



Appendix A
Draft Mundijong Paterson Roundabout Intersection Upgrade
Clearing Permit Offset Proposal and Revegetation Plan

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1. Proposed Offset Site

The Shire of Serpentine Jarrahdale (the Shire), has prepared this offset proposal to counterbalance the significant residual impact of clearing 0.052 ha of native vegetation for the Mundijong and Paterson Road roundabout project in Mundijong. The replanting of cockatoo habitat representative of the Guildford Complex and installation of two artificial nesting boxes at Mundijong Oval Reserve (R4486) is proposed by the Shire as the environmental offset for this project (Figure 1). This offset proposal was developed in consideration of the 'WA Environmental Offsets Policy 2011', 'WA Environmental Offsets Guidelines 2014' and 'Environmental offsets metric: Quantifying environmental offsets in Western Australia 2021' for clearing native vegetation under Part V of the *Environmental Protection Act 1986*.

This offset proposal is dependent on the outcome of the Application for Amendment Form submitted to the Department which is seeking to amend the offset area associated with CPS 8908/2 which would enable this offset plan to be initiated.

Mundijong Oval Reserve is located in Mundijong containing Marri Woodland which is vested for the purpose of Recreation, but current uses also included Conservation. Natural areas in the Conservation Zone are protected through the Shire's Council endorsed 'Marri Woodland Management Plan' (Shire of Serpentine Jarrahdale 2024a). The Marri Woodland Management Plan is a strategic plan which defines management objectives for maintaining and improving the conservation values of Marri woodland and to ensure consistent management into the future. The majority of the reserve belongs to Bush Forever site 360 as part of a Regional Ecological Linkage. The overall vegetation condition is in very good to good condition and contains both dieback free and dieback infected areas.

The reserve is not mapped as a Threatened Ecological Community but is an Environmentally Sensitive Area. The Threatened flora species *Morelotia australiensis* has been recorded in the area. Although fauna has not been formally surveyed, Threatened and Priority fauna species including Black Cockatoos are known to frequent the reserve.

Of the two vegetation communities in the Reserve, a 0.16 ha cleared area adjacent to the Marri Woodland is proposed as a direct offset to undergo rehabilitation and revegetation activities, including the planting of Marri trees suitable for Black Cockatoos (refer to 'Paterson Mundijong Offset Boundary' shapefile). The proposed offset area currently contains paved infrastructure in a completely degraded condition which would be rehabilitated and revegetated to native vegetation (Figure 1, Figure 2). In addition, two trees within the existing Marri Woodland will be selected to host artificial nesting hollows for Black Cockatoos as per DBCA guidelines (DBCA 2023).

This site was selected on the basis of being the closest local natural area to the clearing area (approximately 200 m), the presence of mature Marri trees in the adjoining bushland to install artificial cockatoo nesting boxes, and its classification with the same under-represented Guildford Vegetation Complex. It will also build on and complement the offset revegetation works occurring at the reserve as part of CPS 8908/2.

The Shire has set strategic targets to protect the Guildford vegetation complex and restore and actively manage natural areas on Regional Ecological Linkages through its Local Biodiversity Strategy Update Report (Shire of Serpentine Jarrahdale 2019). The remnant vegetation extent of the Guildford Complex is under-represented in the Shire as only 4% of its original extent remains. Investing in supplementary funds through an offset for rehabilitation and revegetation will aid the Shire in achieving its strategic objective of fulfilling representational targets for the long-term preservation of the vegetation complex. Specifically, the offset proposal will address several priority actions of the Marri Woodland Management Plan as outlined in Table 1.

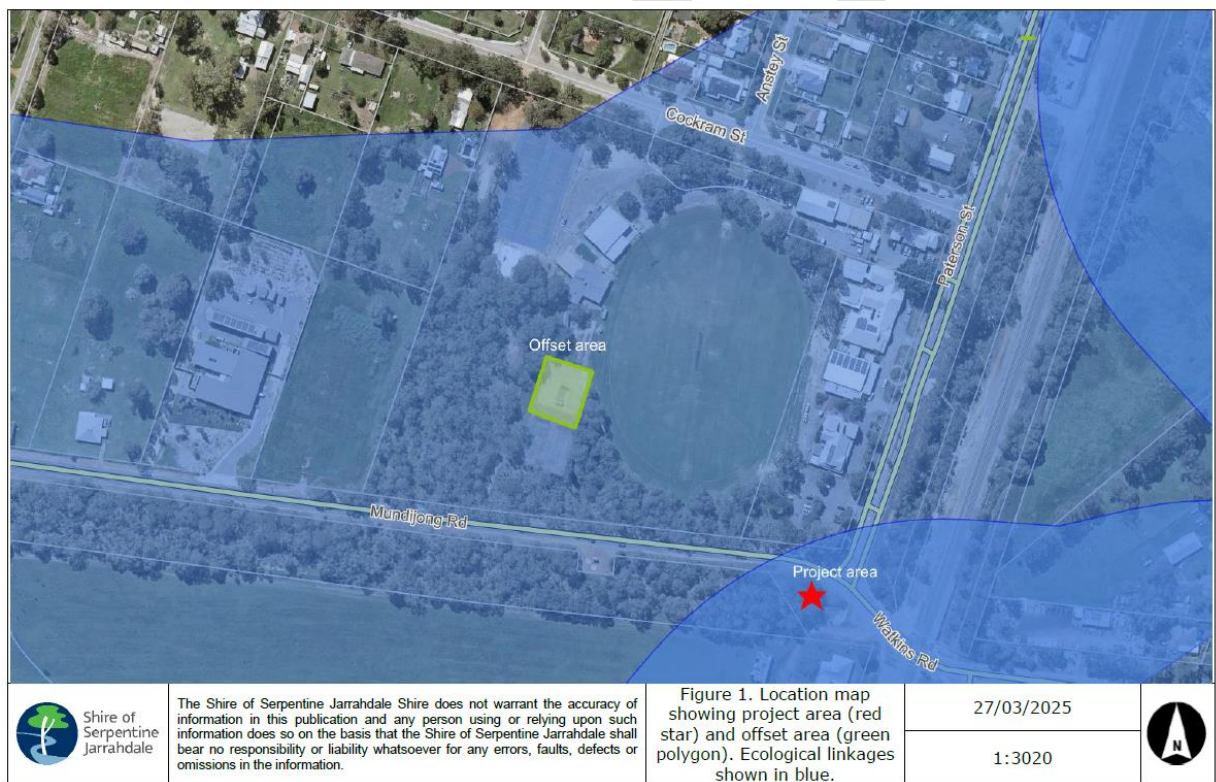




Figure 2. Photographs of current condition of proposed offset area.

Table 1. Action Plan for Mundijong Oval Reserve (extracted from Council endorsed Marri Woodland Management Plan, Shire of Serpentine Jarrahdale 2024a)

No.	Action	Priority	Timing	Status	Responsibility	Cost
2	Keep up to date with the latest research trends with regard to marri woodland and integrate into reserve management.	High	Long Term	Ongoing	Natural Reserves, Emergency Services	Staff Time
9	Work with user groups to protect and minimize impacts to remnant vegetation.	High	Business as Usual	Ongoing	Natural Reserves, User Groups	Staff Time
14	Monitor weed diversity and distribution annually	High	Business as Usual	Ongoing	Natural Reserves	Staff Time
15	Establish and implement a weed control program that utilises best practice methods.	Key	Business as Usual	Ongoing	Natural Reserves, Landcare SJ	Budget Dependent - \$3,000
19	Avoid disturbance to the Conservation Zone and to dieback-free areas.	High	Short Term	Not Yet Implemented	Natural Reserves	Staff Time

No.	Action	Priority	Timing	Status	Responsibility	Cost
28	Revegetate with local provenance seedlings as necessary and appropriate.	Medium	Medium Term	Implemented in Part	Friends Groups, Landcare SJ, Natural Reserves	Funding Dependent - \$2,500
30	Update actions according to best practice management and monitoring outcomes.	High	Medium Term	Not Yet Implemented	Strategic Environment	Staff Time

2. Principals for the use of Environmental Offsets

This section presents an evaluation of the environmental offset proposal in relation to the six principles governing the application of environmental offsets.

1. *Environmental Offsets will only be considered after avoidance and mitigation options have been pursued*

Several avoidance and mitigation measures will be implemented in the proposed clearing area for the Mundijong/Paterson roundabout project. These include:

- Roundabout positioning:** The Shire has explored several options to avoid the clearing of native vegetation, including moving the roundabout northwards and eastwards of its proposed position. However, the active railway track to the east side of the road prevented the Shire's ability to shift the roundabout in an easterly direction. Relocating the roundabout northwards was not a preferable option as it would also involve the clearing of Marri trees as well as requiring land acquisition and additional service relocations. Given these considerations, the current location is the most suitable option to minimise tree removal and service disruptions.
- Tree retention:** Several Marri trees inside the project area will be retained and protected during construction (tree 3, 7, 10, 12, 13, 14, 17 and 19). One of these trees (tree 3), is considered a potential Black Cockatoo habitat tree based on size over 500 mm.
- Dieback management:** The Shire will implement dieback management during earth works. This will involve working in drier weather where possible, cleaning mud and plant material from machinery and vehicles prior to accessing and leaving the project area, and seeking to utilise dieback-free and weed-free gravel and road material.
- Seed collection:** the Shire will engage Landcare SJ to collect Marri seeds from the cleared trees for use in local revegetation projects.
- Tree marking:** the Shire will clearly mark the trees proposed to be cleared with flagging tape as well as clearly communicate to its contractors that only the taped trees are to be removed, and the remaining trees are to be retained and protected.
- Qualified arborist:** the Shire will engage the services of a qualified arborist to perform the clearing works.

- vii. **Habitat logs:** the Shire proposes to retain suitable habitat logs *in situ* post tree removal for use by small fauna and invertebrates that may be utilizing the area.
- viii. **Replanting:** the Shire will replant the roundabout island and surrounding verge area with native low growing herbs, groundcovers, shrubs and salvaged grass trees representative of the Guildford vegetation complex within 12 months of the clearing.
- ix. **Weed management:** The Shire will ensure all green waste generated through the proposed clearing is disposed of in an authorized waste facility or left on-site as mulch.

2. Environmental offsets are not appropriate for all projects

The Shire considers that an offset is necessary in this circumstance as residual impacts were identified in the Shire's Environmental Offset area calculation (DWER 2021, Attachment B). The impact to Black Cockatoo habitat values is the primary impact of this project.

3. Environmental offsets will be cost-effective, as well as relevant and proportionate to the significance of the environmental value being impacted

The revegetation and rehabilitation efforts will enhance and support the ongoing revegetation initiatives associated with CPS 8908/2 which involves the planting of over 33 Marri trees, revegetation of 0.16 ha to mitigate the impacts of clearing and revegetation of 0.07 ha representative of the Guildford Complex (Natural Area Consulting Management Services 2024). Considering that the new offsite site is situated directly next to the existing offset site, utilising the existing Revegetation Plan to the new area can be a measure applied to improve cost efficiency.

As mentioned in Section 1, an Application for a Clearing Permit Amendment has been submitted to adjust the offset boundary linked to CPS 8908/2, since the proposed offset area for this application is currently situated within the existing offset boundary of CPS 8908/2. The amendment will produce the following benefits:

- Enhance the original revegetation and rehabilitation objectives by increasing the planting of native vegetation by 0.04 ha and planting of vegetation representative of the Guildford Complex by 0.01 ha,
- Facilitate efficient implementation of revegetation and rehabilitation according to the formally developed Revegetation Plan,
- Enable the Shire to conduct the infrastructure removal in a more cost-effective manner over two stages, and
- Create availability for the northern court to become a new offset area as per this proposal the Paterson Road/Mundijong Road intersection upgrade.

Section 3 of this proposal provides a cost estimate for the proposed offset work (Table 2). These costs have been partly informed via the budget estimates from the Council Endorsed Marri Woodland Management Plan (Shire of Serpentine Jarrahdale 2024b). The proposed site is considered to be relevant due to the three key reasons outlined in section 1: the closest local natural area to the clearing site; existing in the same

vegetation complex; and presence of mature Marri trees where artificial nesting boxes can be installed.

The Shire also regards the environmental offset to be proportionate to the significance of the environmental value being impacted. The project involves the clearing of 11 trees, including 2 Black Cockatoo habitat trees. Comparatively, the proposed offset area will enhance a larger 0.16 ha area of Marri woodland from completely degraded to good condition and involve the replanting of tubestock suitable for Black Cockatoo habitat.

According to the area offset calculations, the proposed offset is considered to be adequate (Attachment B). The Shire will work with DWER to adjust the calculation as needed to ensure the offset calculation is accurate and appropriate for the clearing.

The offset area is also contiguous with an existing conservation area and includes actions to address threatening processes which are further described in the revegetation plan (Natural Area Consulting Management Services 2024).

4. Environmental offsets will be based on sound environmental information and knowledge

The proposed environmental offset has been informed by the Shire's Marri Woodland Management Plan, prepared by Dr Penny Hollick, a Strategic Environmental Specialist and the Local Biodiversity Strategy and Update Report prepared by Ironbark Environmental and overseen by Dr Penny Hollick.

5. Environmental offsets will be applied with a framework of adaptive management

The Shire acknowledges that an adaptive approach to management will be necessary in the implementation of the proposed offset. Contingency measures will form part of the Revegetation Plan to mitigate and address potential risks.

6. Environmental offsets will be focussed on longer term strategic outcomes

The Shire is committed to protecting, retaining and enhancing approximately 1690 ha of its local natural areas and protecting ecological features and processes through its Local Biodiversity Strategy and Local Biodiversity Update Report (Shire of Serpentine Jarrahdale 2009, Shire of Serpentine Jarrahdale 2019). Furthermore, the Shire's Local Planning Policy 2.7: Biodiversity Planning Policy sets out to ensure that any development in proximity to biodiversity will not have detrimental impacts on biodiversity.

The Shire is in the process of developing an Environmental Offsets Strategy aimed at establishing strategic objectives for offset areas, ensuring alignment with scientific literature, and State and Federal Environmental Offset frameworks. The Department of Water and Environmental Regulation (DWER) and other relevant stakeholders will be consulted in this process to ensure the Strategy complements the State's longer term strategic outcomes.

3. Revegetation and Rehabilitation Proposal

The Shire is committed to revegetating a 0.16 section of Marri woodland to enhance its habitat value for Black Cockatoos and improve the condition of vegetation within the Guildford Complex which is under-represented in the Shire of Serpentine Jarrahdale. The Shire will also install two artificial nesting boxes in Mundijong Oval Reserve to counterbalance the loss of two nesting trees with the potential to develop hollow in the future from the Mundijong/Paterson Road intersection upgrade. These boxes will be installed by a qualified arborist and maintained and monitored for a minimum of five years. As with the existing offset area, a portion of decommissioned infrastructure will require removal and site preparation prior to planting. As discussed in Section 2, the existing Revegetation Plan by Natural Area Consulting Management Services (2024) is transferable to this offset proposal.

The following revegetation components will be guided by the Revegetation Plan prepared by Natural Area Consulting Management Services (2024):

- Reference site floristic data and species list,
- Targets and completion criteria,
- Revegetation techniques including weed control, site preparation, local provenance seed, seedling propagation and planting,
- Dieback management, and
- Monitoring.

Table 2 provides an approximate cost estimate for the revegetation works and Table 3 outlines a proposed schedule for the revegetation activities planned to occur between 2026 and 2031. Maintenance and contingency methods including weed control and infill planting have been incorporated in the cost estimate and revegetation schedule. Additional weed control, infill planting or watering may be identified as further contingency methods subject to the results of the quadrat monitoring.

Table 2. Cost estimate of revegetation works within Mundijong Oval Reserve

Component	Quantity	Unit cost ex GST	Total
2026/2027			
Removal of concrete sports court and skate ramp (27 x 30 x 0.2 m)	202 cubic metres & 1 ramp	\$40,000	\$40,000
Tubestock order/seed collection	2000 tubestock	\$3.00/ea	\$6000
Supply and installation of Cockatubes	2	\$750	\$1500
Top soil installation	165 cubic metres	\$79.50	\$13,000
2027/2028			
Revegetation - planting	2000 tubestock	\$2.00/ea	\$4000
Weed control (winter, spring)	2 events	\$3000/ha	\$600
Cockatube monitoring	1	\$400/event	\$400
Quadrat monitoring & reporting	2 quadrats	\$1500/yr	\$1500

Component	Quantity	Unit cost ex GST	Total
2028/2029			
Tubestock order/seed collection (infill)	250 tubestock	\$3.00/ea	\$750
Weed control (winter, spring)	2 events	\$3000/ha	\$600
Quadrat monitoring & reporting	2 quadrats	\$1500/yr	\$1500
Cockatube monitoring	1	\$400/event	\$400
2029/2030			
Revegetation - planting	250	\$2.00/ea	\$500
Weed control (winter, spring)	2 events	\$3000/ha	\$600
Quadrat monitoring & reporting	2 quadrats	\$1500/yr	\$1500
Cockatube monitoring	1	\$400/event	\$400
2030/2031			
Weed control (winter, spring)	2 events	\$3000/ha	\$600
Quadrat monitoring & reporting	2 quadrats	\$1500/yr	\$1500
Cockatube monitoring	1	\$400/event	\$400
TOTAL			\$75,750

Table 3. Revegetation schedule for implementation of environmental offset works in Mundijong Oval Reserve

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4. Spatial data

An ESRI shapefile of the environmental offset area has been provided with Application for Clearing permit for the Mundijong/Paterson Rd roundabout works (refer to 'Paterson Mundijong Offset Boundary' shapefile).

5. References

Department of Biodiversity, Conservation and Attractions 2023, FAUNA NOTE Artificial Hollows for Black Cockatoos.

Department of Water and Environmental Regulation 2021, 'Environmental offsets metric: Quantifying environmental offsets in Western Australia.

Department of Water and Environmental Regulation 2018, 'A Guide to Preparing Revegetation Plans for Clearing Permits under Part V of the Environmental Protection Act 1986.

Department of Water and Environmental Regulation 2014, 'WA Environmental Offsets Guidelines'.

Department of Water and Environmental Regulation 2011, 'WA Environmental Offsets Policy'.

Natural Area Consulting Management Services 2024, Shire of Serpentine-Jarrahdale Revegetation Plan Lot 232 Cockram St, Mundijong.

Shire of Serpentine Jarrahdale 2024a, 'Marri Woodland Management Plan'. Available from: [Marri Woodland Management Plan](#)

Shire of Serpentine Jarrahdale 2019, 'Local Biodiversity Strategy Update Report'. Available from: [Local Biodiversity Strategy - Update Report](#)

Shire of Serpentine Jarrahdale 2009, 'Local Biodiversity Strategy'. Available from: [Shire of Serpentine-Jarrahdale Biodiversity Strategy](#)