presence at nests.
- All koala food trees were searched for the presence of koalas.
- Any high value habitat was clearly delineated.

Vegetation clearance procedures

The fauna spotter catcher worked alongside the machinery operator to ensure tree felling was undertaken in a methodical, systematic way facilitating the best possible fauna management outcomes.

Communication between the fauna spotter catcher and clearing operators involved the use of UHF radios, direct communication and visual communications where appropriate.

The fauna spotter catcher directly supervised the felling and/or disturbance of all site vegetation. If no wildlife could be sighted, habitat trees were felled in a manner to cause minimal impact to features that could potentially conceal undetected fauna.

Where fauna was present in standing vegetation the tree was either left standing overnight or the animal/s was encouraged out of the tree and/or captured by the fauna spotter.

Once a habitat tree was felled the fauna spotter catcher inspected all habitat features for the presence of fauna.

Fauna spotter catcher results

ATTACHMENT 1 details the clearing location, the fauna found, the actions taken and the habitat types impacted with details as required. No fauna injuries or fatalities were observed from clearing operations.

Hollow-bearing tree audit

The installation of nest boxes was required to meet relevant conditions of the Clarence Valley Council (CVC) and Commonwealth Department of Environment and Energy (DEE) approvals. JWA completed an initial habitat tree audit over the proposed Stage 2 clearing area prior to clearing commencing. Eight (8) hollow-bearing trees were observed within and adjoining the Stage 2 clearing area potentially containing a total of twenty-one (21) small hollows, five (5) medium hollows and three (3) large hollows.

The approved Habitat Management Plan (JWA 2020) notes that additional/supplementary boxes may need to be installed after the felled trees are inspected within each development stage and the numbers and characteristics of the hollows properly determined. Additional/supplementary nest boxes (if required) are to be erected as soon as possible after the clearing.

It is noted that the following nest boxes were installed prior to Stage 1 clearing works in December 2020:

- 9 x bat boxes (approx. 300mm l, 160mm w, 340mm h, bottom opening);
- 9 x small parrot boxes (approx. 180mm l, 200mm w, 490mm h, 75mm opening);
- 1 x possum box (approx. 260mm l, 340mm w, 460mm h, 110mm opening); and
- 1 x black cockatoo/large owl box (approx. 360mm l, 490mm w, 640mm h, 150mm opening).

Nest box monitoring was completed prior to the recent Stage 2 clearing works (completed in August 2021) and determined that only three (3) of the nest boxes were currently occupied or showed signs of usage (i.e. 3 x bat boxes). It was not considered necessary, therefore, to install any additional nest boxes prior to commencement of the Stage 2 clearing works.

An audit of actual hollows removed from the clearing area was completed by the fauna spotter catcher (**ATTACHMENT 1**). In total, the clearing removed twenty-four (24) small hollows, five (5) medium hollows and four (4) large hollows.

Based on the 1:1 offset ratio required within the approved HMP, the fauna species recorded from the site (particularly the Threatened species that rely on hollows), and with consideration of the nest boxes previously installed that are not currently in use, JWA recommends that the following additional nest boxes are installed:

- 3 x bat boxes (approx. 300mm l, 160mm w, 340mm h, bottom opening);
- 3 x small parrot boxes (approx. 180mm l, 200mm w, 490mm h, 75mm opening);
- 4 x possum box (approx. 260mm l, 340mm w, 460mm h, 110mm opening); and
- 3 x black cockatoo/large owl box (approx. 360mm l, 490mm w, 640mm h, 150mm opening).

Summary and Conclusion

All vegetation on the site was cleared/felled under the supervision of the fauna spotter/catcher. All recovered native vertebrate fauna were assessed for injuries and the appropriate actions taken.

Sufficient numbers and types of nest boxes were installed prior to clearing works and additional/supplementary nest boxes are now proposed to be installed ASAP.

Please do not hesitate to contact me if you require any further information.

Yours faithfully,
JWA Pty Ltd

Adam McArthur
Director / Principal Ecologist

Attachment 1

Michael Hallinan
Arbor Ecological
334 Pearces Creek Road
Alstonville NSW 2477
Ph: 02 6628 0365
Mob: 0424 064 002
e: arborecological@netspace.net.au
www.arborecological.com.au

Date 13/09/21

JWA Ecological Consultants Pty Ltd
Attn. Adam McArthur

Re: Birrigan Iluka Beach Stage 2 ecologist pre-clearing inspections and spotter catcher ecologist monitoring of clearing works

Between 23/08/21 and 08/09/21 ecologists Michael Hallinan and Annika Hallinan completed daily pre-clearing fauna inspections and undertook spotter catcher ecologist monitoring during tree clearing works on days when tree clearing occurred.

Reference was made to hollow-bearing trees previously recorded from the site and substantially hollow-bearing trees and fallen logs were re-flagged.

Tree clearing was undertaken with excavators using a two stage clearing process as follows:

- Non-hollow bearing trees were cleared first and vegetation was cleared around hollow bearing trees to isolate them for at least 24 hours.
- Hollow bearing trees were gently bumped by an excavator three times over a minimum five minute period with a minimum of one minute pause between bumps. The aim of this procedure is to encourage nesting, sheltering or roosting hollow dependant fauna to disperse.
- At least one minute after the final bump, the subject trees were felled as gently as possible to avoid possible injury to any fauna remaining within hollows.
- Once felled, the project ecologist inspected hollows at ground level with the aid of bright torchlight and a pointed metal probe. Estimates of hollow numbers and opening size ranges were recorded.
- Substantially hollow-bearing trees were left in situ for at least 48 hours after being felled to permit any remaining fauna to self relocate.
- Any non-mobile fauna detected within clearing areas were relocated to suitable habitat in identified environmental protection zones on the site with consideration of appropriate fauna release times and release locations.

Pre-clearing searches and habitat inspections were made before works commenced on each day of clearing. Searches targeted clearing areas and adjoining areas including the central gully where most of the hollow bearing trees and koala food trees were located. Tree crowns were examined with the aid of binoculars and a pointed metal probe was used to examine dead sections and under decorticating bark of living and dead trees. Fauna scat searches were made near the base of koala food trees and stags/ dead standing trees.

Searches were also made following tree clearing of any small hollowed sections associated with deadwood and branch shedding with the aid of a pointed metal probe and high-powered torch light. Cleared trees were then moved to into piles for processing. Spotter catcher ecologist monitoring of clearing works continued until works were completed on 08/09/21.

Details for the most substantial fauna observations and fauna habitat observations are included below in Table 1. Two emus were observed by the project foreman in the week prior to commencement of clearing in the Stage 1 portion of the site. The local Emu population is part of the listed endangered

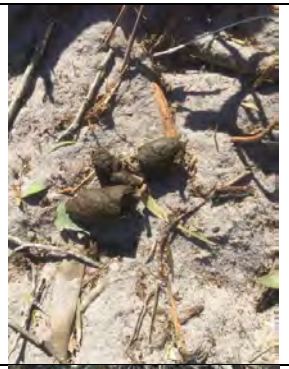
Emu population in the NSW North Coast Bioregion and Port Stephens Local Government Area. No koalas or signs of koala use or occupation (or other threatened species) were detected and no fauna injuries or fatalities were observed from clearing operations.

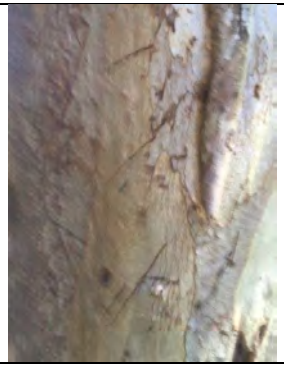
Don't hesitate to contact me if you require clarification or further information regarding works undertaken or findings.

Regards
Michael Hallinan

Bachelor of Applied Science - Environmental Resource Management
Diploma in Arboriculture - AQF Level 5
Associate Diploma in Horticulture (Arboriculture)

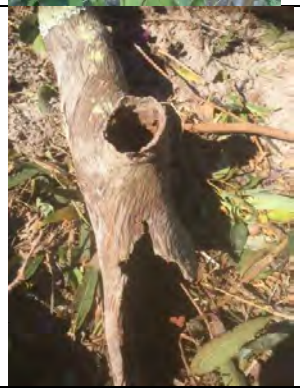
Table 1. Ecological data from tree clearing, Birrigan Iluka Beach Stage 2

Date	Fauna / Habitat Feature	Tree Species	DBH (m)	Height (m)	Hollows	GPS	Details	Photos
23/08/21	Fresh wallaby scats in clearing area							
23/08/21	Numerous cone-shaped fauna diggings typical of bandicoot							

Date	Fauna / Habitat Feature	Tree Species	DBH (m)	Height (m)	Hollows	GPS	Details	Photos
24/08/21	4x flagged hollow fallen ground logs and log piles						Clearing surrounding vegetation and exposed log piles left for 48 hours to allow any occupying fauna to relocate. 2 substantially hollow logs able to be moved to environmental protection zone without breaking up due to decay	
24/08/21	Fauna scratch marks typical of Lace Monitor on several smooth barked trees	*Eucalyptus tereticornis* Forest Red Gum						

Date	Fauna / Habitat Feature	Tree Species	DBH (m)	Height (m)	Hollows	GPS	Details	Photos
25/08/21	Stag/ dead standing tree with Lace Monitor in spout			9m	Hollow stem and 3 small to medium sized hollow branches/ spouts	S 29.39980567 E 153.3561492	Relocated to environmental protection zone intact with Lace Monitor unharmed	
25/08/21	Stag/ dead standing tree			8m	5 small hollow branches/ spouts	S 29.39870108 E 153.3530759		
26/08/21	Stag/ dead standing tree with Lace Monitor			9m	Hollow stem and 2 medium sized hollow branches/ spouts	S 29.3985729 E 153.3570149	Relocated to environmental protection zone intact with Lace Monitor unharmed	
26/08/21	Vacant/ disused ground burrow with 10cm opening					S 29.39940966 E 153.3575201		

Date	Fauna / Habitat Feature	Tree Species	DBH (m)	Height (m)	Hollows	GPS	Details	Photos
27/08/21	Basal hollow and hollow branches	2x *Lophostemon confertus* Brushbox		16m	Hollow stem and 2 small to medium sized hollow branches/ spouts			
30/08/21	Vacant disused small bird's nest in wattle						Wattle housing nest was gently lowered to allow inspection of nest. No fauna or eggs present. Nest relocated to environmental protection zone	
30/08/21	Vacant small ground burrow inspected prior to clearing							

Date	Fauna / Habitat Feature	Tree Species	DBH (m)	Height (m)	Hollows	GPS	Details	Photos
01/09/21	Unharmed native Bush Rat ran from fallen log pile when disturbed							
01/09/21	Vacant disused tunnel/ nest chamber in sand mound typical of Rainbow Bee-eater inspected prior to disturbance							
01/09/21	Small branch hollows relocated to environmental protection zone as potential habitat							

Date	Fauna / Habitat Feature	Tree Species	DBH (m)	Height (m)	Hollows	GPS	Details	Photos
01/09/21	Wallaby jaws found in clearing area							
03/09/21	Major Skink relocated from clearing area to environmental protection zone							
03/09/21	Vacant disused small bird's nest from wattle						Nest in wattle was gently lowered to allow inspection. No fauna or eggs present. Nest relocated to environmental protection zone	

Date	Fauna / Habitat Feature	Tree Species	DBH (m)	Height (m)	Hollows	GPS	Details	Photos
03/09/21	2x adult Eastern Blue-tongue Lizards relocated from clearing area to environmental protection zone							
3/12/20	Golden Whistler, one of numerous commonly occurring mobile bird species observed within, above and adjoining clearing areas							
6/09/21	Small vacant hollows in coalescent fig roots inspected prior to tree removal	*Ficus watkinsiana* Watkin's Fig		14m				

Date	Fauna / Habitat Feature	Tree Species	DBH (m)	Height (m)	Hollows	GPS	Details	Photos
6/09/21	Stag/ dead standing tree gently lowered revealing unharmed Common Brushtail Possum following partial break of main stem			9m	Large stem hollow and 2 small to medium sized upper hollow branches/ spouts	S 29.39938 E 153.35669	Stag undisturbed for 48 hours and bulk branches applied over possum occupied section for dense shade to allow possum to self-relocate in the evening (confirmed self-relocation on 8/9/21). Hollow stem relocated to environmental protection zone	
6/09/21	Juvenile Pink-tongued Lizard relocated from clearing area to environmental protection zone							

Date	Fauna / Habitat Feature	Tree Species	DBH (m)	Height (m)	Hollows	GPS	Details	Photos
6/09/21	HT 21 Stag/ dead standing tree			9m	3 small to medium sized upper hollow branches/ spouts	S 29.39950 E 153.35661		
709/21	HT 6. Stag/ dead standing tree				Stem hollow and 3 small sized upper hollow branches/ spouts	S 29.39962 E 153.35614	Active Tree Termites (*Nasutitermes walkeri*)	
7/09/21	Dead Broad-leaved Paperbark with cultural significance relocated from vegetation adjoining Elizabeth Street to environmental protection zone	Dead *Melaleuca quinquenervia* Broad-leaved Paperbark			Large main stem hollow		No occupying fauna observed in hollowed sections	
8/09/21	Stag/ dead standing tree			6m	Large stem hollow open at top	S 29.39950 E 153.35632	Highly decayed. Hollow stem relocated to environmental protection zone	

Date	Fauna / Habitat Feature	Tree Species	DBH (m)	Height (m)	Hollows	GPS	Details	Photos
8/09/21	Stag/ dead standing tree			7m	Large stem hollow and 3 medium sized upper hollow branches/ spouts	S 29.39931 E 153.35629	Relocated to environmental protection zone	
8/09/21	Stag/ dead standing tree			6m	Large stem hollow open at top	S 29.39928 E 153.35640	Highly decayed and unable to be relocated to environmental protection zone	
8/09/21	Stag/ dead standing tree			11m	Stem hollow and 3 small spouts at top	S 29.39899 E 153.35660	Relocated to environmental protection zone	
8/09/21	Stag/ dead standing tree			9m	Basal stem hollow	S 29.39907 E 153.35658	Highly decayed and unable to be relocated to environmental protection zone	
8/09/21	Stag/ dead standing tree			9m	Stem hollow and 3 small spouts at top	S 29.39948 E 153.35652	Relocated to environmental protection zone	

Date	Fauna / Habitat Feature	Tree Species	DBH (m)	Height (m)	Hollows	GPS	Details	Photos
9/09/21	Mature Land Mullet						Detected by machine operator following completion of clearing and relocated to environmental protection zone unharmed	

Our Ref: AM/N202001/Lw1

8th August 2022

Stevens Holdings Pty Ltd
C/- Ocean Park Consulting Pty Limited
PO Box 99
Miami, QLD 4220

Attention: Rangi Campbell (rangi@oceanparkqld.com.au)

Dear Rangi,

RE: Birrigan Iluka Beach – Spotter Catcher Services (Stage 3 & 4 Clearing Works)

JWA Pty Ltd (JWA) were commissioned by Stevens Holdings Pty Ltd, the holder of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) approval issued on 22nd March 2019 (Ref No. 2017/8003), to provide fauna spotter catcher services during Stage 3 and 4 (cleared simultaneously) vegetation clearing works which occurred on land at Hickey Street, Iluka - formally described as Lot 99 on DP82363.

The following outlines the methodologies and results of the fauna spotter catcher services provided during clearing works between the 30th May and 22nd June 2022.

Pre-clearance inspections

Prior to any heavy disturbance activities each day, a thorough pre-clearance inspection within the clearance boundaries was undertaken. Survey methodologies included:

- Terrestrial habitats
    - Targeted searches for indications of occupancy of rocks and rock piles, hollow logs, bark exfoliations, scattered timber and timber piles, burrows, soil cracks and termite mounds, ground nests, dense shrubs, leaf litter and grasses;
    - Occupancy indicators include: wildlife presence, scats, tracks, slide marks, food scraps or diggings.
    - Any high value terrestrial habitat was clearly delineated.

- Arboreal habitats
    - Visual searches for indications of occupancy of nests, hollows, exfoliating bark, fissures, dreys and arboreal termitaria.

- Occupancy indicators include: wildlife presence, detritus (scats/scraps/hair) in the drip zone, markings or scratches to trunk, chew marks and/or smooth entries to hollows, incisions in trunk and adult presence at nests.
- All koala food trees were searched for the presence of koalas.
- Any high value habitat was clearly delineated.

Vegetation clearance procedures

The fauna spotter catcher worked alongside the machinery operator to ensure tree felling was undertaken in a methodical, systematic way facilitating the best possible fauna management outcomes.

Communication between the fauna spotter catcher and clearing operators involved the use of UHF radios, direct communication and visual communications where appropriate.

The fauna spotter catcher directly supervised the felling and/or disturbance of all site vegetation. If no wildlife could be sighted, habitat trees were felled in a manner to cause minimal impact to features that could potentially conceal undetected fauna.

Where fauna was present in standing vegetation the tree was either left standing overnight or the animal/s was encouraged out of the tree and/or captured by the fauna spotter.

Once a habitat tree was felled the fauna spotter catcher inspected all habitat features for the presence of fauna.

Fauna spotter catcher results

ATTACHMENT 1 details the clearing location, the fauna found, the actions taken and the habitat types impacted with details as required. No fauna injuries or fatalities were observed from Stage 3 and 4 clearing operations.

Hollow-bearing tree audit

The installation of nest boxes is required to meet relevant conditions of the Clarence Valley Council (CVC) and Commonwealth Department of Environment and Energy (DEE) approvals. JWA completed an initial habitat tree audit over the proposed Stage 3 and 4 clearing area prior to clearing commencing.

It is noted that the following nest boxes were installed prior to Stage 1 clearing works in December 2020:

- 9 x bat boxes (approx. 300mm l, 160mm w, 340mm h, bottom opening);
- 9 x small parrot boxes (approx. 180mm l, 200mm w, 490mm h, 75mm opening);
- 1 x possum box (approx. 260mm l, 340mm w, 460mm h, 110mm opening); and
- 1 x black cockatoo/large owl box (approx. 360mm l, 490mm w, 640mm h, 150mm opening).

Additional boxes were installed as required post Stage 2 clearing works in 13th January 2022:

- 3 x bat boxes (approx. 300mm l, 160mm w, 340mm h, bottom opening);
- 3 x small parrot boxes (approx. 180mm l, 200mm w, 490mm h, 75mm opening);
- 4 x possum box (approx. 260mm l, 340mm w, 460mm h, 110mm opening); and
- 3 x black cockatoo/large owl box (approx. 360mm l, 490mm w, 640mm h, 150mm opening).

The approved Habitat Management Plan (JWA 2020) notes that additional/supplementary boxes may need to be installed after the felled trees are inspected within each development stage and the numbers and characteristics of the hollows properly determined. Additional/supplementary nest boxes (if required) are to be erected as soon as possible after the clearing.

Nest box monitoring (July 27th) was completed after the recent Stage 3 and 4 clearing works and determined that seventeen (17) of the thirty-three (33) nest boxes were currently occupied or showed signs of usage. An additional two (2) bat boxes were also recorded in use in 2021.

An audit of actual hollows removed from the clearing area was completed by the fauna spotter catcher (**ATTACHMENT 1**). In total, the clearing removed fifteen (15) small hollows, eleven (11) medium hollows and seven (7) large hollows.

Based on the 1:1 offset ratio required within the approved HMP, the fauna species recorded from the site (particularly the Threatened species that rely on hollows), and with consideration of the nest boxes previously installed that are not currently in use, JWA recommends that the following additional nest boxes are installed:

- 2 x bat boxes (approx. 300mm l, 160mm w, 340mm h, bottom opening);
- 4 x small parrot boxes (approx. 180mm l, 200mm w, 490mm h, 75mm opening); and
- 1 x possum box (approx. 260mm l, 340mm w, 460mm h, 110mm opening).

Summary and Conclusion

All vegetation on the site was cleared/felled under the supervision of the fauna spotter/catcher. All recovered native vertebrate fauna were assessed for injuries and the appropriate actions taken. No fauna injuries or fatalities were observed from Stage 3 and 4 clearing operations.

Sufficient numbers and types of nest boxes were installed prior to clearing works. Based on an audit of actual hollows removed from the clearing area completed by the fauna spotter catcher and with consideration of the 1:1 offset ratio required within the approved HMP, the fauna species recorded from the site (particularly the Threatened species that rely on hollows), and the nest boxes previously installed that are not currently in use, seven (7) additional / supplementary nest boxes are now proposed to be installed ASAP.

Please do not hesitate to contact me if you require any further information.

Yours faithfully,
JWA Pty Ltd

Adam McArthur
Director / Principal Ecologist

Michael Hallinan
Arbor Ecological
334 Pearces Creek Road
Alstonville NSW 2477
Ph: 02 6628 0365
Mob: 0424 064 002
e: arborecological@netspace.net.au
www.arborecological.com.au

Date 27/06/22

JWA Ecological Consultants Pty Ltd
Attn. Adam McArthur

Re: Birrigan Iluka Beach Stage 3 ecologist pre-clearing inspections and spotter catcher ecologist monitoring of clearing works

Between 30/05/22 and 22/06/22 ecologists Michael Hallinan, Annika Hallinan and Jordan Rochfort completed daily pre-clearing fauna inspections and undertook spotter catcher ecologist monitoring during tree clearing works on days when tree clearing occurred.

Tree clearing was undertaken with excavators using a two stage clearing process as follows:

- Living and dead standing and fallen trees and logs suspected to be substantially hollow-bearing were flagged for clearing in the second stage of the clearing process.
- The first stage of the clearing process focused on clearing of non-hollow bearing trees and vegetation around hollow bearing trees to isolate them for at least 24 hours.
- For stage two clearing, hollow bearing trees were gently bumped by an excavator three times over a minimum five minute period with a minimum of one minute pause between bumps. The aim of this procedure is to encourage nesting, sheltering or roosting hollow dependent fauna to disperse.
- At least one minute after the final bump, the subject trees were felled as gently as possible to avoid possible injury to any fauna remaining within hollows.
- Once felled, the project ecologist inspected hollows at ground level with the aid of bright torchlight and a pointed metal probe. Estimates of hollow numbers and opening size ranges were recorded.
- Substantially hollow-bearing trees were left in situ for at least 48 hours after being felled to permit any remaining fauna to self-relocate.
- Any non-mobile fauna detected within clearing areas were relocated to suitable habitat in identified environmental protection zones on the site with consideration of appropriate fauna release times and release locations.

Pre-clearing searches and habitat inspections were made before works commenced on each day of clearing. Searches targeted clearing areas, vegetation piles and environmental protection zones. Tree crowns were examined with the aid of binoculars and a pointed metal probe was used to examine dead sections and under decorticating bark of living and dead trees. Searches for fauna scats, pellets and other signs of fauna use and occupation were made near the base of large trees and stags/ dead standing trees.

Searches were also made following tree clearing of any small hollowed sections associated with deadwood and branch shedding with the aid of a pointed metal probe and high-powered torch light. Cleared trees were then moved to into piles for processing. Spotter catcher ecologist monitoring of clearing works continued until works were completed on 22/06/22.

Vacant hollow stems, branches, and pipes/ spouts were recorded with approximate opening sizes of small (<6cm), medium (6 – 12cm) and large (>12cm) as follows,

- 3 large, 4 medium and 5 small hollows in fallen hollow logs and piles.
- 2 large, 2 medium and 4 small hollows in Brush Box (*Lophostemon confertus*).
- 1 medium and 2 small hollows in Pink Bloodwood (*Corymbia intermedia*).
- 2 large, 4 medium and 4 small hollows in standing dead stags.

Threatened Eastern Osprey and White-bellied Sea-eagle were observed flying over the site. No other signs of threatened species use or occupation, including koalas, were detected and no fauna injuries or fatalities were observed from clearing operations.

Numerous commonly occurring bird and skink species were observed on the site, flying over, and in environmental protection zones. Details of fauna and other fauna habitat observations are included below in Table 1.

Don't hesitate to contact me if you require clarification or further information regarding works undertaken or findings.

Regards
Michael Hallinan

Bachelor of Applied Science - Environmental Resource Management
Scientific License SL100965 – Ecological survey/ consultancy
Biodiversity Assessment Method (BAM) Accredited Assessor: BAAS21025
Diploma in Arboriculture - AQF Level 5
Associate Diploma in Horticulture (Arboriculture)

Table 1. Ecological data from tree clearing, Birrigan Iluka Beach Stage 3

Date	Fauna / Habitat Feature	Details	Photos
Various	Red-necked Wallaby *Notamacropus rufogriseus*	Regularly observed on site	 
30/05/22	Southern Dwarf Crowned Snake *Cacophis krefftii*	Within clearing area. Relocated to environmental protection zone	 
01/06/22	Native bee nest	Hollow with nest relocated to environmental protection zone	
01/06/22	European bee nest	Hollow with nest relocated to environmental protection zone	

Date	Fauna / Habitat Feature	Details	Photos
02/06/22	Mature Land Mullet, *Bellatorias major*	Within clearing area. Relocated to environmental protection zone	 
Various	Hollow bearing trees	Relocated to environmental protection zone	 
06/06/22 & 14/06/22	Gould's Goanna *Varanus gouldii*	Within clearing area. Relocated to environmental protection zone	 
07/06/22 & 15/06/22	Common Eastern Froglet *Crinia signifera*	Within clearing area. Relocated to environmental protection zone	

Date	Fauna / Habitat Feature	Details	Photos
Various	Dense understory vegetation	Pre clearing searches with the aid of a pointed metal probe	
17/06/22 & 22/06/22	Disused bird's nest	Relocated to environmental protection zone	
21/06/22	Peron's Tree Frog, *Litoria peronii*	Relocated to environmental protection zone	
Various	Active Tree Termite nest (*Nasutitermes walkeri*)	Relocated to environmental protection zone	

APPENDIX 3 – SITE PHOTOGRAPHS – WOOD CHIP IN PROGRESS

BIRRIGAN ILUKA BEACH
SITE PHOTOGRAPHS – WOOD CHIP IN PROGRESS
PHOTOGRAPHS TAKEN – 15 DECEMBER 2020

Photo 1: Wood chip operation in progress. Looking from Micalo + Elizabeth Street intersection to the project site.

Photo 2: Wood chip stockpile north of Lot 1 Park C + F. Wood chip mulch berm to Lot 1 perimeter.

Photo 3: Excavators feeding wood chip grinder on western portion of Stage 1 looking from Elizabeth Street future emergency access position.

Photo 4: Wood chip / mulch berm to edge of vegetation clearing along north / eastern internal boundary taken from existing access track.

Photo 5: "Green vegetation shoots" coming through, wood chip stockpiles looking south towards Elizabeth Street just to west of Micalo Street intersection.

Photo 6: From northern Stage 1 clearing boundary looking south towards existing bushfire trail fence behind stockpile and Lot 1 (Park C) partly behind fence + part red flag demarcation.

Photo 7: Wood chip / mulch berm to perimeter of construction compound area off Lot 7020 + Hickey Street.

Photo 8: Wood chip / mulch stockpile + berm to perimeter access to Hickey Street looking from site towards Iluka Golf Club.

APPENDIX 4 - RETAINED HABITAT MONITORING REPORT 2023

JWA PTY LTD
Ecological Consultants
ABN 56 066 448 879

VEGETATION MONITORING REPORT

Birrigan Iluka Beach, Iluka
Lot 99 on DP823635

A Report Prepared for
The Stevens Group

OCTOBER 2023

JWA Pty Ltd
PO Box 650, Jimboomba QLD 4280
p 07 3219 9436 ● **e** brisbane@jwaec.com.au

www.jwaec.com.au

DOCUMENT CONTROL

Document

Title	Baseline Vegetation Monitoring Report
Job Number	N202001
File Reference	\\SERVER\data\2020 CLIENTS\202001 - Birrigan Iluka Beach - Iluka\Annual Monitoring - Veg
Version and Date	RW1 31/10/2023
Client	The Stevens Group

Revision History (office use only)

Issue	Version	Draft /Final	Date Sent	Distributed To	No. Copies	Media	Delivery Method
1	RW1	FINAL	31/10/23	JWA	1	.docx	Email

Client Issue

Version	Date	Author		Approved by	
		Name	Initials	Name	Initials
RW1	31/10/23	Nicole Davies/ Adam McArthur	ND/ AM	Adam McArthur	AM

TABLE OF CONTENTS

1 INTRODUCTION

1.1 Background

JWA Pty Ltd (JWA) have been engaged by The Stevens Group to undertake monitoring of vegetation at the Birrigan Iluka Beach development site, located at Hickey Street, Iluka - formally described as Lot 99 on DP823635.

The Birrigan Iluka Beach development is an approved 141 lot community scheme subdivision over the subject land (**FIGURES 1 & 2**). The subdivision incorporates 140 residential allotments and one (1) Community Property allotment (Lot 1) containing retained bushland. The Community Property Lot will be owned and maintained by the Birrigan Iluka Beach Association.

JWA previously prepared a Habitat Management Plan (HMP) (JWA 2020) which included an amelioration strategy designed to minimise the impacts on fauna during both the construction and operational phases, undertake nature regeneration/revegetation works and to ensure that ecological processes and corridor function within the identified rehabilitation areas are protected and amplified. The HMP contains a detailed monitoring program, including baseline and ongoing monitoring and reporting.

This report details the methodology and results of the vegetation monitoring completed across the site between November 2020 and November 2023.

1.2 Monitoring Requirements

In accordance with the HMP (JWA 2020) baseline monitoring was completed within the Community Property (Lot 1) and Bushland Park areas in November 2020 (i.e. prior to the commencement of works on the site) by suitably qualified person.

Ongoing monitoring is required six (6) monthly after commencement of rehabilitation works in each stage until the establishment period performance criteria are met, and then annually during the maintenance period.

Monitoring has been completed within the Community Property (Lot 1) and Bushland Park areas in June 2022, February 2023 and July 2023. Where rehabilitation works have commenced in these areas, monitoring was part of ongoing monitoring. Where rehabilitation works had yet to commence in these areas, baseline monitoring results were updated.

Weed control and rehabilitation works commenced on 27th September 2021 and follow-up inspection and treatment/weed monitoring visits continued on a monthly basis during the establishment period and have continued during the maintenance period. Stage 1 rehabilitation works were accepted as 'On Maintenance' on 23rd March 2022. The approved HMP (JWA 2020) states that "ongoing maintenance will continue for a minimum period of two (2) years or until the Revegetation Area becomes self-sustaining. A self-sustaining site is achieved once canopy closure is achieved, and all weeds are removed". Stage 1 rehabilitation works were certified in May 2023 to be self-sustaining and are therefore accepted as 'Off Maintenance'. Therefore,

PROJECT:
ILUKA
LOT 99 ON DP 823635

LOCATION:
ILUKA ROAD, ELIZABETH, RIVERVIEW AND HICKEY STREETS
ILUKA, NSW, 2466

DEVELOPMENT CHARACTERISTICS	
ITEM	DESCRIPTION
PROPERTY DESCRIPTION	LOT 99 DP823635
AREA OF LOT 99	19.41 ha.
TOTAL NUMBER OF LOTS	141
PART LOT 1 (Approx.)	5.29 ha.

CLARENCE VALLEY COUNCIL
APPROVAL

This is the plan referred to in Council's Notice of Determination of SUB2015/0034

Date: 13/11/2019

BIKE / PATHWAY CONNECTION TO ILUKA ROAD
- BIKE LANE SITUATED ON THE NORTH EASTERN SIDE OF THE ILUKA ROAD INTERSECTION WITH HICKEY STREET AND TO PROVIDE A REFUGE ISLAND ON ILUKA ROAD

LOT 93 DP 1105124
LOT 64 DP 41701
LOT 7020 DP 1114873
LOT 971 DP 876936
LOT 972 DP 876936
LOT 18 DP 243136
LOT 7019 DP 1114862
LOT 7018 DP 1115127

New Bushfire Trail Connection

HICKEY STREET
ILUKA ROAD
RIVERVIEW STREET (UNFORMED PORTION)
STREET 1
STREET 2
STREET 3
STREET 4
STREET 5
STREET 6
STREET 7
STREET 8
AWAY 3

PART LOT 1 (PARK B)
PART LOT 1 (PARK D)
PART LOT 1 (PARK A)
PART LOT 1 (PARK C)
PART LOT 1 (PARK F)
PART LOT 1 (PARK E)

bike / pathway
16m (reserve)
25m (reserve)
35m

Emergency Access Only
MICALO STREET
BIKE / PATHWAY CONNECTION TO MICALO STREET
ELIZABETH STREET
MAINTAIN EXISTING BUSHFIRE TRAIL ACCESS TO ILUKA ROAD
REALIGN EXISTING BUSHFIRE TRAIL

STREETS FOR LIVING - CHARACTERISTICS				
STREET	RESERVE WIDTH (m)	VERGE WIDTH (m)	TOTAL SEAL WIDTH (m)	CUL DE SAC DIAMETER (m)
HICKEY STREET	30 EXISTING	VARIES	8	-
1	20	6	8	30 outer, 15 inner
2	20 (*1)	6 (*1)	8	-
3	25	6 (*2)	8	20
4, 6, 7	20	6	8	-
5, 8	20	6	8	20
AWAY 3	VARIES	3.5 (*3)	4	-

PURPOSE OF STREET CORRIDORS
- STREET FOR LIVING
- WATER SENSITIVE URBAN DESIGN CORRIDOR
- INFRASTRUCTURE CORRIDOR
- FAUNA / FLORA CORRIDOR

AWAY - MEANS ACCESS WAY

NOTES:
(* 1) - RESERVE WIDTH INCREASED TO 25m (AND VERGE OF 11m) TO ACCOMMODATE WSUD TREATMENT WITHIN RESERVE ON PARK SIDE OF STREET 2
- VERGE REDUCES TO 2m ON PARKSIDE FOR NORTHERN PART OF STREET 2 WHERE DETENTION / WSUD NOT REQUIRED. EXISTING RESERVE WIDTH APPROX. 30m FOR NORTHERN SECTION WHERE STREET 2 IS ACCOMMODATED WITHIN EXISTING HICKEY STREET RESERVE
(* 2) - VERGE WIDTH INCREASED TO 11m ON PARKSIDE TO ACCOMMODATE WSUD TREATMENT
(* 3) - ON SIDE WITH LOT ACCESS ONLY - REDUCED / VARIED VERGE WIDTH ON NON-ACCESS SIDE

TYPICAL ALLOTMENT ATTRIBUTES		
AREA (m2)	WIDTH (m)	LENGTH (m)
>400	13-14	30-35
500	14	35
600	17.5	35
700	19	37

NOTES:
1. **These notes form part of this plan.**
2. **Boundaries identified by plan dimensions only, the boundaries have not been surveyed.**
3. **Adjoining property boundary boundaries may not be complete, a summary of compiled DCDB only.**
4. **The dimensions, bearings, areas and number of allotments shown on this plan are subject to field survey and approval of relevant Government Authorities having jurisdiction over statutory requirements pursuant to any relevant legislation.**
5. **The information for this plan has been prepared for the purpose of a Development Approval for Subdivision and should not be used for any other purpose.**
6. **This plan has been prepared for the Stevens Group.**
7. **Do not scale from this plan.**

note: the layout is preliminary only and subject to detailed engineering and surveying input. all dimensions and areas are indicative only.

Scale 1 : 2500 - Lengths in metres

20 0 20 40 60 80 100

SOURCE: OneCollective - Masterplan (191113 CVC Approved Plans - Extract.pdf)

SCALE: 1 : 2500 @ A3

JWA PTY LTD
Ecological Consultants

CLIENT
Ocean Park Consulting Pty Ltd

PROJECT
Annual Koala Monitoring Report
Birrigan Estate
Lot 99 on DP823635, Hickey Street, Iluka NSW
Clarence Valley Council LGA

FIGURE 1

PREPARED: BW
DATE: 08 September 2021
FILE: N202001_SAT_20210908.dwg

TITLE
APPROVED MASTER PLAN

LEGEND

Site Boundary

Scale 1:20 000 - Lengths in metres

200 0 200 400 600 800 1000

SOURCE: Open Street Maps

SCALE: 1 : 20 000 @ A3

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FIGURE 2

PREPARED: BW
DATE: 08 September 2021
FILE: N202001_SAT_20210908.dwg

TITLE

LOCALITY PLAN

Park D, Park C and the southern half of Park A are ‘Off Maintenance’. Park B and the northern half of Park A are still considered as ‘On Maintenance’.

2 MONITORING METHODOLOGY

2.1 Monitoring Locations

The locations of baseline monitoring were identified to ensure representative sampling of all habitat types (**FIGURE 3**). The methodology for the site selection included the positioning of a 150 m x 150 m grid overlaid on the site so as to ensure uniform and unbiased coverage.

Baseline monitoring locations were used for ongoing monitoring requirements.

2.2 Plot-Based Vegetation Surveys

Plot-based vegetation surveys were undertaken at each monitoring location. Vegetation survey sites were permanently marked (i.e. star pickets or wooden stakes) and the end positions identified on a sitemap using a hand-held Global Positioning System (GPS).

The plot-based vegetation survey were based on a 20 m × 20 m plot (or 400 m^2 equivalent for linear areas).

Survey plots were established around a central 50 m transect as follows:

a) One (1) 400 m^2 plot (standard 20 m x 20 m) is used to assess all performance indicators as set out in **TABLE 1** below.

b) Five (5) 1 m^2 sub-plots can be added to the program for the first monitoring event to assess groundcover recruitment for the plot. A decision as to the utility of these plots can be made after the first or second monitoring events.

The assessor assessed the plot for the information contained in **TABLE 2**.

TABLE 1
VEGETATION SURVEY DATA TO BE COLLECTED

Attribute	Survey required
Native Canopy Cover	Estimate the % foliage cover across the plot. Cover should be recorded in decimals if less than 1% (0.1, 0.2…), or whole numbers up to 5% (1,2,3…), or to the nearest 5% where greater than 5% cover (5,10,15,20,25…).
Weed Presence	Estimate the % cover in the plot of individual weed species. Count the number of each species.
Shrub and Groundcover	Identify native shrub and groundcover species and their percentage cover. Cover should be recorded in decimals if less than 1% (0.1, 0.2…), or whole numbers up to 5% (1, 2, 3…), or to the nearest 5% where greater than 5% cover (5, 10, 15, 20, 25…)

The full species name (genus species) recorded for all native species, unless insufficient diagnostic plant material was present, in which case the genus name followed by a species number was used. Comments should also be included for all attributes (**TABLE 2**) on any notable

CLARENCE VALLEY COUNCIL APPROVAL

This is the plan referred to in Council's Notice of Determination of SUB2015/0034

Date: 13/11/2019

LOT 99 DP 823635

- Core Conservation Zone
- Bushfire Trail Zone
- Street Verges / Landscape Zone
- APZ setbacks
- Residential Lots
- New Bushfire Trail Connection
- Koala SAT Site

note: the layout is preliminary only and subject to detailed engineering and surveying input. all dimensions and areas are indicative only.

Scale 1 : 2500 - Lengths in metres

20 0 20 40 60 80 100

SOURCE: JWA Site Investigations Feb 2020; OneCollective - Vegetation Zones (191113 CVC Approved Plans - Extract.pdf)

SCALE: 1 : 2500 @ A3

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Clarence Valley Council LGA

FIGURE 3

PREPARED: BW
DATE: 08 September 2021
FILE: N202001_SAT_20210908.dwg

TITLE

KOALA SAT SITES

variations elsewhere in the relevant management polygon - e.g. weeds occurring in the management polygon that are not (or poorly) represented in the transect.

2.3 Photo Point Monitoring

Photo-monitoring points were completed as a means of demonstrating compliance or otherwise with performance criteria. Permanent photo stations were located at each monitoring location. Where transects were established, photo points were located on each transect. Four (4) photos were taken from each photo point. Photos were taken to the north, south, east and west. Photos were labelled with the:

- Transect code or photo point code;
- Direction of view; and
- Date and time.

3 RESULTS

3.1 Transect Data

Baseline 2020 monitoring data sheets are provided in **ATTACHMENT 1**. Ongoing/Updated baseline monitoring data sheets for June 2022, January 2023 and July 2023 are provided in **ATTACHMENTS 2 - 4,** respectively. A summary of the data collected for each relevant monitoring site is provided in **TABLES 2 - 10**. The following points provide a general overview of any improvements or declines for each monitoring site between survey periods:

Monitoring Site 1:

- On Maintenance;
- Slight increase in native midstorey cover;
- Slight increase in native groundcover; and
- Decrease in exotic midstorey and groundcover since baseline.

Monitoring Site 2:

- On Maintenance;
- Slight decrease in canopy cover since baseline;
- Substantial decrease in native midstorey cover since initial baseline – this had improved slightly in latest July 2023 survey;
- Significant improvement in exotic midstorey cover;
- Substantial decrease in native groundcover since initial baseline – this had improved slightly in latest July 2023 survey; and
- Significant improvement in exotic groundcover.

This site was significantly flood affected in mid-2022 which is considered to have directly resulted in the substantial decrease in native midstorey and groundcover.

Monitoring Site 3:

- On Maintenance;
- Substantial decrease in native canopy cover since initial baseline;
- Decrease in native midstorey cover since baseline – this had improved slightly in latest July 2023 survey;
- Significant improvement in exotic midstorey cover;
- Increase in native groundcover; and
- Significant improvement in exotic groundcover since baseline.

This site was significantly flood affected in mid-2022 which is considered to have directly resulted in the substantial decrease in native midstorey and groundcover.

Monitoring Site 4:

- Off Maintenance;
- A decrease in canopy cover since baseline;
- Slight increase in native midstorey cover;
- Significant decrease in exotic midstory cover since baseline;
- Slight increase in native groundcover; and
- Significant decrease in exotic groundcover since baseline.

Monitoring Site 5:

- On Maintenance;
- Substantial increase in native midstorey cover and diversity;
- Substantial improvement in exotic midstorey cover since initial baseline;
- Substantial increase in native groundcover and diversity; and
- Significant improvement in exotic groundcover and diversity

Monitoring Site 6:

- On Maintenance;
- Increase in native midstorey cover and diversity since initial baseline;
- Significant improvement in exotic midstorey cover since initial baseline;
- Substantial increase in native groundcover and diversity since baseline; and
- Significant improvement in exotic groundcover since baseline – however diversity has increased despite the reduced cover.

Monitoring Site 7:

- On Maintenance;
- Increase in native midstorey cover and diversity since initial baseline;
- Significant improvement in exotic midstorey cover since initial baseline;
- Slight increase in native groundcover and diversity since initial baseline; and
- Significant improvement in exotic groundcover since initial baseline.

Monitoring Site 8:

- On Maintenance;
- Substantial increase in native midstorey cover and diversity since initial baseline;
- Significant improvement in exotic midstorey cover and diversity;

- Significant increase in native groundcover and diversity since initial baseline. Cover did drop in January 2023 however had begun improving again in July 2023; and
- Significant improvement in exotic groundcover since initial baseline.

Monitoring Site 9:

- On Maintenance;
- Slight increase in native midstorey cover;
- Slight decrease in exotic midstorey cover since baseline;
- Significant increase in native groundcover and diversity since initial baseline. Cover did drop in January 2023 however had begun improving again in July 2023; and
- Significant improvement in exotic groundcover since baseline.

3.2 Photo points

The results of baseline photo point monitoring are provided in **ATTACHMENTS 1 - 4** in conjunction with the plot-based vegetation survey results.

TABLE 2
VEGETATION MONITORING RESULTS – MONITORING SITE 1
(Management Area 3: Bushland Park B)

Date	Canopy Cover				Midstorey Cover				Groundcover			
	Native		Exotic		Native		Exotic		Native		Exotic	
	Diversity	%	Diversity	%	Diversity	%	Diversity	%	Diversity	%	Diversity	%
Nov 2020#	3	63%	0	0%	15	58.5%	1	15%	3	5.3%	3	12.1%
June 2022#	3	65%	0	0%	15	57%	1	25%	3	5.3%	3	18.5%
Jan 2023	3	65%	0	0%	16	59.2%	1	0.5%	4	6.5%	3	1.2%
July 2023	3	65%	0	0%	16	63.7%	1	0.1	4	13.5%	3	0.7

Notes

Rehabilitation works were yet to commence. Updated baseline data was therefore collected.
Improved outcome (Native: increase in diversity and/or >3% increase in percentage cover, or Exotic: decrease in diversity and/or >3% decrease in percentage cover)
Worse outcome (Native: decrease in diversity and/or >3% decrease in percentage cover, or Exotic: increase in diversity and/or >3% increase in percentage cover)

TABLE 3
VEGETATION MONITORING RESULTS – MONITORING SITE 2
(Management Area 3: Bushland Park B)

Date	Canopy Cover				Midstorey Cover				Groundcover			
	Native		Exotic		Native		Exotic		Native		Exotic	
	Diversity	%	Diversity	%	Diversity	%	Diversity	%	Diversity	%	Diversity	%
Nov 2020#	4	32%	0	0%	14	36.4%	1	20%	3	10.5%	2	30%
June 2022#*	4	32%	0	0%	13	22.5%	1	5%	3	3.5%	0	0%
Jan 2023	4	29%	0	0%	14	18.6	1	0.5	4	4.1	2	0.2%

Date	Canopy Cover				Midstorey Cover				Groundcover			
	Native		Exotic		Native		Exotic		Native		Exotic	
	Diversity	%	Diversity	%	Diversity	%	Diversity	%	Diversity	%	Diversity	%
July 2023	4	29%	0	0%	14	20.1	1	0.1%	4	5.5%	2	0.2%

Notes

Rehabilitation works were yet to commence. Updated baseline data was therefore collected.
*Flood affected
Improved outcome (Native: increase in diversity and/or >3% increase in percentage cover, or Exotic: decrease in diversity and/or >3% decrease in percentage cover)
Worse outcome (Native: decrease in diversity and/or >3% decrease in percentage cover, or Exotic: increase in diversity and/or >3% increase in percentage cover)

TABLE 4
VEGETATION MONITORING RESULTS – MONITORING SITE 3
(Management Area 3: Bushland Park B)

Date	Canopy Cover				Midstorey Cover				Groundcover			
	Native		Exotic		Native		Exotic		Native		Exotic	
	Diversity	%	Diversity	%	Diversity	%	Diversity	%	Diversity	%	Diversity	%
Nov 2020#	4	33%	0	0%	11	31.9%	1	10%	1	1%	3	40.6%
June 2022#*	4	23%	0	0%	11	31.9%	1	2%	2	0.6%	1	10%
Jan 2023	4	23%	0	0%	11	24.7%	2	0.2	5	12%	5	1.3%
July 2023	4	23%	0	0%	11	26.7	2	0.2	5	14%	5	0.5%

Notes

Rehabilitation works were yet to commence. Updated baseline data was therefore collected.
*Flood affected
Improved outcome (Native: increase in diversity and/or >3% increase in percentage cover, or Exotic: decrease in diversity and/or >3% decrease in percentage cover)
Worse outcome (Native: decrease in diversity and/or >3% decrease in percentage cover, or Exotic: increase in diversity and/or >3% increase in percentage cover)

TABLE 5
VEGETATION MONITORING RESULTS – MONITORING SITE 4
(Management Area 5: Bushland Park D)

Date	Canopy Cover				Midstorey Cover				Groundcover			
	Native		Exotic		Native		Exotic		Native		Exotic	
	Diversity	%	Diversity	%	Diversity	%	Diversity	%	Diversity	%	Diversity	%
Nov 2020[#]	3	28%	0	0%	16	42.4%	1	25%	4	1%	5	67.6%
June 2022[#]	3	28%	0	0%	16	42.5%	1	35%	4	1.1%	5	69.2%
Jan 2023	3	23%	0	0%	17	44.2%	1	1%	4	2%	5	11.2%
July 2023	3	23%	0	0%	17	48.4%	1	0.1%	4	6%	5	15.4%

Notes

[#] Rehabilitation works were yet to commence. Updated baseline data was therefore collected.
Improved outcome (Native: increase in diversity and/or >3% increase in percentage cover, or Exotic: decrease in diversity and/or >3% decrease in percentage cover)
Worse outcome (Native: decrease in diversity and/or >3% decrease in percentage cover, or Exotic: increase in diversity and/or >3% increase in percentage cover)

TABLE 6
VEGETATION MONITORING RESULTS – MONITORING SITE 5
(Management Area 5: Bushland Park D)

Date	Canopy Cover				Midstorey Cover				Groundcover			
	Native		Exotic		Native		Exotic		Native		Exotic	
	Diversity	%	Diversity	%	Diversity	%	Diversity	%	Diversity	%	Diversity	%
Nov 2020[#]	2	55%	0	0%	15	29%	1	15%	1	1%	3	83.1%
June 2022	2	55%	0	0%	24	42.2%	1	0.5%	4	16.8%	1	10%
Jan 2023	2	55%	0	0%	25	51.3%	1	0.1%	5	38%	1	5%

Date	Canopy Cover				Midstorey Cover				Groundcover			
	Native		Exotic		Native		Exotic		Native		Exotic	
	Diversity	%	Diversity	%	Diversity	%	Diversity	%	Diversity	%	Diversity	%
July 2023	2	55%	0	0%	25	58%	1	0.1%	5	45%	1	0.5%

Notes

[#] Baseline

Improved outcome (Native: increase in diversity and/or >3% increase in percentage cover, or Exotic: decrease in diversity and/or >3% decrease in percentage cover)

Worse outcome (Native: decrease in diversity and/or >3% decrease in percentage cover, or Exotic: increase in diversity and/or >3% increase in percentage cover)

TABLE 7
VEGETATION MONITORING RESULTS – MONITORING SITE 6
(Management Area 5: Bushland Park D**)**

Date	Canopy Cover				Midstorey Cover				Groundcover			
	Native		Exotic		Native		Exotic		Native		Exotic	
	Diversity	%	Diversity	%	Diversity	%	Diversity	%	Diversity	%	Diversity	%
Nov 2020[#]	2	70%	0	0%	20	35.7%	1	25%	1	2%	3	60%
June 2022[#]	2	70%	0	0%	21	37.3%	1	0.5%	3	13%	2	10.2%
Jan 2023	2	70%	0	0%	22	41.7%	1	0.1%	3	22.5%	4	2.3%
July 2023	2	70%	0	0%	22	47.7%	2	0.1%	3	22.5%	4	0.4%

Notes

[#] Baseline

Improved outcome (Native: increase in diversity and/or >3% increase in percentage cover, or Exotic: decrease in diversity and/or >3% decrease in percentage cover)

Worse outcome (Native: decrease in diversity and/or >3% decrease in percentage cover, or Exotic: increase in diversity and/or >3% increase in percentage cover)

TABLE 8
VEGETATION MONITORING RESULTS – MONITORING SITE 7
(Management Area 5: Bushland Park D)

Date	Canopy Cover				Midstorey Cover				Groundcover			
	Native		Exotic		Native		Exotic		Native		Exotic	
	Diversity	%	Diversity	%	Diversity	%	Diversity	%	Diversity	%	Diversity	%
Nov 2020#	3	65%	0	0%	14	26.7%	1	30%	2	2.5%	4	38%
June 2022#	3	65%	0	0%	17	30.2%	1	0.5%	4	4.6%	3	6.1%
Jan 2023	3	65%	0	0%	17	35.7%	1	0.1%	4	6%	4	1.7%
July 2023	3	65%	0	0%	17	38.6%	1	0.1%	4	6.5%	4	0.8%

Notes
Baseline
Improved outcome (Native: increase in diversity and/or >3% increase in percentage cover, or Exotic: decrease in diversity and/or >3% decrease in percentage cover)
Worse outcome (Native: decrease in diversity and/or >3% decrease in percentage cover, or Exotic: increase in diversity and/or >3% increase in percentage cover)

TABLE 9
VEGETATION MONITORING RESULTS – MONITORING SITE 8
(Management Area 2: Bushland Park A)

Date	Canopy Cover				Midstorey Cover				Groundcover			
	Native		Exotic		Native		Exotic		Native		Exotic	
	Diversity	%	Diversity	%	Diversity	%	Diversity	%	Diversity	%	Diversity	%
Nov 2020#	2	65%	0	0%	9	14.2%	3	35.1%	6	13.2%	6	51.3%
June 2022	2	65%	0	0%	17	20%	1	0.5%	7	93.2%	6	3.5%
Jan 2023	2	65%	0	0%	17	22.8%	1	0.1%	7	75.7%	7	1.2%

Date	Canopy Cover				Midstorey Cover				Groundcover			
	Native		Exotic		Native		Exotic		Native		Exotic	
	Diversity	%	Diversity	%	Diversity	%	Diversity	%	Diversity	%	Diversity	%
July 2023	2	65%	0	0%	17	27.9%	1	0.1%	7	86.5%	7	0.7%

Notes

[#] Baseline

Improved outcome (Native: increase in diversity and/or >3% increase in percentage cover, or Exotic: decrease in diversity and/or >3% decrease in percentage cover)

Worse outcome (Native: decrease in diversity and/or >3% decrease in percentage cover, or Exotic: increase in diversity and/or >3% increase in percentage cover)

TABLE 10
VEGETATION MONITORING RESULTS – MONITORING SITE 9
(Management Area 2: Bushland Park A**)**

Date	Canopy Cover				Midstorey Cover				Groundcover			
	Native		Exotic		Native		Exotic		Native		Exotic	
	Diversity	%	Diversity	%	Diversity	%	Diversity	%	Diversity	%	Diversity	%
Nov 2020[#]	4	76%	0	0%	15	23.5%	1	5%	5	8.2%	4	40.2%
June 2022[#]	4	76%	0	0%	15	24.2%	1	5%	6	49.1%	4	10.7%
Jan 2023	4	76%	0	0%	15	25.7%	1	0.5%	6	27.6%	5	3.8%
July 2023	4	76%	0	0%	15	28.2%	1	0.1%	6	36%	5	2.9

Notes

[#] Rehabilitation works were yet to commence. Updated baseline data was therefore collected.

Improved outcome (Native: increase in diversity and/or >3% increase in percentage cover, or Exotic: decrease in diversity and/or >3% decrease in percentage cover)

Worse outcome (Native: decrease in diversity and/or >3% decrease in percentage cover, or Exotic: increase in diversity and/or >3% increase in percentage cover)

4 COMPLIANCE WITH PERFORMANCE CRITERIA

TABLE 11 provides the performance indicators and targets for Bushland Park areas and whether the sites are in compliance. Corrective actions are provided that are to be implemented if performance targets are not met.

TABLE 11
PERFORMANCE TARGETS AND CORRECTIVE ACTIONS

Performance Indicator	Target - Establishment period[1]	Target - Maintenance period[2]	Corrective Actions	Compliance	
Survival and continued growth of seedlings (i.e. planted stock)	>95% survival of plantings during all monitoring events	>95% survival of plantings during all monitoring events	Irrigation if required. Additional planting if required.	100% survival rate	✓
Establishment of native ground cover within revegetation areas	Planted ground covers substantially established[3]	• >60% after three (3) years • >80% after five (5) years	Supplementary planting	On track – 78% of the sites had either maintained or increased in groundcover percentage since baseline.	✓
Establishment of native canopy cover (where applicable) within revegetation areas	Planted trees substantially established[3]	• >60% canopy cover of native tree species >1.5 m in height after three (3) years • >80% canopy cover of native tree species >2.5m in height after five (5) years	Monitoring and maintenance period must be extended until the targets are met.	On track – 56% of the sites were above 60% cover.	✓

Performance Indicator	Target – Establishment period[1]	Target – Maintenance period[2]	Corrective Actions	Compliance	
Natural recruitment of native species throughout rehabilitation areas	Evidence of natural recruitment of shrub and ground cover species.	Increasing natural recruitment of shrub and groundcover species.	Where natural recruitment fails to meet performance targets discussions with CVC shall be initiated by the Community Association or their consultants to consider adjustments to the assisted regeneration strategy being used to improve natural recruitment.	Natural recruitment observed at all sites.	✓
All identified weeds controlled to an acceptable level within retained vegetation areas	Foliage Projective Cover (FPC) (%) assessed using eye estimates or photo points: • reduced to <5% for transformer weeds; • <10% for all other weed species	Foliage Projective Cover (FPC) (%) assessed using eye estimates or photo points: • reduced to <2% for transformer weeds; • <5% for all other weed species	Weed control as necessary	100% of sites that are 'On Maintenance' had less than 5% exotic weed cover in all vegetation layers. Only one 'Off Maintenance' site (site 4) had greater than 10% cover in the groundcover layer.	✓
Infrastructure (e.g. protection fencing, signage, erosion and sediment control devices) functional and well-maintained	Relevant infrastructure maintained	Relevant infrastructure maintained.	Maintenance as necessary	Relevant infrastructure maintained	✓

Notes:

[1] "Establishment period" means the period during which initial environmental repair, restoration and monitoring works required by the relevant approved environmental management plan(s) are undertaken. The establishment period ends when the works meet the establishment period performance criteria, as defined by the relevant approved environmental management plans, to the satisfaction of the Secretary.

[2] "Maintenance period" means the period of environmental management and monitoring works commencing immediately after the end of the establishment period. Maintenance period works are to be carried out in accordance with the relevant performance criteria (as defined by the relevant approved environmental management plan) to the satisfaction of the Secretary.

[3] "Substantial establishment" of the koala habitat plantings means "the plantings have progressed beyond the need for intensive maintenance e.g. weed control, watering etc. and are clearly established by way of persisting through a recognised growth period and a suitably qualified horticultural/environmental specialist has provided a short report confirming that the plantings are established."

5 ONGOING MONITORING AND REPORTING REQUIREMENTS

Ongoing annual vegetation monitoring shall be completed in accordance with the following:

- Six (6) monthly after commencement of rehabilitation works until the establishment period performance criteria are met; and
- Then annually during the maintenance period.

The requirements and future monitoring and reporting dates for the vegetation monitoring program are present in **TABLE 12**.

TABLE 12
MONITORING PROGRAM REQUIREMENTS AND SURVEY DATES

Requirement	Frequency	Latest Date	Next Date
Rehabilitation monitoring – establishment period	6 monthly	July 2023	Completed
Rehabilitation monitoring – maintenance period	Annually	July 2023	July 2024
Monitoring reports	Monitoring reports prepared annually	October 2023	October 2024

REFERENCES

JWA (2020) Habitat Management Plan. Birrigan Iluka Beach Hickey Street, Iluka (Lot 99 on DP823635). Report prepared for Steven Holdings Pty Ltd by JWA Pty Ltd. July 2020.

ATTACHMENT 1 – BASELINE MONITORING DATA – NOVEMBER 2020

400 m² plot: Sheet _ of _	Survey Name	Plot Identifier	Recorders
Date 15 9 21	Birrigan	1	MJ

GF Code	Top 3 native species in each growth form group: Full species name mandatory All other native and exotic species: Full species name where practicable	N, E or HTE	Cover	Abund	stratum	voucher
	Eucalyptus tereticornis		40		C	
	Pink bloodwood		15		C	
	Yellow pear fruit		20			
	Acronychia imperforata		25			
	Tuckeroo		0.5			
	Bracken fern		5			
	Lantana		15			
	Molasses grass		10			
	Smilax australis		0.2			
	Cyperus gracilis		0.2			
	scrambling lily		0.1			
	Dianella caerulea		0.1			
	Elkhorn fern		1			
	Solanum seaforthianum		0.1			
	Orchid sp. (epiphyte)		0.2			
	Acacia disparrima		8		C	
	Tree heath		2			
	Celery wood		5			
	Stephania japonica		0.1			
	Ribbonwood		2			
	Parsonsia straminea		0.1			
	White kamala		0.1			
	Acmena hemilampra		0.1			
	Milk vine		0.1			
	Ground asparagus		2			
	Cymbidium madidum					

GF Code: see Growth Form definitions in Appendix 1 **N:** native, **E:** exotic, **HTE:** high threat exotic **GF – circle code** if 'top 3'.

Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover); ***Note:*** *0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m*

Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

PLOT 1

November 2020	
	
North	East
	
South	West

400 m² plot: Sheet _ of _	Survey Name	Plot Identifier	Recorders
Date 15 9 21	Birrigan	2	MJ

GF Code	Top 3 native species in each growth form group: Full species name mandatory All other native and exotic species: Full species name where practicable	N, E or HTE	Cover	Abund	stratum	voucher
	Pink bloodwood		20		C	
	Acacia disparrima		5		C	
	Acronychia imperforata		15			
	Yellow pear fruit		10			
	Lantana		20			
	Molasses grass		25			
	Grand asparagus		5			
	Morinda jasminoides.		0.1			
	Bracken fern		5			
	Hairy psychotria		0.1			
	Lomandra longifolia		5			
	Tuckeroo		0.5			
	Brown bollygum		0.1			
	Milk vine		0.2			
	Elkhorn fern		1			
	Tree heath		3			
	Mock olive		0.1			
	Smilax australis		5			
	Flindersia schottiana		5		C	
	Brushbox		2		C	
	Cyperus gracilis		0.5			
	Parsonsia straminea		0.2			
	~~Tarenbarth~~					
	Hibbertia scandens		0.1			
	water vine		1			
	Silky oak		0.1			

GF Code: see Growth Form definitions in Appendix 1 **N:** native, **E:** exotic, **HTE:** high threat exotic **GF – circle code** if 'top 3'.

Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover); ***Note:*** *0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m*

Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

PLOT 2

November 2020	
	
North	East
	
South	West

400 m² plot: Sheet _ of _	Survey Name	Plot Identifier	Recorders
Date 15 9 21	Birrigan	3	MJ

GF Code	Top 3 native species in each growth form group: Full species name mandatory All other native and exotic species: Full species name where practicable	N, E or HTE	Cover	Abund	stratum	voucher
	Acacia disparrima		20		C	
	Yellow pear fruit		20			
	Brush cauthium		0.1			
	Blue lilly pilly (A. hemilampra)		3			
	Tuckeroo		5			
	Ribbonwood		5			
	Lantana		10			
	Bracken fern		1			
	Molasses grass		40			
	Elkhorn fern		1			
	Smilax australis		0.2			
	Acronychia imperforata		0.2			
	Cellerywood		2			
	Orchid sp. (epiphyte)		0.2			
	Coffee bush		0.1			
	Pink bloodwood		3		C	
	Eucalyptus tereticornis		5		C	
	Pittosporum revolutum		0.1			
	Ground asparagus		0.5			
	Asparagus fern		0.1			
	Cymbidium madidum					

GF Code: see Growth Form definitions in Appendix 1 **N:** native, **E:** exotic, **HTE:** high threat exotic **GF – circle code** if 'top 3'.

Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover); ***Note:*** *0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m*

Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

PLOT 3

November 2020	
	
North	East
	
South	West

400 m² plot: Sheet _ of _	Survey Name	Plot Identifier	Recorders
Date 15 9 21	Kirrigan	4	MJ

GF Code	Top 3 native species in each growth form group: Full species name mandatory All other native and exotic species: Full species name where practicable	N, E or HTE	Cover	Abund	stratum	voucher
	1 Pink bloodwood		8		C	
	2 Acacia disparrima		15		C	
	3 Yellow pear fruit.		20			
	4 Celery wood		2			
	5 Acronychia imperforata		5			
	6 Lantana		25			
	7 Molasses grass		60			
	8 Ground asparagus		5			
	9 Wandering jew		0.5			
	10 Exotic ground cover sp.		2			
	11 Bird's nest fern		0.1			
	12 Elkhorn fern		3			
	13 Flindersia schottiana		1			
	14 Tuckeroo		5			
	15 Lomandra longifolia		0.2			
	16 Cyperus gracilis		0.1			
	17 Solanum seaforthianum		0.1			
	18 Bracken fern		0.2			
	19 Orchid sp. (epiphyte)		0.2			
	20 Yellow tulip		0.1			A
	21 Ribbonwood		5			
	22 Brush box.		5		C	
	23 Hairy psychotria		0.1			
	24 Mock olive		0.1			
	25 Scrambling lily		0.1			
	26 Dianella caerulea		0.5			
	27 Smilax australis		0.5			
	28 Milk vine		0.1			
	29 Hibbertia scandens		0.1			
	30					
	31					
	32					
	33 Cymbidium madidum					
	34					
	35					
	36					
	37					
	38					
	39					
	40					

GF Code: see Growth Form definitions in Appendix 1 **N:** native, **E:** exotic, **HTE:** high threat exotic **GF – circle code** if 'top 3'.

Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover); ***Note:*** *0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m*

Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

PLOT 4

November 2020	
	
North	East
	
South	West

400 m² plot: Sheet _ of _	Survey Name	Plot Identifier	Recorders
Date 15 9 21	Birrigan	5	MJ

GF Code	Top 3 native species in each growth form group: Full species name mandatory All other native and exotic species: Full species name where practicable	N, E or HTE	Cover	Abund	stratum	voucher
	1 Acacia disparrima		45		C	
	2 Acronychia imperforata		15			
	3 Yellow pea. fruit		15			
	4 Celery wood		2			
	5 Tuckeroo		0.5			
	6 Lantana		15			
	7 Molasses grass		80			
	8 Elkhorn fern		3			
	9 Comandra longifolia		1			
	10 Orchid sp. (epiphyte)		2			
	11 Tree heath		0.5			
	12 Smilax australis		0.2			
	13 Coffee bush		0.1			
	14 Dianella caerulea		0.2			
	15 Solanum seaforthianum		0.1			
	16 Scrambling lily		0.1			
	17 pink bloodwood		10		C	
	18 Ground asparagus		3			
	19 foambark		0.1			
	20 Blue lilly pilly (A. hemilampra)		0.1			
	21 Ribbon wood		0.1			
	22 mock olive		0.1			
	23					
	24					
	25 Cymbidium madidum					
	26					
	27					
	28					
	29					
	30					
	31					
	32					
	33					
	34					
	35					
	36					
	37					
	38					
	39					
	40					

GF Code: see Growth Form definitions in Appendix 1 **N:** native, **E:** exotic, **HTE:** high threat exotic **GF – circle code** if 'top 3'.

Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover); ***Note:*** *0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m*

Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

PLOT 5

November 2020	
	
North	East
	
South	West

400 m² plot: Sheet _ of _	Survey Name	Plot Identifier	Recorders
Date 15 9 21	Birrigan	6	MJ

GF Code	Top 3 native species in each growth form group: Full species name mandatory All other native and exotic species: Full species name where practicable	N, E or HTE	Cover	Abund	stratum	voucher
	1 Pink bloodwood		30		C	
	2 Acacia disparrima		40		C	
	3 Yellow pea fruit		10			
	4 Brush canthium		0.1			
	5 Lantana		25			
	6 Ground asparagus		5			
	7 Molasses grass		50			
	8 Coast cypress pine		2			
	9 Aeronychia imperforata		10			
	10 Celtery wood		0.5			
	11 Bracken fern		2			
	12 exotic ground cover sp.		5			
	13 Lomandra longifolia		2			
	14 Foambark		1			
	15 Morinda jasminoides		0.1			
	16 Elkhorn fern Brown bollygum		2			
	17 ~~Eucalyptus canaliculata~~		0.1			
	18 Tuckeroo		0.2			
	19 Tree heath		5			
	20 Mock olive		0.1			
	21 Suave orchid		0.1			
	22 Scrambling lily		0.1			
	23 Smilax australis		0.2			
	24 Native hoya		1			*
	25 Yellow tulip		0.1			A
	26 Clerodendrum floribundum		0.1			
	27 Water vine		1			
	28					
	29					
	30					
	31					
	32					
	33					
	34					
	35					
	36					
	37					
	38					
	39					
	40					

GF Code: see Growth Form definitions in Appendix 1 **N:** native, **E:** exotic, **HTE:** high threat exotic **GF – circle code** if 'top 3'.

Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover); ***Note:*** *0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m*

Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

PLOT 6

November 2020	
	
North	East
	
South	West

400 m² plot: Sheet _ of _		Survey Name	Plot Identifier	Recorders
Date	15 9 21	Birrigan	7	MJ

GF Code		Top 3 native species in each growth form group: Full species name mandatory All other native and exotic species: Full species name where practicable	N, E or HTE	Cover	Abund	stratum	voucher
	1	Pink bloodwood		20		C	
	2	Acacia disparrima		20		C	
	3	Brush box		25		C	
	4	Yellow pear fruit		2			
*	5	Acronychia littoralis		10			
	6	Cellerywood.		2			
	7	Bracken fern		0.5			
	8	Tuckeroo		0.5			
	9	Molasses grass		20			
	10	Ground asparagus		15			
	11	Smilax australis		2			
	12	Elkhorn fern		1			
	13	Scrambling lily		1			
	14	Asparagus fern		1			
	15	Acmena hemilampra		0.1			
	16	Exotic groundcover sp.		2			
	17	Tree heath		1			
	18	Lomandra longifolia		2			
	19	Pandorea pandorana		0.1			
	20	Acronychia imperforata		5			
	21	Native hoya		0.5			
	22	Banksia integrifolia		1			
	23	Blueberry ash		1			
	24	Lantana		30			
	25						
	26						
	27						
	28						
	29						
	30						
	31						
	32						
	33						
	34						
	35						
	36						
	37						
	38						
	39						
	40						

GF Code: see Growth Form definitions in Appendix 1 **N:** native, **E:** exotic, **HTE:** high threat exotic **GF – circle code if 'top 3'.**

Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover); ***Note:*** *0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m*

Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

PLOT 7

November 2020	
	
North	East
	
South	West

400 m² plot: Sheet _ of _		Survey Name	Plot Identifier	Recorders
Date	15/9/21	Birrigan	8	MJ

GF Code		Top 3 native species in each growth form group: Full species name mandatory All other native and exotic species: Full species name where practicable	N, E or HTE	Cover	Abund	stratum	voucher
	1	Pink bloodwood		35		C	
	2	Acacia disparrima		30		C	
	3	Acronychia imperforata		8			
	4	Lantana		30			
	5	Lomandra longifolia		2			
	6	Ground asparagus		40			
	7	Smilax australis		2			
	8	Exotic groundcover sp.		5			
	9	~~[illegible]~~ Molasses grass		5			
	10	Bracken fern		2			
	11	Cyperus gracilis		7			
	12	Ochna		1			
	13	Yellow pear fruit		5			
	14	Tree heath		0.5			
	15	Solanum seaforthianum		0.1			
	16	Stephania japonica		0.1			
	17	Scrambling lily		0.1			
	18	white passion flower		0.2			
	19	Wandering jew		0.1			
	20	Dianella caerulea		0.1			
	21	~~[illegible]~~ Yellow tulip		0.1			A
	22	Tuckeroo		0.1			
	23	Bird's nest fern		0.1			
	24	umbrella tree		5			
	25	Elkhorn fern		0.2			
	26	winter senna		0.1			
	27						
	28						
	29						
	30						
	31						
	32						
	33						
	34						
	35						
	36						
	37						
	38						
	39						
	40						

GF Code: see Growth Form definitions in Appendix 1 **N:** native, **E:** exotic, **HTE:** high threat exotic **GF – circle code** if 'top 3'.

Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover); ***Note:*** *0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m*

Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

PLOT 8

November 2020	
	
North	East
	
South	West

400 m² plot: Sheet _ of _	Survey Name	Plot Identifier	Recorders
Date 15 9 21	Bivrigan	9	MJ

GF Code	Top 3 native species in each growth form group: Full species name mandatory All other native and exotic species: Full species name where practicable	N, E or HTE	Cover	Abund	stratum	voucher
	Pink bloodwood.		30		C	
	Acacia disparrima		45		C	
	Acronychia imperforata.		10			
	Tree heath.		5			
	BL paperbark.		0.5			
	Brush box		0.5			
	Lantana		5			
	Milk vine		0.2			
	Asparagus ~~fern~~ (ground)		20			
	Lomandra (long) folia		5			
	Yellow pear fruit		5			
	Blue lilly pilly		0.1			
	Cabbage tree palm		1			
	Sweet morinda.		0.2			
	Smilax		0.5			
	Cordyline stricta		0.1			
	Bracken		2			
	Hibbertia scandens.		0.1			
	Tuckeroo.		0.1			
	Hard corkwood		0.1			
	Ochna.		0.1			
	Elkhorn fern		0.5			
	Cyperus gracilis		1			
	Bird's nest fern		0.5			
	Asparagus fern		0.1			
	~~Original grass~~ Molasses grass		20			
	Dianella caerulea		0.1			
	Mock olive		0.1			
	Wandering jew		0.1			

GF Code: see Growth Form definitions in Appendix 1 **N:** native, **E:** exotic, **HTE:** high threat exotic **GF – circle code** if 'top 3'.

Cover: 0.1, 0.2, 0.3, ..., 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover); ***Note:*** *0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m*

Abundance: 1, 2, 3, ..., 10, 20, 30, ... 100, 200, ..., 1000, ...

PLOT 9

November 2020	
	
North	East
	
South	West

ATTACHMENT 2 – MONITORING DATA - JUNE 2022

400 m² plot: Sheet _ of _	Survey Name	Plot Identifier	Recorders
Date 03 / 06 /22	Birrigan	1	AM

GF Code	*Top 3 native species in each growth form group: Full species name mandatory All other native and exotic species: Full species name where practicable*	N, E or HTE	Cover	Abund	stratum	voucher
	1 Eucalyptus tereticornis		40		C	
	2 Pink bloodwood		15		C	
	3 Yellow pear fruit		20		M	
	4 Acronychia imperforata		25		M	
	5 Tuckeroo		1		M	
	6 Bracken fern		5		G	
	7 Lantana		25			
	8 Molasses grass		15			
	9 Smilax australis		0.2		M	
	10 Cyperus gracilis		0.2		G	
	11 Scrambling lily		0.1		M	
	12 Dianella caerulea		0.1		G	
	13 Elkhorn fern		1		M	
	14 Solanum seaforthianum		0.5			
	15 Cymbidium madidum		0.2		M	
	16 Acacia disparrima		10		C	
	17 Tree heath		2		M	
	18 Celery wood		5		M	
	19 Stephania japonica		0.1		M	
	20 Ribbonwood		2		M	
	21 Parsonsia straminea		0.1		M	
	22 White kamala		0.1		M	
	23 Acmena hemilampra		0.1		M	
	24 Milk vine		0.1		M	
	25 Ground asparagus		3			
	26					
	27					
	28					
	29					
	30					
	31					
	32					
	33					
	34					
	35					
	36					
	37					
	38					
	39					
	40					

GF Code: see Growth Form definitions in Appendix 1 **N:** native, **E:** exotic, **HTE:** high threat exotic **GF – circle code** if 'top 3'.

Cover: 0.1, 0.2, 0.3, …, 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover); ***Note:*** *0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m*

Abundance: 1, 2, 3, …, 10, 20, 30, … 100, 200, …, 1000, …

400 m² plot: Sheet _ of _	Survey Name	Plot Identifier	Recorders
Date 03 / 06 / 22	Birrigan	2	AM

GF Code	*Top 3 native species in each growth form group: Full species name mandatory All other native and exotic species: Full species name where practicable*	N, E or HTE	Cover	Abund	stratum	voucher
	1 Pink bloodwood		20		C	
	2 Acacia disparrima		5		C	
	3 Acronychia imperforata		10		M	
	4 Yellow pear fruit		2		M	
	5 Lantana		5			
	6 Molasses grass		0			
	7 Ground asparagus		0			
	8 Morinda jasminoides		0			
	9 Bracken fern		0.5		G	
	10 Hairy psychotria		0.2		M	
	11 Lomandra longfolia		2.5		G	
	12 Tuckeroo		0.5		M	
	13 Brown bollygum		0.1		M	
	14 Milk vine		0.2		M	
	15 Elkhorn fern		1		M	
	16 Tree heath		2		M	
	17 Mock olive		0.1		M	
	18 Smilax australis		5		M	
	19 Flindersia schottiana		5		C	
	20 Brushbox		2		C	
	21 Cyperus gracilis		0.5		G	
	22 Parsonsia straminea		0.2		M	
	23 Hibbertia scandens		0			
	24 Water vine		1		M	
	25 Silky oak		0.2		M	
	26					
	27					
	28					
	29					
	30					
	31					
	32					
	33					
	34					
	35					
	36					
	37					
	38					
	39					
	40					

GF Code: see Growth Form definitions in Appendix 1 **N:** native, **E:** exotic, **HTE:** high threat exotic **GF – circle code** if 'top 3'.

Cover: 0.1, 0.2, 0.3, …, 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover); ***Note:*** *0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m*

Abundance: 1, 2, 3, …, 10, 20, 30, … 100, 200, …, 1000, …

PLOT 2

June 2022	
	
North	East
	
South	West

400 m² plot: Sheet _ of _	Survey Name	Plot Identifier	Recorders
Date 03 / 06 / 22	Birrigan	3	AM

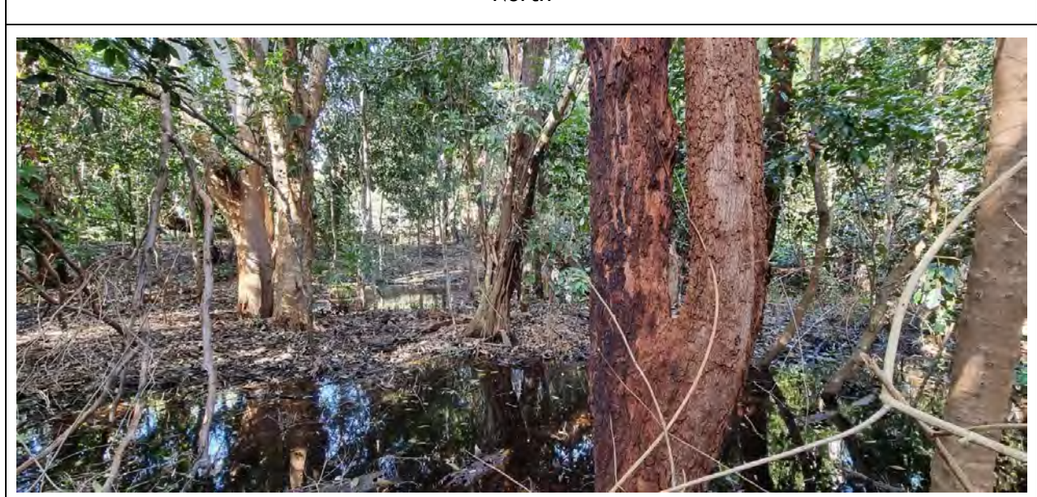
GF Code	*Top 3 native species in each growth form group: Full species name mandatory All other native and exotic species: Full species name where practicable*	N, E or HTE	Cover	Abund	stratum	voucher
	1 Acacia disparrima		10		C	
	2 Yellow pear fruit		20	M		
	3 Brush Canthium		0.1	M		
	4 Blue lilly pilly		3	M		
	5 Tuckeroo		5	M		
	6 Ribbonwood		5		C	
	7 Lantana		2			
	8 Brachen fern		0.5		G	
	9 Molasses grass		10			
	10 Elkhorn fern		1		M	
	11 Smilax australis		0.2		M	
	12 Acronychia imperforata		0.2		M	
	13 Celerywood		2		M	
	14 Cymbidium madidum		0.2		M	
	15 Coffee bush		0.1		M	
	16 Pink bloodwood		3		C	
	17 Eucalyptus tereticornis		5		C	
	18 Pittosporum revolutum		0.1		M	
	19 Ground asparagus		0			
	20 Asparagus fern		0			
	21 Native wandering jew		0.1		G	
	22					
	23					
	24					
	25					
	26					
	27					
	28					
	29					
	30					
	31					
	32					
	33					
	34					
	35					
	36					
	37					
	38					
	39					
	40					

GF Code: see Growth Form definitions in Appendix 1 **N:** native, **E:** exotic, **HTE:** high threat exotic **GF – circle code** if 'top 3'.

Cover: 0.1, 0.2, 0.3, …, 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover); ***Note:*** *0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m*

Abundance: 1, 2, 3, …, 10, 20, 30, … 100, 200, …, 1000, …

PLOT 3

June 2022	
	
North	East
	
South	West

400 m² plot: Sheet _ of _		Survey Name	Plot Identifier	Recorders
Date	03 06 /22	Birrigan	4	AM

GF Code	*Top 3 native species in each growth form group: Full species name mandatory All other native and exotic species: Full species name where practicable*	N, E or HTE	Cover	Abund	stratum	voucher
	1 Pink bloodwood		8		C	
	2 Acacia disparrima		15		C	
	3 Yellow pear fruit		20		M	
	4 Celerywood		2		M	
	5 Acronychia imperforata		5		M	
	6 Lantana		35			
	7 Molasses grass		60			
	8 Ground asparagus		5			
	9 Wandering jew		2			
	10 Exotic ground cover sp.		2			
	11 Birds nest fern		0.2		M	
	12 Elkhorn fern		3		M	
	13 Flindersia schottiana		1		M	
	14 Tuckeroo		5		M	
	15 Lomandra longfolia		0.2		G	
	16 Cyperus gracilis		0.2		G	
	17 Solanum seaforthianum		0.2			
	18 Bracken fern		0.2		G	
	19 Cymbidium madidum		0.2		M	
	20 Yellow tulip		0.1		M	
	21 Ribbonwood		5		M	
	22 Brushbox		5		C	
	23 Hairy psychotria		0.1		M	
	24 Mock olive		0.1		M	
	25 Scrambling lily		0.1		M	
	26 Dianella caerulea		0.5		G	
	27 Smilax australis		0.5		M	
	28 Milk vine		0.1		M	
	29 Hibbertia scandens		0.1		M	
	30					
	31					
	32					
	33					
	34					
	35					
	36					
	37					
	38					
	39					
	40					

GF Code: see Growth Form definitions in Appendix 1 **N:** native, **E:** exotic, **HTE:** high threat exotic **GF – circle code** if 'top 3'.

Cover: 0.1, 0.2, 0.3, …, 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover); ***Note:*** *0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m*

Abundance: 1, 2, 3, …, 10, 20, 30, … 100, 200, …, 1000, …

PLOT 4

June 2022	
	
North	East
	
South	West

400 m² plot: Sheet _ of _		Survey Name	Plot Identifier	Recorders
Date	03 / 06 / 22	Birrigan	5	Am

GF Code	*Top 3 native species in each growth form group: Full species name mandatory All other native and exotic species: Full species name where practicable*	N, E or HTE	Cover	Abund	stratum	voucher
	1 Acacia disparrima		45		C	
	2 Acronychia imperata		15		M	
	3 Yellow pear fruit		15		M	
	4 Celerywood		2		M	
	5 Tuckeroo		0.5		M	
	6 Lantana		0.5			
	7 Molasses grass		10			
	8 Elkhorn fern		3		M	
	9 Lomandra longfolia		1		G	
	10 Cymbidium madidum		2		M	
	11 Tree heath		0.5		M	
	12 Smilax australis		0.2		M	
	13 Coffee bush		0.1		M	
	14 Dianella caerulea		0.2		M	
	15 Scrambling lily		0.1		M	
	16 Pink bloodwood		10		C	
	17 Foambark		0.1		M	
	18 Blue lilly pilly		0.5		M	
	19 Ribbonwood		0.1		M	
	20 Mock olive		0.1		M	
	21 Clerodendrum floribundum		0.2		M	
	22 Bracken		0.5		G	
	23 Native wandering jew		15		G	
	24 Bangalow Palm		0.5		M	
	25 Blueberry ash		0.1		M	
	26 Muttonwood		0.7		M	
	27 Red ash		0.1		M	
	28 Notelaea		0.3		M	
	29 Common lilly pilly		0.2		M	
	30 Dianella		0.3		G	
	31 Forest red gum		0.6		M	
	32 Banksia integrifolia		0.1		M	
	33 Blush walnut					
	34					
	35					
	36					
	37					
	38					
	39					
	40					

GF Code: see Growth Form definitions in Appendix 1 **N:** native, **E:** exotic, **HTE:** high threat exotic **GF – circle code** if 'top 3'.

Cover: 0.1, 0.2, 0.3, …, 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover); ***Note:*** *0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m*

Abundance: 1, 2, 3, …, 10, 20, 30, … 100, 200, …, 1000, …

PLOT 5

June 2022	
	
North	East
	
South	West

400 m² plot: Sheet _ of _	Survey Name	Plot Identifier	Recorders
Date 03 / 06 / 22	Birrigan	6	AM

GF Code	*Top 3 native species in each growth form group: Full species name mandatory All other native and exotic species: Full species name where practicable*	N, E or HTE	Cover	Abund	stratum	voucher
	1 Pink bloodwood		30		C	
	2 Acacia disparrima		40		C	
	3 Yellow pear fruit		10		M	
	4 Brush canthium		0.1		M	
	5 Lantana		0.5			
	6 Ground asparagus		0			
	7 Molasses grass		10			
	8 Coast cypress pine		2		M	
	9 acronchia imperforata		10		M	
	10 Celerywood		0.5		M	
	11 Bracken fern		2		M	
	12 Exotic ground cover sp.		0			
	13 Lomandra longifolia		2.5		G	
	14 Foambark		1		M	
	15 Morinda jasminoides		0.5		M	
	16 Elkhorn fern		2		M	
	17 Brown bollygum		0.1		M	
	18 Tuckeroo		0.5		M	
	19 Tree heath		5		M	
	20 Mock olive		0.1		M	
	21 Suave orchid		0.1		M	
	22 Scrambling lily		0.1		M	
	23 Smilax australis		1		M	
	24 Native hoya		1		M	
	25 Yellow tulip		0.1		M	
	26 Clerodendrum floribundum		0.1		M	
	27 Water vine		1		M	
	28 Native wandering jew		10		G	
	29 White passion flower		0.2			
	30 Muttonwood		0.1		M	
	31 Cyperus gracilis		0.5		G	
	32					
	33					
	34					
	35					
	36					
	37					
	38					
	39					
	40					

GF Code: see Growth Form definitions in Appendix 1 **N:** native, **E:** exotic, **HTE:** high threat exotic **GF – circle code** if 'top 3'.

Cover: 0.1, 0.2, 0.3, …, 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover); ***Note:*** *0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m*

Abundance: 1, 2, 3, …, 10, 20, 30, … 100, 200, …, 1000, …

PLOT 6

June 2022	
	
North	East
	
South	West

400 m² plot: Sheet _ of _		Survey Name	Plot Identifier	Recorders
Date	03 / 06 / 22	Birrigan	7	AM

GF Code	*Top 3 native species in each growth form group: Full species name mandatory All other native and exotic species: Full species name where practicable*	N, E or HTE	Cover	Abund	stratum	voucher
	1 Pink bloodwood		20		C	
	2 Acacia disparrima		20		C	
	3 Brush box		25		C	
	4 Yellow pear fruit		2		M	
	5 Acronychia littoralis		10		M	
	6 Celerywood		2		M	
	7 Bracken fern		1		G	
	8 Tuckeroo		1		M	
	9 Molasses grass		5			
	10 Ground asparagus		0			
	11 Smilax australis		3		M	
	12 Elkhorn fern		1		M	
	13 Scrambling lily		2		M	
	14 Asparagus fern		0.1			
	15 Acmena hemilampra		0.2		M	
	16 Exotic ground cover sp.		1			
	17 Tree heath		1		M	
	18 Lomandra longfolia		3		G	
	19 Pandorea pandorana		0.1		M	
	20 Acronychia imperforata		5		M	
	21 Native hoya		0.5		M	
	22 Banksia integrifolia		1		M	
	23 Blueberry ash		1		M	
	24 Lantana		0.5			
	25 Coffee bush		0.2		M	
	26 Cryptocarya foetida		0.1		M	
	27 Ottochloa gracillima		0.5		G	
	28 Pearl vine		0.1		M	
	29 Cyperus gracilis		0.1		G	
	30					
	31					
	32					
	33					
	34					
	35					
	36					
	37					
	38					
	39					
	40					

GF Code: see Growth Form definitions in Appendix 1 **N:** native, **E:** exotic, **HTE:** high threat exotic **GF – circle code** if 'top 3'.

Cover: 0.1, 0.2, 0.3, …, 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover); ***Note:*** *0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m*

Abundance: 1, 2, 3, …, 10, 20, 30, … 100, 200, …, 1000, …

PLOT 7

June 2022	
	
North	East
	
South	West

400 m² plot: Sheet _ of _	Survey Name	Plot Identifier	Recorders
Date _ _ / _ _ / _ _			

GF Code	*Top 3 native species in each growth form group: Full species name mandatory All other native and exotic species: Full species name where practicable*	N, E or HTE	Cover	Abund	stratum	voucher
	1 Pink bloodwood		35		C	
	2 Acacia disparrima		30		C	
	3 Acronychia imperforata		8		M	
	4 Lantana		0.5			
	5 Lomandra longifolia		3		G	
	6 Ground asparagus		0.5			
	7 Smilax australis		3		G	
	8 Exotic groundcover sp.		2			
	9 Molasses grass		0.5			
	10 Bracken fern		2		G	
	11 Cyperus gracilis		7		G	
	12 Ochna		0.1			
	13 Yellow pear fruit		5		M	
	14 Tree heath		0.5		M	
	15 Solanum seaforthianum		0.1			
	16 Stephania japonica		0.1		M	
	17 Scrambling lily		0.1		M	
	18 White passion flower		0.2			
	19 Native wandering jew		75		G	
	20 Dianella caerulea		0.5		G	
	21 Yellow tulip		0.1		M	
	22 Tuckeroo		0.1		M	
	23 Birds nest fern		0.2		M	
	24 Elkhorn fern		0.2		M	
	25 Coffee bush		0.2		M	
	26 Pearl vine		0.1		M	
	27 Native grape		0.1		M	
	28 Solanum sp.		0.1			
	29 Snake vine		0.1		M	
	30 Forest red gum		3.5		M	
	31 Brushbox		0.9		M	
	32 Lomandra		2.7		G	
	33 Common lilly pilly		0.4		M	
	34 Melicope		0.4		M	
	35					
	36					
	37					
	38					
	39					
	40					

GF Code: see Growth Form definitions in Appendix 1 **N:** native, **E:** exotic, **HTE:** high threat exotic **GF – circle code** if 'top 3'.

Cover: 0.1, 0.2, 0.3, …, 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover); ***Note:*** *0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m*

Abundance: 1, 2, 3, …, 10, 20, 30, … 100, 200, …, 1000, …

PLOT 8

June 2022	
	
North	East
	
South	West

400 m² plot: Sheet _ of _	Survey Name	Plot Identifier	Recorders
Date 03/06/22	Birrigan	9	AM

GF Code	*Top 3 native species in each growth form group: Full species name mandatory All other native and exotic species: Full species name where practicable*	N, E or HTE	Cover	Abund	stratum	voucher
	1 Pink bloodwood		30		C	
	2 Acacia disparrima		45		C	
	3 Acronychia imperforata		10		M	
	4 Tree heath		5		M	
	5 Paperbark		0.5		C	
	6 Brushbox		0.5		C	
	7 Lantana		5			
	8 Milk vine		0.2		M	
	9 Ground asparagus		5			
	10 Lomandra longfolia		5		G	
	11 Yellow pear fruit		5		M	
	12 Blue lilly pilly		0.2		M	
	13 Cabbage tree palm		1		M	
	14 Sweet morinda		0.2		M	
	15 Smilax		1		M	
	16 Cordyline stricta		0.1		M	
	17 Bracken		2		G	
	18 Hibbertia scandens		0.1		M	
	19 Tuckeroo		0.1		M	
	20 Hard corkwood		0.1		M	
	21 Ochna		0.1			
	22 Elkhorn fern		0.5		M	
	23 Cyperus gracilis		2		G	
	24 Birds nest fern		0.5		M	
	25 Asparagus fern		0.1			
	26 Molasses grass		5			
	27 Dianella caerulea		0.5		G	
	28 Mock olive		0.2		M	
	29 Wandering jew		40		G	
	30 Solanum seaforthianum		0.5			
	31 Pomax umbellata		0.1		G	
	32					
	33					
	34					
	35					
	36					
	37					
	38					
	39					
	40					

GF Code: see Growth Form definitions in Appendix 1 **N:** native, **E:** exotic, **HTE:** high threat exotic **GF – circle code** if 'top 3'.

Cover: 0.1, 0.2, 0.3, …, 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover); ***Note:*** *0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m*

Abundance: 1, 2, 3, …, 10, 20, 30, … 100, 200, …, 1000, …

PLOT 9

June 2022	
	
North	East
	
South	West

ATTACHMENT 3 – MONITORING DATA - JANUARY 2023

400 m² plot: Sheet _ of _	Survey Name	Plot Identifier	Recorders
Date 17 / 01 /23	Birrigan	1	AM

GF Code	*Top 3 native species in each growth form group: Full species name mandatory All other native and exotic species: Full species name where practicable*	N, E or HTE	Cover	Abund	stratum	voucher
	1 Eucalyptus tereticornis		40		C	
	2 Pink bloodwood		15		C	
	3 Yellow pear fruit		20		M	
	4 Acronychia imperforata		25		M	
	5 Tuckeroo		1		M	
	6 Bracken fern		5		G	
	7 Lantana	E	0.5			
	8 Molasses grass	E	1			
	9 Smilax australis		0.5		M	
	10 Cyperus gracilis		0.5		G	
	11 Scrambling lily		0.2		M	
	12 Dianella caerulea		0.5		G	
	13 Elkhorn fern		1		M	
	14 Solanum seaforthianum	E	0.1			
	15 Cymbidium madidum		0.2		M	
	16 Acacia disparrima		10		C	
	17 Tree heath		2		M	
	18 Celery wood		5		M	
	19 Stephania japonica		0.5		M	
	20 Ribbonwood		2		M	
	21 Parsonsia straminea		0.1		M	
	22 White kamala		0.1		M	
	23 Acmena hemilampra		0.1		M	
	24 Milk vine		0.5		M	
	25 Ground asparagus	E	0.1			
	26 Coffee bush		1			
	27 Pomax umbellata		0.5			
	28					
	29					
	30					
	31					
	32					
	33					
	34					
	35					
	36					
	37					
	38					
	39					
	40					

GF Code: see Growth Form definitions in Appendix 1 **N:** native, **E:** exotic, **HTE:** high threat exotic **GF – circle code** if 'top 3'.

Cover: 0.1, 0.2, 0.3, …, 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover); ***Note:*** *0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m*

Abundance: 1, 2, 3, …, 10, 20, 30, … 100, 200, …, 1000, …

PLOT 1

January 2023	
	
North	East
	
South	West

400 m² plot: Sheet _ of _	Survey Name	Plot Identifier	Recorders
Date 17 / 01 / 23	Birrigan	2	AM

GF Code	*Top 3 native species in each growth form group: Full species name mandatory All other native and exotic species: Full species name where practicable*	N, E or HTE	Cover	Abund	stratum	voucher
	1 Pink bloodwood		20		C	
	2 Acacia disparrima		2		C	
	3 Acronychia imperforata		5		M	
	4 Yellow pear fruit		2		M	
	5 Lantana		0.5			
	6 Molasses grass		0.1			
	7 Ground asparagus		0.1			
	8 Morinda jasminoides		0.1			
	9 Bracken fern		0.5		G	
	10 Hairy psychotria		0.2		M	
	11 Lomandra longfolia		2.5		G	
	12 Tuckeroo		0.5		M	
	13 Brown bollygum		0.1		M	
	14 Milk vine		0.2		M	
	15 Elkhorn fern		1		M	
	16 Tree heath		2		M	
	17 Mock olive		0.5		M	
	18 Smilax australis		5		M	
	19 Flindersia schottiana		5		C	
	20 Brushbox		2		C	
	21 Cyperus gracilis		1		G	
	22 Parsonsia straminea		0.5		M	
	23 Hibbertia scandens		0.1		G	
	24 Water vine		1		M	
	25 Silky oak		0.5		M	
	26					
	27					
	28					
	29					
	30					
	31					
	32					
	33					
	34					
	35					
	36					
	37					
	38					
	39					
	40					

GF Code: see Growth Form definitions in Appendix 1 **N:** native, **E:** exotic, **HTE:** high threat exotic **GF – circle code** if 'top 3'.

Cover: 0.1, 0.2, 0.3, …, 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover); ***Note:*** *0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m*

Abundance: 1, 2, 3, …, 10, 20, 30, … 100, 200, …, 1000, …

PLOT 2

January 2023	
	
North	East
	
South	West

400 m² plot: Sheet _ of _	Survey Name	Plot Identifier	Recorders
Date 17/ 01 /23	Birrigan	3	AM

GF Code	*Top 3 native species in each growth form group: Full species name mandatory All other native and exotic species: Full species name where practicable*	N, E or HTE	Cover	Abund	stratum	voucher
	1 Acacia disparrima		10		C	
	2 Yellow pear fruit		10		M	
	3 Brush Canthium		0.1		M	
	4 Blue lilly pilly		5		M	
	5 Tuckeroo		5		M	
	6 Ribbonwood		5		C	
	7 Lantana		0.1			
	8 Brachen fern		0.5		G	
	9 Molasses grass		0.5			
	10 Elkhorn fern		1		M	
	11 Smilax australis		0.2		M	
	12 Acronychia imperforata		0.2		M	
	13 Celerywood		2		M	
	14 Cymbidium madidum		0.2		M	
	15 Coffee bush		0.5		M	
	16 Pink bloodwood		3		C	
	17 Eucalyptus tereticornis		5		C	
	18 Pittosporum revolutum		0.5		M	
	19 Ground asparagus		0.1			
	20 Asparagus fern		0.1			
	21 Native wandering jew		10		G	
	22 Tiny sedge		0.5		G	
	23 Lomandra		0.5		G	
	24 Stephania		0.5		G	
	25 Solanum seaforthianum		0.1			
	26 Solanum (other)		0.5			
	27 Wild tobacco		0.1			
	28					
	29					
	30					
	31					
	32					
	33					
	34					
	35					
	36					
	37					
	38					
	39					
	40					

GF Code: see Growth Form definitions in Appendix 1 **N:** native, **E:** exotic, **HTE:** high threat exotic **GF – circle code** if 'top 3'.

Cover: 0.1, 0.2, 0.3, …, 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover); ***Note:*** *0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m*

Abundance: 1, 2, 3, …, 10, 20, 30, … 100, 200, …, 1000, …

PLOT 3

January 2023	
	
North	East
	
South	West

400 m² plot: Sheet _ of _	Survey Name	Plot Identifier	Recorders
Date 17/01/23	Birrigan	4	AM

GF Code	*Top 3 native species in each growth form group: Full species name mandatory All other native and exotic species: Full species name where practicable*	N, E or HTE	Cover	Abund	stratum	voucher
	1 Pink bloodwood		8		C	
	2 Acacia disparrima		10		C	
	3 Yellow pear fruit		20		M	
	4 Celerywood		2		M	
	5 Acronychia imperforata		5		M	
	6 Lantana		1			
	7 Molasses grass		5			
	8 Ground asparagus		0.5			
	9 Wandering jew		5			
	10 Exotic ground cover sp.		0.5			
	11 Birds nest fern		0.2		M	
	12 Elkhorn fern		3		M	
	13 Flindersia schottiana		1		M	
	14 Tuckeroo		5		M	
	15 Lomandra longfolia		0.5		G	
	16 Cyperus gracilis		0.5		G	
	17 Solanum seaforthianum		0.2			
	18 Bracken fern		0.5		G	
	19 Cymbidium madidum		0.2		M	
	20 Yellow tulip		0.5		M	
	21 Ribbonwood		5		M	
	22 Brushbox		5		C	
	23 Hairy psychotria		0.1		M	
	24 Mock olive		0.5		M	
	25 Scrambling lily		0.5		M	
	26 Dianella caerulea		0.5		G	
	27 Smilax australis		0.5		M	
	28 Milk vine		0.1		M	
	29 Hibbertia scandens		0.1		M	
	30 Coffee bush		0.5		M	
	31					
	32					
	33					
	34					
	35					
	36					
	37					
	38					
	39					
	40					

GF Code: see Growth Form definitions in Appendix 1 **N:** native, **E:** exotic, **HTE:** high threat exotic **GF – circle code** if 'top 3'.

Cover: 0.1, 0.2, 0.3, …, 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover); ***Note:*** *0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m*

Abundance: 1, 2, 3, …, 10, 20, 30, … 100, 200, …, 1000, …

PLOT 4

Januaary 2023	
	
North	East
	
South	West

400 m² plot: Sheet _ of _	Survey Name	Plot Identifier	Recorders
Date 17 / 01 / 23	Birrigan	5	AM

GF Code	*Top 3 native species in each growth form group: Full species name mandatory All other native and exotic species: Full species name where practicable*	N, E or HTE	Cover	Abund	stratum	voucher
	1 Acacia disparrima		45		C	
	2 Acronychia imperata		15		M	
	3 Yellow pear fruit		20		M	
	4 Celerywood		2		M	
	5 Tuckeroo		1		M	
	6 Lantana		0.1			
	7 Molasses grass		5			
	8 Elkhorn fern		3		M	
	9 Lomandra longfolia		2		G	
	10 Cymbidium madidum		2		M	
	11 Tree heath		0.5		M	
	12 Smilax australis		0.5		M	
	13 Coffee bush		1		M	
	14 Dianella caerulea		0.5		M	
	15 Scrambling lily		0.5		M	
	16 Pink bloodwood		10		C	
	17 Foambark		0.1		M	
	18 Blue lilly pilly		0.5		M	
	19 Ribbonwood		0.1		M	
	20 Mock olive		0.5		M	
	21 Clerodendrum floribundum		0.2		M	
	22 Bracken		0.5		G	
	23 Native wandering jew		20		G	
	24 Bangalow Palm		0.5		M	
	25 Blueberry ash		0.2		M	
	26 Muttonwood		1		M	
	27 Red ash		0.2		M	
	28 Notelaea		0.5		M	
	29 Common lilly pilly		0.2		M	
	30 Dianella		0.5		G	
	31 Forest red gum		1		M	
	32 Banksia integrifolia		0.2		M	
	33 Blush walnut		0.1		M	
	34 Tiny sedge		15		G	
	35					
	36					
	37					
	38					
	39					
	40					

GF Code: see Growth Form definitions in Appendix 1 **N:** native, **E:** exotic, **HTE:** high threat exotic **GF – circle code** if 'top 3'.

Cover: 0.1, 0.2, 0.3, …, 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover); ***Note:*** *0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m*

Abundance: 1, 2, 3, …, 10, 20, 30, … 100, 200, …, 1000, …

PLOT 5

January 2023	
	
North	East
	
South	West

400 m² plot: Sheet _ of _	Survey Name	Plot Identifier	Recorders
Date 17 / 01 / 23	Birrigan	6	AM

GF Code	*Top 3 native species in each growth form group: Full species name mandatory All other native and exotic species: Full species name where practicable*	N, E or HTE	Cover	Abund	stratum	voucher
	1 Pink bloodwood		30		C	
	2 Acacia disparrima		40		C	
	3 Yellow pear fruit		10		M	
	4 Brush canthium		0.1		M	
	5 Lantana		0.1			
	6 Ground asparagus		0.1			
	7 Molasses grass		2			
	8 Coast cypress pine		2		M	
	9 acronchia imperforata		10		M	
	10 Celerywood		0.5		M	
	11 Bracken fern		2		M	
	12 Exotic ground cover sp.		0.1			
	13 Lomandra longifolia		2.5		G	
	14 Foambark		1		M	
	15 Morinda jasminoides		1		M	
	16 Elkhorn fern		2		M	
	17 Brown bollygum		0.1		M	
	18 Tuckeroo		1		M	
	19 Tree heath		5		M	
	20 Mock olive		0.1		M	
	21 Suave orchid		0.1		M	
	22 Scrambling lily		0.5		M	
	23 Smilax australis		1		M	
	24 Native hoya		1		M	
	25 Yellow tulip		0.5		M	
	26 Clerodendrum floribundum		0.2		M	
	27 Water vine		1		M	
	28 Native wandering jew		15		G	
	29 White passion flower		0.1			
	30 Muttonwood		0.1		M	
	31 Cyperus gracilis		5		G	
	32 Coffee bush		2.5		M	
	33					
	34					
	35					
	36					
	37					
	38					
	39					
	40					

GF Code: see Growth Form definitions in Appendix 1 **N:** native, **E:** exotic, **HTE:** high threat exotic **GF – circle code** if 'top 3'.

Cover: 0.1, 0.2, 0.3, …, 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover); ***Note:*** *0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m*

Abundance: 1, 2, 3, …, 10, 20, 30, … 100, 200, …, 1000, …

PLOT 6

January 2023	
	
North	East
	
South	West

400 m² plot: Sheet _ of _	Survey Name	Plot Identifier	Recorders
Date 17 / 01 / 23	Birrigan	7	AM

GF Code	*Top 3 native species in each growth form group: Full species name mandatory All other native and exotic species: Full species name where practicable*	N, E or HTE	Cover	Abund	stratum	voucher
	1 Pink bloodwood		20		C	
	2 Acacia disparrima		20		C	
	3 Brush box		25		C	
	4 Yellow pear fruit		3		M	
	5 Acronychia littoralis		10		M	
	6 Celerywood		2		M	
	7 Bracken fern		1		G	
	8 Tuckeroo		2		M	
	9 Molasses grass		0.5			
	10 Ground asparagus		0.1			
	11 Smilax australis		5		M	
	12 Elkhorn fern		1		M	
	13 Scrambling lily		2		M	
	14 Asparagus fern		0.1			
	15 Acmena hemilampra		0.5		M	
	16 Exotic ground cover sp.		1			
	17 Tree heath		1		M	
	18 Lomandra longfolia		3		G	
	19 Pandorea pandorana		0.5		M	
	20 Acronychia imperforata		5		M	
	21 Native hoya		1		M	
	22 Banksia integrifolia		1		M	
	23 Blueberry ash		1		M	
	24 Lantana		0.1			
	25 Coffee bush		0.5		M	
	26 Cryptocarya foetida		0.1		M	
	27 Ottochloa gracillima		1		G	
	28 Pearl vine		0.1		M	
	29 Cyperus gracilis		1		G	
	30					
	31					
	32					
	33					
	34					
	35					
	36					
	37					
	38					
	39					
	40					

GF Code: see Growth Form definitions in Appendix 1 **N:** native, **E:** exotic, **HTE:** high threat exotic **GF – circle code** if 'top 3'.

Cover: 0.1, 0.2, 0.3, …, 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover); ***Note:*** *0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m*

Abundance: 1, 2, 3, …, 10, 20, 30, … 100, 200, …, 1000, …

PLOT 7

January 2023	
	
North	East
	
South	West

400 m² plot: Sheet _ of _	Survey Name	Plot Identifier	Recorders
Date 17 / 01 / 23	Birrigan	8	AM

GF Code	*Top 3 native species in each growth form group: Full species name mandatory All other native and exotic species: Full species name where practicable*	N, E or HTE	Cover	Abund	stratum	voucher
	1 Pink bloodwood		35		C	
	2 Acacia disparrima		30		C	
	3 Acronychia imperforata		8		M	
	4 Lantana		0.1			
	5 Lomandra longifolia		10		G	
	6 Ground asparagus		0.1			
	7 Smilax australis		5		G	
	8 Exotic groundcover sp.		0.5			
	9 Molasses grass		0.2			
	10 Bracken fern		2		G	
	11 Cyperus gracilis		30		G	
	12 Ochna		0.1			
	13 Yellow pear fruit		5		M	
	14 Tree heath		0.5		M	
	15 Solanum seaforthianum		0.1			
	16 Stephania japonica		0.5		M	
	17 Scrambling lily		0.5		M	
	18 White passion flower		0.1			
	19 Native wandering jew		25		G	
	20 Dianella caerulea		1		G	
	21 Yellow tulip		0.5		M	
	22 Tuckeroo		0.5		M	
	23 Birds nest fern		0.2		M	
	24 Elkhorn fern		0.2		M	
	25 Coffee bush		0.2		M	
	26 Pearl vine		0.5		M	
	27 Native grape		0.2		M	
	28 Solanum sp.		0.1			
	29 Snake vine		0.5		M	
	30 Forest red gum		3.5		M	
	31 Brushbox		1		M	
	32 Lomandra		2.7		G	
	33 Common lilly pilly		0.5		M	
	34 Melicope		0.5		M	
	35					
	36					
	37					
	38					
	39					
	40					

GF Code: see Growth Form definitions in Appendix 1 **N:** native, **E:** exotic, **HTE:** high threat exotic **GF – circle code** if 'top 3'.

Cover: 0.1, 0.2, 0.3, …, 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover); ***Note:*** *0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m*

Abundance: 1, 2, 3, …, 10, 20, 30, … 100, 200, …, 1000, …

PLOT 8

January 2023	
	
North	East
	
South	West

400 m² plot: Sheet _ of _	Survey Name	Plot Identifier	Recorders
Date 17 / 01 / 23	Birrigan	9	AM

GF Code	*Top 3 native species in each growth form group: Full species name mandatory All other native and exotic species: Full species name where practicable*	N, E or HTE	Cover	Abund	stratum	voucher
	1 Pink bloodwood		30		C	
	2 Acacia disparrima		45		C	
	3 Acronychia imperforata		10		M	
	4 Tree heath		5		M	
	5 Paperbark		0.5		C	
	6 Brushbox		0.5		C	
	7 Lantana		0.5			
	8 Milk vine		0.2		M	
	9 Ground asparagus		1			
	10 Lomandra longfolia		5		G	
	11 Yellow pear fruit		5		M	
	12 Blue lilly pilly		0.5		M	
	13 Cabbage tree palm		1		M	
	14 Sweet morinda		0.5		M	
	15 Smilax		1.5		M	
	16 Cordyline stricta		0.1		M	
	17 Bracken		2		G	
	18 Hibbertia scandens		0.1		M	
	19 Tuckeroo		0.5		M	
	20 Hard corkwood		0.1		M	
	21 Ochna		0.1			
	22 Elkhorn fern		0.5		M	
	23 Cyperus gracilis		10		G	
	24 Birds nest fern		0.5		M	
	25 Asparagus fern		0.1			
	26 Molasses grass		2.5			
	27 Dianella caerulea		0.5		G	
	28 Mock olive		0.2		M	
	29 Wandering jew		10		G	
	30 Solanum seaforthianum		0.1			
	31 Pomax umbellata		0.1		G	
	32					
	33					
	34					
	35					
	36					
	37					
	38					
	39					
	40					

GF Code: see Growth Form definitions in Appendix 1 **N:** native, **E:** exotic, **HTE:** high threat exotic **GF – circle code** if 'top 3'.

Cover: 0.1, 0.2, 0.3, …, 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover); ***Note:*** *0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m*

Abundance: 1, 2, 3, …, 10, 20, 30, … 100, 200, …, 1000, …

PLOT 9

January 2023	
	
North	East
	
South	West

ATTACHMENT 4 – MONITORING DATA - JULY 2023

400 m² plot: Sheet _ of _	Survey Name	Plot Identifier	Recorders
Date 28 / 07 23	Birrigan	1	AM

GF Code	*Top 3 native species in each growth form group: Full species name mandatory All other native and exotic species: Full species name where practicable*	N, E or HTE	Cover	Abund	stratum	voucher
	1 Eucalyptus tereticornis		40		C	
	2 Pink bloodwood		15		C	
	3 Yellow pear fruit		20		M	
	4 Acronychia imperforata		25		M	
	5 Tuckeroo		1.5		M	
	6 Bracken fern		10		G	
	7 Lantana	E	0.1			
	8 Molasses grass	E	0.5			
	9 Smilax australis		1.5		M	
	10 Cyperus gracilis		1.5		G	
	11 Scrambling lily		0.5		M	
	12 Dianella caerulea		1		G	
	13 Elkhorn fern		1		M	
	14 Solanum seaforthianum	E	0.1			
	15 Cymbidium madidum		0.2		M	
	16 Acacia disparrima		10		C	
	17 Tree heath		2		M	
	18 Celery wood		5		M	
	19 Stephania japonica		1		M	
	20 Ribbonwood		2		M	
	21 Parsonsia straminea		0.5		M	
	22 White kamala		0.5		M	
	23 Acmena hemilampra		0.5		M	
	24 Milk vine		1		M	
	25 Ground asparagus	E	0.1			
	26 Coffee bush		1.5		M	
	27 Pomax umbellata		1		G	
	28					
	29					
	30					
	31					
	32					
	33					
	34					
	35					
	36					
	37					
	38					
	39					
	40					

GF Code: see Growth Form definitions in Appendix 1 **N:** native, **E:** exotic, **HTE:** high threat exotic **GF – circle code** if 'top 3'.

Cover: 0.1, 0.2, 0.3, …, 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover); ***Note:*** *0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m*

Abundance: 1, 2, 3, …, 10, 20, 30, … 100, 200, …, 1000, …

400 m² plot: Sheet _ of _		Survey Name	Plot Identifier	Recorders
Date	28_07_23_	Birrigan	2	AM

GF Code	*Top 3 native species in each growth form group: Full species name mandatory All other native and exotic species: Full species name where practicable*	N, E or HTE	Cover	Abund	stratum	voucher
	1 Pink bloodwood		20		C	
	2 Acacia disparrima		2		C	
	3 Acronychia imperforata		5		M	
	4 Yellow pear fruit		2		M	
	5 Lantana	E	0.1			
	6 Molasses grass	E	0.1			
	7 Ground asparagus	E	0.1			
	8 Morinda jasminoides		0.1		M	
	9 Bracken fern		1.5		G	
	10 Hairy psychotria		0.5		M	
	11 Lomandra longfolia		2.5		G	
	12 Tuckeroo		0.5		M	
	13 Brown bollygum		0.5		M	
	14 Milk vine		0.5		M	
	15 Elkhorn fern		1		M	
	16 Tree heath		2		M	
	17 Mock olive		0.5		M	
	18 Smilax australis		5		M	
	19 Flindersia schottiana		5		C	
	20 Brushbox		2		C	
	21 Cyperus gracilis		1		G	
	22 Parsonsia straminea		1		M	
	23 Hibbertia scandens		0.5		G	
	24 Water vine		1		M	
	25 Silky oak		0.5		M	
	26					
	27					
	28					
	29					
	30					
	31					
	32					
	33					
	34					
	35					
	36					
	37					
	38					
	39					
	40					

GF Code: see Growth Form definitions in Appendix 1 **N:** native, **E:** exotic, **HTE:** high threat exotic **GF – circle code** if 'top 3'.

Cover: 0.1, 0.2, 0.3, …, 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover); ***Note:*** *0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m*

Abundance: 1, 2, 3, …, 10, 20, 30, … 100, 200, …, 1000, …

400 m² plot: Sheet _ of _	Survey Name	Plot Identifier	Recorders
Date 28 / 07 / 23	Birrigan	3	AM

GF Code	*Top 3 native species in each growth form group: Full species name mandatory All other native and exotic species: Full species name where practicable*	N, E or HTE	Cover	Abund	stratum	voucher
	1 Acacia disparrima		10		C	
	2 Yellow pear fruit		10		M	
	3 Brush Canthium		0.5		M	
	4 Blue lilly pilly		5		M	
	5 Tuckeroo		5		M	
	6 Ribbonwood		5		C	
	7 Lantana	E	0.1			
	8 Bracken fern		1		G	
	9 Molasses grass	E	0.1			
	10 Elkhorn fern		1		M	
	11 Smilax australis		0.5		M	
	12 Acronychia imperforata		0.5		M	
	13 Celerywood		2		M	
	14 Cymbidium madidum		0.2		M	
	15 Coffee bush		1		M	
	16 Pink bloodwood		3		C	
	17 Eucalyptus tereticornis		5		C	
	18 Pittosporum revolutum		1		M	
	19 Ground asparagus	E	0.1			
	20 Asparagus fern	E	0.1			
	21 Native wandering jew		10		G	
	22 Tiny sedge		1		G	
	23 Lomandra		1		G	
	24 Stephania		1		G	
	25 Solanum seaforthianum	E	0.1			
	26 Solanum (other)	E	0.1			
	27 Wild tobacco	E	0.1			
	28					
	29					
	30					
	31					
	32					
	33					
	34					
	35					
	36					
	37					
	38					
	39					
	40					

GF Code: see Growth Form definitions in Appendix 1 **N:** native, **E:** exotic, **HTE:** high threat exotic **GF – circle code** if 'top 3'.

Cover: 0.1, 0.2, 0.3, …, 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover); ***Note:*** *0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m*

Abundance: 1, 2, 3, …, 10, 20, 30, … 100, 200, …, 1000, …

400 m² plot: Sheet _ of _	Survey Name	Plot Identifier	Recorders
Date 28/07/23	Birrigan	4	AM

GF Code	*Top 3 native species in each growth form group: Full species name mandatory All other native and exotic species: Full species name where practicable*	N, E or HTE	Cover	Abund	stratum	voucher
	1 Pink bloodwood		8		C	
	2 Acacia disparrima		10		C	
	3 Yellow pear fruit		20		M	
	4 Celerywood		2		M	
	5 Acronychia imperforata		5		M	
	6 Lantana	E	0.1			
	7 Molasses grass	E	0.1			
	8 Ground asparagus	E	0.1			
	9 Wandering jew	E	15			
	10 Exotic ground cover sp.	E	0.1			
	11 Birds nest fern		0.2		M	
	12 Elkhorn fern		3		M	
	13 Flindersia schottiana		1		M	
	14 Tuckeroo		5		M	
	15 Lomandra longfolia		1.5		G	
	16 Cyperus gracilis		1.5		G	
	17 Solanum seaforthianum	E	0.1			
	18 Bracken fern		1.5		G	
	19 Cymbidium madidum		0.2		M	
	20 Yellow tulip		1		M	
	21 Ribbonwood		5		M	
	22 Brushbox		5		C	
	23 Hairy psychotria		0.5		M	
	24 Mock olive		1		M	
	25 Scrambling lily		1		M	
	26 Dianella caerulea		1.5		G	
	27 Smilax australis		1.5		M	
	28 Milk vine		0.5		M	
	29 Hibbertia scandens		0.5		M	
	30 Coffee bush		1		M	
	31					
	32					
	33					
	34					
	35					
	36					
	37					
	38					
	39					
	40					

GF Code: see Growth Form definitions in Appendix 1 **N:** native, **E:** exotic, **HTE:** high threat exotic **GF – circle code** if 'top 3'.

Cover: 0.1, 0.2, 0.3, …, 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover); ***Note:*** *0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m*

Abundance: 1, 2, 3, …, 10, 20, 30, … 100, 200, …, 1000, …

400 m² plot: Sheet _ of _	Survey Name	Plot Identifier	Recorders
Date 28 / 07 / 23	Birrigan	5	AM

GF Code	*Top 3 native species in each growth form group: Full species name mandatory All other native and exotic species: Full species name where practicable*	N, E or HTE	Cover	Abund	stratum	voucher
	1 Acacia disparrima		45		C	
	2 Acronychia imperata		15		M	
	3 Yellow pear fruit		20		M	
	4 Celerywood		2		M	
	5 Tuckeroo		1.5		M	
	6 Lantana	E	0.1			
	7 Molasses grass	E	0.5			
	8 Elkhorn fern		3		M	
	9 Lomandra longfolia		2		G	
	10 Cymbidium madidum		2		M	
	11 Tree heath		1		M	
	12 Smilax australis		1		M	
	13 Coffee bush		1.5		M	
	14 Dianella caerulea		1		M	
	15 Scrambling lily		1.5		M	
	16 Pink bloodwood		10		C	
	17 Foambark		0.5		M	
	18 Blue lilly pilly		0.5		M	
	19 Ribbonwood		0.5		M	
	20 Mock olive		0.5		M	
	21 Clerodendrum floribundum		0.5		M	
	22 Bracken		1.5		G	
	23 Native wandering jew		25		G	
	24 Bangalow Palm		0.5		M	
	25 Blueberry ash		0.5		M	
	26 Muttonwood		1		M	
	27 Red ash		0.5		M	
	28 Notelaea		1		M	
	29 Common lilly pilly		0.5		M	
	30 Dianella		1.5		G	
	31 Forest red gum		1		M	
	32 Banksia integrifolia		0.5		M	
	33 Blush walnut		0.5		M	
	34 Tiny sedge		15		G	
	35					
	36					
	37					
	38					
	39					
	40					

GF Code: see Growth Form definitions in Appendix 1 **N:** native, **E:** exotic, **HTE:** high threat exotic **GF – circle code** if 'top 3'.

Cover: 0.1, 0.2, 0.3, …, 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover); ***Note:*** *0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m*

Abundance: 1, 2, 3, …, 10, 20, 30, … 100, 200, …, 1000, …

400 m² plot: Sheet _ of _	Survey Name	Plot Identifier	Recorders
Date 28 / 07 / 23	Birrigan	6	AM

GF Code	*Top 3 native species in each growth form group: Full species name mandatory All other native and exotic species: Full species name where practicable*	N, E or HTE	Cover	Abund	stratum	voucher
	1 Pink bloodwood		30		C	
	2 Acacia disparrima		40		C	
	3 Yellow pear fruit		10		M	
	4 Brush canthium		0.5		M	
	5 Lantana	E	0.1			
	6 Ground asparagus	E	0.1			
	7 Molasses grass	E	0.1			
	8 Coast cypress pine		2		M	
	9 acronchia imperforata		10		M	
	10 Celerywood		0.5		M	
	11 Bracken fern		5		M	
	12 Exotic ground cover sp.	E	0.1			
	13 Lomandra longifolia		2.5		G	
	14 Foambark		1		M	
	15 Morinda jasminoides		1		M	
	16 Elkhorn fern		2		M	
	17 Brown bollygum		0.5		M	
	18 Tuckeroo		1.5		M	
	19 Tree heath		5		M	
	20 Mock olive		0.5		M	
	21 Suave orchid		0.2		M	
	22 Scrambling lily		0.5		M	
	23 Smilax australis		1		M	
	24 Native hoya		1		M	
	25 Yellow tulip		1		M	
	26 Clerodendrum floribundum		0.5		M	
	27 Water vine		1		M	
	28 Native wandering jew		15		G	
	29 White passion flower	E	0.1			
	30 Muttonwood		0.5		M	
	31 Cyperus gracilis		5		G	
	32 Coffee bush		2.5		M	
	33					
	34					
	35					
	36					
	37					
	38					
	39					
	40					

GF Code: see Growth Form definitions in Appendix 1 **N:** native, **E:** exotic, **HTE:** high threat exotic **GF – circle code** if 'top 3'.

Cover: 0.1, 0.2, 0.3, …, 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover); ***Note:*** *0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m*

Abundance: 1, 2, 3, …, 10, 20, 30, … 100, 200, …, 1000, …

400 m² plot: Sheet _ of _	Survey Name	Plot Identifier	Recorders
Date 28 / 07 / 23	Birrigan	7	AM

GF Code	*Top 3 native species in each growth form group: Full species name mandatory All other native and exotic species: Full species name where practicable*	N, E or HTE	Cover	Abund	stratum	voucher
	1 Pink bloodwood		20		C	
	2 Acacia disparrima		20		C	
	3 Brush box		25		C	
	4 Yellow pear fruit		3		M	
	5 Acronychia littoralis		10		M	
	6 Celerywood		2		M	
	7 Bracken fern		1.5		G	
	8 Tuckeroo		2.5		M	
	9 Molasses grass	E	0.1			
	10 Ground asparagus	E	0.1			
	11 Smilax australis		5		M	
	12 Elkhorn fern		1		M	
	13 Scrambling lily		2		M	
	14 Asparagus fern	E	0.1			
	15 Acmena hemilampra		1		M	
	16 Exotic ground cover sp.	E	0.5			
	17 Tree heath		1		M	
	18 Lomandra longfolia		3		G	
	19 Pandorea pandorana		0.5		M	
	20 Acronychia imperforata		5		M	
	21 Native hoya		1		M	
	22 Banksia integrifolia		1.5		M	
	23 Blueberry ash		1.5		M	
	24 Lantana	E	0.1			
	25 Coffee bush		1		M	
	26 Cryptocarya foetida		0.1		M	
	27 Ottochloa gracillima		1		G	
	28 Pearl vine		0.5		M	
	29 Cyperus gracilis		1		G	
	30					
	31					
	32					
	33					
	34					
	35					
	36					
	37					
	38					
	39					
	40					

GF Code: see Growth Form definitions in Appendix 1 **N:** native, **E:** exotic, **HTE:** high threat exotic **GF – circle code** if 'top 3'.

Cover: 0.1, 0.2, 0.3, …, 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover); ***Note:*** *0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m*

Abundance: 1, 2, 3, …, 10, 20, 30, … 100, 200, …, 1000, …

400 m² plot: Sheet _ of _		Survey Name	Plot Identifier	Recorders
Date	28 / 07 / 23	Birrigan	8	AM

GF Code	*Top 3 native species in each growth form group: Full species name mandatory All other native and exotic species: Full species name where practicable*	N, E or HTE	Cover	Abund	stratum	voucher
	1 Pink bloodwood		35		C	
	2 Acacia disparrima		30		C	
	3 Acronychia imperforata		8		M	
	4 Lantana	E	0.1			
	5 Lomandra longifolia		10		G	
	6 Ground asparagus	E	0.1			
	7 Smilax australis		5		G	
	8 Exotic groundcover sp.	E	0.1			
	9 Molasses grass	E	0.1			
	10 Bracken fern		5		G	
	11 Cyperus gracilis		30		G	
	12 Ochna	E	0.1			
	13 Yellow pear fruit		5		M	
	14 Tree heath		1		M	
	15 Solanum seaforthianum	E	0.1			
	16 Stephania japonica		1		M	
	17 Scrambling lily		1		M	
	18 White passion flower	E	0.1			
	19 Native wandering jew		30		G	
	20 Dianella caerulea		1.5		G	
	21 Yellow tulip		1		M	
	22 Tuckeroo		1		M	
	23 Birds nest fern		0.5		M	
	24 Elkhorn fern		0.2		M	
	25 Coffee bush		1		M	
	26 Pearl vine		1		M	
	27 Native grape		0.2		M	
	28 Solanum sp.	E	0.1			
	29 Snake vine		1.5		M	
	30 Forest red gum		3.5		M	
	31 Brushbox		1		M	
	32 Lomandra		5		G	
	33 Common lilly pilly		0.5		M	
	34 Melicope		0.5		M	
	35					
	36					
	37					
	38					
	39					
	40					

GF Code: see Growth Form definitions in Appendix 1 **N:** native, **E:** exotic, **HTE:** high threat exotic **GF – circle code** if 'top 3'.

Cover: 0.1, 0.2, 0.3, …, 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover); ***Note:*** *0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m*

Abundance: 1, 2, 3, …, 10, 20, 30, … 100, 200, …, 1000, …

400 m² plot: Sheet _ of _	Survey Name	Plot Identifier	Recorders
Date 28 / 07 / 23	Birrigan	9	AM

GF Code	*Top 3 native species in each growth form group: Full species name mandatory All other native and exotic species: Full species name where practicable*	N, E or HTE	Cover	Abund	stratum	voucher
	1 Pink bloodwood		30		C	
	2 Acacia disparrima		45		C	
	3 Acronychia imperforata		10		M	
	4 Tree heath		5		M	
	5 Paperbark		0.5		C	
	6 Brushbox		0.5		C	
	7 Lantana	E	0.1			
	8 Milk vine		0.5		M	
	9 Ground asparagus	E	0.1			
	10 Lomandra longfolia		7.5		G	
	11 Yellow pear fruit		5		M	
	12 Blue lilly pilly		0.5		M	
	13 Cabbage tree palm		1		M	
	14 Sweet morinda		0.5		M	
	15 Smilax		2		M	
	16 Cordyline stricta		0.5		M	
	17 Bracken		2		G	
	18 Hibbertia scandens		0.5		M	
	19 Tuckeroo		1		M	
	20 Hard corkwood		0.5		M	
	21 Ochna	E	0.1			
	22 Elkhorn fern		0.5		M	
	23 Cyperus gracilis		10		G	
	24 Birds nest fern		0.5		M	
	25 Asparagus fern	E	0.1			
	26 Molasses grass	E	2.5			
	27 Dianella caerulea		1		G	
	28 Mock olive		0.2		M	
	29 Wandering jew		15		G	
	30 Solanum seaforthianum	E	0.1			
	31 Pomax umbellata		0.5		G	
	32					
	33					
	34					
	35					
	36					
	37					
	38					
	39					
	40					

GF Code: see Growth Form definitions in Appendix 1 **N:** native, **E:** exotic, **HTE:** high threat exotic **GF – circle code** if 'top 3'.

Cover: 0.1, 0.2, 0.3, …, 1, 2, 3, ..., 10, 15, 20, 25, ...100% (foliage cover); ***Note:*** *0.1% cover represents an area of approximately 63 x 63 cm or a circle about 71 cm across, 0.5% cover represents an area of approximately 1.4 x 1.4 m, and 1% = 2.0 x 2.0 m, 5% = 4 x 5 m, 25% = 10 x 10 m*

Abundance: 1, 2, 3, …, 10, 20, 30, … 100, 200, …, 1000, …

APPENDIX 5 - ANNUAL KOALA MONITORING REPORT 2023

KOALA
(*Phascolarctos cinereus*)
3RD ANNUAL MONITORING REPORT

Birrigan Iluka Beach, Iluka
Lot 99 on DP823635

A Report Prepared for
The Stephens Group Pty Ltd

SEPTEMBER 2023

JWA Pty Ltd
PO Box 650, Jimboomba QLD 4280
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DOCUMENT CONTROL

Document

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Version and Date	RW1 21/09/23
Client	The Stephens Group Pty Ltd

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Client Issue

Version	Date	Author		Approved by	
		Name	Initials	Name	Initials
RW1	21/09/23	Nicole Davies	ND	Adam McArthur	AM

TABLE OF CONTENTS

1 INTRODUCTION

1.1 Background

JWA Pty Ltd have been engaged by The Stephens Group Pty Ltd to undertake annual monitoring for the koala (*Phascolarctos cinereus*) population at the Birrigan Iluka Beach development site, located at Hickey Street, Iluka - formally described as Lot 99 on DP823635. The Birrigan Iluka Beach development is an approved 141 lot community scheme subdivision over the subject land (**FIGURE 1**).

The koala is listed as an endangered species within schedules of the NSW *Biodiversity Conservation Act (2016)* (BC Act). The koala (combined population in Queensland, New South Wales and the Australian Capital Territory) is listed as an endangered species within schedules of the Commonwealth E*nvironment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

Comprehensive Koala surveys have previously been undertaken by Keystone Ecological in 2014, using a variety of direct and indirect methods (spotlight, call broadcast, camera trap, predator scats, scratch searches, and Spot Assessment Technique surveys) (Keystone Ecological 2018). The presence of this species on the subject site was confirmed by a single camera trap image (Keystone Ecological 2018a).

In order to comply with approval condition 4f issued by the Commonwealth Department of the Environment and Energy (DEE), a Koala Monitoring and Reporting Program is required. The Koala Monitoring Program must be consistent with the provisions of the Clarence Valley Comprehensive Koala Plan of Management, including any provisions for registration of data on koala presence. Koala baseline monitoring was completed on the site by JWA in February 2020.

This report details the methodology and results from the 3rd annual koala monitoring completed by JWA during September 2023.

1.2 Site Description

Birrigan Iluka Beach is a 19.41 ha site located in Iluka, within the Clarence Valley Local Government Area (LGA) (**FIGURE 2**). The Birrigan Iluka Beach subdivision is surrounded by residential development in the west and south-west, bushland to the north, east and south-east and the Iluka Golf Course to the north-east. Iluka Nature Reserve and the Bundjalung National Park are in proximity to the site to the east.

The site has experienced disturbance comprising clearing, sand mining, severe fires, weed infestation, possibly some recontouring and some seeding and/or planting of unknown material. The site continues to be used by locals as a dumping ground for garden waste, old furniture, building materials and other rubbish.

The vegetation is a mosaic of regenerating locally native canopy species. The understorey is dominated by exotic species across most of the site, particularly Lantana (*Lantana camara*) and Guinea Grass (*Megathyrsus maximus*). A narrow band of vegetation at the

PROJECT:
ILUKA
LOT 99 ON DP 823635

LOCATION:
ILUKA ROAD, ELIZABETH, RIVERVIEW AND HICKEY STREETS
ILUKA, NSW, 2466

DEVELOPMENT CHARACTERISTICS	
ITEM	DESCRIPTION
PROPERTY DESCRIPTION	LOT 99 DP823635
AREA OF LOT 99	19.41 ha.
TOTAL NUMBER OF LOTS	141
PART LOT 1 (Approx.)	5.29 ha.

CLARENCE VALLEY COUNCIL
APPROVAL

This is the plan referred to in Council's Notice of Determination of SUB2015/0034

Date: 13/11/2019

BIKE / PATHWAY CONNECTION TO ILUKA ROAD
- BIKE LANE SITUATED ON THE NORTH EASTERN SIDE OF THE ILUKA ROAD INTERSECTION WITH HICKEY STREET AND TO PROVIDE A REFUGE ISLAND ON ILUKA ROAD

LOT 93 DP 1105124
LOT 64 DP 41701
LOT 7020 DP 1114873
LOT 971 DP 876936
LOT 972 DP 876936
LOT 18 DP 243136
LOT 7019 DP 1114862
LOT 7018 DP 1115127

New Bushfire Trail Connection

HICKEY STREET
ILUKA ROAD
RIVERVIEW STREET (UNFORMED PORTION)
STREET 1
STREET 2
STREET 3
STREET 4
STREET 5
STREET 6
STREET 7
STREET 8
AWAY 3

PART LOT 1 (PARK B)
PART LOT 1 (PARK D)
PART LOT 1 (PARK A)
PART LOT 1 (PARK C)
PART LOT 1 (PARK F)
PART LOT 1 (PARK E)

bike / pathway
16m (reserve)
25m (reserve)
35m

Emergency Access Only
MICALO STREET
BIKE / PATHWAY CONNECTION TO MICALO STREET
ELIZABETH STREET
MAINTAIN EXISTING BUSHFIRE TRAIL ACCESS TO ILUKA ROAD
REALIGN EXISTING BUSHFIRE TRAIL

STREETS FOR LIVING - CHARACTERISTICS				
STREET	RESERVE WIDTH (m)	VERGE WIDTH (m)	TOTAL SEAL WIDTH (m)	CUL DE SAC DIAMETER (m)
HICKEY STREET	30 EXISTING	VARIES	8	-
1	20	6	8	30 outer, 15 inner
2	20 (*1)	6 (*1)	8	-
3	25	6 (*2)	8	20
4, 6, 7	20	6	8	-
5, 8	20	6	8	20
AWAY 3	VARIES	3.5 (*3)	4	-

PURPOSE OF STREET CORRIDORS
- STREET FOR LIVING
- WATER SENSITIVE URBAN DESIGN CORRIDOR
- INFRASTRUCTURE CORRIDOR
- FAUNA / FLORA CORRIDOR

AWAY - MEANS ACCESS WAY

NOTES:
(* 1) - RESERVE WIDTH INCREASED TO 25m (AND VERGE OF 11m) TO ACCOMMODATE WSUD TREATMENT WITHIN RESERVE ON PARK SIDE OF STREET 2
- VERGE REDUCES TO 2m ON PARKSIDE FOR NORTHERN PART OF STREET 2 WHERE DETENTION / WSUD NOT REQUIRED. EXISTING RESERVE WIDTH APPROX. 30m FOR NORTHERN SECTION WHERE STREET 2 IS ACCOMMODATED WITHIN EXISTING HICKEY STREET RESERVE
(* 2) - VERGE WIDTH INCREASED TO 11m ON PARKSIDE TO ACCOMMODATE WSUD TREATMENT
(* 3) - ON SIDE WITH LOT ACCESS ONLY - REDUCED / VARIED VERGE WIDTH ON NON-ACCESS SIDE

TYPICAL ALLOTMENT ATTRIBUTES		
AREA (m2)	WIDTH (m)	LENGTH (m)
>400	13-14	30-35
500	14	35
600	17.5	35
700	19	37

NOTES:
1. **These notes form part of this plan.**
2. **Boundaries identified by plan dimensions only, the boundaries have not been surveyed.**
3. **Adjoining property boundary boundaries may not be complete, a summary of compiled DCDB only.**
4. **The dimensions, bearings, areas and number of allotments shown on this plan are subject to field survey and approval of relevant Government Authorities having jurisdiction over statutory requirements pursuant to any relevant legislation.**
5. **The information for this plan has been prepared for the purpose of a Development Approval for Subdivision and should not be used for any other purpose.**
6. **This plan has been prepared for the Stevens Group.**
7. **Do not scale from this plan.**

note: the layout is preliminary only and subject to detailed engineering and surveying input. all dimensions and areas are indicative only.

Scale 1 : 2500 - Lengths in metres

20 0 20 40 60 80 100

SOURCE: OneCollective - Masterplan (191113 CVC Approved Plans - Extract.pdf)

SCALE: 1 : 2500 @ A3

JWA PTY LTD
Ecological Consultants

CLIENT
Ocean Park Consulting Pty Ltd

PROJECT
Annual Koala Monitoring Report
Birrigan Estate
Lot 99 on DP823635, Hickey Street, Iluka NSW
Clarence Valley Council LGA

FIGURE 1

PREPARED: BW
DATE: 08 September 2021
FILE: N202001_SAT_20210908.dwg

TITLE
APPROVED MASTER PLAN

LEGEND

Site Boundary

Scale 1:20 000 - Lengths in metres

200 0 200 400 600 800 1000

SOURCE: Open Street Maps

SCALE: 1 : 20 000 @ A3

JWA PTY LTD
Ecological Consultants

CLIENT
Ocean Park Consulting Pty Ltd

PROJECT
Annual Koala Monitoring Report
Birrigan Estate
Lot 99 on DP823635, Hickey Street, Iluka NSW
Clarence Valley Council LGA

FIGURE 2

PREPARED: BW
DATE: 08 September 2021
FILE: N202001_SAT_20210908.dwg

TITLE

LOCALITY PLAN

western end of the site supports large trees and the landform seems to reflect a more natural pattern of dune and swale.

Three vegetation types have been recorded on the site (Keystone Ecological 2018):

- Community 190 Coast Banksia woodland and open forest of coastal dunes: 0.41 ha of relatively undisturbed vegetation at the site's western end. This area has elements of regenerating Littoral Rainforest (for example, some vines and rainforest tree species), but it is not structurally or floristically well developed.
- Community 193 Pink Bloodwood - Brush Box open forest on coastal dunes and sandplains: dominant community, occupying 18.16 hectares.
- Community 187 Coast Cypress Pine shrubby open forest: restricted on site to a dense patch of adult trees near the site's southern boundary, occupying 0.25 hectares.

2 METHODOLOGY

2.1 Background

A Baseline Koala Monitoring program was established in February 2020 across the retained vegetation on site to collect data to allow future monitoring to determine any changes in the distribution and level of Koala activity.

Monitoring is then to be undertaken annually to determine the effectiveness of management actions implemented and to monitor the Iluka Koala population.

The first annual monitoring was completed on the 10th August 2021 by one (1) JWA ecologist. The second annual monitoring was completed on the 12th August 2022 by one (1) JWA ecologist. The third annual monitoring was completed on the 1st September 2023 by one (1) JWA ecologist.

2.2 Koala Monitoring Program

2.2.1 Introduction

This section discusses the proposed monitoring program for koalas at the Birrigan Iluka Beach site including the key monitoring objectives, methodologies employed during baseline monitoring and to be implemented during ongoing annual monitoring, and reporting requirements.

2.2.2 Monitoring Program

2.2.2.1 Baseline koala monitoring

The aims of the baseline monitoring are to establish survey sites and protocols and to collect data which will allow future monitoring to determine any changes in the distribution and level of Koala activity within the Birrigan Iluka Beach site.

Baseline koala monitoring has been completed across the vegetated areas to be retained on the site. Baseline monitoring was completed prior to the commencement of works on the site by suitably qualified and/or accredited persons[1]. Baseline monitoring included:

- diurnal searches of Birrigan Iluka Beach koala habitat; and
- a full measure of koala activity i.e. application of Spot Assessment Technique (SAT) methodology (Phillips and Callaghan 2011).

2.2.2.2 Annual koala monitoring

Annual koala monitoring was completed over the Birrigan Iluka Beach site following the methodology described in the Baseline koala monitoring section (**SECTION 2.2.2.1**), and included:

- diurnal searches of Birrigan Iluka Breach koala habitat; and

[1] Means a qualified ecologist with appropriate training and at least five years of experience in undertaking surveys in relation to the relevant EPBC Act listed threatened species.

- a full measure of koala activity i.e. application of Spot Assessment Technique (SAT) methodology (Phillips and Callaghan (2011).

In reporting of annual monitoring results, liaison is to be undertaken with the Clarence Valley Council, NSW Koala Preservation Society, NSW – Office of Environment and Heritage and/or Clarence Valley WIRES to gather data on any koala incidents that may have occurred within the area in the previous two-year period. In accordance with the HMP (Keystone Ecological 2018), annual reports detailing the results of the monitoring program is to include:

- a comparison of koala activity with data from past surveys;
- a summary of koala incidents having occurred over the previous two year period;
- any other observations of relevance to koala management; and
- a discussion of the findings of the program and any recommendations for amendment of the Community Scheme Residential Subdivision Koala Plan of Management or further action by the Birrigan Iluka Beach Association or Clarence Valley Council or other relevant party.

Reporting of Koala sightings should be in accordance with the protocol adopted by the Clarence Valley Council – refer to the Council website for "Register a Koala Sighting Form".

Any records of diseased koalas will be included in the results of the annual koala monitoring report. In the event that a suspected diseased koala is observed during monitoring, the time, date and location of the sighting must be recorded. These details should be passed on to an appropriate wildlife care organization as soon as practicable. If required, the observer should remain at the location until the wildlife rescuer attends.

2.2.3 Monitoring Methodology

Sampling

The field surveys will utilise the Spot Assessment Technique (SAT) (Phillips and Callaghan 2011), which involves a radial assessment of koala "activity" within the immediate area surrounding a SAT site. In the field, the technique is applied as follows:

1. Locate the SAT site;
2. Identify and uniquely mark the thirty (30) nearest trees to the SAT site;
3. Undertake a search for koala faecal pellets beneath each of the thirty (30) marked trees based on a cursory inspection of the undisturbed ground surface within a distance of 100 centimetres around the base of each tree, followed (if no faecal pellets are initially detected) by a more thorough inspection involving disturbance of the leaf litter and ground cover within the prescribed search area.

For assessment purposes, a tree is defined as "a live woody stem of any plant species (excepting palms, cycads, tree ferns and grass trees) which has a diameter at breast height (DBH) of 100 mm or greater" (Phillips *et al*. 2000). In the case of multi-stemmed

trees, at least one of the live stems must have a DBH of 100 millimetres or greater in order to qualify.

Strict adherence to the 100 cm search area is a fundamental component of the SAT methodology. It is this distance that both optimises the probability of success in terms of actually finding faecal pellets, while at the same defining a workable search area (Phillips and Callaghan, 2011). In terms of search effort, an average of approximately two (2) person minutes per tree should be dedicated to the faecal pellet search. For assessment purposes, the search should be concluded once a single faecal pellet has been detected or when the maximum search time has expired, whichever happens first. This process should be repeated until each of the 30 trees in the site has been assessed. Where the location of faecal pellets falls within overlapping search areas due to two (2) or more trees growing in close proximity to each other, both should be scored for pellet(s).

In addition to the SAT analysis demographic attributes of the koala population will be determined via targeted searches of:

a) 25 m fixed radius from the central tree (0.196 ha); and

b) opportunistic sightings whilst traversing the subject site.

The following information relating to each koala sighting should be collected:

- Age class: Adult, sub-adult (2-4 kg) or juvenile (less than one (1) year old, less than 2 kg, not yet independent);
- Reproductive status: the presence of a pouch young, back young, or no young associated with an adult female;
- Health status: healthy, or showing signs of Chlamydia such as cystitis (wet, stained bottom) and/or conjunctivitis (red swollen eyes discharging pus), or other indicators of poor health such as discharges from nose or mouth, wasted or emaciated appearance etc.; and
- Koala location: using a map and/or GPS unit, the location of each koala should be plotted on a map to gain an overall distribution of koalas on the site.

Field sampling will be carried out between August to February (i.e. the breeding season) by ecologists experienced in koala faecal pellet identification, koala survey and tree species identification.

Data Analysis

Koala Activity

Koala 'activity' at each site will be determined by dividing the number of trees with a koala faecal pellet by the number of trees searched in the site (a minimum of 30). Activity thresholds of Phillip and Callaghan (2011) will be used to describe the results of field sites. This threshold allows interpretation of the activity level at each site in order to determine its relative importance to the koala population. The key measures on the east coast are summarized below in **TABLE 1**.

TABLE 1
SUMMARY OF KOALA ACTIVITY CATEGORIES AND THEIR INTERPRETATION

Activity Category	Activity Level	Interpretation
Significant activity	≥ 22.52%	Site is regularly used by one or more koalas as part of normal ranging behaviour.
Low activity	0% - 22.51%	Occasional or transitory use of the site by (for example) dispersing animals not yet displaying established home ranging movement patterns.

Habitat Utilisation / Occupancy rates

Two measures of "occupancy" are to be assessed. "Occupancy" describes the proportion of a sampled area where the target species is present. The first is usage of habitat by koalas at any level (Habitat Utilisation rate), be it occasional or frequent. The second and more useful measure is occupancy by resident koala populations (Koala Occupancy rate). Changes in occupancy by resident koalas in a population is more meaningful, as it describes the trend as it relates to the majority of the koala population at any given time.

Baseline Habitat Utilisation rate will be estimated on the basis of the numbers of sampled field sites in which koala faecal pellets were recorded, while the Baseline Koala Occupancy rate will be the subset of these sites that had koala activity levels > 22.52%. The first provides a measure of what proportion of available habitat is currently utilised by koalas in any way, the second indicating what proportion of habitat is occupied by resident populations.

A Baseline koala density estimate will be determined by dividing the total number of koalas sighted within the 0.196 ha radial assessments, by the total area covered by this assessment process over the sampling period.

A test of significance utilising the Paired Student t-test will be completed after each monitoring event to determine if a statistically significant reduction in koala occupancy rates has occurred (i.e. to test the hypothesis that pre-development koala activity is higher than the post-development koala activity). As sample sizes are relatively small, however, the value of p (typically 0.05 or 0.01 in order for significance to be determined) should be raised to something that better reflects the limitations of the sample size. A p of 0.25 as the statistical benchmark of significant change should be considered, further qualified by a requirement that a major review should be initiated only after consideration of the monitoring data from two (2) successive monitoring events.

2.2.4 Performance Criteria and Corrective Actions

TABLE 2 provides the performance criteria for the koala monitoring program. Corrective actions are provided that are to be implemented if performance criteria are not met.

TABLE 2
KOALA MONITORING PERFORMANCE CRITERIA AND CORRECTIVE ACTIONS

Performance Indicator	Corrective Action
For monitoring purposes, the benchmark habitat occupancy rate to be achieved for koala populations inhabiting the Birrigan Iluka Beach site will be equal to or greater than baseline levels	Investigate habitat usage on the Birrigan Iluka Beach site. Determine which areas of potential habitat are not being utilised by the population. Consult with OEH and koala experts to develop a strategy to improve/facilitate the usage of the potential koala habitat. Implement the strategy.
Mitigate processes which are limiting koala occupancy rates and / or population sizes: Bushfire related deaths or damage to habitat are minimised	If a bushfire occurs within land an investigation will be triggered to assess damage to koalas and their habitat on the Birrigan Iluka Beach lands. The investigation will include a survey of the koala population occurring on the site. Consultation will occur with RFS, Council and OEH to determine the cause of the fire. A report will be prepared after the consultation. The report will address, causes, impacts and proposed changes, if considered necessary, to Bushfire management plans.
Mitigate processes which are limiting koala occupancy rates and / or population sizes: No evidence or reports of dog attacks on a koala	If there is an instance of one (1) attack by a dog on a koala then an investigation of causes will be triggered. Dog management within the Birrigan Iluka Beach site will be investigated. If dog management strategies are considered to be ineffective or dog owners do not have sufficient awareness of their responsibilities, then Council, OEH and relevant specialists will be consulted and a more prescriptive dog ownership/management/education strategy will be prepared and implemented, including the installation of additional educational signage if necessary.
Mitigate processes which are limiting koala occupancy rates and / or population sizes: No reported vehicle strike mortalities	If there is an instance of one (1) koala killed or injured on Birrigan Iluka Beach internal roads then an investigation of causes will be triggered.
Mitigate processes which are limiting koala occupancy rates and / or population sizes: High rates of diseased koalas are not detected	Disease condition assessments will be carried out during the baseline monitoring assessment and in every annual assessment thereafter. If expert opinion considers that disease occurrence is over and above that which would be expected in a wild population of koalas or they consider that there has been a significant increase in diseased animals since the Baseline assessment, then

Performance Indicator	Corrective Action
	advice will obtained from appropriate OEH scientists and/or other koala experts as considered necessary or appropriate. The advice will be implemented.
Mitigate processes which are limiting koala occupancy rates and / or population sizes: Swimming pool drownings	If there is an instance of a koala drowning in a residential pool then an investigation will be triggered to ensure pool ownership strategies are in place e.g. checking to ensure all pool owners have pool fences which are koala-proof and pools have acceptable Koala escape mechanisms installed (e.g. shallow end or a thick rope A report will be prepared in consultation with OEH, Council and/or koala experts as necessary or appropriate. The recommendations contained in the report will be implemented.

3 RESULTS

3.1 Koala Surveys

3.1.1 Field Sites

Nine (9) sites were sampled across the subject site by JWA ecologists as part of the baseline survey in February 2020 (**FIGURE 3**). These nine (9) sites were sampled again in August 2021, August 2022 and September 2023. **TABLE 3** provides a summary of activity/occupancy data at the nine (9) sites sampled during both the baseline and scheduled monitoring.

3.1.2 Koala Sightings

No koalas were sighted during the 2020 Baseline survey or the August 2021, August 2022, or September 2023 surveys (**TABLE 3**).

3.1.3 Koala Activity

Koala activity was not recorded from any of the nine (9) field sites sampled during the baseline study or the August 2021, August 2022, or September 2023 surveys.

3.1.4 Habitat Utilisation / Occupancy rates

Baseline Habitat Utilisation rates (number of sampled field sites in which koala faecal pellets were recorded) were estimated at 0% (n=0) of the 9 sampled sites. This provides a measure of what proportion of available habitat is currently utilised by koalas in any way.

Baseline Koala Occupancy rate (subset of sites that had koala activity levels > 22.52%) were estimated at 0% (n=5) of the 9 sampled sites. The Baseline Koala Occupancy rate indicates what proportion of habitat is occupied by resident populations.

The Occupancy rate during the August 2021, August 2022 and September 2023 monitoring surveys were also estimated at 0% of the 9 sampled sites.

3.1.5 Koala Density and Population Estimate

The Baseline koala density and population estimates could not be estimated due to no koalas seen during the baseline surveys. No koalas were recorded during the August 2021, August 2022 or September 2023 surveys, therefore density and population estimates still could not be estimated.

3.1.6 Summary of Recent Koala Sightings/Incidents

The Clarence Valley Koala Register mapping indicates that no koalas have been recorded within one (1) kilometre of the subject site in the last two (2) years. The last record in the area is of a male koala that was hit and killed by a car within two (2) kilometres of the subject site in July 2020.

CLARENCE VALLEY COUNCIL APPROVAL

This is the plan referred to in Council's Notice of Determination of SUB2015/0034

Date: 13/11/2019

LOT 99 DP 823635

- Core Conservation Zone
- Bushfire Trail Zone
- Street Verges / Landscape Zone
- APZ setbacks
- Residential Lots
- New Bushfire Trail Connection
- Koala SAT Site

note: the layout is preliminary only and subject to detailed engineering and surveying input. all dimensions and areas are indicative only.

Scale 1 : 2500 - Lengths in metres

20 0 20 40 60 80 100

SOURCE: JWA Site Investigations Feb 2020; OneCollective - Vegetation Zones (191113 CVC Approved Plans - Extract.pdf)

SCALE: 1 : 2500 @ A3

JWA PTY LTD
Ecological Consultants

CLIENT
Ocean Park Consulting Pty Ltd

PROJECT
Annual Koala Monitoring Report
Birrigan Estate
Lot 99 on DP823635, Hickey Street, Iluka NSW
Clarence Valley Council LGA

FIGURE 3

PREPARED: BW
DATE: 08 September 2021
FILE: N202001_SAT_20210908.dwg

TITLE

KOALA SAT SITES

No further observations of relevance to koala management with relation to the subject site have been recorded.

TABLE 3
BASELINE KOALA SURVEY RESULTS

Site	Trees Surveyed		Baseline (Feb 2020)			August 2021			August 2022			September 2023		
	Species	Number	No. of trees with Scats	Koalas Present	Koala Activity	No. of trees with Scats	Koalas Present	Koala Activity	No. of trees with Scats	Koalas Present	Koala Activity	No. of trees with Scats	Koalas Present	Koala Activity
1	Forest red gum (*Eucalyptus tereticornis*)	4	x	x	0 (inactive)	x	x	0 (inactive)	x	x	0 (inactive)	x	x	0 (inactive)
	Pink bloodwood (*Corymbia intermedia*)	7												
	Hickory wattle (*Acacia disparrima*)	19												
2	Pink bloodwood (*Corymbia intermedia*)	5	x	x	0 (inactive)	x	x	0 (inactive)	x	x	0 (inactive)	x	x	0 (inactive)
	Hickory wattle (*Acacia disparrima*)	16												
	Yellow pear-fruit (*Mischocarpus pyriformis*)	6												
	Fraser Island apple (*Acronychia imperforata*)	3												
3	Forest red gum (*Eucalyptus tereticornis*)	2	x	x	0 (inactive)	x	x	0 (inactive)	x	x	0 (inactive)	x	x	0 (inactive)
	Brushbox (*Lophostemon confertus*)	2												
	Pink bloodwood (*Corymbia intermedia*)	6												
	Yellow pear-fruit (*Mischocarpus pyriformis*)	8												
	Hickory wattle (*Acacia disparrima*)	6												
	Fraser Island apple (*Acronychia imperforata*)	6												
4	Brushbox (*Lophostemon confertus*)	2	x	x	0 (inactive)	x	x	0 (inactive)	x	x	0 (inactive)	x	x	0 (inactive)
	Fraser Island apple (*Acronychia imperforata*)	6												
	Yellow pear-fruit (*Mischocarpus pyriformis*)	10												
	Hickory wattle (*Acacia disparrima*)	10												
	Pink bloodwood (*Corymbia intermedia*)	2												
5	Pink bloodwood (*Corymbia intermedia*)	4	x	x	0 (inactive)	x	x	0 (inactive)	x	x	0 (inactive)	x	x	0 (inactive)
	Hickory wattle (*Acacia disparrima*)	16												
	Yellow pear-fruit (*Mischocarpus pyriformis*)	3												
	Fraser Island apple (*Acronychia imperforata*)	1												
	Brushbox (*Lophostemon confertus*)	1												
6	Pink bloodwood (*Corymbia intermedia*)	8	x	x	0 (inactive)	x	x	0 (inactive)	x	x	0 (inactive)	x	x	0 (inactive)
	Hickory wattle (*Acacia disparrima*)	18												
	Fraser Island apple (*Acronychia*	3												

Site	Trees Surveyed		Baseline (Feb 2020)			August 2021			August 2022			September 2023		
	Species	Number	No. of trees with Scats	Koalas Present	Koala Activity	No. of trees with Scats	Koalas Present	Koala Activity	No. of trees with Scats	Koalas Present	Koala Activity	No. of trees with Scats	Koalas Present	Koala Activity
	imperforata)													
	Brushbox (*Lophostemon confertus*)	1												
7	Pink bloodwood (*Corymbia intermedia*)	5	x	x	0 (inactive)	x	x	0 (inactive)	x	x	0 (inactive)	x	x	0 (inactive)
	Brushbox (*Lophostemon confertus*)	6												
	Fraser Island apple (*Acronychia imperforata*)	10												
	Hickory wattle (*Acacia disparrima*)	9												
8	Pink bloodwood (*Corymbia intermedia*)	8	x	x	0 (inactive)	x	x	0 (inactive)	x	x	0 (inactive)	x	x	0 (inactive)
	Brushbox (*Lophostemon confertus*)	6												
	Hickory wattle (*Acacia disparrima*)	16												
9	Pink bloodwood (*Corymbia intermedia*)	3	x	x	0 (inactive)	x	x	0 (inactive)	x	x	0 (inactive)	x	x	0 (inactive)
	Fraser Island apple (*Acronychia imperforata*)	10												
	Tree heath (*Trochocarpa laurina*)	6												
	Broad-leaved paperbark (*Melaleuca quinquenervia*)	5												
	Yellow pear-fruit (*Mischocarpus pyriformis*)	6												

4 DISCUSSION AND CONCLUSION

No Koalas or evidence of Koala activity (i.e. scats) were detected during the 2020 Baseline surveys or subsequent August 2021, August 2022 or September 2023 surveys. The proportion of habitat occupied by a resident koala population at the time of the baseline survey and first annual monitoring, and areas of the site that are subject to any koala use (whether occasional or frequent e.g. transient) at the time of the surveys is therefore estimated at 0%.

The nine (9) field sites sampled during this baseline study are considered to provide good coverage of the habitat on the subject site, are placed regularly throughout the landscape, and therefore provide a sound sample from which to examine trends over time. Proposed revegetation/regeneration works on the subject site in accordance with the Habitat Restoration Plan (JWA 2020) include planting of preferred koala food trees and other koala habitat embellishment measures, which may potentially lead to increased koala activity on the site. Two measures of "occupancy" will be assessed during ongoing annual koala monitoring. "Occupancy" describes the proportion of a sampled area where the target species is present. The first measure that will be monitored is usage of habitat by koalas at any level (Habitat Utilisation rate), be it occasional or frequent. The second and more useful measure that will be monitored over time is occupancy by resident koala populations (Koala Occupancy rate). Changes in occupancy by resident koalas in a population is more meaningful, as it describes the trend as it relates to the majority of the koala population at any given time.

5 NEXT MONITORING ROUNDS

The requirements and future survey dates for the annual Koala Monitoring Program are present in **TABLE 4**. Reporting will be annually for the duration of the monitoring program. The next monitoring event (i.e. third annual monitoring) will occur during the August 2024 to February 2025 period (i.e. the breeding season) and the results will be compared to the results of this monitoring report.

TABLE 4
MONITORING PROGRAM REQUIREMENTS AND SURVEY DATES

Survey	Requirements/Frequency	Latest Survey Date	Next Survey Date
Baseline Koala Survey	Prior to commencement of site vegetation clearing works	Completed in February 2020	N/A
Koala Monitoring Survey	Annually for a minimum five-year management period following the completion of the initial phase of habitat protection works	3rd Annual Monitoring: Completed September 2023	4th Annual monitoring: between August 2024 and February 2025

REFERENCES

Keystone Ecological (2018a) Ecological Response for Preliminary Documentation, Hickey Street Iluka, Clarence Valley LGA. Report to Stevens Group.

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Phillips, S., and Callaghan, J. (2011) The "Spot Assessment Technique": a tool for determining localized levels of habitat use by Koalas *Phascolarctos cinereus*. *Australian Zoologist:* **35(3)**, 774 – 780.