



NEW HOPE
GROUP

Appendix M
Revised Biodiversity Offsets Strategy





**NEW HOPE
GROUP**

BIODIVERSITY OFFSET STRATEGY

*New Acland Coal Mine Stage 3
Project*

JUNE 2014



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1. Introduction

New Acland Coal Pty Ltd (NAC) has developed this Biodiversity Offset Strategy (the Strategy) in accordance with the *Queensland Biodiversity Offsets Policy 2011* (QBOP) and the *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC) *Environmental Offsets Policy 2012* (EOP, for the construction of the revised New Acland Stage 3 Project (the revised Project).

The Strategy discusses the State and Federal offset requirements for the revised Project including:

- Policy requirements
- Offset approach
- Impacts on State significant biodiversity values
- Impacts on Federal threatened species and communities
- Proposed offsets for residual impacts on State significant biodiversity values
- Proposed offsets for residual impacts on Federal threatened species and communities
- Securing offsets
- Management of offsets

2. Policy Requirements

Two offset policies apply to the revised Project, at the State and Commonwealth levels. The offset requirements for the revised Project and each applicable policy have been assessed within this Strategy.

The offset policies to be considered for the revised Project are:

- *Environment Protection and Biodiversity Conservation Act 1999 Environmental Offset Policy 2012* (EPBC EOP)
- *Queensland Biodiversity Offset Policy 2011* Version 1 (QBOP)

2.1. EPBC EOP

The following has been extracted from the *Environment Protection and Biodiversity Conservation Act 1999 Environmental Offset Policy 2012*.

The use of offsets to compensate for adverse impacts to heritage values is appropriate in some circumstances. In cases where offsetting of adverse impacts on heritage values is considered possible and appropriate, the principles of this policy apply with regard to determining what constitutes a suitable offset. Offsets for impacts on heritage values should improve the integrity and resilience of the heritage values of the property involved. This may include offsets in areas adjacent to the property.

The EPBC Act environmental offsets policy has five key aims, to:

1. ensure the efficient, effective, timely, transparent, proportionate, scientifically robust and reasonable use of offsets under the EPBC Act
2. provide proponents, the community and other stakeholders with greater certainty and guidance on how offsets are determined and when they may be considered under the EPBC Act
3. deliver improved environmental outcomes by consistently applying the policy
4. outline the appropriate nature and scale of offsets and how they are determined
5. provide guidance on acceptable delivery mechanisms for offsets.

2.2. QBOP

The purpose of the QBOP is to increase the long-term protection and viability of the State's biodiversity where residual impacts from a development on an area possessing State significant biodiversity values cannot be avoided. The QBOP provides the framework to ensure that there is no net loss of biodiversity.

For the purposes of the QBOP, State Significant Biodiversity Values (SSBVs) have been derived from relevant values in the DEHP’s Areas of Ecological Significance (**AES**) mapping and Biodiversity Planning Assessments (**BPA**).

The revised Project will need to provide an offset for impacts on State Significant Biodiversity Values in accordance with the *Queensland Biodiversity Offset Policy*. This requirement will be included in the revised Project’s Environmental Authority (EA).

Impacts on SSBVs must not occur until the holder of the EA has provided a legally secured direct land based offset, or entered into a Deed of Agreement, with the administering authority for an offset transfer, consistent with the QBOP requirements for reporting on progress of securing the offset.

3. Offset Approach

3.1. Avoidance

In developing the revised Project following concerns raised by government and public stakeholders in relation to the original Project, NHG have considerably reduced its project footprint, including its potential impacts on threatened flora and fauna.

The revised Project includes a reduction in the active area of the MLA 50232 Project area from 5,069 hectares (ha) to 2027 ha. The revised Project avoids mining within Acland and includes a buffer zone along Lagoon Creek, where a revegetation program will be implemented over the life of the revised Project. Figure 2 sets out the revised Project's footprint.

Impacts on all ecological values have been avoided and minimised as far as practicable. The revised Project will use ongoing opportunities to further avoid impacts at a local scale through the detailed design and construction phases.

3.2. Residual Impacts

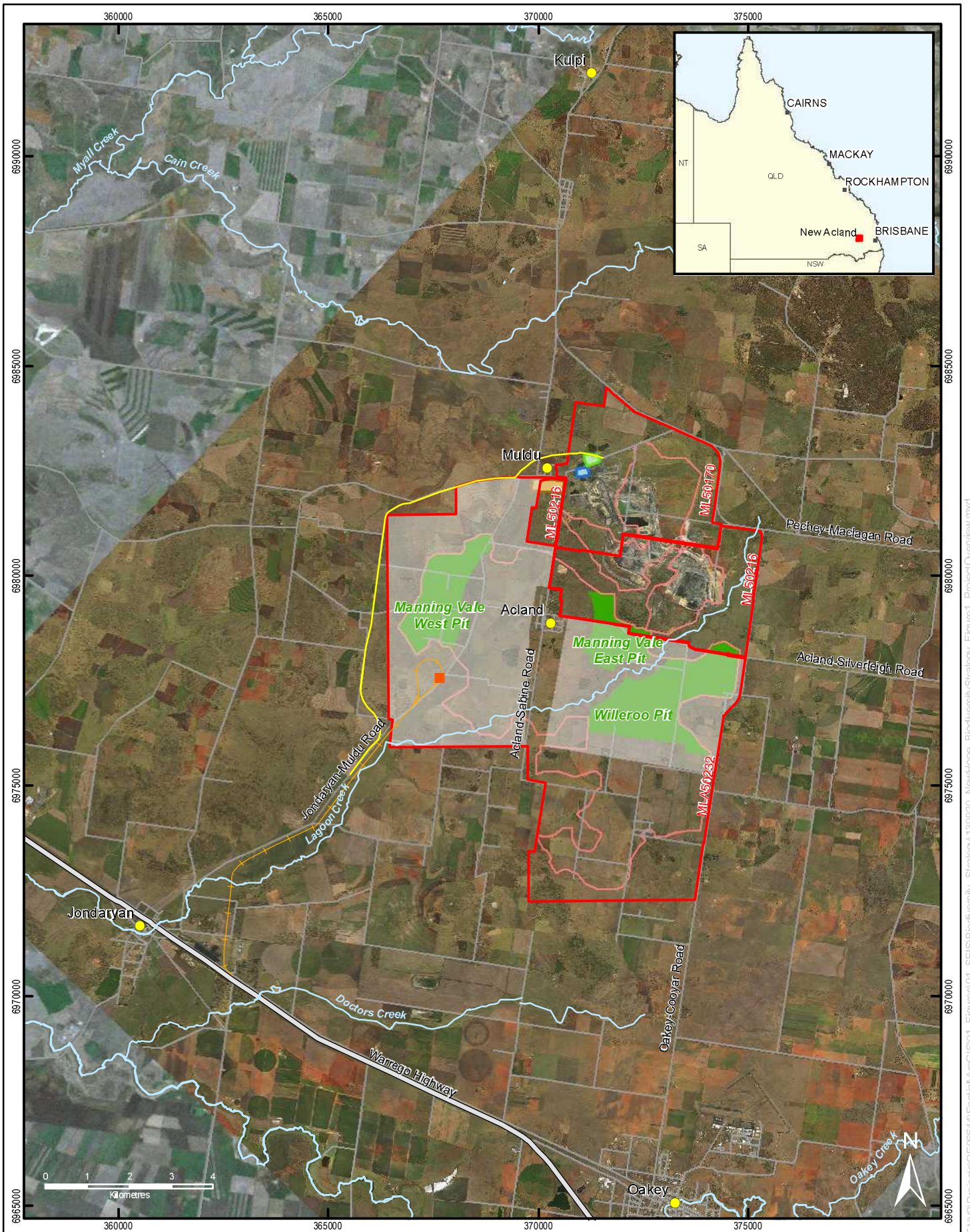
The revised Project will impact on Threatened Ecological Communities (TEC), Endangered and Of Concern Regional Ecosystems (REs), watercourses and threatened species (*Figure 2*). TECs are those communities listed as threatened under the Commonwealth's EPBC Act. REs are those vegetation communities in a bioregion that are consistently associated with a particular combination of geology, landform and soil. A community that is a TEC can correspond with an RE, but not necessarily.

The residual and unavoidable impacts resulting from clearing required for the revised Project will be offset in accordance with QBOP and EPBC EOP. The offsets proposed are intended to satisfy both policies, for example, one offset for Brigalow will satisfy both the QBOP and EPBC EOP requirements.

Residual impacts requiring offsets under EPBC EOP and QBOP have been calculated for the revised Project and verified using the EOP offset calculator. Where watercourses, as defined under the *Vegetation Management Act, 1999* (VMA) will be impacted upon by clearing, the area requiring offsetting has been calculated by applying the applicable buffers as per the regional vegetation management code and Department of Natural Resources and Mines (DNRM) stream order mapping. This buffer has been applied to the field verified vegetation mapping.

The Department of Environment and Heritage Protection (DEHP) Biodiversity Planning Assessment Mapping identifies regional corridors across the project area. The value attributed to connectivity has been based on impacts on Endangered and Of Concern REs, watercourses and protected species within the corridor areas. Additionally, with the proposed mitigation measures for fragmentation, barrier effects and reduction in vegetation communities and habitats, the overall function of the corridors are not expected to be compromised or significantly impacted.

The impacts on flora and fauna protected under the EPBC and *Nature Conservation Act 1992* (NCA) that are classified and known to occur on the site have been included in this strategy. The offsets that are proposed under the EPBC EOP and QBOP provide a net environmental gain and cover all of the impacts assessable.



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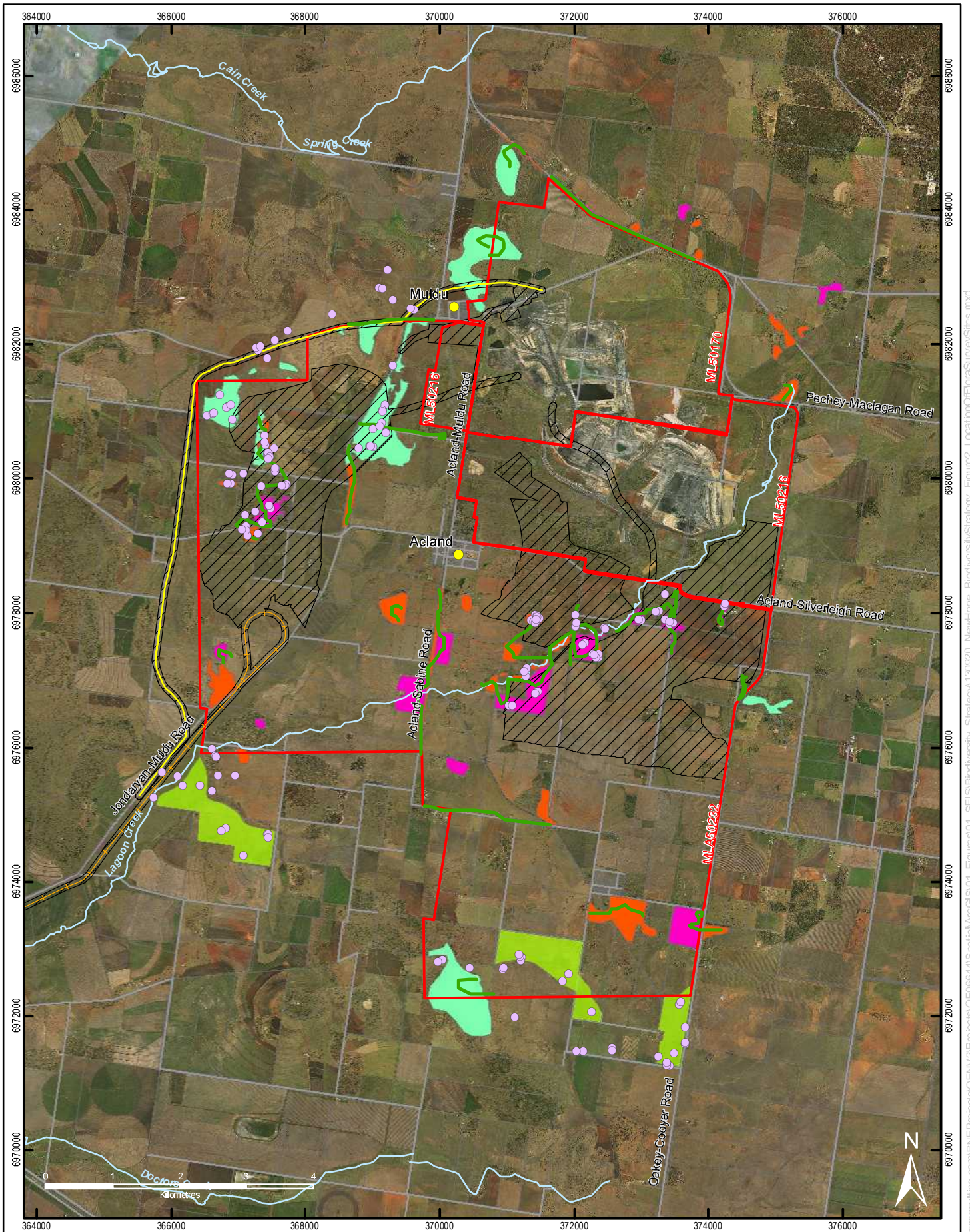
- Towns and Localities
- Train Loadout Facility
- Rail Spur
- Roads
- Creeks
- Jondaryan-Muldu Road Diversion
- Proposed Extent of Surface Rights Area
- Coal Resource Area
- Mining Tenements
- Stage 3 Pit Areas
- CHPP Precinct
- Material Handling Facility
- Mine Industrial Area



**NEW ACLAND COAL MINE
STAGE 3 PROJECT**

Figure 1 - Revised Project Overview

Scale 1:120,000 on A4
Projection: Australian Geodetic Datum – Zone 56 (AGD84)



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- | | | |
|-----------------------------------|---------------------------------------|-------------------------------------|
| ● Towns and Localities | ▭ Cadastre | Observed Regional Ecosystems |
| ● Vegetation & Biocondition Sites | ▭ Mining Tenements | ■ Endangered |
| — Flora Transects | ▨ Disturbance Footprint Area | ■ Of Concern |
| — Rail Spur | ▭ Proposed Bluegrass Offset Locations | ■ Least Concern |
| — Roads | | |
| — Creeks | | |
| — Jondaryan-Muldu Road Diversion | | |



**NEW ACLAND COAL MINE
STAGE 3 PROJECT**

**Figure 2 - Location of
Flora Survey Sites**

Scale 1:75,000 on A4
Projection: Australian Geodetic Datum - Zone 56 (AGD84)

4. Impacts on State significant biodiversity values

The revised Project will have an impact on the following State significant biodiversity values:

- remnant endangered regional ecosystems;
- remnant endangered grassland regional ecosystems Regional ecosystems;
- remnant of concern regional ecosystems;
- remnant of concern grassland regional ecosystems;
- watercourse regional ecosystem;
- protected animals Endangered, vulnerable, near threatened and special least concern animals under the Nature Conservation Act 1992; and
- protected plants Extinct in the wild, endangered, vulnerable or near threatened protected plants under the *Nature Conservation Act 1992*.

The state significant biodiversity values are listed on **Table 1**.

The state significant biodiversity values affected by the revised Project are a combination of endangered and of concern regional ecosystems, as watercourse regional ecosystem and animals and plants listed in the Nature Conservation Act 1992.

An area of 2.39 ha of the poplar box woodland (11.3.2) falls within 50 metres of Lagoon Creek, which is a stream order 2, making the area of the community that is adjacent to Lagoon Creek a state significant biodiversity value.

Table 1 Impact to SSBVs

RE	VMA Class	BVG 1: 1M	Short Description (Regulation)	Total area (ha)	% riparian "Regional" corridor	% "State" terrestrial corridor	Area in Stream Order Buffer
11.3.1	E	25a	Open-forest dominated by <i>Acacia harpophylla</i> and/or <i>Casuarina cristata</i> (particularly in southern parts), with or without scattered emergent <i>Eucalyptus</i> spp.	12.0	0	0	0
11.3.2	OC	17a	<i>Eucalyptus populnea</i> woodland to open-woodland. <i>E. melanophloia</i> may be present and locally dominant. There is sometimes a distinct low tree layer	4.5	0	0	2.39 (SO2)
11.3.17	OC	25a	<i>Eucalyptus populnea</i> woodland with <i>Acacia harpophylla</i> and/or <i>Casuarina cristata</i> on alluvial plains	5.8	0	0	0

RE	VMA Class	BVG 1: 1M	Short Description (Regulation)	Total area (ha)	% riparian "Regional" corridor	% "State" terrestrial corridor	Area in Stream Order Buffer
11.3.21	E	30a	Grassland dominated by <i>Dichanthium sericeum</i> and/or <i>Astrebla</i> spp. (<i>A. lappacea</i> , <i>A. elymoides</i> and <i>A. squarrosa</i>). A wide range of other grass and forb species is usually present and may dominate depending on seasonal conditions and management regime.	35.9	0	0	0
11.8.11	OC	30b	<i>Dichanthium sericeum</i> grassland on Cainozoic igneous rocks	4.1	0	0	0
11.9.5	E	25a	<i>Acacia harpophylla</i> and/or <i>Casuarina cristata</i> open forest on fine-grained sedimentary rocks	12.6	0	0	0
11.9.10	OC	25a	<i>Eucalyptus populnea</i> predominates forming a distinct but discontinuous canopy (15-18 m tall). <i>Acacia harpophylla</i> and sometimes <i>Casuarina cristata</i> usually forms a lower tree layer (8-14 m tall) which occasionally becomes the dominant layer.	4.1	0	0	0
11.9.13	OC	13d	<i>Eucalyptus moluccana</i> or <i>E. microcarpa</i> open forest on fine grained sedimentary rocks	3.6	0	0	0

Listed species	NC Status	Description
<i>Phascolarctos cinereus</i> - Koala	Special least concern	Poplar box woodland, that is habitat for the Koala will be cleared for the revised Project in the Manning Vale West pit and in areas adjacent to Lagoon Creek.
<i>Digitaria porrecta</i> - Finger panic grass	Near threatened	One isolated patch in western part of the revised Project area, in the Manning Vale West Pit.
<i>Homopholis belsonii</i> - Belson's panic	Endangered	Twelve patches found in the bluegrass dominated grassland community and are found in the Manning Vale West Pit and the Willaroo Pit, to the south of Lagoon Creek. This species has been found in the shelter of trees in the brigalow and poplar box vegetation communities.

E – Endangered; OC – Of Concern

5. Impacts on Federal threatened species and communities

The revised Project will result in the clearing of 64.7 ha of three threatened ecological communities, as listed in **Table 2**.

Three flora species that are listed under either the EPBC Act have been recorded from the revised Project site and are within the disturbance footprint. The affected species are listed **Table 2**.

The EPBC Offset calculator the each of the matters of National Environmental Significance are included in **Appendix A**. The justification of the scores used in the Offset calculators are also provided in **Appendix A**.

Table 2 Impact on MNES

Matters of National Environmental Significance Impacts			
MNES	EPBC Act Status	Significantly Impacted	Primary reason for the outcome
Bluegrass dominant grasslands of the Brigalow Belt Bioregions (North and South)	Endangered	Yes – 40.1 ha	Significant impact as per the MNES Guidelines Version 1.1
Brigalow (<i>Acacia harpophylla</i> dominant and co-dominant)	Endangered	Yes – 24.6 ha	Significant impact as per the MNES Guidelines Version 1.1 Brigalow
Listed Flora Species			
<i>Bothriochloa biloba</i> (lobed blue grass)	Vulnerable	Yes	Significant impact as per the MNES Guidelines Version 1.1
<i>Digitaria porrecta</i> (finger panic grass)	Endangered	Yes	Significant impact as per the MNES Guidelines Version 1.1
<i>Homopholis belsonii</i> (Belson's panic)	Vulnerable	Yes	Significant impact as per the MNES Guidelines Version 1.1

6. Proposed offsets for residual impacts on State significant biodiversity values

The proposed offset for state significance biodiversity values is described below and presented in **Table 3**.

Brigalow Offset

The total Brigalow impact of the revised Project on brigalow is 28.7 ha, which includes both Queensland and Commonwealth listed communities, comprised of RE 11.3.1, RE 11.9.5 and 11.9.10.

NAC is currently investigating several options with regard to suitable Brigalow offset areas within the Bioregion. The Brigalow offset for Queensland and Commonwealth impacts will be collocated to improve the ecological benefit of the offset and to improve the management effectiveness of the offset.

Natural grasslands Offset

The bluegrass community consists of RE 11.3.21 and 11.8.11. Of this, the entire 40.1 ha is listed by Queensland and Commonwealth legislation that require to be offset. The proposed bluegrass offset of 247 ha has been identified on the NHG's property and this should satisfy the Queensland and Commonwealth offset policies. The three listed grass species that may be impacted by the revised Project have been identified as occurring within the proposed offset area, and so will be collocated within the natural grasslands offset area.

Poplar box and Gum-topped box Offset

NAC is investigating options for the establishment of an offset for poplar box (11.3.2 and 11.3.17) and gum-topped box (11.9.13) in the Bioregion. Initial information has identified that an appropriate area is available to offset the clearing of 13.9 ha of these communities. Investigations are continuing and discussions are planned with third party landholders on whose property the offset may be located.

Fauna listed under Nature Conservation Act

Habitat for the Koala, a special least concern species under the Nature Conservation Act, will be cleared for the revised Project. The revised Project will impact an area of approximately 18 ha of potential Koala habitat that meets the criteria of "habitat critical to the survival" of Koala and includes REs 11.3.2, 11.3.17, 11.9.10 and 11.9.13. Details of impacted areas for each RE and proposed offset areas can be found in **Table 3**.

Plants listed under Nature Conservation Act

Two species of plant listed under the Nature Conservation Act will be affected by the revised Project. These species are *Digitaria porrecta* and *Homopholis belsonii*.

These species will be translocated and re-established within areas of bluegrass dominant grassland offset, to be located to the south of the revised Project on land owned by NAC.

Table 3 Proposed State Offsets

RE Impacted	Impacted Area (Ha)	Stream Order (QBOP)	Proposed offset area
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11.3.1	12	NA	60 ha within an area of naturally regenerating Brigalow that is part of the Brigalow TEC is being investigated to satisfy both the EPBC EOP requirement and the QBOP requirement
11.3.2	4.5	2	An appropriate offset area will be identified and secured to meet QBOP requirements that is on a stream order of 2, around 20 ha in area.
11.3.17	5.8	NA	To be collocated with offsets for 11.9.5, 11.9.10 and 11.9.13, around 30 ha in area.
11.3.21	35.9	NA	247 ha of Bluegrass dominated grasslands with secured to offset impact to 11.3.21, on land adjacent to the revised Project.
11.8.11	4.1	NA	247 ha of Bluegrass dominated grasslands with secured to offset impact to 11.3.21, on land adjacent to the revised Project around 20 ha in area.
11.9.5	12.6	NA	To be collocated with offsets for 11.3.17, 11.9.10 and 11.9.13 around 60 ha in area.
11.9.10	4.1	NA	To be collocated with offsets for 11.3.17, 11.9.5, and 11.9.13 around 20 ha in area.
11.9.13	3.6	NA	To be collocated with offsets for 11.3.17, 11.9.5 and 11.9.10

6.1. Bluegrass dominated Grasslands

The bluegrass dominated natural grasslands consists of RE 11.3.21 and 11.8.11. Of this, the entire 40.1 ha is captured by the EPBC offset requirements. The proposed bluegrass offset of 90 ha has been identified on the NAC's property and this should satisfy both Commonwealth and State offset policies. The three listed grass species that may be impacted by the revised Project have been identified as occurring within the proposed offset area, and so will be collocated within the natural grasslands offset area.

6.2. Brigalow, Poplar Box and Gum-topped Box REs

The proposed offsets for impacts to REs 11.3.1, 11.3.2, 11.3.17, 11.9.5, 11.9.10 and 11.9.13 will be collocated within the proposed offset area/s that has been proposed for the impacted Brigalow TEC, as described in section 7.1 of this strategy. The area of Brigalow, Poplar Box and Gum-topped Box RE needing to be offset is 42.6 ha. The offset area/s will be approximately 250 ha and will satisfy the QBOP. The offset area/s for these communities will most likely be located away from the revised Project site and is yet to be secured.

The combined Brigalow offset will consist of an RE (250Ha) that is listed as a Brigalow TEC under the EPBC Act and will therefore satisfy both Commonwealth and State offset policies and will contribute to a greater environmental outcome due to the larger patch size. NHG is currently investigating several options with regard to suitable Brigalow offset areas within the Bioregion.

7. Proposed offsets for residual impacts on Federal threatened species and communities

The offset areas have been calculated using the EPBC Offset calculator and the assessment of the condition of TECs within the revised Project site. **Table 4** lists the areas to be provided as an offset.

For the Brigalow offset, the area of impact has been calculated as 24.6, being the area of the constituent regional ecosystems – 11.3.1 and 11.9.5. With this area and an assessment of the condition of the community and an conservative estimate for the time of a patch of brigalow to reach ecological benefit and area of 60 ha is produced from the calculator. This area has been used as the size of the brigalow offset to be secured. Once a patch of brigalow has been identified and assessed, this area will need to be revised, with a site assessment of the condition of the offset site.

The bluegrass dominant grassland will be offset on land owned by NAC. The area of land that is suitable for use as a grassland and listed species offset is 247 ha. This area has been determined by condition assessment completed 2013. The area of impact and the assessment of the condition of the impacted communities have been used in the EPBC Offset calculator to determine the expected area of offset needed to offset the impact to the bluegrass dominant grassland.

Table 4 Proposed Federal Offsets

Threatened Species or Community Impacted	Area (Ha)	Proposed Offset area
Brigalow (Acacia harpophylla dominant and co-dominant)	24.6	60 ha within an area of naturally regenerating Brigalow that is part of the Brigalow TEC is being investigated to satisfy both the EPBC EOP requirement and the QBOP requirement
Bluegrass dominant grasslands of the Brigalow Belt Bioregions (North and South)	40.1	90 ha of Bluegrass dominated grasslands will be required to offset the impact to this community. An area of 247 ha is available for this offset.
<i>Bothriochloa biloba</i> (lobed blue grass)	70	70 ha of grasslands will be required to offset the impact to this species. An area of 247 ha is available for this offset.
<i>Digitaria porrecta</i> (finger panic grass)	165	165 ha of grasslands will be required to offset the impact to this species. An area of 247 ha is available for this offset.
<i>Homopholis belsonii</i> (Belson's panic)	87	87 ha of grasslands will be required to offset the impact to this species. An area of 247 ha is available for this offset.

7.1. Brigalow TEC Offset

The total Brigalow impact for the revised Project is 24.6 ha has been classified as the EPBC listed TEC (comprised of RE 11.3.1 and RE 11.9.5).

NAC is currently investigating several options with regard to suitable Brigalow offset areas within the Bioregion. The Brigalow TEC offset will be collocated with the State offset and will contribute to a greater environmental outcome due to the larger patch size.

An offset of approximately 60 ha is expected to be needed to offset the impact of the revised Project on the Brigalow TEC.

7.2. Natural grasslands Offset

The bluegrass dominated natural grasslands consists of RE 11.3.21 and 11.8.11. Of this, the entire 40.1 ha is captured by the EPBC offset requirements. The proposed bluegrass offset of 90 ha has been identified on the NAC's property and this should satisfy both Commonwealth and State offset policies. The three listed grass species that may be impacted by the revised Project have been identified as occurring within the proposed offset area, and so will be collocated within the natural grasslands offset area.

8. Delivery of Biodiversity Offsets

The next phase of the process after the revised Project has been approved and issued with an amended EA will be to finalise arrangements for the potential offset areas.

Prior to construction, a Biodiversity Offset Package will be prepared that will:

- identify and secure an offset package/s – following completion of ecological assessments of proposed offset sites;
- secure a legally binding mechanism on Title; and
- develop an Offset Area Management Plan (**OAMP**) for each offset management area.

There are several legally binding mechanisms available that may be applied to the final Biodiversity Offset Package including:

- ‘gazettal as a protected area (e.g. a nature refuge)’ under the NCA;
- ‘voluntary declaration of an area of high nature conservation value’ under the VMA;
or
- use of a ‘covenant’ under the *Land Title Act 1994* or *Land Act 1994*.

9. Management of Offset Areas

An OAMP will be prepared for each offset site to meet the requirements of the EPBC EOP and QBOP. The OAMPs will include information on the threats and the management actions required at each offset site to abate those threats. Each OAMP will contain an estimate of the costs of management and will provide a monitoring program that will extend until the management outcomes are achieved.

Management actions may include:

- management of grazing;
- weed management;
- feral pest management;
- management of fire; and
- if applicable, active revegetation.

The length of active management will be influenced by the condition of vegetation, type of habitat, climatic conditions and vegetation on site, as well as existing management issues. The OAMPs will incorporate conditions of approval required by the State and Commonwealth departments, including regular monitoring and reporting such as those conditions granted for the Stage Two Project in 2006.

Appendix A – EPBC Offset Calculator

EPBC Calculator Inputs - Brigalow TEC

Calculator Variable	Input	Explanation	Reference document/s
Impact description	Clearing of a threatened ecological community for construction of the revised Project	Residual impact on Brigalow in revised Project area (24.6 ha). Community is present in small, fragmented areas of brigalow are located along Lagoon Creek that flows through the revised Project area	Appendix H.1 MNES Report.
Impact area	24.6 ha residual impact	Field surveys to confirm presence of brigalow community, consistent with listing advice. Condition of vegetation was recorded by BioCondition surveys (Eyre et al. 2011) and by using the listing advice condition criteria.	Appendix H.1 MNES Report; Appendix G Terrestrial Ecology Field Survey Results BioCondition – A Condition Assessment Framework for Terrestrial Biodiversity in Queensland – Assessment Manual (Eyre et al. 2011)
Quality of vegetation impacted (0-10)	5	Components of habitat quality for consideration in the EPBC Act offsets assessment guide include site condition, site context and species stocking rate. Site condition - Condition of the vegetation was found to be impacted by clearing, weed infestation and grazing. Site condition score 6. Site context – Patches of the community are scattered and fragmented across the landscape, with limited connection to other areas of vegetation. There is some connection long Lagoon Creek. Site condition score 5. Species stocking rate – Surveys found a dominance of common species, with no	Appendix G Terrestrial Ecology Field Survey Results Ecological Equivalence Methodology Guideline Version 1 (DERM, 2011)

Calculator Variable	Input	Explanation	Reference document/s
		<p>listed fauna and one listed flora species. The species stocking rate is considered to be low. Species stocking rate is 4.</p> <p>The average score across the three components is 5.</p>	
Proposed offset Area	60 ha	Area of Brigalow community that NAC is seeking to secure on a third party property.	
Risk related time horizon	20 years	Offset will be secured “in perpetuity” so the maximum timeframe has been used.	
Time until ecological benefit	15 years	The time until benefit is 15 years, as the Brigalow community will be present on the offset property.	
Start area	60 ha	Area of Brigalow community that NAC is seeking to secure on a third party property.	
Start quality	5	The start quality is an estimate and is to be confirmed once negotiations with the third party landholder allow for NAC to undertake a survey of the potential offset site.	
Risk of loss (%) without offset	15%	<p>The risk of loss without an offset is estimated to be 15% on the basis that the loss of the community from clearing is low due to the operation of clearing controls (Qld Vegetation Management Act and Cth EPBC Act). It is very unlikely that there will be approvals in place for the clearing of vegetation and there is not pending threat of clearing.</p> <p>This level of risk has been assigned as the clearing of vegetation on these properties needs planning approval from the State and Commonwealth governments, as it is both remnant vegetation and a threatened ecological community. While approval for the clearing of vegetation is possible, an applicant will need to provide information to the regulators on the impact of the development of the values of the vegetation and provide an offset for the residual impact of the clearing.</p>	
Future quality without offset (scale of 0-10)	4	The future quality of the vegetation is anticipated to decline slightly over the 15 year period of the evaluation. This is as a result of the gradual increase in impact of weeds and grazing and the likely continued	

Calculator Variable	Input	Explanation	Reference document/s
		exclusion of fire.	
Risk of loss (%) with offset	5%	Risk of loss of the Brigalow community at an offset site is considered to be 5%. The offset site will be protected and managed to improve the quality of the community. A covenant placed on title of the offset property will avert the risk of loss of the offset area as the landowner will not be able to obtain development approval that has an impact on the offset.	
Future quality with offset (scale of 0-10)	8	The future quality of the offset vegetation will be 8. This is on the basis that the Brigalow community is present at the site and will respond to management and removal of threats (weeds, grazing) to lead to regeneration of the community.	
Confidence in result (quality)	50%	Confidence in the quality result is rated a relatively low level, as the offset site has yet to be inspected and the quality of the existing vegetation to be evaluated. Without specific knowledge of the offset vegetation, a very conservative level of confidence has been applied.	
Confidence in result (risk of loss)	50%	Confidence in the risk result is rated a relatively low level, as the offset site has yet to be inspected and the quality of the existing vegetation to be evaluated. Without specific knowledge of the offset vegetation, a very conservative level of confidence has been applied.	

EPBC Calculator Inputs - Bluegrass dominant grasslands of the Brigalow Belt Bioregions (North and South)

Calculator Variable	Input	Explanation	Reference document/s
Impact description	Clearing of a threatened ecological community for construction of the revised Project	Residual impact on Bluegrass dominant grasslands in revised Project area (40.1 ha). The community is present in scattered areas along Lagoon Creek and patch in Manning Vale west pit.	Appendix H.1 MNES Report.
Impact area	40.1 ha	Field surveys to confirm presence of	Appendix H.1

Calculator Variable	Input	Explanation	Reference document/s
	residual impact	Bluegrass dominant grasslands community, consistent with listing advice. Condition of vegetation was recorded by BioCondition surveys (Eyre et al. 2011) and by using the listing advice condition criteria.	MNES Report; Appendix G Terrestrial Ecology Field Survey Results BioCondition – A Condition Assessment Framework for Terrestrial Biodiversity in Queensland – Assessment Manual (Eyre et al. 2011)
Quality of vegetation impacted (0-10)	5	Components of habitat quality for consideration in the EPBC Act offsets assessment guide include site condition, site context and species stocking rate. Site condition - Condition of the vegetation was found to be impacted by clearing, weed infestation and grazing. Site condition score 6. Site context – Patches of the community are scattered and fragmented across the landscape, with limited connection to other areas of vegetation. Site condition score 5. Species stocking rate – Surveys found a dominance of common species, with no listed fauna and one listed flora species. The species stocking rate is considered to be low. Species stocking rate is 4. The average score across the three components is 5.	
Proposed offset Area	90 ha	This is the area of the grassland community that NAC has on its land, adjacent to the revised Project.	
Risk related time horizon	20 years	Offset will be secured “in perpetuity” so the maximum timeframe has been used.	
Time until ecological benefit	15 years	The time until benefit is 15 years, as the grassland community will be present within the offset sites, however will require management of weeds and grazing the achieve the realisation of the offset objectives.	
Start area	90 ha	This is the area of the grassland community	

Calculator Variable	Input	Explanation	Reference document/s
		that NAC has on its land, adjacent to the revised Project.	
Start quality	4	The start quality has been derived from surveys of the disturbance area of the revised Project. The start quality of 4 reflects that there is encroachment of woody vegetation at the edges of some of the community, use of the community for grazing and the widespread presence of weeds that compete with native species within the community.	
Risk of loss (%) without offset	15%	<p>The risk of loss without an offset is estimated to be 15% on the basis that the loss of the community from clearing is low due to the operation of clearing controls (Qld Vegetation Management Act and Cth EPBC Act).</p> <p>This level of risk has been assigned as the clearing of vegetation at the offset sites needs planning approval from the State and Commonwealth governments, as it is both remnant vegetation and a threatened ecological community. While approval for the clearing of vegetation is possible, an applicant will need to provide information to the regulators on the impact of the development of the values of the vegetation and provide an offset for the residual impact of the clearing.</p>	
Future quality without offset (scale of 0-10)	3	The future quality of the vegetation is anticipated to decline slightly over the 15 year period of the evaluation. This is as a result of the gradual increase in impact of weeds and grazing.	
Risk of loss (%) with offset	5%	Risk of loss of the grassland community at an offset site is considered to be 5%. The offset site will be protected and managed to improve the quality of the community. A covenant placed on title of the offset property will avert the risk of loss of the offset area as the landowner will not be able to obtain development approval that has an impact on the offset.	
Future quality with	8	The future quality of the offset vegetation will be 8. This is on the basis that the	

Calculator Variable	Input	Explanation	Reference document/s
offset (scale of 0-10)		grassland community is present at the site and will respond to management and removal of threats (weeds, grazing) to lead to regeneration of the community.	
Confidence in result (quality)	75%	Confidence in the quality result is rated at 75%, as the sites have been surveyed and there is knowledge of the current state of both the impact area and offset area.	
Confidence in result (risk of loss)	75%	Confidence in the risk result is rated at 75%, as there is knowledge of the management of the impact and offset sites and the risks that are present with the management of the offset.	

EPBC Calculator Inputs - *Homopholis belsonii*

Calculator Variable	Input	Explanation	Reference document/s
Impact description	Clearing of a threatened species for construction of the revised Project	Residual impact on <i>Homopholis belsonii</i> in revised Project area (69.3 ha). The species is associated with poplar box woodland (RE 11.3.2), mountain coolibah woodland (RE11.8.5), poplar box/brigalow woodland (RE11.3.17) and brigalow/poplar box open forest (RE 11.9.10).	Appendix H.1 MNES Report.
Impact area	69.3 ha residual impact	Field surveys to confirm presence of <i>Homopholis belsonii</i> .	Appendix H.1 MNES Report; Appendix G Terrestrial Ecology Field Survey Results BioCondition – A Condition Assessment Framework for Terrestrial Biodiversity in Queensland – Assessment Manual (Eyre et al. 2011)
Quality of vegetation impacted (0-10)	5	Components of habitat quality for consideration in the EPBC Act offsets assessment guide include site condition, site context and species stocking rate.	

Calculator Variable	Input	Explanation	Reference document/s
		<p>Site condition - Condition of the vegetation was found to be impacted by clearing, weed infestation and grazing. Site condition score 6.</p> <p>Site context – Patches of the community are scattered and fragmented across the landscape, with limited connection to other areas of vegetation. Site condition score 4.</p> <p>Species stocking rate – Surveys found a dominance of common species, with no listed fauna and one listed flora species. The species stocking rate is considered to be medium. Species stocking rate is 5.</p> <p>The average score across the three components is 5.</p>	
Proposed offset Area	Proposed offset areas	90 ha	
Risk related time horizon	20 years	Offset will be secured “in perpetuity” so the maximum timeframe has been used.	
Time until ecological benefit	15 years	The time until benefit is 15 years, to allow for the successful establishment of the species at offset sites and for the plants to reproduce.	
Start area	Proposed offset areas	90 ha	
Start quality	4	The start quality has been derived from surveys of the disturbance area of the revised Project. The start quality of 4 reflects that there is encroachment of woody vegetation at the edges of some of the communities in which <i>Homopholis belsonii</i> is located, use of the community for grazing and the widespread presence of weeds that compete with <i>Homopholis belsonii</i> within the communities.	
Risk of loss (%) without offset	15%	<p>The risk of loss of the species without an offset is estimated to be 15% on the basis that the loss of the species from clearing is low due to the operation of clearing controls (Qld Nature Conservation Act and Cth EPBC Act).</p> <p>This level of risk has been assigned as the clearing of the species on the offset properties needs planning approval from the State and Commonwealth governments,</p>	

Calculator Variable	Input	Explanation	Reference document/s
		as the species is a listed under both Queensland and Commonwealth legislation. While approval for the clearing of vegetation is possible, an applicant will need to provide information to the regulators on the impact of the development of the values of the species and provide an offset for the residual impact of the clearing.	
Future quality without offset (scale of 0-10)	3	The future quality of the vegetation community in which the species is found is anticipated to decline slightly over the 15 year period of the evaluation. This is as a result of the gradual increase in impact of weeds and grazing.	
Risk of loss (%) with offset	5%	Risk of loss of the species at an offset site is considered to be 5%. The offset site will be protected and managed to improve the quality of the community. A covenant placed on title of the offset property will avert the risk of loss of the offset area as the landowner will not be able to obtain development approval that has an impact on the offset.	
Future quality with offset (scale of 0-10)	8	The future quality of the offset vegetation will be 8. This is on the basis that the community in which the species is present at the site and will respond to management and removal of threats (weeds, grazing) to lead to regeneration of the species. The species will also be translocated where it will establish additional communities of the species.	
Confidence in result (quality)	80%	Confidence in the quality result is rated at 80%, as the sites have been surveyed and there is knowledge of the current state of both the impact area and offset area.	
Confidence in result (risk of loss)	80%	Confidence in the risk result is rated at 80%, as there is knowledge of the management of the impact and offset sites and the risks that are present with the management of the offset.	

EPBC Calculator Inputs - *Digitaria porrecta*

Calculator Variable	Input	Explanation	Reference document/s
Impact	Clearing of a	Residual impact on <i>Digitaria porrecta</i> in	Appendix H.1

Calculator Variable	Input	Explanation	Reference document/s
description	threatened species for construction of the revised Project	revised Project area (101 ha). The species is associated with poplar box woodland (RE 11.3.2), mountain coolibah woodland (RE 11.8.5), poplar box/brigalow woodland (RE 11.3.17) and bluegrass dominant native grassland (RE 11.3.21).	MNES Report.
Impact area	101 ha residual impact	Field surveys to confirm presence of <i>Digitaria porrecta</i> .	Appendix H.1 MNES Report; Appendix G Terrestrial Ecology Field Survey Results BioCondition – A Condition Assessment Framework for Terrestrial Biodiversity in Queensland – Assessment Manual (Eyre et al. 2011)
Quality of vegetation impacted (0-10)	5	<p>Components of habitat quality for consideration in the EPBC Act offsets assessment guide include site condition, site context and species stocking rate.</p> <p>Site condition - Condition of the vegetation was found to be impacted by clearing, weed infestation and grazing. Site condition score 6.</p> <p>Site context – Patches of the community are scattered and fragmented across the landscape, with limited connection to other areas of vegetation. Site condition score 4.</p> <p>Species stocking rate – Surveys found a dominance of common species, with no listed fauna and one listed flora species. The species stocking rate is considered to be medium. Species stocking rate is 5.</p> <p>The average score across the three components is 5.</p>	Appendix G Terrestrial Ecology Field Survey Results Ecological Equivalence Methodology Guideline Version 1 (DERM, 2011)
Proposed offset Area	Proposed offset area	165 ha	
Risk related time horizon	20 years	Offset will be secured “in perpetuity” so the maximum timeframe has been used.	
Time until	15 years	The time until benefit is 15 years, to allow	

Calculator Variable	Input	Explanation	Reference document/s
ecological benefit		for the successful establishment of the species at offset sites and for the plants to reproduce.	
Start area	Proposed offset area	165 ha	
Start quality	4	The start quality has been derived from surveys of the disturbance area of the revised Project. The start quality of 4 reflects that there is encroachment of woody vegetation at the edges of some of the communities in which <i>Digitaria porrecta</i> is located, use of the community for grazing and the widespread presence of weeds that compete with <i>Digitaria porrecta</i> within the communities.	
Risk of loss (%) without offset	15%	<p>The risk of loss of the species without an offset is estimated to be 15% on the basis that the loss of the species from clearing is low due to the operation of clearing controls (Qld Nature Conservation Act and Cth EPBC Act).</p> <p>This level of risk has been assigned as the clearing of the species on the offset properties needs planning approval from the State and Commonwealth governments, as the species is a listed under both Queensland and Commonwealth legislation. While approval for the clearing of vegetation is possible, an applicant will need to provide information to the regulators on the impact of the development of the values of the species and provide an offset for the residual impact of the clearing.</p>	
Future quality without offset (scale of 0-10)	3	The future quality of the vegetation community in which the species is found is anticipated to decline slightly over the 15 year period of the evaluation. This is as a result of the gradual increase in impact of weeds and grazing.	
Risk of loss (%) with offset	5%	Risk of loss of the species at an offset site is considered to be 5%. The offset site will be protected and managed to improve the quality of the community. A covenant placed on title of the offset property will avert the risk of loss of the offset area as the	

Calculator Variable	Input	Explanation	Reference document/s
		landowner will not be able to obtain development approval that has an impact on the offset.	
Future quality with offset (scale of 0-10)	8	The future quality of the offset vegetation will be 8. This is on the basis that the community in which the species is present at the site and will respond to management and removal of threats (weeds, grazing) to lead to regeneration of the species. The species will also be translocated where it will establish additional communities of the species.	
Confidence in result (quality)	80%	Confidence in the quality result is rated at 80%, as the sites have been surveyed and there is knowledge of the current state of both the impact area and offset area.	
Confidence in result (risk of loss)	80%	Confidence in the risk result is rated at 80%, as there is knowledge of the management of the impact and offset sites and the risks that are present with the management of the offset.	

EPBC Calculator Inputs - *Bothriochloa biloba*

Calculator Variable	Input	Explanation	Reference document/s
Impact description	Clearing of a threatened species for construction of the revised Project	Residual impact on <i>Bothriochloa biloba</i> in revised Project area (35.9 ha). The species is associated with bluegrass dominant native grassland (RE 11.3.21)	Appendix H.1 MNES Report.
Impact area	35.9 ha residual impact	Field surveys to confirm presence of <i>Bothriochloa biloba</i> .	Appendix H.1 MNES Report; Appendix G Terrestrial Ecology Field Survey Results BioCondition – A Condition Assessment Framework for Terrestrial Biodiversity in Queensland – Assessment

Calculator Variable	Input	Explanation	Reference document/s
			Manual (Eyre et al. 2011)
Quality of vegetation impacted (0-10)	5	<p>Components of habitat quality for consideration in the EPBC Act offsets assessment guide include site condition, site context and species stocking rate.</p> <p>Site condition - Condition of the vegetation was found to be impacted by clearing, weed infestation and grazing. Site condition score 6.</p> <p>Site context – Patches of the community are scattered and fragmented across the landscape, with limited connection to other areas of vegetation. Site condition score 4.</p> <p>Species stocking rate – Surveys found a dominance of common species, with no listed fauna and one listed flora species. The species stocking rate is considered to be medium. Species stocking rate is 5.</p> <p>The average score across the three components is 5.</p>	
Proposed offset Area	Proposed offset area	70 ha	
Risk related time horizon	20 years	Offset will be secured “in perpetuity” so the maximum timeframe has been used.	
Time until ecological benefit	15 years	The time until benefit is 15 years, to allow for the successful establishment of the species at offset sites and for the plants to reproduce.	
Start area	Proposed offset area	70 ha	
Start quality	4	The start quality has been derived from surveys of the disturbance area of the revised Project. The start quality of 4 reflects that there is encroachment of woody vegetation at the edges of some of the communities in which <i>Bothriochloa biloba</i> is located, use of the community for grazing and the widespread presence of weeds that compete with <i>Bothriochloa biloba</i> within the communities.	
Risk of loss (%) without offset	15%	The risk of loss of the species without an offset is estimated to be 15% on the basis that the loss of the species from clearing is low due to the operation of clearing controls (Qld Nature Conservation Act and Cth	

Calculator Variable	Input	Explanation	Reference document/s
		<p>EPBC Act).</p> <p>This level of risk has been assigned as the clearing of the species on the offset properties needs planning approval from the State and Commonwealth governments, as the species is a listed under both Queensland and Commonwealth legislation. While approval for the clearing of vegetation is possible, an applicant will need to provide information to the regulators on the impact of the development of the values of the species and provide an offset for the residual impact of the clearing.</p>	
Future quality without offset (scale of 0-10)	3	The future quality of the vegetation community in which the species is found is anticipated to decline slightly over the 15 year period of the evaluation. This is as a result of the gradual increase in impact of weeds and grazing.	
Risk of loss (%) with offset	5%	Risk of loss of the species at an offset site is considered to be 5%. The offset site will be protected and managed to improve the quality of the community. A covenant placed on title of the offset property will avert the risk of loss of the offset area as the landowner will not be able to obtain development approval that has an impact on the offset.	
Future quality with offset (scale of 0-10)	8	The future quality of the offset vegetation will be 8. This is on the basis that the community in which the species is present at the site and will respond to management and removal of threats (weeds, grazing) to lead to regeneration of the species. The species will also be translocated where it will establish additional communities of the species.	
Confidence in result (quality)	80%	Confidence in the quality result is rated at 80%, as the sites have been surveyed and there is knowledge of the current state of both the impact area and offset area.	
Confidence in result (risk of loss)	80%	Confidence in the risk result is rated at 80%, as there is knowledge of the management of the impact and offset sites and the risks that are present with the	

Calculator Variable	Input	Explanation	Reference document/s
		management of the offset.	